



INSTITUTE OF TECHNOLOGY OF CAMBODIA

# **The 31<sup>st</sup> Meeting Board of Trustees**

Phnom Penh, 28 June 2023

## **Director's Report 2022-2023**

### **Supplementary Documents:**

- General and Pedagogical Documents
- Financial Report

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**Proposed Agenda of CA 2023**  
**28 June 2023**

**8h30 à 12h00 : Room A-113 at ITC (And Zoom)**

- 1) Opening Remarks by the President of the Board of Trustees
- 2) Adoption of Agenda
- 3) Presentation of Report of Director 2022-2023
- 4) Presentation of General and Pedagogical Documents 2023-2024
- 5) Financial Report: Status in 2022-2023 and Estimated budget for 2023-2024
- 6) Nomination of Direction Team for 2023-2024
- 7) Q&A

## MEMBERS OF CA 2023

### Membres de droit

1. S. E. Mme PHOEURNG Sackona, présidente du conseil d'administration et ministre de la culture et des beaux-arts
2. S. E. M. PELLET Jacques, ambassadeur de France au Cambodge
3. S. E. M. UENO Atsushi, ambassadeur du Japon au Cambodge
4. S. E. M. OM Romny, secrétaire d'État au ministère de l'éducation, de la jeunesse et des sports
5. S. E. Mme PEN Chhorda, secrétaire d'État du ministère des mines et de l'énergie
6. S. E. M. CHOU Kimleng, secrétaire d'État du ministère de l'économie et des finances
7. S. E. M. PO Kimtho, directeur de l'ITC
8. Mme TEA Channy, représentante des personnels de l'ITC
9. M. SERMET Laurent, directeur de l'AUF Asie-Pacifique
10. M. LAY Méng Sun, directeur de la SKD
11. M. VERLEYSEN Michel, représentant de l'ARES-ex CUD

### Membres invités

12. M. PROTIN Ludovic, directeur honoraire de l'ITC
13. M. VINCENT Pierre, Conseiller de Coopération et d'action culturelle de l'Ambassade de France et directeur de l'Institut Français du Cambodge
14. Mr. KAZUMASA Sanui, chief Representative of JICA Cambodia Office, AUN/SEED-Net
15. M. VALLEE Thomas, attaché de coopération scientifique et universitaire de l'Ambassade de France
16. M. KOICHIRO Watanabe, Senior Advisor of JICA
17. M. JUN-ICHI Takada, vice-president of Tokyo Institute of Technology
18. Mrs. MARTIAL Adèle, Country Representative of IRD and Representative of Consortium
19. M. YINDIZOGLU Murat, conseiller du MEJS
20. M. MAUSSION Pascal, vice-président des Relations Internationales INP-Toulouse
21. M. IM Kravong, responsable Antenne AUF, Phnom Penh
22. Ms. MIYAKE Chiho, Industry Linkage / Project Coordinator of JICA Project for Strengthening Engineering Education and Research for Industrial Development in Cambodia (LBE Project)

### Direction de l'ITC et ses coéquipiers

23. M. SOY Ty, directeur adjoint de l'ITC, chargé des affaires académiques
24. Dr. OEURNG Chantha, directeur adjoint
25. Dr. BUN Kim Ngun, directeur adjoint
26. Dr. NGUON Kollika, directeur adjoint
27. Dr. CHUNHIENG Thavarith, conseiller chargé de la coopération et de la recherche
28. M. NUTH Sothân, conseiller de l'ITC, chargé de la pédagogie et des études
29. M. DAGUES Bruno, conseiller de la direction de l'ITC
30. M. SIEANG Phen, directeur et de la coopération et des relations internationales (RI)
31. Dr. OR Chanmoly, directeur du centre de recherche et d'innovation (RIC)

32. Dr. SIM Tepmony, directeur du 3ème cycle (GS)
33. Dr. HAN Virak, doyen de la faculté de génie civil (GCI)
34. Dr. CHHUON Kong, doyen de la faculté d'hydrologie
35. Dr. CHRIN Phok, doyen de la faculté de génie électrique et énergétique (GEE)
36. Dr. LIN Mongkulserey, directeur adjoint du centre de recherche et d'innovation et Chef du département de Mathématiques Appliquées et Statistiques
37. Dr. IN Sokneang, doyenne de la faculté de génie chimique et alimentaire (GCA)
38. M. LAY Heng, vice-doyen de la faculté de génie électrique et chef de département de génie informatique et communication (GIC)
39. Dr. SRENG Sochenda, chef de département de Télécommunications et Réseaux (GTR)
40. Mme SREY Malis, chef de département du tronc commun (TC)
41. Dr. CHAN Sarin, chef de département de génie mécanique et industriel (GIM)
42. Dr. PHUN Veng Kheang, chef de département transports et infrastructures (DTI)
43. Dr. ENG Chandoeun, doyen de la faculté de génie de géo-ressources et de géotechnique (GGG)
44. Mme KHEM TranKrasel, coordinatrice de la section de français (SF)
45. M. SO Phea, coordinateur de la section d'anglais (SA)
46. M. SOK Kimheng, responsable de la bibliothèque STEM
47. Dr. SRANG Sarot, responsable du génie mécanique et des systèmes de contrôle au Département de génie industriel et mécanique et coordinateur du programme international
48. Dr. YIN Molika, responsable des relations avec les entreprises (UIL)
49. M. KHIEV Samnang, responsable du service informatique (IT)

# **1. Summary of activities**

## **– Current state**

In 2022-2023, a number of remarkable events have been organized in close cooperation with national and international stakeholders.

Moreover, different meetings of ITC councils have been taken place online as follows:

- 30<sup>th</sup> Board of Trustees meeting, 16 June 2022 (Annex 1).
- International consortium meeting at ITC, 22-23 March 2023 (Annex 2).
- Study Council and University Life meeting (Annex 4).

An overview of the CA 2022's opinions and recommendation of Consortium 2023 is presented in annex 3.

## 1.1. Remarkable events at ITC in 2022-2023

### 1.1.1. Inauguration of two buildings and graduation ceremony



March 1, 2023 is an important date on which **Samdech Akkak Moha Sena Padei Dekcho HUN Sen, Prime Minister of the Kingdom of Cambodia**, presided over a grand inauguration ceremony for the two buildings with funding from the Asian Development Bank (ADB) and the French Development Agency (AFD) and awarding diplomas to 4,617 laureates, including 1,281 girls from 5 different generations, at doctoral, master's, engineer and technician

levels. The Institute of Technology of Cambodia is a public institution of higher education that plays an important role in training human resources in the fields of science, technology and engineering to contribute to the development of the Cambodian economy. From 1981 to present, a total of 14968 students have graduated from this institute, of which 2860 are women.



At present, this institute has a direction board, 478 civil servants, professors and staff, including 148 women. This institution has 95 foreign-trained doctoral lecturers/researchers. For this academic year 2022-2023, the institute is training 7,860 students, including 2,568 girls. Its main campus in Phnom Penh has 7,747 students, including 2,521 girls, and its campus in Tbong Khmum has 113 engineering students, including 47 girls.

As for the two buildings, one is 3 stories and the other is 7 stories. To do this, ITC received funding of \$11 million, as part of the project: S4C “The Skills for Competitiveness”. This project aims to improve the skills and competitiveness of Cambodia's industrial sector workforce.

It will develop human resources to work as skilled labor in four priority sectors, namely manufacturing, construction, electrical and electronics.

The project will help transform five selected Technical Training Institutes (TTIs) into leading Technical and Vocational Education and Training (TVET) institutes in Cambodia, to produce high quality technicians in priority sectors and respond to changing technologies and industry needs. The project will also strengthen industry roles and engagement in skills development, focusing on upskilling and reskilling existing workers. Partnership agreements will be established with industry and TTIs to promote Work-Based Learning (WBL) programs and develop the Skills Development Fund (SDF) as an innovative funding mechanism for TVET.



**Samdech Akkak Moha Sena Padei Dekcho HUN Sen** welcomed this great contribution that ITC has made. There is no doubt that such a large number of engineers are helping the Royal Government of Cambodia achieve its goal of advancing the kingdom to upper-middle-income country status by 2030 and high-income country status by 2050.



### 1.1.2. Laying of the foundation stone of ITC dormitory on the new campus



March 10, 2023, HE Mak Ngoy, Director General of Higher Education of the Ministry of Education, Youth and Sport and HE Dr. PO Kimtho, Director of the Institute of Technology of Cambodia, laid the foundation stone to build a 9-storey dormitory with 91 rooms on the campus of the Institute of Technology of Cambodia, near the Win-Win

Monument on an area of 5 hectares in the village of Prek Taro, Sangkat Prek Ta Sek, Khan Chroy Changva, about 20 km from the main campus in Phnom Penh.

The construction of this building uses funds from the Higher Education Improvement Project (HEIP), which is funded by the World Bank (World Bank). This building is very important to provide proper shelter for poor students who come from remote areas.

The work began the same day and is expected to be completed by the end of June 2024.



### 1.1.3. Visit of the French deputies



February 21, 2023, HE Dr. Po Kimtho, Director of the Institute of Technology of Cambodia, welcomed a high-level delegation from France, led by HE Barbara Pompili, Member of Parliament and former Minister of the Environment of the Republic French.

As a welcome, the director of ITC presented to the guests the great achievements of this public higher

education institution and highlighted some important collaborations with French partners such as:

- 1) Joint research;
- 2) BGF & Eiffel scholarships;
- 3) Masters training in water;
- 4) AFD's contribution to the construction of 7-storey buildings: Community Knowledge Center.

Then the delegates visited: 1) Global Green Growth Institute (GGGI); 2) Research Institute for Development (IRD); 3) Coastal and Wet Environment Research Laboratory; 4) Water laboratory; 5) Khmer Earth Observation Laboratory (KHEOBS).



#### 1.1.4. Visit of a high-level delegation from the Japanese Parliament



November 23, 2022, HE Dr. Po Kimtho, Director of the Cambodia Institute of Technology, paid a courtesy visit to a high-level delegation from the Japanese Parliament led by Mr. DOKO Shigeru, accompanied by representatives of the Japanese Embassy, the President of JICA in Cambodia.

HE Dr. PO Kimtho presented a number of major Japanese projects that have made significant contributions to the development of ITC: AUN-Seed/Net, the reopening of the Faculty of Mines and Geology with the support of Prof. Watanabe KOICHIRO, from Kyushu University, the construction of a research and innovation center (RIC) (under the aegis of Grant-Aid of Japan), the Satreps 1 & 2 project and the LBE project.



The delegates thanked for the warm hospitality and appreciated the Cambodian human resources trained in Japan and in the region, thanks to the AUN-Seed/Net network. Ideally, they have decided to return to work, after their studies, at ITC to improve the quality of teaching and research development.

#### 1.1.5. Visit of a special adviser from JICA of Japan

On the afternoon of Thursday, September 15, 2022, HE Dr. OM Romny, Secretary of State of the Ministry of Education, Youth and Sports and HE Dr. Po Kimtho, Director General of the Institute of Technology of Cambodia warmly welcomed Mr. Kitaoka, Special Adviser to the President of JICA Japan.

After listening to the report constituting activities carried out within the framework of ITC-Japan cooperation through JICA, Mr. Kitaoka presented **JICA President AWARD** to His Excellency Dr. OM Romny.



He also took the opportunity to visit some important laboratories:

- Laboratory for Nanostructure and Chemical Analysis;
- E-Learning Center;
- HPLC and GC-MS;
- AAS & Phytochemicals.

It should be noted that Japan via its International Cooperation Agency (JICA) provides the ITC with a lot of laboratory equipment.

Dr. Kitaoka took advantage of his visit to meet AUN/SEED-Net Alumni.



### 1.1.6. A "Chevalier des Palmes Académiques" medal awarded to HE Dr. OM Romny

On September 29, 2022, the "Chevalier des Palmes Académiques" guard medal was presented by HE the French Ambassador to Cambodia, Jacques PELLET, to HE Dr. OM Romny.

He is well deserving of this award as he has put forth his considerable efforts to develop his institute, ITC. The latter is an engineering school that plays an important role in the development of human resources in the field of engineering, which present-day Cambodia cannot do without.



### 1.1.7. Renewal of the Memorandum of Understanding (MoU/ITC-IRD) and inauguration of the Khmer Earth Observation Laboratory

November 17, 2022, the Institute of Technology of Cambodia and the Research Institute for Development (IRD), after the renewal of the Memorandum of Understanding for 5 more years, officially inaugurated the Khmer Laboratory for Observation of the Earth (KHEOBS).



Institute of Technology.

The ceremony was chaired by HE the Ambassador of France to Cambodia Jacques PELLET, Mrs Valérie VERDIER, President of the Research Institute for the Development of the French Republic, Mrs Neou Sokmady, representative of Mr Heng Kreng, Director of Research Scientist from the General Department of Higher Education of the Ministry of Education, Youth and Sports and HE Dr. Po Kimtho, Director of Cambodia

Also present were national and international researchers and a number of professors.



The Khmer Earth Observation Laboratory (KHOEBS) is ITC's first remote sensing centre. KHOEBS was created in November 2022 under the aegis of the Institute of Technology of Cambodia (ITC) and the Research Institute for the Development of the French Republic (IRD) with the aim of establishing cooperation between the different remote sensing actors, not only in Cambodia but also in ASEAN as a whole.

The Ambassador of France welcomed the development of the Institute of Technology of Cambodia and thanked IRD for bringing KHOEBS to ITC in a context of global interest ASEAN partner. He asked ITC, through this new lab, to work with the French Institute of Cambodia (IFC) to work together to organize major photo exhibitions in the future.

After the inauguration ceremony, the high-level delegation also visited some important laboratories, namely: Rice Health Laboratory (HealthyRice); Water Chemistry Laboratory; Organic Chemistry and Biochemistry Laboratory; Coastal and Wetland Environment Research Laboratory, and Soils Laboratory.



### 1.1.8. ARES Project (Academy of Research and Higher Education) of Belgium

ITC has again partnered with Belgian project partner ARES in a five-year (2022-2027) ITC development assistance project with a budget of €1.1 million.



Through a week-long discussion meeting between leaders and project leaders, Prof. Michel Verleysen, representative of ARES recalls the main purpose of this project which aims to strengthen the capacity of the ITC according to its needs, by highlighting the results of six priority objectives responsible for the implementation by the ITC and five major Belgian universities. This cooperation focuses on two main deliverables:

1) Building and strengthening the capacity of ITC staff, improving curriculum, research and priority services; 2) Strengthen the capacity of ITC so that it can transfer technology know-how to other universities, businesses and the community of the Kingdom of Cambodia.

### 1.1.9. STEP UP Project

The Asian Development Bank (ADB) has approved a \$70 million loan to Cambodia to support government efforts to deepen reforms in upper secondary science, technology, engineering, and mathematics (STEM) education across the Cambodia. This project called “The Science and

Technology Project in Upper Secondary Education (STEP UP)”. The project will cover 6 years (2023-2028). ITC is one of the implementing agency of this project and receive the financial support of about 12 M USD in total. The Cambodia Science and Technology Center (CSTC) will be constructed in the ITC’s campus at Win Win Monument with the budget of about 10 M USD. The CSTC aims to promote STEM in an interactive and innovative way to the public through a physical presence and a digital outreach program for access in schools and communities nationwide. It will also provide a STEM eco-system hub for teacher education institutions and higher education institutions for research and teaching purposes; connect industry and secondary schools; and connect with regional and global STEM communities.



### 1.1.10. Recent Memoranda of Understanding (MoU) with major institutions



Recently, the Institute of Technology of Cambodia signed the Memoranda of Understanding (MoU) with the Phnom Penh Water Supply Authority (PPWSA); National Preah Vihear Authority; Polytechnic Institute of Grenoble + Electricity of Cambodia, Dhuva Space Private Limited, Sanjivani Group of Institutes, Kopargaon.

The increase in partners testifies to the quality of training and research at ITC. Hired in several ministries of the Kingdom of Cambodia are the former students of ITC.

The partnership with major regional and international universities allows ITC to maintain its sustainable development in terms of the production of qualified human resources. More concretely, ITC's master's and especially doctoral training revolves around a double degree and joint supervision. This is a good choice for our training to be recognized internationally.

The partnership with major regional and international



As a reminder, since October 1996, ITC has signed 198 partnership documents including 178 MoU at the national, regional, and international level. Moreover, for this new academic year 2022-2023, since July 2022, 11 new MoUs have been signed one after the other.

### 1.1.11. The 5<sup>th</sup> annual meeting of the ITC-Industries Consortium

December 23, 2022, HE Dr. Po Kimtho, Director of Cambodia Institute of Technology, chaired the 5th Annual Meeting with Private Sector Partners.



“The private sector is an indispensable partner for ITC,” he stressed. Higher education institutions cannot be developed without the support of this sector. Private companies and factories are sources that provide us with the gaps to fill. Nowadays, as we are in the context of the Industrial Revolution 4.0, all institutions

that produce human resources, must meet the specific needs of factories and industries, otherwise graduates have a problem of employability.

His Excellency the Director thanked all the companies and factories of all sizes for their support and especially the reception of our internship students as well as the hiring of our young graduates.

### 1.1.12. International Symposiums

To build research capacity, it is important to come together internationally. In this perspective, some departments have been able to organize annual meetings with their international partners to highlight the deliverables resulting from different research and point out certain challenges to minimize these possible difficulties for future research in the respective institutions or even joint research.

- March 6 and 7, 2023: Department of Electrical and Energy Engineering (GEE) “The 1st International Symposium on Life Mechatronics Society 2023”.



### 1.1.13. Visit of HE Dr. PO Kimtho to Japan under the SATREPS project



From 26 to 31 March 2023, a delegation from Cambodia led by H.E. Dr. Po Kimtho, Director General of ITC, visited the Japanese partners under the SATREPS project.

The delegates are made up of a management team from the Cambodia Institute of Technology, the University of Health Sciences, the National University of

Management and the Ministry of Environment. The visit aims to pay tribute to Japanese counterparts for their support as well as to expand collaboration in terms of research activity, staff mobility and student exchange.

The visit was warmly welcomed by senior managers of Japanese organizations. All parties exchanged their presentations followed by labs and visits to understand each other and expand the collaboration. Finally, both parties look forward to the successful outcome of this joint research project and to further expand the research collaboration as well as the exchange program and mobility.



It should be noted that in 2022, the Institute of Technology of Cambodia (ITC) obtained research grain via the Japanese Agency for Science and Technology (JST) and the Japanese International Cooperation Agency (JICA), called SATREPS (Science and Technology Research Partnership for Sustainable Development Program) Project.

This is a 5-year research project, from July 1, 2022 to June 31, 2027, and involving 9 organizations (4 organizations from Cambodia and 5 organizations from Japan). The project aims to improve research capacity and research collaboration between partners in the field of air pollution. Therefore, the title of the project is Creating a Platform for Air Pollution.

### 1.1.14. Visit of HE Dr. PO Kimtho to France

From 22 to 28 April 2023, following invitations from ITC partner institutions in France, HE Dr. PO Kimtho paid an official visit to France. He was accompanied by Dr. SIM Tepmony, director of the doctoral school and Mr. SIEANG Phen, director of international relations. The main goal was to strengthen bilateral cooperation in training, teacher-student mobility, postgraduate training and joint research. In this perspective, several documents such as memorandums of understanding, framework agreements have been signed.

The institutions visited were IMT Mines Alès, Insa Toulouse, INP-ENSAT, INP-ENSEEIH and ECAM LaSalle de Lyon.

HE the Director took the opportunity to visit the ITC students present in these great French cities.



### 1.1.15. the Institute of Technology of Cambodia and the University of Health Sciences met with the Ambassador of the Czech Republic and his delegates

On May 16, 2023, at the Institute of Technology of Cambodia (ITC), a meeting was held between



the leaders of the ITC and those of the University of Health Sciences (USS), and a delegation from the Embassy of the Czech Republic led by H.E. Mr. Martin Vavra, Ambassador of the Czech Republic to Cambodia.

The directorates of the two institutions of higher education are headed by H.E. Dr. Po Kimtho, Director of the Institute of Technology of Cambodia (ITC) and H.E.

Prof. Saphon Vattanak, Rector of the University of Health Sciences (UHS ).

Discussions between the two higher education institutions and delegates from the Embassy of the Czech Republic focused on joint cooperative projects to foster the development of professional training programs related to biomedical engineering for second-generation Cambodian students.

They jointly stated that human resources in this area are very important for the needs of Cambodian hospitals. Obviously, we only have 5 students for the first promotion, but for the second, we have up to 28 students.

The five students who successfully completed were all hired at Calmette Hospital. In the future, the Czech and Cambodian parts aim to train up to bachelor's and master's level in biomedical engineering.

**1.1.16. Signature of the Memorandum of Understanding (MoU) with the Ministry of Posts and Telecommunications**



On May 22, 2023 marks an important date, on which took place the signing ceremony of the Memorandum of Understanding between 11 universities in the country of which ITC was a part and the Ministry of Posts and Telecommunications, under the chairmanship of HE Mr. Chea Vandeth, Minister of Posts and Telecommunications.

The signing of the memorandum is a new step of the ministry in the promotion and development of the field of telecommunications towards the electronic government and the digital economy in the future”, said HE Mr. Chea Vandeth on this occasion. The Minister is also convinced that the Ministry of Posts and Telecommunications and higher education institutions will work together to carry out this valuable project. The main purpose is to set up a document verification platform VERIFY.GOV.KH. with which we are able to verify the diplomas of outgoing students if they are false or true.

**1.1.17. Sharing of research results and consultation on the improvement of the master's program in urban water and sanitation engineering**



On May 31, 2023, The Institute of Technology of Cambodia held a conference on “Sharing Research Findings and Guidance on Improving Master’s Program in Urban Water and Sanitation Engineering” at the Himawari hotel, in Phnom Penh, under the chairmanship of H.E. Dr. PO Kimtho, Director of the Institute of Technology of Cambodia, Mrs. Sandrine BOUCHER, Regional Director of the French Development Agency (AFD) in Cambodia and Mr. Bryan Fornari, Head of Cooperation of the European Delegation in Cambodia.

The research activities and the curriculum are part of the Provincial Water Supply and Sanitation Project (PWSSP), funded by the European Union (EU) and the French Development Agency (AFD).

The workshop aims to share the main research results and progress of research projects related to water and environment and the results of the master program in urban water and sanitation to stakeholders.

Additionally, we discussed with stakeholders the direction of urban water policy and sustainability ideas for the Master's program.

This event brought together about 74 participants from different institutions.

These results contribute further to the development of the policy and the training of human resources in the areas mentioned above for the whole kingdom.

### 1.1.18. Visit of the new representative of the Japanese Development Agency (JICA) to Cambodia

On the morning of June 6, 2023, Mr. Sanui Kazumasa, JICA's new representative in Cambodia visited the Cambodia Institute of Technology.



In his welcoming remarks, H.E. the Director thanked JICA for its continued technical and financial support to ITC. In fact, through the provision of AUN/SEED-Net scholarships, the human resources of ITC are greatly developed with quality, whose Director himself was

the first student of AUN/SEED-Net.

Thanks to this network, the ITC has more than 100 professors with the title Doctor, while there were none when the establishment reopened in the 1980s.

He also highlighted two major projects with which ITC is working closely with Japanese partners: laboratory education (LBE) and the establishment of an air pollution risk management platform (ERMPAP).

“ITC has also assisted Svay Rieng University and National University of Battambang under the LBE project to ensure that the two institutions have the capacity to produce sufficient human resources (manpower) for the border special economic zones,” he said.

The new JICA representative thanked the General Manager and praised ITC. He is very proud to have ITC as a collaborating partner.





### 1.1.19. Visit of senior delegates from the Asian Development Bank (ADB)

the afternoon of June 6, 2023, His Excellency Dr. PO Kimtho warmly welcomed a delegation from the Asian Development Bank (ADB), led by David Cavanaugh, Executive Director of the ADB. The purpose of the visit to ITC was to learn about the ADB's support for human resource development, which is a priority area of the Royal Government of Cambodia as well as the ADB. Delegates also heard presentations on the status of implementation of the Skills for Competitiveness Project under ADB financing to the Royal Government of Cambodia, which was implemented by ITC.



### 1.1.20. Project : Pilotage Universitaire Rénové pour le Sud-Est Asiatique (PURSEA)



On June 6, 7 and 8, 2023, ITC hosted around 40 participants from Vietnam and Europe for the closing workshop of the PURSEA project of which ITC was a part.

It is a project that brought together 16 universities, including 8 from Europe and 8 from Asia. The main objective was to help the 8 Asian universities, including 2 in Cambodia, in the piloting phase, to move towards administrative and

financial autonomy in terms of management and good university governance.

It is a project that touches on the strategic orientations of the policy on higher education whose vision for 2030 is to oblige higher education establishments to "develop a plan to improve governance and management in the sector higher education" and to "develop a plan for the establishment of a 'model' university in Cambodia that operates autonomously and of high quality". It was an ERASMUS+ project that started in March 2020 and ended in June 2023.

**1.1.21. The 12th ITC Scientific Day**



On June 8 and 9, 2023, ITC organized its 12th Scientific Day, under the theme: "Engineering, technology and innovation for the development of the digital economy and society".

This event which is chaired by H.E. Dr. OM Romny, Secretary of State at the Ministry of Education, Youth and Sport representing H.E. the Minister of Education, Youth and Sport, HANG Choun Naron, mobilized 1600 participants being researchers, scientists, teachers, students and pupils

from different high schools.

These two great days were possible thanks to the collaboration of the French Embassy, the Japanese Embassy, the Ministry of Education, Youth and Sports and the support of the private sector: CAPFish-UNIDO-EU; TEM Trading (M&E Product) Co., Ltd.; Voltra Co., Ltd; SNP-PT International Co., Ltd; Chip Mong Insee Cement Corporation; DENSO (Cambodia) Co.,



Ltd; The French Agricultural Research Centre for International Development (CIRAD); B Scientific Instrument Co., Ltd (BSI); PRASAC Microfinance Institution Plc; Cast Laboratories (Cambodia) Co., Ltd; Advanced Technical Supplies Co., Ltd; The French National Research Institute for Sustainable Development (IRD); Smile Shop Super App; Kampot Cement Co., Ltd; et SNAPKYU.

**1.1.22. The title of "professor"**

On June 15, 2023, an official ceremony for awarding the title of professor, often noted Prof., took place at the National University of Management of Cambodia, under the high presidency of his excellence Dr. HANG Choun Naron, Minister of Education, Youth and Sport. According to the royal decree dated June 9, 2023 on the offer of the title of professor in the field of education, the ITC has 29 teachers who have obtained this title, for this first promotion.



### 1.1.23. Honda Y-E-S Award Program 2022

It is important to remember that this HONDA Y-E-S AWARD PROGRAM concerns Vietnam, Burma, India, Bangladesh, Laos and Cambodia.

As one of the important ASEAN countries, Cambodia is expected to experience dramatic growth in the near future. Higher education institutions are still in the process of growing and training future leaders, especially in the field of science and technology. Human exchanges and trade with Japan keep growing day by day, and expectations for expansion in these areas were high. This is why this program for Cambodia began in 2008. As for the establishments concerned, they are the Institute of Technology of Cambodia, the Royal University of Phnom Penh and the Royal University of Agriculture.



Since 2008, according to the Director of CJCC, there are more than 800 students who have participated in this competition but only 60 have won this HONDA Y-E-S AWARD, of which 13 were able to access Master's and PhD level students, winning 10,000 USD (ten thousand dollars) more for each.

This year, there are 4 Cambodian laureates, including two from ITC and two others from the Royal University of Phnom Penh. The management of the ITC was pleased with its two students who were able to win these two major prizes from the HONDA Y-E-S AWARD. Miss DET Mouykeang, 4th year student in the Department of Chemical and Food Engineering, and Mr. VIRAK Alexander, 4th year student in the Department of Mechanical and Industrial Engineering. The following table highlights this data.

Year	Full Name	Total Number	Number of ITC students
2022	Miss DET Mouykeang (GCA) Mr. VIRAK Alexander (GIM)	4 (ITC/RUPP)	2
2021	Miss CHHUOR Sochan Vimul(GCA)	4 (ITC/RUPP)	2
2020	Mr. KEO Seiha (GCI) Miss LAY Cheavita (GCA)	4 (ITC/RUPP)	2
2019	Mr. KONG Rathaseyhak (GCA) Mr. CHHENG Ilay (GCI)	4 (ITC/RUPP)	2
2018	Mr. SONG Vergenylundy (GEE)	4 (ITC/URA/RUPP)	1
2017	Miss NY Vourchnea (GCA)	4 (ITC/RUA/RUPP)	1
2016	Mr. KOUCH Keang Ang (GCI) Mr. THAI Sereyvuth (GCA)	4	2
2015	Miss EA Somuynea Miss CHHIM Panchapor	4	2

2014	Mr. KOUCH Henghok Mr. PHON Bunheng	4	2
2013	Mr. SRENG Mengoing Miss SROY Sengly	4	2
2012	Mr. RITH Monorom Mr. KHY Kimleng	4	2
2011	Miss EK Pichmony Mr. SAY Vortana CHHOR Marady	4	3
2010	Mr. CHEA Ratha Miss Rath Sovannsathya	4	2

### 1.1.24. Admission to Ecole Polytechnique



Since 2007-2008, Cambodian students of the ITC have been present among other students foreigners in a highly reputed school in France and around the world, the École Polytechnique. It is indisputable that our students have the basic knowledge solid enough to be recruited by the very difficult competition of this school. The list below illustrates the names of students who are studying or have studied at our polytechnic in other major schools and their careers.

Due to the Covid-19 pandemic, the École Polytechnique international competition could not be organized in 2020-2021. Recruitment started again last year. For this year, 15 students took part in this competition organized at Institut Français du Cambodge, of which only four students succeeded. It should be noted that there is one for the École Polytechnique.

The table below illustrates this data.

Academic Year	Full Name	Sex	Degree	Workplace or University	Responsibility
2022-2023	SENG Hok	M	Étudiant		
2021-2022	MOK Yong	M	Étudiant		
2019-2020	NORNG Vannvatthana	M	Étudiant		
	CHHOUT Laychiva	M	Étudiant		
2018-2019	VENG Namchhoen	M	Étudiant		
2016-2017	CHAO Kimhong	M	Ingénieur	Institut Polytechnique	Etudiant en Master
	SAMBATH Vibolroth	F	Ingénieur	Institut Polytechnique	Etudiant en Master
	THY Vathana	M	Ingénieur	Institut Polytechnique	Etudiant en Master
2015-2016	EANG Chanpaya	M	Abandon		Ingénieur
	NOU Sithea	M	Master	Suisse	Ingénieur
2014-2015	HEANG Kitiyavirayuth	M	Master	Ecole des Ponts ParisTech (Paris)	Etudiant Architecte
	KHUN Kimang	M	Master	INRIA (Grenoble)	Ingénieur Doctorant
	THAN Poseng	M	Master	Paris Partner (Paris)	Ingénieur Informaticien

2013-2014	IEA Bunthan	M	Master	Ministère du Développement Durable (France)	Ingénieur Corps d'Etat
	DIN Ratanak	M	Master	Vinci Construction (Paris)	Ingénieur d'Etudes
2012-2013	KHOUN Ladyya	M	PhD	Naval Group	Ingénieur-Chercheur
	SENG Sodarith	M	Master	Vinci Construction (Phnom Penh)	Ingénieur d'Etudes
2011-2012	UCH Bunnarith	M	Master	Suez (Rennes et Phnom Penh)	Ingénieur de Projet
2010-2011	IM Seyha	M	Master	Corsicasole (Paris)	Ingénieur, Chef de projet
	HUY Seav Er	M	Master	AFD (Phnom Penh)	Ingénieur, Chef de projet
	SE Dara	M	Master	Suez (Rennes et Phnom Penh)	Ingénieur, Chef de projet
2009-2010	SVAY Angkeara	M	PhD	LBL International (Phnom Penh)	Directeur Technique (CTO)
	CHEY Sopheak	M	Ingénieur	TC (Cambodge)	Enseignant à temps partiels
2008-2009	MUY Sokseiha	M	PhD	EPFL (Lausanne, Suisse)	Post-Doctorat
2007-2008	MANG Chetra	M	PhD	IRT SystèmeX (Paris)	Ingénieur R&D Sénior

## **2. Recruitment, Evolution of Number of Students and Others Activities**

## 2.1. Recruitment in 2022-2023

Students of engineering program have been recruited through an entrance writing examination (on site). Four subjects of this exam are mathematics, physic/chemistry and logic. Recruitment of technician program is based on documentation from high school.

### 2.1.1. Information Campaign

After more than two years of Covid-19 Pandemic, some information campaigns to high school students had been done on site. Online campaign and social network had also been implemented.

### 2.1.2. Preparation of Entrance Exam

Lecturers of ITC were requested to propose writing tests based on curriculum in high school. The Direction Board of ITC was responsible for the final selection of the best tests with confidentiality.

The date, the tests and all regulations of the exam in both campuses (Phnom Penh and Tbong Khmum) are the same.

### 2.1.3. Enrolment to the exam

Enrollment to the entrance exam of Engineering Program took place from 26 December 2022 to 18 January 2023. In total, 3378 candidates (1130 females) enrolled to the examination in Phnom Penh and 21 candidates (10 females) in Tbong Khmum campus.

The tests of selection were held at ITC-Phnom Penh and ITC-Tbong Khmum on 20 January 2023 under supervision of ITC's Direction Board. No fraud had been reported and the tests were conducted in a satisfactory and transparent manner.

Figure 1 shows that number of candidates is almost the same as last year.

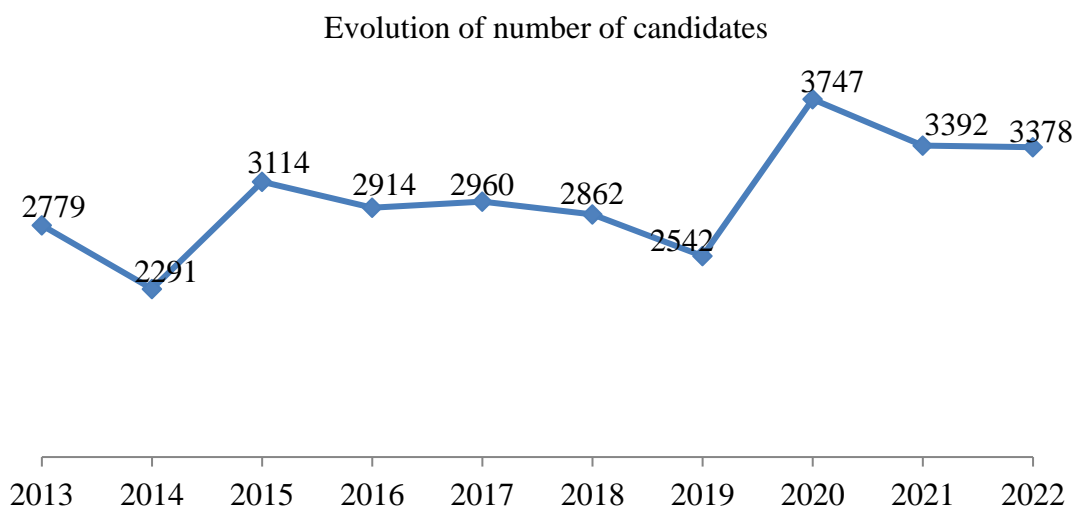


Figure 1. Number of Candidates enrolled in the entrance exam.

### 2.1.4. Result of Entrance Exam

Result of the Entrance Exam was announced on 22 January 2023. There are 1649 successful candidates (521 Females) and 358 candidates in reserved list (135 Females).

Figure 2 shows that number of successful candidates remained around 800 from 2013 to 2016. Due to new building and equipment, number of successful candidates were increased every year from 1002 in 2017 to 1700 in 2020 and slightly decreased to 1649 in 2022.

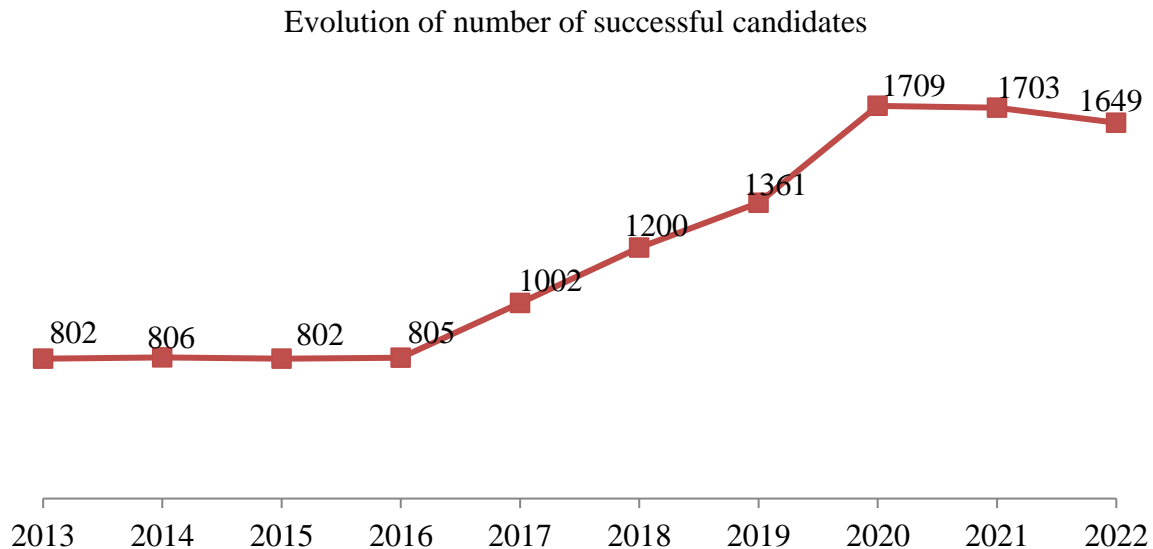


Figure 2. Evolution of number of successful candidates.

### 2.1.5. Enrollment in 1st Year

#### a) Engineering Program (ITC-Phnom Penh)

In total, 1595 students (525 females) have enrolled to 1<sup>st</sup> year of Engineering Program in 2022-2023.

#### b) Engineering Program (ITC-Tbong Khmum)

Table 1 below presents number of high school graduates registered in the entrance examination, number of successful candidates and the one enrolled in the first year of engineering program at the second campus in Tbong Khmum Province. It is noted that all students enrolled in Tbong Khmum Campus are scholarship holders.

Table 1. Number of students enrolled to 1st Year at ITC-Tbong Khmum.

	Total	Female
<b>Candidate</b>	21	10
<b>Successful candidates</b>	15	8
<b>Enrolled to I1</b>	25 (11 transferred from Phnom Penh)	8



### c) Technician Program

For Technician Program, 568 students (181 females) have enrolled in the first year in 2022-2023.

#### 2.1.6. Remark and Conclusion

Maintaining the entrance examination is very important in order to keep a positive impression and a very strong brand in mind and appreciation of teachers, students, public and society. It is noted that expense of this examination was fully covered by the Ministry of Education, Youth and Sports, and ITC.

The direction board of ITC should continue to strengthen recruitment strategy of 1<sup>st</sup> year student of both engineering and technician program by sending staffs to high school in some provinces for advertising and distributing brochures to show the importance and benefit of studying of STEM (Science, Technology, Engineering and Mathematics), especially studying at ITC. The promotion activities can be also implemented online.

## 2.2. Entrance Exam to 3rd Year Engineering Program

### 2.2.1. Pass from T2 to 3rd Year Engineering

The examination is for Technician graduates or equivalent degree. This year 2022-2023, 24 candidates applied for this exam. Candidates have to pass the following tests:

- Writing test on mathematics and physic,
- Interview by relevant department.

Based on result of writing test and interview, Selection committee decided to accept 15 candidates, about 63%. The others were not accepted because their performance is not qualified.

Table 2 below indicates number of candidates and successful candidates to 3<sup>rd</sup> Year distributed by department over the last five years.

Table 2. Number of technician graduates accepted to 3<sup>rd</sup> Year Engineering Program.

Dept.	Number of candidates and successful candidates to I3									
	2018-2019		2019-2020		2020-2021		2021-2022		2022-2023	
	Candidate	Successful Candidate	Candi.	Suce. Candi.	Candi.	Suce. Candi.	Candi.	Suce. Candi.	Candi.	Suce. Candi.
GCA	24	15	29	10	27	10	27	15	13	9
GCI	34	16	18	12	16	9	12	10	6	2
GAR	-	-	-	-	-	-	-	2	-	-
GEE	12	5	12	10	4	1	6	3	2	2
GTR	-	-	-	-	-	1	-	3	-	-
GIM	6	3	5	3	7	5	2	2	3	2
GRU	6	3	5	5	-	-	-	-	-	-
GIC	1	1	-	-	1	1	-	-	-	-
<b>Total</b>	<b>83</b>	<b>43</b>	<b>69</b>	<b>40</b>	<b>55</b>	<b>27</b>	<b>47</b>	<b>35</b>	<b>24</b>	<b>15</b>

## 2.2.2. Entry into 3<sup>rd</sup> Year Engineering Program

Third year Engineering students may come from:

- Engineering students who finished successfully 2<sup>nd</sup> year of foundation year,
- DUT and technician graduates if they pass writing test and interview,

Table 3 shows actual number of 3<sup>rd</sup> year Engineering students.

Table 3. Actual number of 3<sup>rd</sup> year engineering students.

Department	I2 to I3	T2 to I3	Repeating students	Total
GCA	205	9	8	<b>222</b>
GCI	202	2	14	<b>218</b>
GAR	92		4	<b>96</b>
GEE	167	2	5	<b>174</b>
GGG	79		6	<b>85</b>
GIC	71		8	<b>79</b>
GIM	155	2	8	<b>165</b>
GRU	105		9	<b>114</b>
GTR	58		4	<b>62</b>
GTI	80		0	<b>80</b>
AMS	89		1	<b>90</b>
<b>Total</b>	<b>1303</b>	<b>15</b>	<b>67</b>	<b>1385</b>

## 2.3. Total number of students in 2022-2023

### 2.3.1. Total number of students in March 2023

As of March 2023, there are 7025 students (2263 females = 32.2%) in both Engineering and Technician programs in academic year 2022-2203 (Table below).

Table 4. Total number of students in March 2023 (ITC-Phnom Penh).

Dept.	T-1	T-2	Total 1	I-1	I-2	I-3	I-4	I-5	Total 2	Total 1+2
DTC				1595	1341				<b>2936</b>	<b>2936</b>
GCA	136	92	<b>229</b>			222	157	158	<b>537</b>	<b>766</b>
GCI	165	112	<b>279</b>			218	253	154	<b>625</b>	<b>904</b>
GAR	-	-				96	74	47	<b>217</b>	<b>217</b>
GEE	194	99	<b>296</b>			174	128	137	<b>439</b>	<b>735</b>
GGG	-	-				85	29	65	<b>179</b>	<b>179</b>
GIC	-	-				79	79	80	<b>238</b>	<b>238</b>
GIM	73	44	<b>111</b>			165	86	106	<b>357</b>	<b>468</b>
GRU	-	-				114	67	103	<b>284</b>	<b>284</b>
GTR	-	-				62	40	26	<b>128</b>	<b>128</b>
GTI						80	0	0	<b>80</b>	<b>80</b>
AMS						90	0	0	<b>90</b>	<b>90</b>
<b>Total</b>	<b>568</b>	<b>347</b>	<b>915</b>	<b>1595</b>	<b>1341</b>	<b>1385</b>	<b>913</b>	<b>876</b>	<b>6110</b>	<b>7025</b>

Table 5 presents total number of students in 2022-2023 at ITC-Tbong Khmum Campus.

Table 5. Total number of students in 2022-2023 (ITC-Tbong Khmum).

Dept.	I1		I2		I3		I4		I5		Total	F
	Total	F	Total	F	Total	F	Total	F	Total	F		
<b>DTC</b>	25	8	22	11							<b>47</b>	19
<b>GCA</b>					12	8	7	7	9	7	<b>28</b>	22
<b>GCI</b>					18	5	8	1	11	0	<b>37</b>	6
<b>Total</b>	<b>25</b>	<b>8</b>	<b>22</b>	<b>11</b>	<b>30</b>	<b>13</b>	<b>15</b>	<b>8</b>	<b>20</b>	<b>7</b>	<b>112</b>	<b>47</b>

### 2.3.2. Reorientation

The reorientation represents number of students who quitted ITC due to some reasons such as:

- Recipient of scholarship to study abroad
- Changing of institution
- Dropping out since beginning of academic year
- Etc.

Table below summarizes number of reoriented students of Engineering and Technician Programs. It is noted that 1<sup>st</sup> Year students have not finished their 1<sup>st</sup> semester. Therefore, number of reoriented students is not yet available at the time of reporting.

Table 6. Number of reorientation of Engineering and Technician students.

	T-1	T-2	Total 1	I-1	I-2	I-3	I-4	I-5	Total 2	Total 1+2
<b>Total</b>	0	23	<b>23</b>	0	103	53	23	8	<b>187</b>	<b>210</b>

### 2.3.3. Total number of students in June 2023

In total, number of reorientations is 210 students without taking account of 1<sup>st</sup> year students whose 1<sup>st</sup> semester will be finished at the end of July 2023. Total number of students remains 6815 students. This number includes students of both Engineering and Technician Program. Table 7 shows total number of students in June 2023.

Table 7. Total Number of students in June 2023 (ITC-Phnom Penh).

Dépt.	T-1	T-2	Total 1	I-1	I-2	I-3	I-4	I-5	Total 2	Total 1+2
<b>DTC</b>	-	-		1595	1238				<b>2833</b>	<b>2833</b>
<b>GCA</b>	136	90	<b>226</b>			216	156	158	<b>530</b>	<b>756</b>
<b>GCI</b>	165	106	<b>271</b>			208	246	154	<b>608</b>	<b>879</b>
<b>GAR</b>	-	-				92	73	47	<b>212</b>	<b>212</b>
<b>GEE</b>	194	91	<b>285</b>			170	125	136	<b>431</b>	<b>716</b>

<b>GGG</b>	-	-				79	28	64	<b>171</b>	<b>171</b>
<b>GIC</b>	-	-				74	74	77	<b>225</b>	<b>225</b>
<b>GIM</b>	73	37	<b>110</b>			157	84	106	<b>347</b>	<b>457</b>
<b>GRU</b>	-	-				106	65	101	<b>272</b>	<b>272</b>
<b>GTR</b>	-	-				60	39	25	<b>124</b>	<b>124</b>
<b>GTI</b>	-	-				80	-	-	<b>80</b>	<b>80</b>
<b>AMS</b>	-	-				90	-	-	<b>90</b>	<b>90</b>
<b>Total</b>	<b>568</b>	<b>324</b>	<b>892</b>	<b>1595</b>	<b>1238</b>	<b>1332</b>	<b>890</b>	<b>868</b>	<b>5923</b>	<b>6815</b>

## 2.4. Final Exam (End of Semester)

This academic year 2022-2023, final exam during the 18<sup>th</sup> week of semester was organized onsite at ITC. The examination of some subjects has been made in advance because of special character (oral exam of language, projects...). The score is allocated according to the following scale:

- Attendance in class, TD and TP: 10%,
- Mid-term exam, project report, assignment, report of TP: 30-40%,
- Final exam: 50-60%.

It is noted that ITC management system has been developing under support of ARES-CCD project, Belgium. Score input is entered into this system by each lecturer.

## 2.5. Continuing Education

Continuing Education is designed for technician degree or equivalent degree holders who would like to continue their study in order to upgrade their degree to Bachelor Degree of Engineering.

This year, 140 students (55 females) have registered in this program. Among them, 32 students (30 females) enrolled in GCA Department, 46 (8 Females) in GCI, 43 (12 Females) in GEE and 19 (5 Females) in GIM department. Table 8 shows total number of students registered for the continuing education.

Table 8. Number of students registered for the continuing education.

Start	End	GCA		GCI		GEE		GIM		Total	
		Total	F	Total	F	Total	F	Total	F	Total	F
2020	2023	45	41	58	9	35	10	23	6	<b>161</b>	<b>66</b>
2021	2024	53	48	32	5	45	11	24	2	<b>154</b>	<b>66</b>
2022	2025	46	35	37	5	48	10	12	6	<b>143</b>	<b>56</b>
2023	2026	32	30	46	8	43	12	19	5	<b>140</b>	<b>55</b>
<b>Total</b>		<b>176</b>	<b>154</b>	<b>173</b>	<b>27</b>	<b>171</b>	<b>43</b>	<b>78</b>	<b>19</b>	<b>598</b>	<b>243</b>

Figures 3, 4, 5 and 6 below show number of students enrolled and graduated in GCI, GEE GCA and GIM departments respectively.

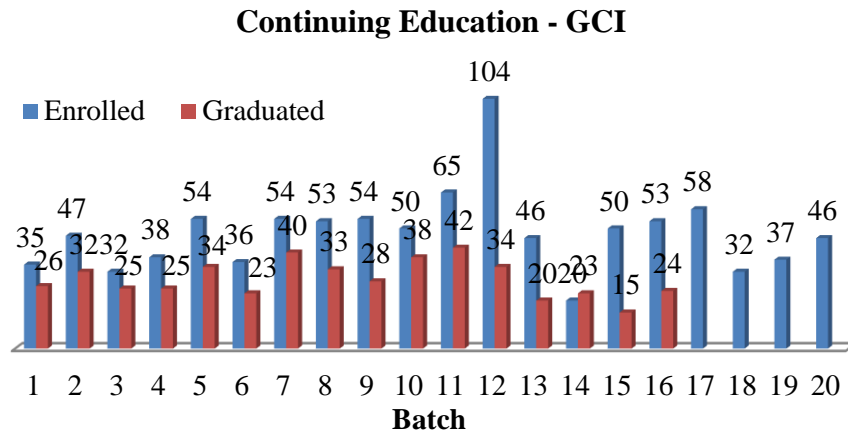


Figure 3. Number of students enrolled and graduated in continuing education (GCI).

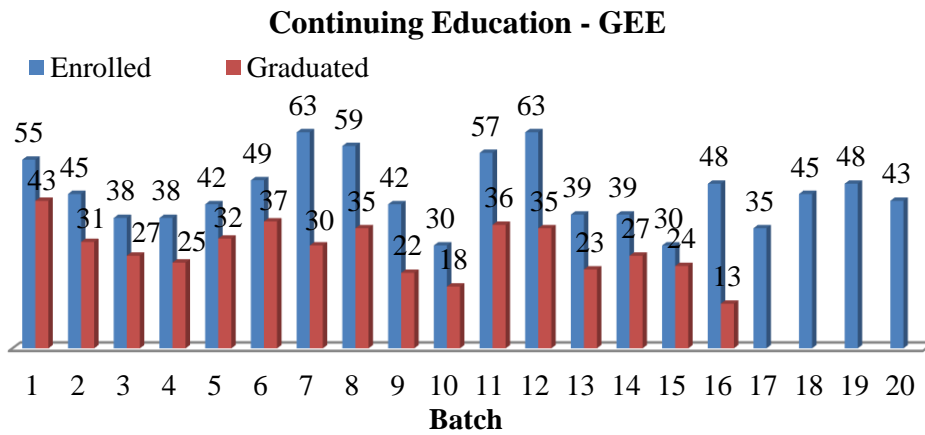


Figure 4. Number of students enrolled and graduated in continuing education (GEE).

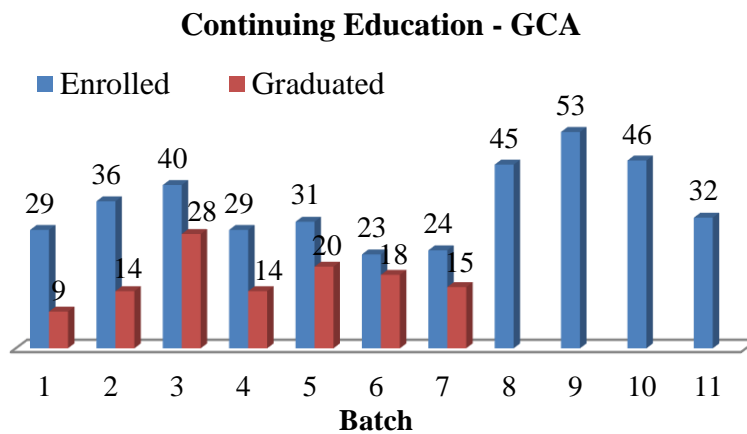


Figure 5. Number of students enrolled and graduated in continuing education (GCA).

## Continuing Education - GIM

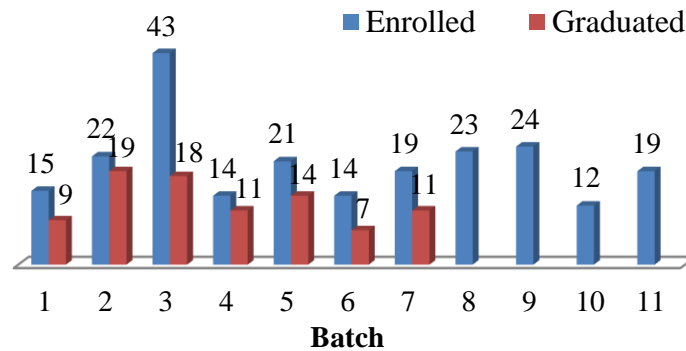


Figure 6. Number of students enrolled and graduated in continuing education (GIM).

### 2.6. Preparation of ITC students for exam of Grandes Ecoles in France

The cooperation between ITC and Ecole Polytechnique ParisTech was launched in 2007. It is mainly reflected by receiving at Department of Foundation Year long-term polytechnician trainees and organizing international exam of Ecole Polytechnique at ITC. A partnership agreement was signed between the two institutions.

An intensive session of preparation for Institut Polytechnique de Paris (IP Paris) was set up from 17 to 22 October 2022 for 15 eligible ITC students. This preparation has involved two French professors of preparatory classes of Grandes Ecoles (Olivier GRANIER and Gilbert MONNA).

The exam conducted face to face at Institut Francais du Cambodge on 5-6 November 2022 by an International Committee of Institut Polytechnique de Paris.

Finally, five candidates have been accepted. One of them will study at Ecole Polytechnique, two at École nationale supérieure d'informatique pour l'industrie et l'entreprise (ENSIIE), one at Ecole Nationale de la Statistique et de l'Administration Economique Paris (ENSAE) and another one at Institut Mines Telecom Mines-Alès.

Since academic year 2007-2008, 55 ITC students integrated in one of the Grande Ecole in France:

- 25 at Ecole Polytechnique,
- 4 at Ecole Supérieure de Physique et de Chimie Industrielles (ESPCI),
- 3 at Ecole Nationale Supérieure des Techniques Avancées (ENSTA),
- 16 at Ecole Nationale Supérieure d'Informatique pour l'Industrie et l'Entreprise (ENSIIE),
- 1 at Ecole Nationale Supérieure des Mines d'Albi,
- 2 at Ecole Nationale Supérieure des Mines d'Alès,
- 1 at Ecole Telecom Sud Paris, and
- 3 at Ecole Nationale de la Statistique et de l'Administration Economique.

These students get systematically scholarships, usually Eiffel Scholarship from Government of France.

Figure 7 below shows number of ITC students integrated in an engineering school since beginning of cooperation.

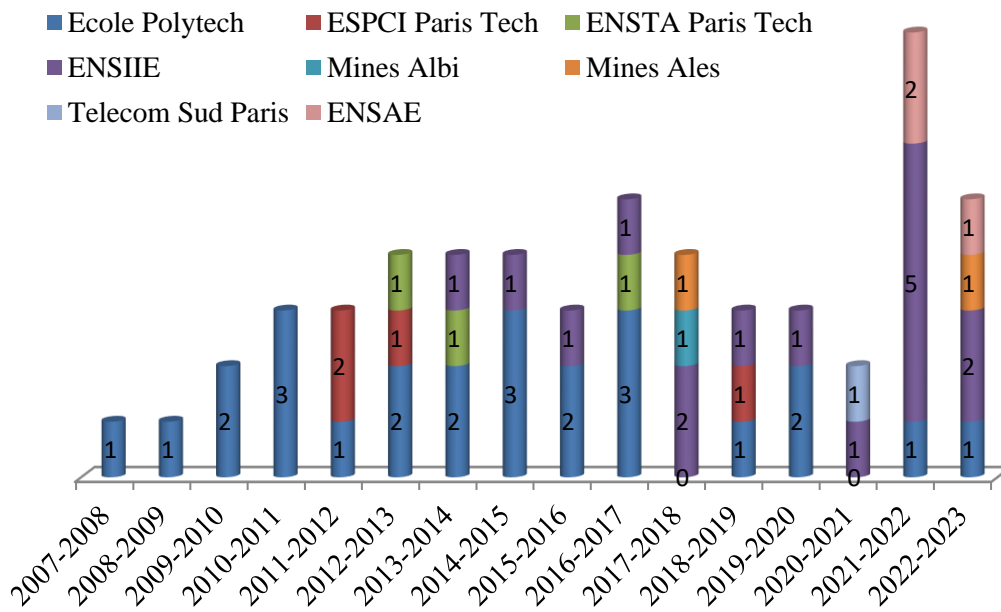


Figure 7. Number of ITC students integrated in an engineering school since 2007-2008.

## 2.7. Preparation for the exam of Japanese Government Scholarship

Table 9 shows the number of ITC students who passed successfully the exam of Japanese Government Scholarship. In 2022-2023, 7 students of ITC among 27 successful candidates won this Scholarship.

Table 9. Number of winners of Japanese Government Scholarship.

Year	Research		Undergraduate		College of Technology		Specialized Training College		Total (ITC)
	Total	ITC	Total	ITC	Total	ITC	Total	ITC	
2010-11	9	0	0	-	0	-	2	2	11 (2)
2011-12	11	0	2	1	8	8	7	1	28 (10)
2012-13	11	0	0	-	14	13	12	3	37 (16)
2013-14	11	0	1	0	16	15	9	3	37 (18)
2014-15	12	2	2	0	15	12	13	7	42 (21)
2015-16	12	2	1	1	6	3	7	3	26 (9)
2016-17	12	3	1	1	7	4	10	5	30 (13)
2017-18	12	1	2	1	5	4	3	3	22 (9)
2018-19	12	5	1	1	7	3	5	0	25 (9)
2019-20	10	5	0	0	11	8	8	4	29 (17)
2020-21	NA	NA	0	0	14	7	8	3	22 (10)
2021-22	12	1	1	1	14	11	9	5	36 (19)
2022-23	10	1	0	0	10	5	6	1	27 (7)

## 2.8. Scholarships and exemption of tuition fee (2022-2023)

Several funding sources were used to award scholarships to ITC students for encouraging the best students and also to help those whose families faced financial difficulty.

There are 2929 scholarships, which represents 41.7% of the total number of Engineer and Technician students. It is noted that the estimated amount of a scholarship varies from 100 to 2600 USD per year and 100% of female students are scholarship holders (tuition fee's discount). The table below shows the different scholarships.

Table 10. Different Scholarships at ITC.

No.	Type of Scholarship	Number of students
1	Government Scholarship (M, P and ITC)	521
2	Scholarship for all female students	1896
3	Panasonic	4
4	Chip Mong Insee	18
5	Prince Bank	71
6	Enfant du Mékong	46
7	Smart Axiata	13
8	Sumitomo	8
9	S4C Project	283
10	Akaraka	8
11	CADT	40
12	TEM	21
<b>Total</b>		<b>2929</b>

## 2.9. Activities report of E-learning Center

### 2.9.1. Background

ASEAN Cyber University project was first proposed at the ASEAN – South Korea Summit in 2009. The project is expected to help establishing a foundation for sharing experiences, knowledge, and skills in higher education and long-distance education among ASEAN countries and South Korea. At the first stage, the project is designed to help the CLMV (Cambodia, Laos, Myanmar and Vietnam) countries acquire the technology and knowledge related to e-learning systems, to help students in remote areas access higher education.

In 2011, ITC was selected by the selection committee from Korea for setting up ASEAN Cyber University (ACU) and also mandated by the Ministry of Education, Youth and Sport (MoEYS) of Cambodia to implement the ACU Project. In the project, an e-learning center and multimedia studio had been installed in May 2012 with a content development room, an operation room and learning management system (LMS) servers to host the e-learning course contents. The e-learning center is directly connected to the ACU hub center in Vietnam to share online courses among CLMV countries using TEIN (Trans-Eurasia Information Network) high speed network connection.



From January 2020, ASEAN Cyber University project have been finished. There is no support from ACU for course development and course operation. ITC has moved all the courses (including the courses of our partners) to our own LMS for course operating in ITC.

The goals of this center are the follows:

- Capacity building of staff and students for e-learning
- Increase access to higher education using ICT as the tool for learning, teaching, and sharing information
- Promote Cambodia life-long learning
- Promote the collaboration on e-learning in CLMV countries
- Advocate best practice, strategy and policy for e-learning

### **2.9.2. Achievement in 2022-2023**

In 2022, the e-learning center of ITC involves in several projects to support the development of Cambodia cyber universities network and support our partners to develop the e-learning activities.

#### **Public Investment Program (PIP): Cambodia Cyber Universities Network (CCUN)**

In 2022, ITC supports the Directorate General of Higher Education of the Ministry of Education, Youth and Sport (DGHE/MoEYS) to prepare the concept note for the CCUN project. This project aims to improve higher education quality by using online and digital Teaching and Learning (T&L) materials. The project will connect the Higher Education Institutes (HEIs) in Cambodia through a common network infrastructure and LMS (Moodle). And through this common infrastructure and platform, Member Institutes (MIs) can share their digital content among each other's. The project will also promote the credit transfer among MIs and allow them to connect to global cyber universities network.

In the pilot phase of this project, it involves six HEIs (ITC, RUPP, RUA, NUBB, SRU, UHST) as MIs. With the experience ITC gained from ACU project, ITC will play a role as technical lead and support other five HEIs to development their e-learning activities.

In February 2023, ITC works with DGHE/MoEYS to organize the kickoff meeting of CCUN with the present of other five MIs. And in this March, ITC will organize the training on “Basic e-learning content development” for the other five MIs.

Two training on e-learning content development was organized at ITC to build the capacity MIs. The first training was organized on March 13th – 15th, with total 53 participants. And the second training was organized on May 30th to June 2nd, with total 43 participants. Each MI produced a prototype of e-learning content for each training.

Starting from June to December 2023, ITC will provide local training on “LMS user training” at each MIs. The training will cover the features of user Teacher and LMS Administrator. In the same time, ITC will also visit each MI to provide support on e-learning content development.

## Erasmus + KA2, FoodSTEM

In this project, ITC is the main coordinator. Several T&L materials related to food processing, food safety, etc. will be produced. The e-learning center support the transformation of these T&L materials into e-learning content.

Up to now, there are 4 courses have been completely developed. And there are another 4 courses in the development process, which we expected to finish around May or June 2023.

## Erasmus + KA2, Health information and technology for improved health education in South-East Asia (HITIHE)

In this project, several materials and knowledge related to health and medical will be created. The role of ITC in this project is to provide technical support to partners in Cambodia: University of Health Science (UHS), and National Institute of Public Health (NIPH), to develop and operate e-learning content. In 2022, ITC organized the LMS user training for NIPH.

## Agroecology and safe food system transition (ASSET) Project

In this project, several materials and knowledge related to food safety and agriculture will be developed. The e-learning center will support the transformation of these T&L materials into e-learning content in 2023.

### 1. Content development

Below table summary the content that the e-learning center developed up to March 2023.

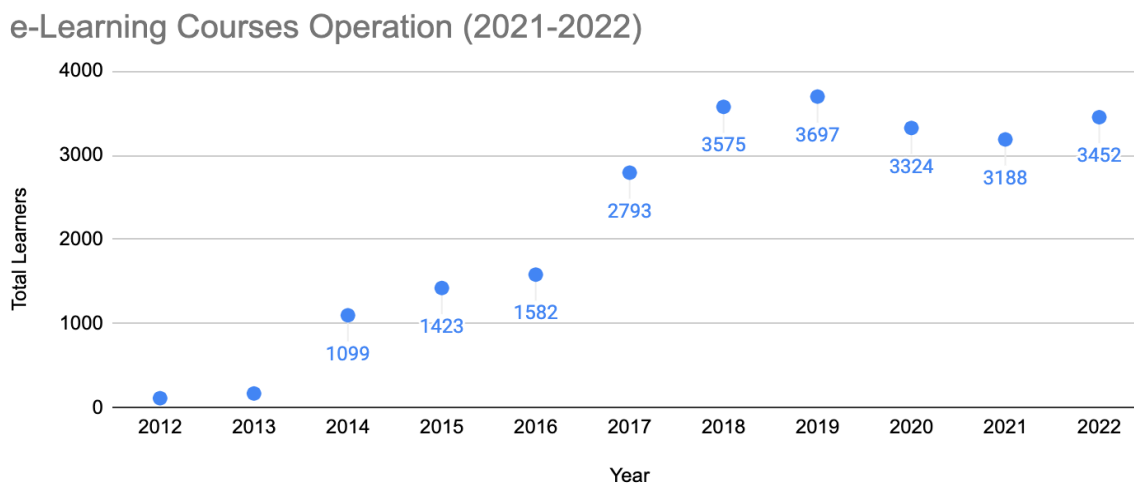
E-learning content		
40	Courses at ITC	Some content are shared to partners
11	Courses for UNESCO-BEEP	Currently hosted and operated by DIT/MoEYS
3	Courses for partners	NUM, UHS, Ministry of Rural Development
77	Content for CIESF – IT Passport Examination Preparation Book	Video production Hosting with ITC
74	Math and Khmer contents grade 12 for MoEYS	Video production during COVID-19 pandemic
4	Courses of FoodSTEM project	Another 4 courses are in the development process.

Besides the courses and content above, the e-learning center also host the content of our partner on <https://moodle.itc.edu.kh>

E-learning content		
13	Courses integration of CIRAD (RUA)	Agroecology content
4	Contents of AUF	Moodle training

## 2. Content operation

Below figure illustrate the e-learning courses operation in ITC from 2012 to 2022 (last update December 2022).



In academic year 2021-2022, 39 among 40 courses at ITC were operated on <https://moodle.itc.edu.kh>. And there are 3452 learners accessed to the courses, which represent about 70% of students at ITC.

### 2.10. Activities of library of ITC

Since 2017, the library has moved to a new location and also changed a new name to STEM Library of ITC which refers to (Science, Technology, Engineering, Mathematics) to encourage and promote STEM in education and support teaching, learning and research. Library received students between 70 to 280 in a daily based according to study schedule and academic calendar.

Currently we have more than 12000 resources, we start collecting students' thesis in hard copy to store in the library, this year we got more than 1000 thesis from every department. Next year we will also collect the soft copy of the thesis.

Library is very lucky, when we move to a new building, we have many rooms such as symposium I & II which includes 10 small discussion rooms that could hold 6 to 12 people, and a showroom which could hold a meeting of 30 people. A self-study and e-learning room which could hold 30 students, a start-up incubation room which consists of 3 small rooms for 3 startup teams with an open space for many people. All the rooms are used to a full capacity on a daily basis.

Library has actively participated in the library community in Cambodia to have a webinar, sharing session, and exchange knowledge. We also plan to build the capacity of each higher education librarian through training with international partners and also to have a library visit overseas in order to improve their working place.

Library starts engaging with students and teachers, we could have real time interaction, share knowledge, news, announcements faster and very effectively. At the same time get them to know and use the library services more than before.

## **3. Educational Report**

### 3.1. Overview of teaching/research staffs at ITC

#### 3.1.1. Number of lecturers/researchers

In 2022-2023, ITC has 345 (97 females) full-time (civil servant), trainee (full-time but not civil servant) and part-time lecturers, lecturer-researchers and full-time researchers. Table 11 below shows the number of lecturers in different departments. Among these 345 lecturers, there are 93 PhD (27.0%), 191 Masters (55.4%) and 61 other degrees (17.7%). They give lectures and also participate in research project, as well as other administrative tasks.

Table 11. Number of lecturers/researchers in different departments in 2022-2023.

Degree		GCA	GCI	GEE	GGG	GIC	GIM	GRU	GTR	MAS	DTC	SF	SA	Total
PhD	Full-time	12	14	6	7	2	8	11	5	3	0	0	0	68
	Trainee	4	3	0	4	0	1	4	0	0	0	0	0	16
	Part-time	1	1	0	2	0	0	3	0	1	1	0	0	9
<b>Sub-total 1</b>		<b>17</b>	<b>18</b>	<b>6</b>	<b>13</b>	<b>2</b>	<b>9</b>	<b>18</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>93</b>
Master	Full-time	2	3	7	6	5	14	7	5	4	8	4	2	67
	Trainee	18	7	8	9	8	14	7	0	0	0	0	0	71
	Part-time	8	9	1	0	3	0	3	2	10	4	3	10	53
<b>Sub-total 2</b>		<b>28</b>	<b>19</b>	<b>16</b>	<b>15</b>	<b>16</b>	<b>28</b>	<b>17</b>	<b>7</b>	<b>14</b>	<b>12</b>	<b>7</b>	<b>12</b>	<b>191</b>
Engineer/Bachelor	Full-time	1	2	0	1	1	0	0	0	0	3	4	0	12
	Trainee	0	0	0	0	2	2	0	0	0	0	0	0	4
	Part-time	0	7	4	0	0	0	3	1	0	1	20	9	45
<b>Sub-total 3</b>		<b>1</b>	<b>9</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>24</b>	<b>9</b>	<b>61</b>
<b>Total</b>		<b>46</b>	<b>46</b>	<b>26</b>	<b>29</b>	<b>21</b>	<b>39</b>	<b>38</b>	<b>13</b>	<b>18</b>	<b>17</b>	<b>31</b>	<b>21</b>	<b>345</b>

Number of lecturers/researchers increases slightly each year. The evolution of number of lecturers/researchers in the last 10 years is shown in Figure 8.

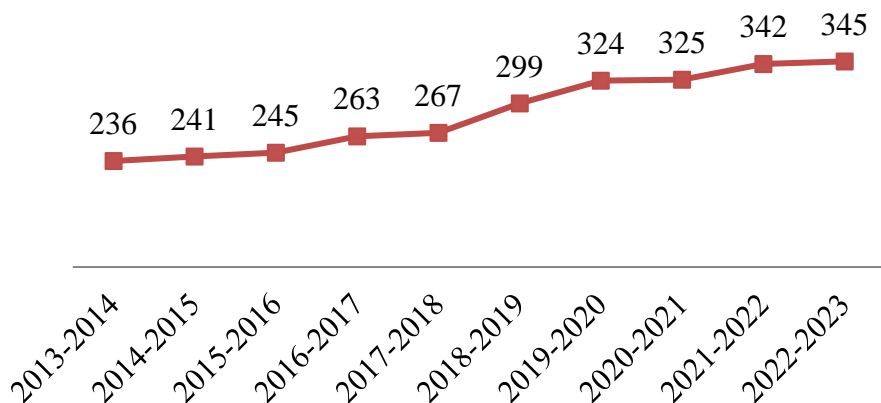


Figure 8. Evolution of Number of Lecturers/Researchers.

Evolution of number of lecturers/researchers with PhD and Master Degree is shown on Figure 9 below. Through regional and international cooperation, number of PhD holders increases about 2.5 times over the past 10 years, from 40 in 2013-2014 to 93 in 2022-2023. Number of Master holders also increases from 117 in 2013-2014 to 191 in 2022-2023. They are potential human resources for teaching and research at ITC.

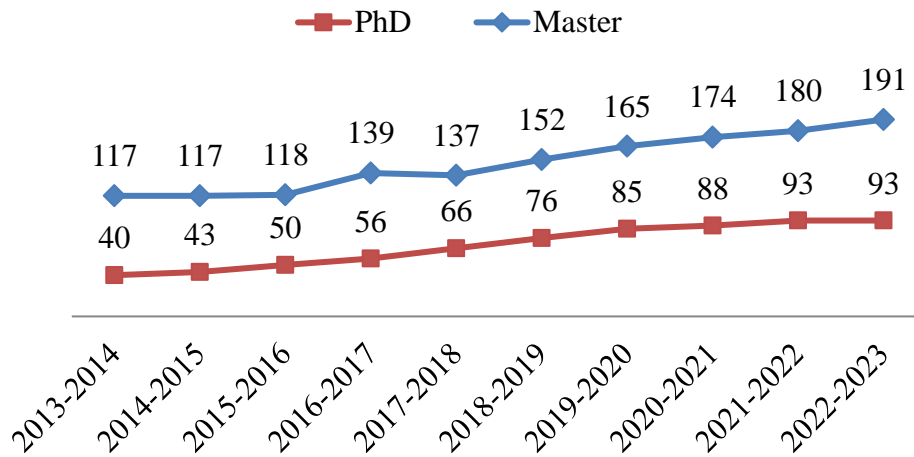


Figure 9. Evolution of number of PhD and Master holders.

### 3.1.2. Lecturers/researchers graduated from different countries

Lecturers/Researchers of ITC were graduated from different countries and regions in the world:

- At local level in Cambodia (34.5%) in which most of them are lecturers in Department of Foundation Year, English and French sections.
- At regional level (24.1%) in 5 ASEAN countries: Thailand, Indonesia, Philippines, Malaysia, and Vietnam
- At international level (41.4%) in 13 countries: France, Japan, Belgium, South Korea, Russia, Australia, Canada, China, Spain, India, Mexico, New Zealand and USA.

Figure 10 below indicates percentage by country that ITC lecturers/researchers were graduated from. Abroad, ITC lecturers/researchers graduated from France the most, followed by Japan, Thailand, Indonesia and Belgium.

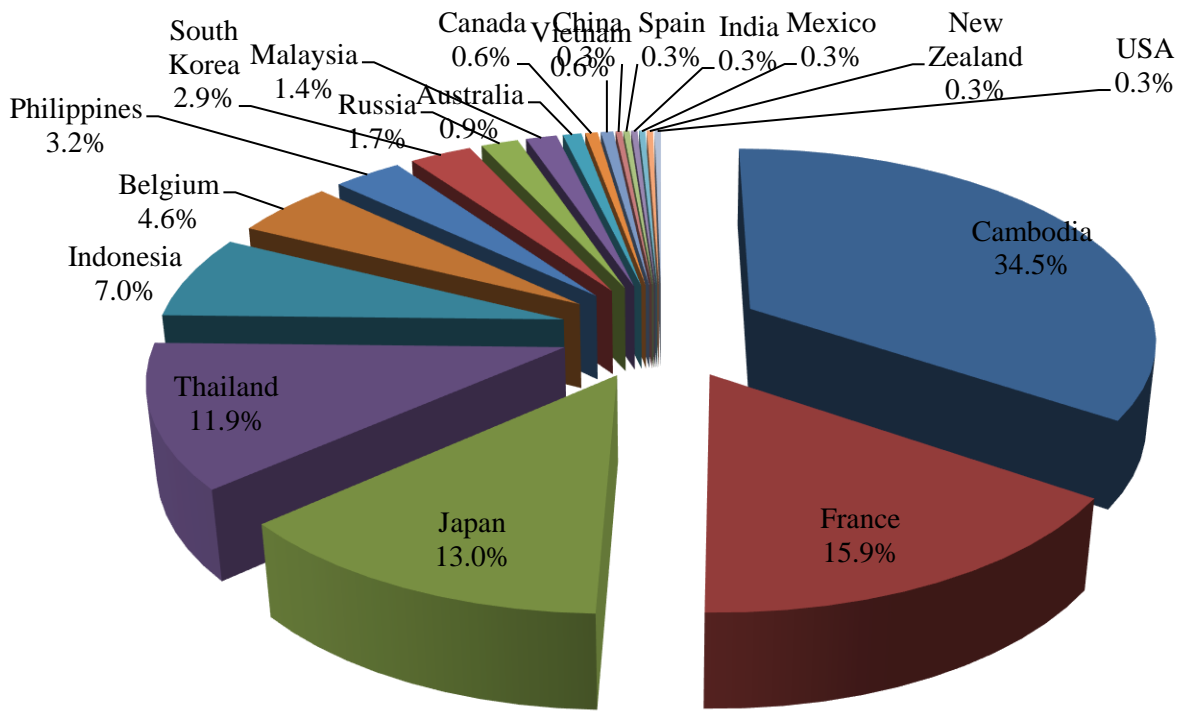


Figure 10. ITC lecturers/researchers graduated from different countries.

### 3.1.3. Conclusion

Human resources of ITC have increased in recent years with PhD's Degree holders. This year, number of PhD (93) remains the same as last year but number of PhD with civil servant status in 2022-2023 (68) is slightly increased comparing to last year (63).

With strong collaboration with partners and through some projects, young lecturers and students have been sent to partner universities abroad to continue their PhD's Degree abroad and will come back in the upcoming year. To ensure quality of teaching, research and also technology transfer, ITC needs to recruit and also maintain young Master and PhD holders who are dynamic for both academy and research.

### 3.2. Student Employability

A short online survey on student employability was conducted in February 2023 before graduation ceremony which was held on 1<sup>st</sup> March 2023. 566 engineering students graduated in 2022 responded which is about 82.1% of total graduates (689). Result of this survey is shown graphically on Figure 11.

Figure shows that 86.4% of engineers graduated in 2022 are employed in different sectors (private, public and NGOs); 11.1% are continuing their studies mostly in oversea; 1.6% are running their own business and 0.9% are seeking employment.

Among the employed graduates, 96.5% works with private sector, 2.7% with public sector and 0.8% with NGO.

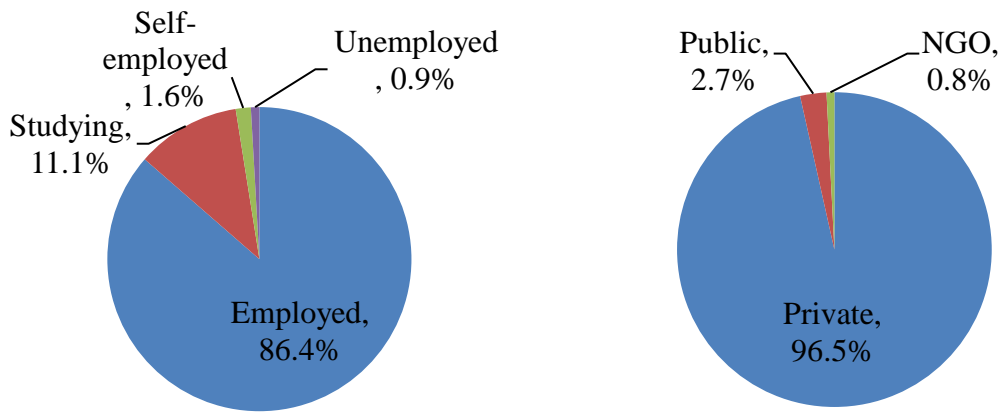


Figure 11. Engineering students graduated in 2021-2022.

For Associate's Degree Program, 145 students graduated in 2022 responded which is about 81.9% of total graduates (177). Result of this survey is shown graphically on Figure 12.

Figure shows that 48.2% of technician students graduated in 2022 are employed; 51.8% are continuing their studies mostly in continuing program at ITC.

Among the employed graduates, 91.1% works with private sector and 8.9% with public sector.

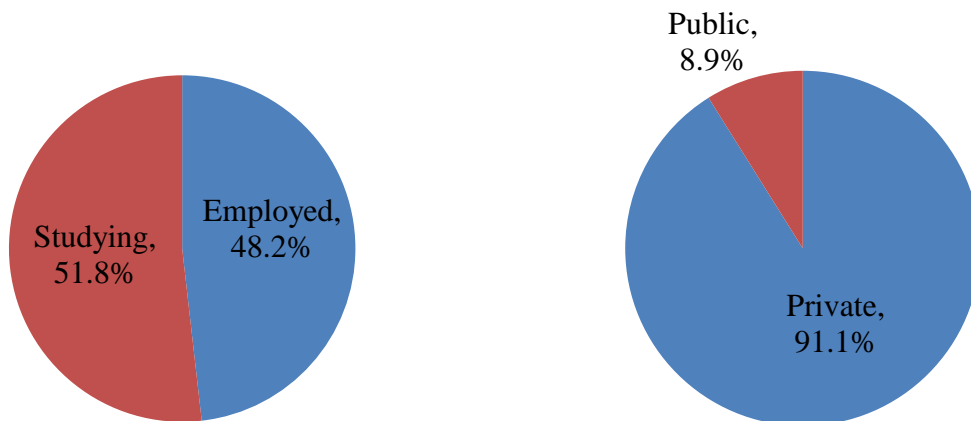


Figure 12. Technician students graduated in 2021-2022.



### 3.3. Graduate School of ITC

#### 3.3.1. Introduction

Graduate School of the Institute of Technology of Cambodia (GS-ITC) plays an important role in supporting and providing services regarding the development of human resources at graduate (Master and Doctoral) levels at ITC. Its prime objective is to increase the number of highly qualified human resources in fields of Sciences, Engineering, Technology and Architecture, to meet the demands of Cambodian economic development and society.

#### *Vision*

Excellence in graduate education in STEM so that graduates have full potentials and skills to meet the requirement of the Cambodia's 2030 vision.

#### *Mission*

GS-ITC commits to achieving the long-term vision of ITC concerning graduate education by providing services to the campus community that maintain integrity and excellence in graduate education in STEM through clear and consistent policies, high standards, efficient procedures, and direct student support. We seek to support and serve as a resource for all graduate students, and to support faculty and staff by fostering relationships, increasing communications and collaborations, and delivering comprehensive research and data resources to inform about graduate education. The graduate school:

1. Improve and develop graduate training programs in STEM to align with national, regional, and international standards.
2. Educate graduate students to have full potentials and skills in STEM to meet the requirement of the Cambodia's 2030 vision.

#### *Core Values*

- Excellence in graduate education
- Recruitment and graduation of outstanding students
- Ethical conduct and integrity in graduate studies and research
- Diversity among students, faculty, and staff
- Communication and collaboration throughout the graduate community
- Accountability and transparency
- Graduate-student professional development
- Preservation of academic standards
- Maintaining accurate data and records.

#### *Goals (2021-2030)*

1. Improve and develop **10 graduate training programs** in STEM to align with national, regional, and international standards.
2. Educate **952 graduate students** to have full potentials and skills in STEM to meet the requirement of the Cambodia's 2030 vision.

### 3.3.2. Summary of Realized Activities in 2022

No	Activities	Based line (2021-22)	Target (2022-23)	Realized (March 2023)	Plan 2023-24	Indicator	
1	Increase number of partnerships	Academic institutions	21	21	21	21	Number
		Development agencies	4	4	4	4	Number
		Government/Private sectors/NGO	3	3	3	5	Number
2	Operate thematic programs (Master)	7	8	8	8	Number	
3	Operate research-based program (Master)	7	8	8	8	Number	
4	Seek for funds/scholarships to support students	Master programs	48% of students enrolled	43% of students enrolled	44% of students enrolled	50% of students enrolled	Percentage
		Doctoral programs	100% of students enrolled	100% of students enrolled	100% of students enrolled	100% of students enrolled	
5	Conduct fresh graduate employment survey of master and doctoral graduates (annually).	37	65	51	70	Number of responses	
6	Internationalize the programs through our regional and international partnerships.	2	4	3	4	Number	
7	Increase communication among campus community, faculty staff and prospective students.	Leaflet, website, On-line application, Telegram, Outlook email, digital governance	Leaflet, website, On-line application, Telegram, Outlook email, digital governance	Website, Facebook, Telegram	Website, Facebook, Telegram, study fair, promotional video	Means of communication	
8	Fully implement Partnership programs of the HIEP projects.	5	5	5	5	Number	
9	Increase number of research topics that respond to the societies needed through support from research fund institutions such as ministries, LBE/JICA project, WB project.	15	30	38	50	Number	

10	Increase number of students' publications in journals/conferences	67 (14 journal articles)	35	53 (27 journal articles)	80	Number
11	Enroll PhD students	55	62	54 (7 new enrolled)	10 new enrolled	Number
12	Number of PhD students graduated	4	15	12 (8 new graduates)	20 (8 new graduates)	Number
13	Enroll Master students for the full-time thematic master programs	122	136	144	150	Number
14	Number of Master students graduated (accumulated)	277	340	320	420	Number
15	Implementation of EU-AFD project to support <i>Urban Supply and Sanitation Engineering</i>	85%	100%	100%	End of project	Percentage

### 3.3.3. Master Programs

#### 3.3.3.1. Overview

The master programs at ITC were authorized by the Ministry of Education Youth and Sport (MoEYS) of Cambodia since 2007 and launched the first promotions of different programs successively from 2010. The curricula were continuously updated from which a remarkable change from departments-based operation to a centralization at Graduate School in 2017. Six master programs were transformed to be thematic so that the students can be trained in multi-disciplinary skills.

In the academic year 2022-2023, the Graduate School of ITC offers 8 full-time thematic Master programs in the field of engineering and applied science (cf. table below). The calendar of semester 1 is from October 25, 2022, to February 11, 2023, and the semester 2 from February 27, 2023, to July 02, 2023.

#### *List of Thematic Master Programs*

No	Program ( <b>Master of Engineering</b> )	Eligible student's background	Promo.	Descended from	Remark
1	Master of Materials and Structural Engineering (M-MSE)	GCI, GIM, GGG, GRU, others equivalent field	13 (since 2010)	MGCI (+MGIM)	<ul style="list-style-type: none"> <li>• In operation</li> <li>• Program Head: <i>Dr. LIM Sovanvichet</i></li> <li>• <b>Double diploma with INSA de Rennes since 2010</b></li> </ul>

2	Master of Energy Technology and Management Engineering (M-ETM)	GIM, GEE, others equivalent field	7 (since 2011)	MGIM (+MGEE)	<ul style="list-style-type: none"> <li>• In operation</li> <li>• Program Head: <i>Dr. KIM Bunthern</i></li> </ul>
3	Master of Water and Environmental Engineering (M-WEE)	GRU, GCA, GCI, GGG, others equivalent field	9 (since 2012)	MGRU	<ul style="list-style-type: none"> <li>• In operation</li> <li>• Program Head: <i>Dr. KET Pinnara</i></li> <li>• <b>Financial support by EU-AFD project 2018-2023</b></li> </ul>
4	Agro-industrial Engineering (M-AIE)	GCA, RUPP, RUA, others equivalent field	9 (since 2012)	MAIE	<ul style="list-style-type: none"> <li>• In operation</li> <li>• Program Head: <i>Dr. TY Boreborey</i></li> </ul>
5	Master of Computer Science (M-ECS)	GIC, GEE, others equivalent field	9 (since 2013)	MGIC	<ul style="list-style-type: none"> <li>• In operation</li> <li>• Program Head: <i>Mr. HENG Rathpisey</i></li> </ul>
6	Master of Mechatronics, Information and Communication Engineering (M-MIC)	GIM, GEE, others equivalent field	7 (since 2012)	MGIM (+MGEE, +MGIC)	<ul style="list-style-type: none"> <li>• In operation</li> <li>• Program Head: <i>Dr. PEC Rotna</i></li> <li>• <b>Double diploma with IMT Mine Alès since 2021</b></li> </ul>
7	Master of Transport Engineering (M-TIE)	GCI, GIM, GIC, GEE	3 (since 2020)	New program	<ul style="list-style-type: none"> <li>• In operation</li> <li>• Program Head: <i>Dr. PHUN Veng Kheang</i></li> </ul>
8	Master of Data Science (M-DAS)	GIC, GEE, MATH	1 (since 2022)	New program	<ul style="list-style-type: none"> <li>• In operation</li> <li>• Program Head: <i>Dr. Phauk Sokkhey</i></li> </ul>

### ***Enrollment and Scholarship in 2022-2023***

The official announcement has been disclosed at ITC, at Graduate School and on ITC Facebook pages and Telegram channels. In general, the duration for each Master program is 2 or 3 years, classified as year 1 level (M1) and year 2 level (M2). For students holding ITC Engineer's degree, they are allowed to enter directly the M2 program, thus being able to spend only 1 year more in addition to 5 years in engineering program to complete the master's degree (5+1 program). However, this opportunity is selective.

In the academic year 2022-2023, there are in total 144 students (43 females) enrolled into 8 master programs and 63 students receive scholarships. For the double degree programs, there are 5 students registered at INSA Rennes for the M-MSE and 3 students registered at IMT Mine Alès for the M-MIC. On the other hand, there are 3 exchange master students from INSA Rennes enrolled in M-ECS. The details are presented in the table below.

**Number of Students enrolled in 2022-2023**

Master Programs	Partial or Full Scholarship Students				Non-scholarship Students				Total	Female
	M1		M2		M1		M2			
	Total	F	Total	F	Total	F	Total	F		
M-MSE	0	0	3	0	1	0	12	1	<b>16</b>	<b>1</b>
M-ETM	0	0	9	1	2	0	9	0	<b>20</b>	<b>1</b>
M-WEE	0	0	27	13	2	0	7	2	<b>36</b>	<b>15</b>
M-AIE	2	2	7	7	0	0	9	7	<b>18</b>	<b>16</b>
M-ECS	3	0	3	1	0	0	12	2	<b>18</b>	<b>3</b>
M-MIC	2	1	7	2	0	0	7	1	<b>16</b>	<b>4</b>
M-TIE	0	0	0	0	3	0	10	0	<b>13</b>	<b>0</b>
M-DAS	1	0	0	0	4	3	2	0	<b>7</b>	<b>3</b>
<b>Total</b>	<b>8</b>	<b>3</b>	<b>56</b>	<b>24</b>	<b>12</b>	<b>3</b>	<b>69</b>	<b>0</b>	<b>144</b>	<b>43</b>

**Sources of Scholarships/funding in 2022-2023**

N°	Type /Funder	Benefit	Number of beneficiaries
1	AFD-EU	100% Tuition Fee + Monthly allowance	25
2	HEIP-ITC	100% Tuition Fee/Monthly allowance	19
3	HEIP-NUBB	100% Tuition Fee	7
4	HEIP-SRU	100% Tuition Fee	6
5	HEIP-UHST	100% Tuition Fee	2
6	ITC 100%	100% Tuition Fee	2
7	ITC 50%	50% Tuition Fee	1
8	CE Fund	Tuition Fees/Research Fund	1
9	USAID	Tuition Fees/Research Fund	1
<b>Total</b>			<b>64</b>

**Graduates and Tracer study**

The number of graduated master students from the academic year 2010-2011 to 2021-2022 is in total 320 graduates (80 females). In the last academic year, there are 43 new graduates (19 females) in which 24 graduates (11 females) benefitted from partial and full scholarships. For graduates in M-MSE who received double degree from INSA Rennes (cf. section 3.3.3.2), there are in total 85

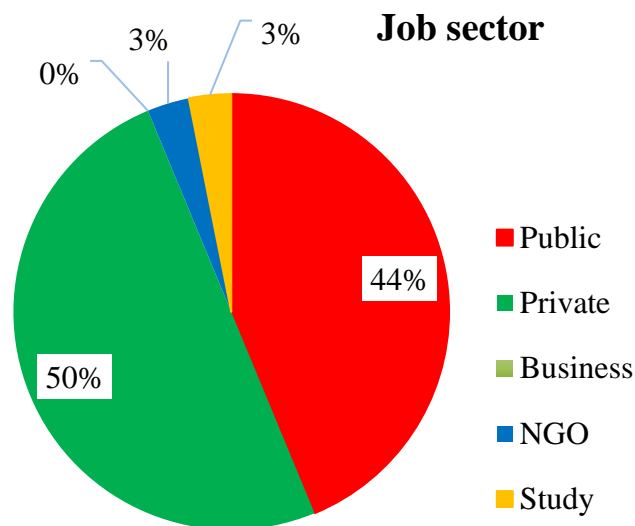
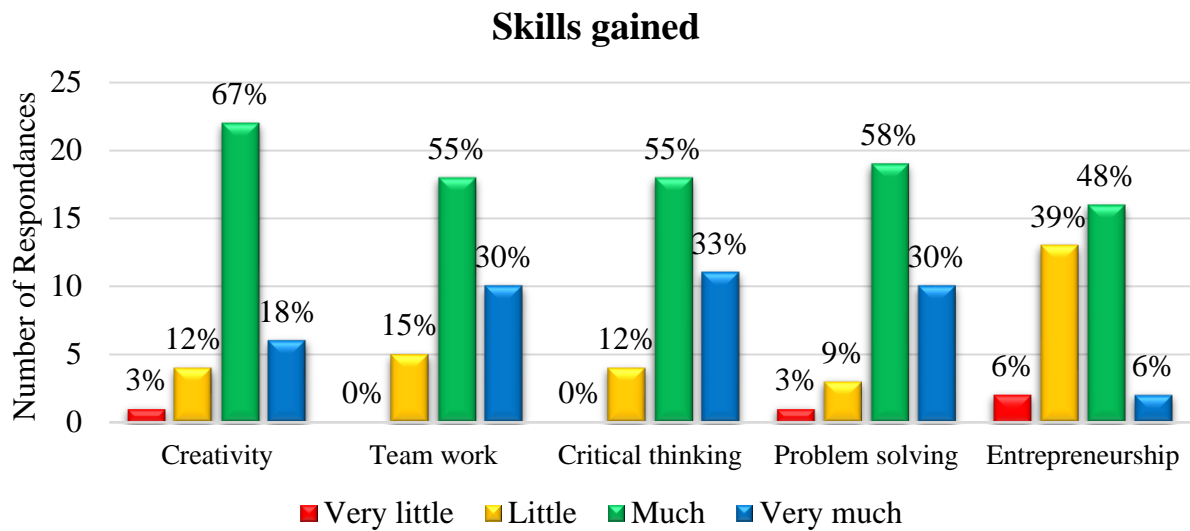
graduates (11 females) from the first to twelfth promotion, in which there are 4 new graduates (0 female) in 2021-2022. Lists of Master Thesis posted on the webpage of the Graduate School ([www.grads.itc.edu.kh](http://www.grads.itc.edu.kh)). The statistics of master graduates are reported in Table below.

***Number of Students graduated from master programs in 2021-2022***

Program	Number of students graduated in 2021-2022						Cumulative graduated students from Promotion 1		
	Partial or Full Scholarship Students		Non-scholarship students		Total	Female	Number of promotions	Total	Female
	Total	F	Total	F					
M-MSE	3	0	9	2	<b>12</b>	<b>2</b>	12	<b>108</b>	<b>13</b>
M-ETM	1	0	-	-	<b>1</b>	<b>0</b>	7	<b>28</b>	<b>0</b>
M-WEE	17	9	3	3	<b>20</b>	<b>12</b>	8	<b>99</b>	<b>39</b>
M-AIE	2	2	2	2	4	4	7	<b>30</b>	<b>22</b>
M-ECS	-	-	2	0	<b>2</b>	<b>0</b>	8	<b>28</b>	<b>4</b>
M-MIC	-	-	2	1	<b>2</b>	<b>1</b>	7	<b>22</b>	<b>1</b>
M-TIE	1	0	1	0	<b>2</b>	<b>0</b>	2	<b>5</b>	<b>1</b>
M-DAS	-	-	-	-	-	-	-	-	-
<b>Total</b>	24	11	19	8	<b>43</b>	<b>19</b>	<b>Total</b>	<b>320</b>	<b>80</b>

A survey on fresh graduates in 2021-2022 was conducted via Google Form. The objectives of this survey are to trace the employability and skills development of the graduates. Out of 43 fresh graduates, 33 (or 76%) of them responded to the questionnaires, which is an acceptable participation rate. The result of the survey is described as follows. When asking the question “Please evaluate the level of 5 following skills that you gained from your study in master program: creativity, teamwork, critical thinking, problem solving, and entrepreneurship (1 = Very little, 2 = Little, 3 = Much, 4 = Very much)”, more than 85% of them said that they gained (much or very much) the first four skills. However, 45% of them said that they did not gain (little or very little) skill in entrepreneurship. The observation on job sector also shows that none of them have run startup at fresh graduate.

Having a job is a success from the technical and softs skill of the graduate, but creating a job is competence that they should have received from the program. The course specifically on entrepreneurship we provided is not enough to make students become entrepreneurs. Each course in the program needs to stimulate the startup concept and make class assignment to become an investment project.



### 3.3.3.2. Program M-MSE

#### *Program's objective*

Master's Degree Program of Materials and Structural Engineering, codeveloped by professionals and experts of INSA Rennes, France, is designed to provide students expertise in research, innovation, and complex problem solving of diverse engineering topics related to materials properties and structural engineering. In this program, qualified students can apply for double degrees issued by ITC and by INSA Rennes, and they can choose to study at ITC or at INSA Rennes.

**Program Coordinator:** Dr. LIM Sovannvichet

#### *Curriculum and syllabus*

M-MSE is a full-time program (1 to 3 years), classified into two levels, M1 and M2, and is offered in two pathways: research-based and course-research pathways. For course-research pathway,

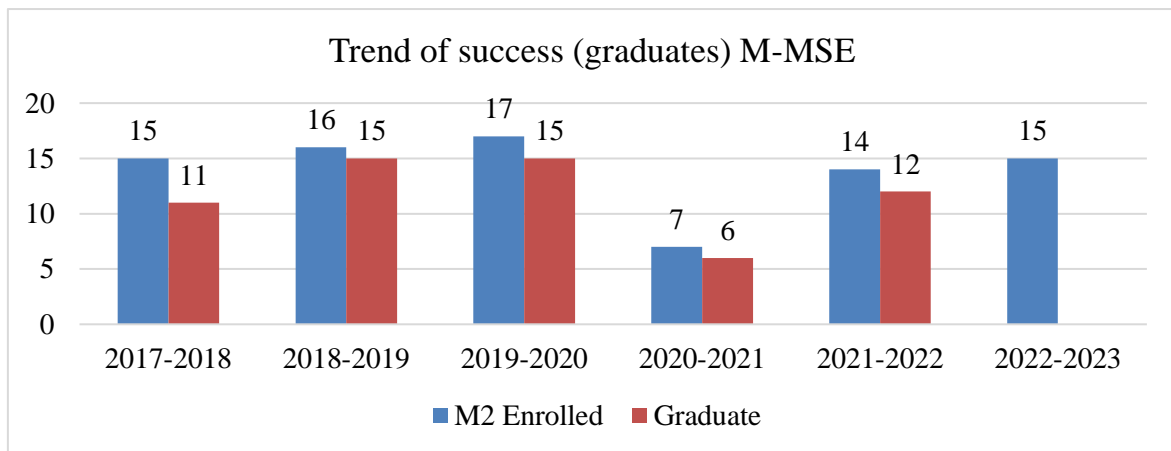
students are required to take 52 credits, 40 credits for coursework and 12 credits for the last semester report/thesis defense of their final project/thesis. For research-based pathway, students are required to take 54 credits, 12 credits for coursework and 42 credits for research activities, research results, thesis, and thesis defense. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/master-of-materials-and-structural-engineering/>

### ***Students and alumni***

Starting in 2010-2011 academic year, in total, 108 students (15 females) graduated from the program, in which 85 (11 females) of them got double degree from INSA Rennes. In the academic year 2022-2023, there are 16 students (1 female) enrolling in the program and the details are reported in the table below.

Pathway	M1		M2		Total	Female	Remark
	Total	F	Total	F			
Course-research	0	0	15	1	15	1	5 in Double-degree with INSA-Rennes
Research-based	1	0	0	0	1	0	
Total	1	0	15	1	16	1	

The time series of enrollments in M2 and numbers of graduates from 2017 to 2023 is displayed in the following figure. We observed that rate of success (ratio graduate/ M2 enrolled) is at least 73%.



### ***Scholarships***

In this academic year 2022-2023, 3 students obtain scholarships and funding support, 2 from ITC, 1 from research project under HEIP.

### ***Lecturers***

This program involves over 15 faculty members whose specializations are in materials science and engineering, civil engineering, and structural engineering, etc. All of them hold doctoral degrees from Europe, Japan, and ASEAN. They serve as teaching resources and superiors for the master students M-MSE. Some students are jointly supervised by professors from partner universities. The list of faculty members for M-MSE can be found in Annex 5 or in: <https://grads.itc.edu.kh/faculty-staff/>



### ***Theses and publications***

In the academic year 2021-2022, 12 master theses were successfully defended, in which 4 of them are co-supervised and defended to the committee with INSA Rennes. One of them was conducted under the research-based pathway. The list of published theses can be found in Annex 6 or here: <https://grads.itc.edu.kh/thesis-master/>

Regarding the dissemination and publication, 2 articles were published to national journals, 4 conference papers, 8 posters. The list of publications can be found in Annex 7 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-master/>

### **3.3.3.3. Program M-ETM**

#### ***Program's objective***

Master's Degree Program of Energy Technology and Management Engineering, technically supported by professionals and experts from European and ASEAN partner universities, is designed to provide students with technical skills, competencies, and expertise in the field of energy technology and management. Students will be equipped with advanced research methods, energy-related techniques and regulations, project management, and problem-solving methods. Graduates of M-ETM will be able to design effective techniques and tools, manage projects, and propose suitable solutions toward solving real-world energy-related problems.

***Program Coordinator:*** Dr. KIM Bunthern

#### ***Curriculum and syllabus***

M-ETM is a full-time program (1 to 3 years), classified into two levels, M1 and M2, and is offered in two pathways: research-based and course-research pathways. For course-research pathway, students are required to take 54 credits, 42 credits for coursework and 12 credits for the last semester report/thesis defense of their final project/thesis. For research-based pathway, students are required to take 54 credits, 12 credits for coursework and 42 credits for research activities, research results, thesis, and thesis defense. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/energy-technology-and-management/>

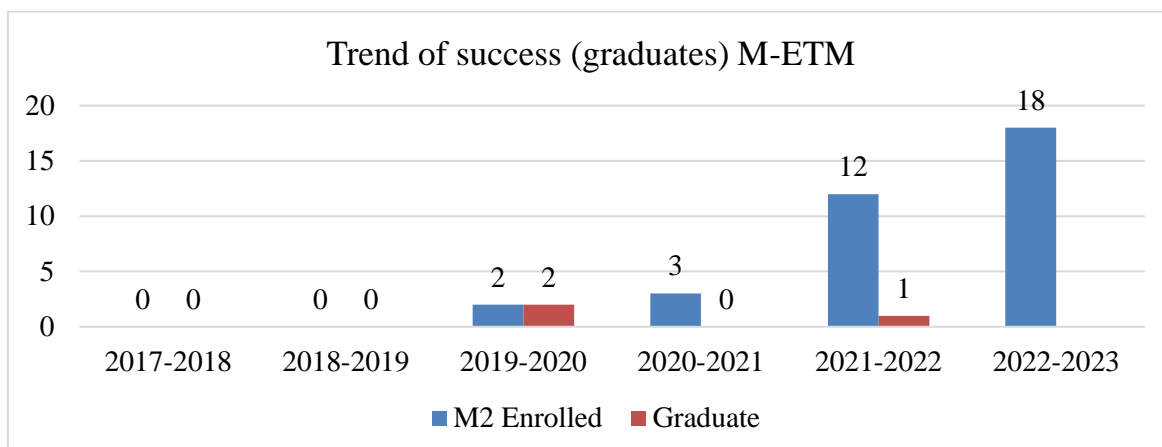
The curriculum of M-ETM is reviewed annually by the program's curriculum committee with consultation with stakeholders and partner universities, especially, with Institut Bundung Teknologi (ITB), Indonesia--a partner under HEIP project and with INP Grenoble, France. Currently, this program is under evaluation process and is evaluated by external expert panels (both technical and educational aspects) to see whether the program meets the modest standard criteria set by the higher education's educational experts from the MoEYS and the World Bank (WB).

#### ***Alumni and Students***

From 2016-2017 academic year, in total, 28 students graduated from the program. Currently, there are 20 students (1 female) enrolling in the program and the details are reported in the table below.

Pathway	M1		M2		Total	Female	Remark
	Total	F	Total	F			
Course-research	0	0	0	0	0	0	
Research-based	2	0	18	1	20	1	
Total	2	0	18	1	20	1	

The time series of enrollments and numbers of graduates from 2017 to 2023 is displayed in the following figure.



### **Scholarships**

In this academic year 2022-2023, eight students (1 female) obtain scholarships and funding support: 2 from HEIP-NUBB, 3 from HEIP-SRU and 3 HEIP-ITC (1 female).

### **Lecturers**

This program involves over 14 faculty members whose specializations range from electrical energy, renewable energy to energy power management. Half the faculty members (7) hold doctoral degrees from Europe, Japan, Korea, and ASEAN. They serve as teaching resources and supervisors for the master students M-ETM. The list of faculty members for M-ETM can be found in Annex 5 or in: <https://grads.itc.edu.kh/faculty-staff/>

### **Theses and publications**

In the academic year 2021-2022, three out of 8 students successfully defended their theses, yet only 1 student met the graduation requirements. All of them conducted the study under the research-based pathway. The list of published theses can be found in Annex 6 or here: <https://grads.itc.edu.kh/thesis-master/>

Regarding the dissemination and publication, 1 article was published in an international journal. The list of publications can be found in Annex 7 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-master/>

### **3.3.3.4. Program M-WEE**

#### **Program's objective**

Master's Degree Program of Water and Environmental Engineering, technically supported by professionals and experts from European and ASEAN partner universities, is designed to provide students with technical skills, competencies, and expertise in the field of water and environment. Students will be equipped with advanced research methods, water-related techniques, modern modeling tools and problem-solving methods, and after graduation, they will be able to design effective techniques and tools, manage projects, and propose suitable solutions toward solving real-world problems including water supply and sanitation, irrigation and drainage, disaster management, wastewater treatment and disposal systems, transport and disposal systems and drainage systems.

**Program Coordinator:** Dr. KET Pinnara

**Curriculum and syllabus**

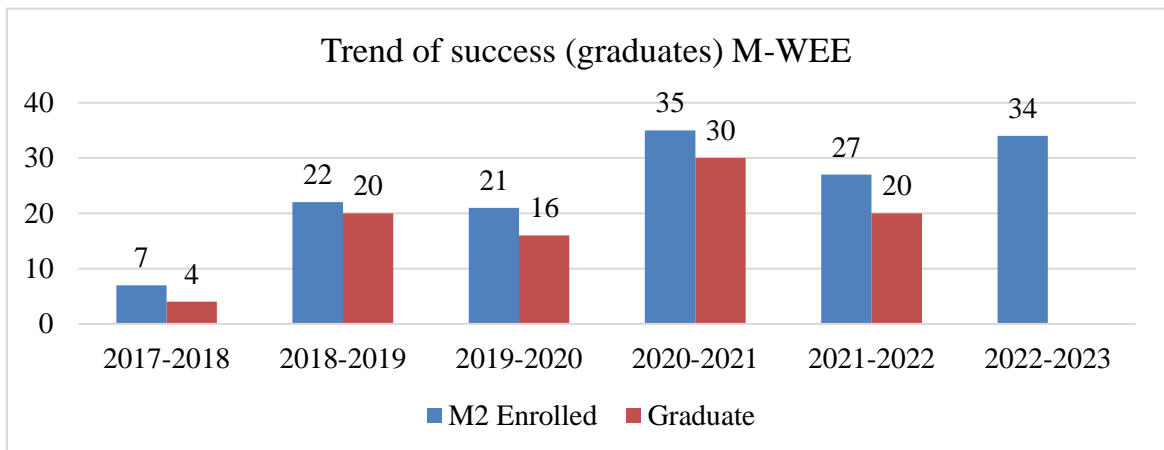
M-WEE is a full-time program (1 to 3 years), classified into two levels, M1 and M2, and is offered in two pathways: research-based and course-research pathways. For course-research pathway, students are required to take 54 credits, 42 credits for coursework and 12 credits for the last semester report/thesis defense of their final project/thesis. For research-based pathway, students are required to take 54 credits, 12 credits for coursework and 42 credits for research activities, research results, thesis and thesis defense. There are three specializations in M-WEE, namely, (1) Water Resources Engineering (WRE), (2) Urban Water and Sanitation Engineering (UWE), which receives full financial supports from AFD-EU to support both curriculum development and student scholarships, and (3) Environmental Engineering and Management (EEM). Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/master-of-water-and-enviromental-engineering/> The curriculum of M-WEE is reviewed annually by the program’s curriculum committee with consultation with stakeholders and partner universities, especially, with Chulalongkorn University (CU), Thailand--a partner under HEIP project and with Pau University, France. Currently, this program is under evaluation process and is evaluated by external expert panels (both technical and educational aspects) to see whether the program meets the modest standard criteria set by the higher education’s educational experts from the MoEYS and the World Bank (WB).

**Alumni and Students**

Starting in 2012-2013 academic year, in total, 99 students (39 females) graduated from the program. Currently, there are 36 students (15 females) enrolling in the program and the details are reported in the table below.

Pathway	M1		M2		Total	Female	Remark
	Total	F	Total	F			
Course-research	0	0	31	13	31	13	
Research-based	2	0	3	2	5	2	
Total	2	0	34	15	36	15	

The time series of enrollments and numbers of graduates from 2017 to 2023 is displayed in the following figure.



### ***Scholarships***

From 2018 to 2022, 94 students (43 females) received AFD-EU scholarships that cover tuition fees, monthly living allowance, research, and internship funds. In this 2022-2023 academic year, there are in total 28 scholarship students (18 females): 25 students (16 females) obtain AFD-EU scholarships and 3 students (2 females) obtain HEIP-ITC under the framework of upgrading staff's qualification.

### ***Lecturers***

This program involves over 20 faculty members whose specializations are in water resources, hydrology, environmental engineering, ... Most of them hold doctoral degrees from Europe, Japan, Korea, and ASEAN. They serve as teaching resources and superiors for the master students M-WEE. Some students are jointly supervised by professors from partner universities. The list of faculty members for M-WEE can be found in Annex 5 or in: <https://grads.itc.edu.kh/faculty-staff/>

### ***Theses and publications***

In the academic year 2021-2022, twenty theses were published. The list of published theses can be found in Annex 6 or here: <https://grads.itc.edu.kh/thesis-master/>  
Regarding the dissemination and publication, 4 articles were published: 3 in international journals and 1 in ITC journal, and 1 conference paper. The list of publications can be found in Annex 7 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-master/>

### **3.3.3.5. Program M-AIE**

#### ***Program's objective***

Master's Degree Program of Agro-industrial Engineering, technically supported by professionals and experts from European and ASEAN partner universities, is designed to provide students with technical skills, competencies, and expertise in the field of agro-industrial engineering. Students will be equipped with advanced research methods, food processing and development techniques, business and entrepreneurship skills and problem-solving methods. As graduates of M-AIE, they will be able to design innovative techniques and processes, manage projects and propose suitable solutions toward solving real-world problems in food industries. Graduates can also apply their knowledge and skills to do develop their own businesses.

***Program Coordinator:*** Dr. TY Boreborey

#### ***Curriculum and syllabus***

M-AIE is a full-time program (1 to 3 years), classified into two levels, M1 and M2, and is offered in two pathways: research-based and course-research pathways. For course-research pathway, students are required to take 54 credits, 42 credits for coursework and 12 credits for the last semester report/thesis defense of their final project/thesis. For research-based pathway, students are required to take 54 credits, 12 credits for coursework and 42 credits for research activities, research results, thesis and thesis defense. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/master-of-agro-industrial-engineering/>

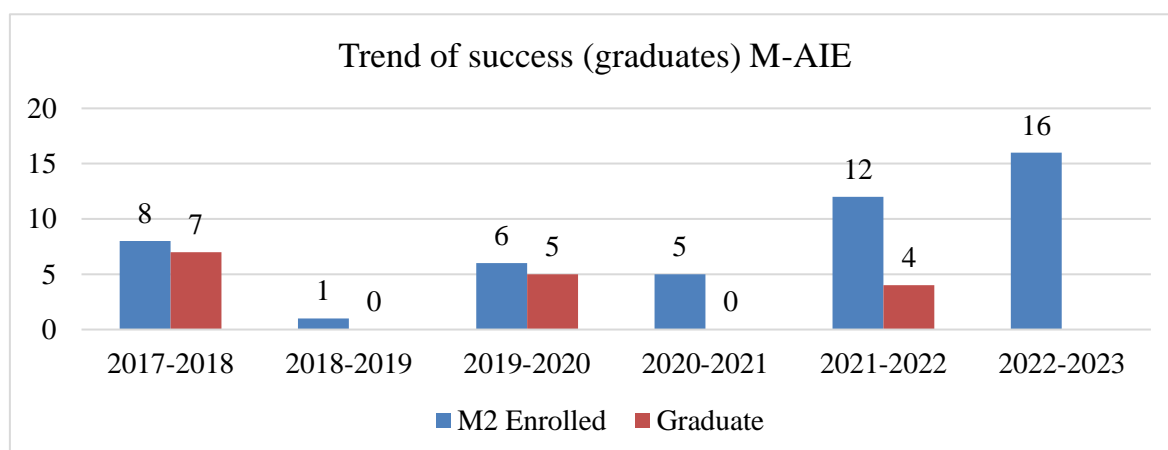
The curriculum of M-AIE is reviewed annually by the program’s curriculum committee with consultation with stakeholders and partner universities, especially, with Kasetsart University (KU), Thailand--a partner under HEIP project and AgroSup Dijon, France. Currently, this program has just been evaluated by external expert panels (both technical and educational aspects) to see whether the program meets the modest standard criteria set by the higher education’s educational experts from the MoEYS and the World Bank (WB).

### ***Alumni and Students***

Starting in the academic year 2017-2018, in total, 30 students graduated from the program. Currently, there are 18 students (16 females) enrolling in the program and the details are reported in the table below.

Pathway	M1		M2		Total	Female	Remark
	Total	F	Total	F			
Course-research	0	0	0	0	0	0	
Research-based	2	2	16	14	18	16	
Total	2	2	16	14	18	16	

The time series of enrollments and numbers of graduates from 2017 to 2023 is displayed in the following figure.



### ***Scholarships***

In this academic year 2022-2023, 4 students (4 females) obtain scholarships and funding support from HEIP-ITC under the framework of upgrading staff’s qualification.

### ***Lecturers***

This program involves over 15 faculty members whose specializations are in food science and technology, food processing, agro-industrial engineering, chemical engineering, ... All of them hold doctoral degrees from Europe, Japan, and ASEAN. They serve as teaching resources and superiors for the master students M-AIE. Some students are jointly supervised by professors from partner universities. The list of faculty members for M-AIE can be found in Annex 5 or in: <https://grads.itc.edu.kh/faculty-staff/>

### ***Theses and publications***

In the academic year 2021-2022, four master theses were successfully defended. All of them were conducted under the research-based pathway. The list of published theses can be found in Annex 6 or here: <https://grads.itc.edu.kh/thesis-master/>

Regarding the dissemination and publication, 4 articles were published to national journals. The list of publications can be found in Annex 7 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-master/>

### **3.3.3.6. Program M-ECS**

#### ***Program's objective***

Master's Degree Program of Computer Science aims to provide students with essential skills and advanced research methods, in the field of Computer Science, Artificial Intelligence (AI) applications and Information Security, to address the current trends of fast-growing technology and digitalization.

***Program Coordinator:*** Mr. HENG Rathpisey

#### ***Curriculum and syllabus***

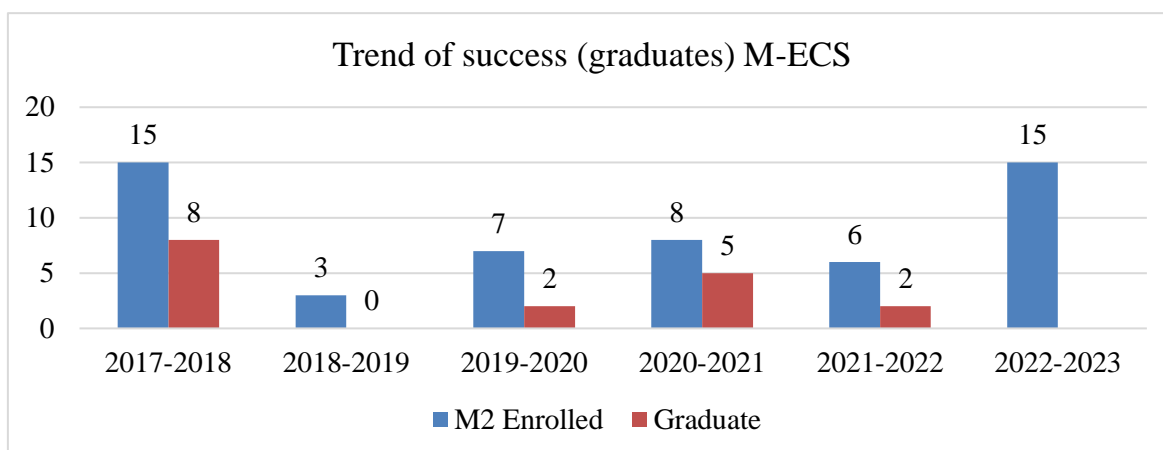
M-ECS is a full-time program, classified into two levels, M1 and M2, and is offered in two pathways: research-based and course-research pathways. For course-research pathway, students are required to take 54 credits, 42 credits for coursework and 12 credits for the last semester report/thesis defense of their final project/thesis. For research-based pathway, students are required to take 54 credits, 12 credits for coursework and 42 credits for research activities, research results, thesis and thesis defense. Detailed curriculum can be found on the website: <http://grads.itc.edu.kh/computer-science/>

#### ***Alumni and Students***

Starting in academic 2013-2014, in total, 28 students (4 females) graduated from the program. Currently, there are 18 students (3 females) enrolling in the program and the details are reported in the table below.

Pathway	M1		M2		Total	Female	Remark
	Total	F	Total	F			
Course-research	0	0	11	2	11	2	
Research-based	3	0	4	1	7	1	
Total	3	0	15	3	18	3	

The time series of enrollments and numbers of graduates from 2017 to 2023 is displayed in the following figure.



### ***Scholarships***

In this academic year 2022-2023, three students obtain scholarships and funding support, 2 ITC scholarships, 1 HEIP-NUBB scholarship.

### ***Lecturers***

This program involves over 11 faculty members whose specializations are in software engineering, IT, machine learning, deep learning, AI, information security, computer vision, NLP, data science, etc. Among these, 5 of them hold doctoral degrees from Europe, Japan, Korea, and ASEAN. They serve as teaching resources and superiors for the master students M-ECS. Some students are jointly supervised by professors from partner universities. The list of faculty members for M-ECS can be found in Annex 5 or in: <https://grads.itc.edu.kh/faculty-staff/>

### ***Theses and publications***

In the academic year 2021-2022, two master theses were successfully defended. All of them were conducted under the research-based pathway. The list of published theses can be found in Annex 6 or here: <https://grads.itc.edu.kh/thesis-master/>  
Regarding the dissemination and publication, 2 articles were published to national journals. The list of publications can be found in Annex 7 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-master/>

### **3.3.3.7. Program M-MIC**

#### ***Program's objective***

Multimilitary master's degree Program of Mechatronics, Information and Communication Engineering, technically supported by professionals and experts from stakeholders and European partner university, is designed to equip students with a broad range of skills and knowledge that seek the applications in engineering disciplines ranging from mechanical design to software engineering as well as those more purely focused on mechatronics, automation, and robotics. Graduates from this program are employed in industries ranging from mining to manufacturing, agriculture, and defense.

***Program Coordinator:*** Dr. PEC Rothna

## Curriculum and syllabus

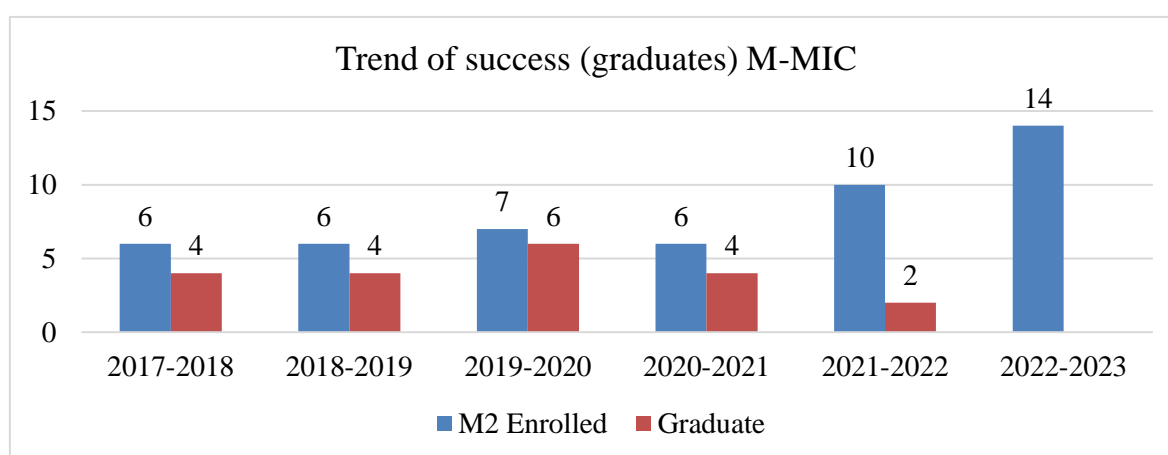
M-MIC is a full-time program, classified into two levels, M1 and M2, and is offered in two pathways: research-based and course-research pathways. For course-research pathway, students are required to take 54 credits, 42 credits for coursework and 12 credits for the last semester report/thesis defense of their final project/thesis. For research-based pathway, students are required to take 54 credits, 12 credits for coursework and 42 credits for research activities, research results, thesis and thesis defense. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/master-of-mechatronics-information-and-communication-engineering/> The curriculum of M-MIC is reviewed annually by the program's curriculum committee with consultation with stakeholders and partner university, namely, IMT Mines Alès, France--a partner under HEIP project. Currently, this program is under evaluation process and will be evaluated by external expert panels (both technical and educational aspects) to see whether the program meets the modest standard criteria set by the higher education's educational experts from the MoEYS and the World Bank (WB).

## Alumni and Students

Starting in academic 2013-2014, in total, 22 students (1 female) graduated from the program. Currently, there are 16 students enrolling in the program and the details are reported in the table below.

Pathway	M1		M2		Total	Female	Remark
	Total	F	Total	F			
Course-research	0	0	0	0	0	0	
Research-based	2	1	14	3	16	4	3 in Double-degree with IMT Mines Alès, France
Total	2	1	14	3	16	4	

The time series of enrollments and numbers of graduates from 2017 to 2023 is displayed in the following figure.



## Scholarships

In this academic year 2022-2023, 9 students (3 females) obtain scholarships and funding support, 2 Eiffel scholarships, 2 Erasmus+ + HEIP-ITC, 1 HEIP-NUBB, 2 HEIP-SRU, 2 HEIP-ITC.



### ***Lecturers***

This program involves over 15 faculty members whose specializations are in electronics, mechanical engineering, control system, mechatronics, robotics, automation, machine learning, and data science, IT, telecommunication engineering, etc. Most of them hold doctoral degrees from Europe, Japan, Korea, and ASEAN. They serve as teaching resources and superiors for the master students M-MIC. Some students are jointly supervised by professors from partner universities (Annex 5) or <https://grads.itc.edu.kh/faculty-staff/>.

### ***Theses and publications***

In the academic year 2021-2022, two master theses were successfully defended. All of them were conducted under the research-based pathway. The list of published theses can be found in Annex 6 or here: <https://grads.itc.edu.kh/thesis-master/>

Regarding the dissemination and publication, 2 articles were published to national journals. The list of publications can be found in Annex 7 in the webpage of graduate school: <https://grads.itc.edu.kh/publication-master/>

### **3.3.3.8. Program M-TIE**

#### ***Program's objective***

Master's Degree Program of Transport Engineering is designed to provide students expertise in research, innovation, and complex problem solving of diverse engineering topics related to transport engineering and public infrastructure. It addresses the solution toward land, air and water transportation issues including traffic congestion and accidents, public transport systems, transport policy, logistic networks, energy consumption, aviation issues, environmental matters, etc.

***Program Coordinator:*** Dr. PHUN Vengkheang

#### ***Curriculum and syllabus***

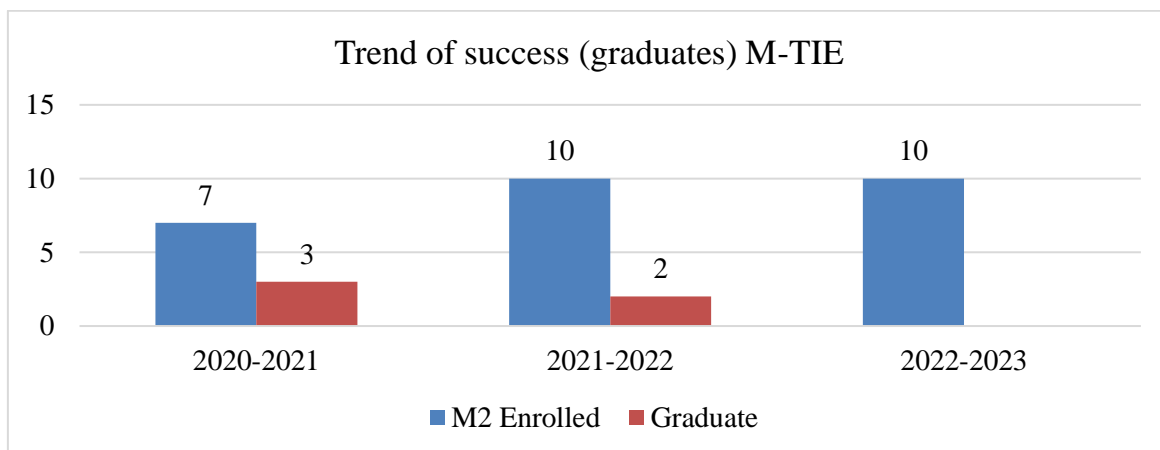
M-TIE is a full-time program, classified into two levels, M1 and M2, and is offered in two pathways: research-based and course-research pathways. For course-research pathway, students are required to take 52 credits, 40 credits for coursework and 12 credits for the last semester report/thesis defense of their final project/thesis. For research-based pathway, students are required to take 54 credits, 12 credits for coursework and 42 credits for research activities, research results, thesis and thesis defense. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/transport-and-infrastructure-engineering/>

#### ***Alumni and Students***

Starting in academic 2020-2021, in total, five students graduated from the program. Currently, there are 13 students enrolling in the program and the details are reported in the table below.

Pathway	M1		M2		Total	Female	Remark
	Total	F	Total	F			
Course-research	0	0	0	0	0	0	
Research-based	3	0	10	0	13	0	
Total	3	0	10	0	13	0	

The time series of enrollments and numbers of graduates from 2020 to 2023 is displayed in the following figure.



### ***Scholarships***

In this academic year 2022-2023, there are no scholarship students.

### ***Lecturers***

This program involves over 14 faculty members whose specializations are in transport engineering, logistics, civil engineering, public infrastructure, etc. Among these, 11 of them hold doctoral degrees from Europe, Japan, Korea, and ASEAN. They serve as teaching resources and superiors for the master students M-TIE. Some students are jointly supervised by professors from partner universities. The list of faculty members for M-TIE can be found in Annex 5 or in: <https://grads.itc.edu.kh/faculty-staff/>

### ***Theses and publications***

In the academic year 2021-2022, two master theses were successfully defended. All of them were conducted under the research-based pathway. The list of published theses can be found in Annex 6 or here: <https://grads.itc.edu.kh/thesis-master/>

Regarding the dissemination and publication, 2 articles were published: 1 in an international journal and 1 national journal. The list of publications can be found in the webpage of graduate school (Annex 7) or <https://grads.itc.edu.kh/publication-master/>.

### **3.3.3.9. Program M-DAS**

#### ***Program's objective***

Master's Degree Program of Data Science, codeveloped by professionals and experts of IMT and ENSIIE, France, uses real-world problems and situations to prepare graduates for roles as strategic thought leaders who leverage predictive modeling to drive decision making. Students will develop in-depth understanding of key technologies in data science and business analytics: data mining, machine learning, visualization techniques, predictive modeling and Statistics.

***Program Coordinator:*** Dr. PHAUK Sökkhey

### ***Curriculum and syllabus***

M-DAS is a full-time program, classified into two levels, M1 and M2, and is offered in two pathways: research-based and course-research pathways. For course-research pathway, students are required to take 54 credits, 42 credits for coursework and 12 credits for the last semester report/thesis defense of their final project/thesis. For research-based pathway, students are required to take 54 credits, 12 credits for coursework and 42 credits for research activities, research results, thesis and thesis defense. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/master-of-data-science/>

The curriculum of M-DAS is reviewed annually by the program's curriculum committee with consultation with stakeholders and partner universities, especially, with ENSIIE, France--a partner under HEIP project. Currently, this program has just been evaluated successful by external expert panels (both technical and educational aspects) to see whether the program meets the modest standard criteria set by the higher education's educational experts from the MoEYS and the World Bank (WB).

### ***Alumni and Students***

There have been no graduates from this program yet as it just started in the academic year 2021-2022. Currently, there are 7 students enrolling in the program and the details are reported in the table below.

Pathway	M1		M2		Total	Female	Remark
	Total	F	Total	F			
Course-research	5	3	0	0	5	3	
Research-based	0	0	2	0	2	0	
Total	5	3	2	0	7	3	

### ***Scholarships***

In this academic year 2022-2023, 1 student obtain scholarships and funding support from HEIP-ITC project under the framework of upgrading staff's qualifications.

### ***Lecturers***

This program involves over 15 faculty members whose specializations are in software engineering, IT, machine learning, deep learning, AI, NLP, data science, data mining, mathematics, and statistics, etc. Among these, 7 of them hold doctoral degrees from Europe, Japan, Korea, and ASEAN. They serve as teaching resources and superiors for the master students M-DAS. Some students are jointly supervised by professors from partner universities. The list of faculty members for M-DAS can be found in Annex 5 or in: <https://grads.itc.edu.kh/faculty-staff/>

### ***Theses and publications***

Neither theses nor publications have been produced by this new launch program.

### 3.3.4. Doctoral Programs

#### 3.3.4.1. Overview

The doctoral programs at ITC were authorized by the Ministry of Education, Youth and Sport by the **Prakas No. 909 AYK. BrK**, dated the 29<sup>th</sup> September 2017, to operate 5 programs as listed in table below.

No	Abbrev.	Name in English	First promotion
<b>I</b>	<b>DEng</b>	<b>Doctor of Engineering</b>	<b>2017</b>
1	D-FTN	Food Technology and Nutrition	2017 (Cotuelle)
2	D-MSS	Materials Science and Structures	2017 (Cotuelle)
3	D-MIT	Mechatronics and Information Technology	2018 (Cotuelle)
4	D-WAE	Water and Environment	2018 (Cotuelle)
5	D-ETM	Energy Technology and Management	2018 (Cotuelle)

In the academic year 2022-2023, fifty-four doctoral students are enrolled, in which 28 of them are in cotutelle (12 with universities in Belgium, 16 with universities in France). All students enrolled receive financial support from several projects and organizations. PhD graduates have jobs and most of them are working in academic institutions.

#### *Statistics of students*

Name	Program										Total	F
	WAE		FTN		MIT		MSS		ETM			
Number	Total	F	Total	F	Total	F	Total	F	Total	F		
<b>Total number of PhD graduates</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>12</b>	<b>7</b>
PhD Graduated in 2021-22	2	2	2	2	-	-	3	2	1	0	-	-
<b>Total number of PhD enrolments by 2022-23</b>	<b>5</b>	<b>4</b>	<b>10</b>	<b>6</b>	<b>21</b>	<b>0</b>	<b>9</b>	<b>3</b>	<b>9</b>	<b>2</b>	<b>54</b>	<b>15</b>
PhD Enrolled in year 1	2	2	2	1	2	0	1	1	-	-	7	4
PhD Enrolled in year 2	-	-	6	5	2	0	2	0	3	0	13	5
PhD Enrolled in year 3	3	2	2	0	11	0	6	2	3	0	25	4
PhD Enrolled in year 4	-	-	-	-	2	0	-	-	3	2	5	2
PhD Enrolled in year 5	-	-	-	-	4	0	-	-	-	-	4	0
<b>Scholarship</b>	<b>5</b>	<b>4</b>	<b>10</b>	<b>6</b>	<b>21</b>	<b>0</b>	<b>9</b>	<b>3</b>	<b>9</b>	<b>2</b>	<b>54</b>	<b>15</b>

### Sources of funding

Sources of Funding*	Number of Beneficiaries	Number of Beneficiaries (Female)
HEIP	14	5
BGF	11	4
NPIC	11	0
ARES	10	3
CCCA	1	0
Erasmus+	1	1
IRD	1	1
KIT	1	0
MoE	1	0
NIPTIC	1	0
NUM	1	0
USAID-WoM	1	1
<b>Total</b>	<b>54</b>	<b>15</b>

\* 16 (7 females) of the 54 students, who are ITC staffs, receive co-funding from ITC.

#### 3.3.4.2. Program D-WAE

##### *Program's Objective*

D-WAE, in conjunction with the Research Unit of Water and Environment under IC-ITC, is one of the five doctoral programs of ITC, established in 2017, recognized by the Ministry of Education Youths and Sports. D-WAE was developed by the relevant experts in Water and Environment Engineering such as lecturers and researchers at ITC with the support from partner universities and institutions. Students can register for a single degree at ITC, or a degree under cotutelle (co-supervision) between ITC and a partner university in France. The cotutelle program is selective and upon the agreement between ITC and the partner university.

D-WAE students will develop in-depth understanding of the key technologies in their research area of Water and Environmental Engineering. D-WAE students will work closely with researchers of WAE research unit (generally, one of them is the student's supervisor) and they also can be co-supervised by the professors from our partner universities or research institutions (France, Belgium, Japan, etc.).

##### *Curriculum and syllabus*

D-WAE is a full-time program (3 to 6 years), consist of 54 credits: 21 credits for coursework (Supplementary/Prerequisite and Doctoral courses, and PhD Orientation courses), and 33 credits for research and thesis (3 credits for detailed research proposal, 6 credits for national/international publications, 3 credits for the presentation in scientific conference, 3 credits for seminars, 18 credits for Thesis writing and defense). This program trains doctoral students to be specialized in their advanced research and development field including hydrology, water supply and wastewater, urban environment management, disaster and climate system and other relevant fields. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/doctor-of-water-and-environment/>.

### *Students and Alumni*

Starting from the academic year 2017-2018 to 2022-2023, four students (2 females) have graduated from the program. Currently, there are 4 students (3 females) enrolling in the program and the details are reported in the table below. The list of current and graduated students including their including research topic can be found on the website <https://grads.itc.edu.kh/>

#### *List of current D-WAE students in 2022-2023*

No.	Name	Sex	First Reg.	Funding	Cotutelle		Research topic
					Yes/No	University	
1	PHOEURN Chan Arun	F	2020	HEIP	Yes	Université de Liège	Integrated approach of precise irrigation and sustainable laboratory development: the focus on rice farming
2	LAI Chenda	F	2020	HEIP	Yes	Université de Liège	Optimization of Soil Nutrients for Rice Cultivation Using Experimental and Modeling Approach
3	HIN Chandara	M	2020	NPIC	No		Development of Eco-Friendly and Low-Cost Wastewater Treatment System as an On-site Product
4	CHEA Seila	F	2022	USAID-WoM	No		Assessment of Plastic Debris Distribution in Coastal and Mekong River systems of Cambodia towards separation process development

### *Lecturers and Supervisors*

This program involves over 15 faculty members whose specializations are in water resources, hydrology, environmental engineering, and relevant fields. All of them hold doctoral degrees from Europe, Japan, and ASEAN. They are involving in the program for teaching or/and supervising the D-WAE students. Some students are jointly supervised by professors from partner universities. The list of faculty members in D-WAE program can be found in Annex 8 or on the website <https://grads.itc.edu.kh/faculty-staff/>.

### *Theses and publications*

Four theses were published in the academic year 2020-2021 and 2021-2022. The list of published theses can be found in Annex 9 or here: <https://grads.itc.edu.kh/thesis-phd/>.

Regarding the dissemination and publication, 7 articles were published in international journals. The list of publications is presented in Annex 10 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-phd/>

### 3.3.4.3. Program D-ETM

#### *Program's Objective*

D-ETM, in conjunction with the Research Unit of Energy Technology and Management under RIC-ITC, is one of the five doctoral programs of ITC, established in 2017, recognized by the Ministry of Education Youths and Sports. D-ETM was developed by the relevant experts in Energy Technology and Management including the lecturers and researchers at ITC with the support from partner universities and institutions. Students can register for a single degree at ITC, or a degree under cotutelle (co-supervision) between ITC and a partner university in France. The cotutelle program is selective and upon the agreement between ITC and the partner university.

D-ETM students will develop in-depth understanding of the key technologies and engineering in their research area of Energy Technology and Management. D-ETM students will work closely with researchers of ETM research unit (generally, one of them is the student's supervisor) and they also can be co-supervised by the professors from our partner universities or research institutions (France, Belgium, Japan, etc.).

#### *Curriculum and syllabus*

D-ETM is a full-time program (3 to 6 years), consist of 54 credits: 21 credits for coursework (Supplementary/Prerequisite and Doctoral courses, and PhD Orientation courses), and 33 credits for research and thesis (3 credits for detailed research proposal, 6 credits for national/international publications, 3 credits for the presentation in scientific conference, 3 credits for seminars, 18 credits for Thesis writing and defense). This program trains doctoral students to be specialized in their respective advanced research and development field such as new and renewable energy, energy efficiency and conservation, smart grid, energy management and other relevant fields. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/doctor-of-energy-technology-and-management/>.

#### *Students and Alumni*

Starting from the academic year 2017-2018 to 2022-2023, one student (0 female) has graduated from the program. Currently, there are 9 students (2 female) enrolling in the program and the details are reported in the table below. The list of current and graduated students including their including research topic can be found on the website <https://grads.itc.edu.kh/>

*List of current D-ETM students in 2022-2023*

No.	Name	Sex	First Reg.	Funding	Cotutelle		Research topic
					Yes/No	University	
1	PECH Sopheap	F	2019	HEIP-ITC	No		Source Rock Evaluation and Depositional Environment of Sediments Characterization in Southern (Block VIII), Kampong-Som Basin, onshore of Cambodia
2	SIO Sreymean	F	2019	HEIP-ITC	No		Applied geophysical methods for geological structures and hydrocarbon potential investigation in Kampong Som Basin, Onshore of Cambodia

3	ETH Oudaya	M	2019	HEIP-ITC	No		Study on Impacts of the Integration of Renewable Energy Resources on Distribution System considering Micro Grid Scenario
4	HEANG Latin	M	2020	CCCA	No		Study on impact of heat stress on construction worker's productivity and economic in Cambodia
5	CHEA Vabotra	M	2020	MoE	No		Study on the Impact of Heat Stress on Garment Worker Productivity and Economy in Cambodia
6	MEAS Saran	M	2020	NPIC	No		Optimization of an Integrated Hybrid Onboard Charger with High Efficiency of MPPT Solar Charger for 3-Wheel Solar E-Rickshaw and Electric Vehicles
7	CHHLONH Chhith	M	2021	BGF-HEIP	Yes	Université Grenoble Alpes	Optimal fault location, isolation, and restoration procedure for LV microgrids
8	NEAK Kimhak	M	2021	HEIP-ITC	No		The impacts Assessment of Gasoline and Diesel Quality in Cambodian Fuel Market on Economic and Environment
9	CHHENG Monyvathna	M	2021	HEIP	No		Design and Techno-economic analysis of plug-in electric vehicle-integrated Hybrid solar PV charging system for Cambodia

### ***Lecturers and Supervisors***

This program involves over 15 faculty members whose specializations are in new and renewable energy, energy efficiency and conservation, smart grid, energy management and relevant fields. All of them hold doctoral degrees from Europe, Japan, Korea, and ASEAN. They are involving in the program for teaching or/and supervising the D-ETM students. Some students are jointly supervised by professors from partner universities. The list of faculty members in D-ETM program can be found in Annex 8 or on the website <https://grads.itc.edu.kh/faculty-staff/>.

### ***Thesis and publication***

1 thesis was published in the academic year 2021-2022. The list of published theses can be found in Annex 9 or here: <https://grads.itc.edu.kh/thesis-phd/>.

Regarding the dissemination and publication, 3 articles were published in international journals. The list of publications is presented in Annex 10 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-phd/>.



### 3.3.4.4. Program D-FTN

#### *Program's Objective*

D-FTN, in conjunction with the Research Unit of Food Technology and Nutrition under RIC-ITC, is one of the five doctoral programs of ITC, established in 2017, recognized by the Ministry of Education Youths and Sports. D-FTN was developed by the relevant experts in Food Science, Food Engineering, Food Technology and Nutrition including the lecturers and researchers at ITC with the support from partner universities and institutions. Students can register for a single degree at ITC, or a degree under cotutelle (co-supervision) between ITC and a partner university in France. The cotutelle program is selective and upon the agreement between ITC and the partner university. D-FTN students will develop in-depth understanding of the key technologies and engineering in their research area of Food Science, Food Engineering, Food Technology and Nutrition. D-FTN students will work closely with researchers of FTN research unit (generally, one of them is the student's supervisor) and they also can be co-supervised by the professors from our partner universities or research institutions (France, Belgium, Japan, etc.).

#### *Curriculum and syllabus*

D-FTN is a full-time program (3 to 6 years), consist of 54 credits: 21 credits for coursework (Supplementary/Prerequisite and Doctoral courses, and PhD Orientation courses), and 33 credits for research and thesis (3 credits for detailed research proposal, 6 credits for national/international publications, 3 credits for the presentation in scientific conference, 3 credits for seminars, 18 credits for Thesis writing and defense). This program trains doctoral students to be specialized in their respective advanced research and development field such as Food technology development, Food processing and engineering, Food product development, Food quality and safety, Sustainability of food systems, Food contaminant surveillance and control and other relevant fields. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/doctor-of-food-technology-and-nutrition/>.

#### *Students and Alumni*

Starting from the academic year 2017-2018 to 2022-2023, three students (3 female) has graduated from the program. Currently, there are 10 students (6 female) enrolling in the program and the details are reported in the table below. The list of current and graduated students including their including research topic can be found on the website <https://grads.itc.edu.kh/>

#### *List of current D-FTN students in 2022-2023*

No.	Name	Sex	First Reg.	Funding	Cotutelle		Research topic
					Yes/No	University	
1	NGET Sovannmony	M	2020	BGF-HEIP	Yes	Université de Nantes	Comparative study of conventional and innovative technologies for a better conservation of meat and fish products in interest of Cambodia
2	LY Luka	M	2020	HEIP	Yes	0	Control of Different Soy Sauces Sold in the Markets and the Development of

							Soy Sauce Fermentation Process
3	THANH Channmuny	F	2021	BGF-ITC/ HEIP	Yes	Montpellier SupAgro	Nutritional Interest of Different Fish Species and Valorization of By-Products
4	CHIN Lyda	F	2021	BGF-ITC/ HEIP	Yes	Montpellier SupAgro	Impact of initial compositions and processing techniques on aromatic quality of Mango
5	PHAL Sivchheng	F	2021	BGF-ITC	Yes	INSA Toulouse	New insights into Pharmaceuticals and Personal Care Products (PPCPs) removal from waters
6	SAY Manit	M	2021	HEIP	No		Development of cooking oil processes for commercialization
7	MAO Socheata	F	2021	ITC-Erasmus+/ HEIP	Yes	Agro-Sup Dijon	Lactic Acid Bacteria Strain Diversity Depending on the Origin of the Product
8	OEUM Kakada	F	2021	IRD	Yes	University of Montpellier	Exploration and exploitation of root-associated bacteria for a sustainable rice agriculture in Cambodia
9	MOM Vattana	F	2022	ARES-CAMBOFISH	Yes	Université de Liège	Improvement the safety of processed fish farm products
10	LAY Sovannmony	M	2022	ARES-CAMBOFISH	Yes	Université Catholique de Louvain	Improvement of nutritional profiles of fish through plant-based feed

### ***Lecturers and Supervisors***

This program involves over 15 faculty members whose specializations are in Food technology development, Food processing and engineering, Food product development, Food quality and safety, Sustainability of food systems, Food contaminant surveillance and control and other relevant fields. They hold doctoral degrees from Europe, Japan, US, or ASEAN. They are involving in the program for teaching or/and supervising the D-FTN students. Some students are jointly supervised by professors from partner universities. The list of faculty members in D-FTN program can be found in Annex 8 or on the website <https://grads.itc.edu.kh/faculty-staff/>.

### ***Thesis and publication***

Three theses were published in the academic years 2020-2021 and 2021-2022. The list of published theses can be found in Annex 9 or here: <https://grads.itc.edu.kh/thesis-phd/>  
Regarding the dissemination and publication, 5 articles were published in international journals. The list of theses and publication are presented in the webpage of graduate school: The list of publications is presented in Annex 10 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-phd/>.

### 3.3.4.5. Program D-MIT

#### *Program's Objective*

D-MIT, in conjunction with the Research Unit of Mechatronics and Information Technology under RIC-ITC, is one of the five doctoral programs of ITC, established in 2017, recognized by the Ministry of Education Youths and Sports. D-MIT was developed by the relevant experts in Mechanical engineering, robotics, electronics and automation, information and technology including the lecturers and researchers at ITC with the support from partner universities and institutions. Students can register for a single degree at ITC, or a degree under cotutelle (co-supervision) between ITC and a partner university in France. The cotutelle program is selective and upon the agreement between ITC and the partner university.

D-MIT students will develop in-depth understanding of the key technologies and engineering in their research area of mechanical engineering, robotics, electronics and automation, information and technology, data science, computer vision and other related fields. D-MIT students will work closely with researchers of MIT research unit (generally, one of them is the student's supervisor) and they also can be co-supervised by the professors from our partner universities or research institutions (France, Belgium, Japan, etc.).

#### *Curriculum and syllabus*

D-MIT is a full-time program (3 to 6 years), consist of 54 credits: 21 credits for coursework (Supplementary/Prerequisite and Doctoral courses, and PhD Orientation courses), and 33 credits for research and thesis (3 credits for detailed research proposal, 6 credits for national/international publications, 3 credits for the presentation in scientific conference, 3 credits for seminars, 18 credits for Thesis writing and defense). This program trains doctoral students to be specialized in their respective advanced research and development field such as intelligent mechatronics, artificial intelligence, telecommunication and internet of things, optimization for operation research and supply chain, electronics, and communication and other relevant fields. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/doctor-of-mechatronics-and-information-technology/>

#### *Students and Alumni*

Starting from the academic year 2017-2018 to 2022-2023, one student (0 female) has graduated from the program. Currently, there are 21 students (0 female) enrolling in the program and the details are reported in the table below. The list of current and graduated students including their including research topic can be found on the website <https://grads.itc.edu.kh/>

#### *List of current D-FTN students in 2022-2023*

No.	Name	Sex	First Reg.	Funding	Cotutelle		Research topic
					Yes/No	University	
1	HEAN Samboeun	M	2018	NIPTIC	No		Research & development mathematical model as a machine learning system for Cambodia's digital economy
2	LAY Vathna	M	2018	ARES	No		Secure and interoperable communication protocols for industrial automata
3	SIV Ratha	M	2018	ARES-ITC	Yes	Université de Mons	Crowds Analysis and Augmentation

4	SOK Kim Heng	M	2018	ARES-ITC	Yes	Université de Namur	Building trustable and privacy aware IoT systems using blockchain and smart contacts
5	KEAN Jeudy	M	2019	BGF-ITC/HEIP	Yes	INP Toulouse	Studying and sizing the electromagnetic reverberation chamber with meta-material walls for the study of the Electromagnetic Compatibility (EMC)
6	BAN Sam	M	2019	BGF-ITC	Yes	IMT Mines Albi	Developing Countries' Transportation Enhancement through the Application of Physical Internet Paradigms
7	TEP Sovichea	M	2020	HEIP	Yes	INP Toulouse	Power quality monitoring based on the deployment of sensors in the grid and parameter measurement
8	UN Sok Oeun	M	2020	NPIC	No		Cambodia disaster back-up communication for natural disaster by emergency amateur radio operator
9	SRUN Channareth	M	2020	NPIC	No		Control Structure for Grid-Connected Photovoltaic systems
10	SREY Sophyn	M	2020	NPIC	No		State and parameter estimation, and flight control for Unmanned Aerial Vehicle (UAV)
11	THUOK David	M	2020	NPIC	No		Optimization for multi agent in system integrity protection
12	CHHOUR Vongchivorn	M	2020	NPIC	No		Parameter estimation for actuator using Kalman filter
13	PEOU Thura	M	2020	NPIC	No		System integration for autonomous navigation for mobile robots using deep learning and ROS
14	KARTHIKEYAN Dinesh Kumar	M	2020	KIT-ITC	No		Image or Video Visualization of Text (Book) using Generative Adversarial Networks (GAN) / Educational GAN(EduGAN)
15	YEAN Sopheak	M	2020	NPIC	No		Parameter Identification and Automatic Control for a System with Friction
16	SOK Song	M	2020	HEIP-NUBB	No		Development of Non-Intrusive Appliance Load

							Monitoring and Diagnostic System for Residential Home
17	KUY Movsun	M	2020	ARES	Yes	Université de Mons	Automatic security assessment of IoT devices using machine learning
18	PICH Reatrey	M	2021	ARES-ITC-HEIP	Yes	Université de Namur	Anomaly Detection in networks based on DNS's data analysis
19	BUN Menghorng	M	2021	HEIP	Yes	Toulouse INP	Study of feasibility and control of solar electric tuktuk
20	CHIN Chan Daraly	M	2022	BGF-ITC	Yes	Toulouse INP	The vehicle as an intelligent thing
21	SRENG Vichet	M	2022	NUM	No		Automatic License plate number recognition system for Vehicle in Cambodia (ALPR)

### ***Lecturers and Supervisors***

This program involves over 15 faculty members whose specializations are in mechatronics, electronic and automation engineering, data science, robotics, and relevant fields. They hold doctoral degrees from Europe, Japan, or ASEAN. They are involving in the program for teaching or/and supervising the D-MIT students. Some students are jointly supervised by professors from partner universities. The list of faculty members in D-MIT program can be found in Annex 8 or on the website <https://grads.itc.edu.kh/faculty-staff/>.

### ***Theses and publications***

One thesis was published in the academic year 2020-2021. The list of published theses can be found in Annex 9 or here: <https://grads.itc.edu.kh/thesis-phd/>.

Regarding the dissemination and publication, 2 articles were published in international journals. The list of theses and publication are presented in the webpage of graduate school: The list of publications is presented in Annex 10 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-phd/>

### **3.3.4.6. Program D-MSS**

#### ***Program's Objective***

D-MSS, in conjunction with the Research Unit of Materials Science and Structure (MSS) under RIC-ITC, is one of the five doctoral programs of ITC, established in 2017, recognized by the Ministry of Education Youths and Sports. D-MSS was developed by the relevant experts in material science, structural engineering, mechanical engineering, and related fields including the lecturers and researchers at ITC with the support from partner universities and institutions. Students can register for a single degree at ITC, or a degree under cotutelle (co-supervision) between ITC and a partner university in France. The cotutelle program is selective and upon the agreement between ITC and the partner university.

D-MSS students will develop in-depth understanding of the key technologies and engineering in their research area of material science and engineering, structural engineering, polymer composites, failure analysis of steel structure and other materials, numerical modeling and experimental analysis of infrastructure and materials. D-MSS students will work closely with researchers of MSS research unit (generally, one of them is the student’s supervisor) and they also can be co-supervised by the professors from our partner universities or research institutions (France, Belgium, Japan, etc.).

### ***Curriculum and syllabus***

D-MSS is a full-time program (3 to 6 years), consist of 54 credits: 21 credits for coursework (Supplementary/Prerequisite and Doctoral courses, and PhD Orientation courses), and 33 credits for research and thesis (3 credits for detailed research proposal, 6 credits for national/international publications, 3 credits for the presentation in scientific conference, 3 credits for seminars, 18 credits for Thesis writing and defense). This program trains doctoral students to be specialized in their respective advanced research and development field such as material science and engineering, structural engineering, polymer composites, failure analysis of steel structure and other materials, numerical modeling and experimental analysis of infrastructure and materials and other relevant fields. Detailed curriculum can be found on the website: <https://grads.itc.edu.kh/doctor-of-materials-science-and-structures/>.

### ***Students and Alumni***

Starting from the academic year 2017-2018 to 2022-2023, three student (2 female) have graduated from the program. Currently, there are 9 students (5 females) enrolling in the program and the details are reported in the table below. The list of current and graduated students including their including research topic can be found on the website <https://grads.itc.edu.kh/>.

***List of current D-MSS students in 2022-2023***

No.	Name	Sex	First Reg.	Funding	Cotutelle		Research topic
					Yes /No	University	
1	OUCH Vanthet	M	2020	BGF	Yes	INSA Rennes	Behavior of Timber-concrete Composite Slab with new Notched Connectors
2	OENG Thaileng	M	2020	BGF	Yes	INSA Rennes	Analysis of Composite Beams Taking Into Account of Uplift at The Interface
3	HOUR Sokaon	M	2020	NPIC	No		FEM to Predict Effects of Plastic Deformation on Mechanical Properties of a Structural Steel
4	KEAT Rayuth	M	2020	NPIC	No		Study on Furnace Glass Heat Treatment Technology
5	TAING Kimnenh	F	2020	ARES-COMBOdIA	Yes	Université de Liège	Green BIM – Analysis of BIM approach for design a bioclimatic building
6	KETH Kannary	F	2020	ARES-COMBOdIA	Yes	Université Libre de Bruxelles	Managing the interdisciplinary collaboration in Construction 4.0: ITC case

7	HENG Kimhong	M	2021	HEIP	Yes	Université de Rennes 1	A study of high strength-to-weight ratio glass beam
8	LONG Makara	M	2021	ARES-ITC	Yes	Université de Liège	Sustainable design conception integrated in architecture project in BIM environment
9	HENG Muoy Yi	F	2022	HEIP	Yes	Université de Liège	Quality assurance of concrete pile integrity using Non-destructive method

### *Lecturers and Supervisors*

This program involves over 15 faculty members whose specializations are material science and engineering, structural engineering, polymer composites, failure analysis of steel structure and other materials, numerical modeling and experimental analysis of infrastructure and materials, and relevant fields. They hold doctoral degrees from Europe, Japan, or ASEAN. They are involving in the program for teaching or/and supervising the D-MSS students. Some students are jointly supervised by professors from partner universities. The list of faculty members in D-MSS program can be found in Annex 8 or on the website <https://grads.itc.edu.kh/faculty-staff/>.

### *Theses and publications*

Three theses were published in the academic years 2020-2021 and 2021-2022. The list of published theses can be found in Annex 9 or here: <https://grads.itc.edu.kh/thesis-phd/>.

Regarding the dissemination and publication, 3 articles were published in international journals. The list of publications is presented in Annex 10 or in the webpage of graduate school: <https://grads.itc.edu.kh/publication-phd/>.

### **3.3.5. Other activities**

On 31 May 2023, ITC organized a dissemination workshop on **“Research Finding and Consultation on the Improvement of the Master Program of Urban Water and Sanitation Engineering”** through the Provincial Water Supply and Sanitation Project (PWSSP) with financial support of Agence Française de Développement (AFD), along with the European Commission (EC) and Asian Development Bank (ADB).

The dissemination workshop on “Research Finding and Consultation on the Improvement of the Master Program of Urban Water and Sanitation Engineering” aims to share the key findings and the way forwards of the research projects and achievement of the master program of urban water and sanitation to the relevant stakeholders and donors. In addition, it will be an opportunity for the stakeholders to discuss on ways to sustain the research and master program and the different needs of the stakeholders. There were 74 participants joining the workshop from various key institutions relevant to water and environmental sectors.

On 6 June 2023, Graduate School organized a lecture seminar for ITC faculty members on **“Assessment for Enhancing Quality Teaching and Learning in Higher Education in Cambodia: Principles and Practices”**. The seminar emphasized on (i) to design assessment criteria for course assessment and (ii) to develop an assessment plan for the student-centered learning activities. Thirteen young faculty members from different departments joined the seminar,

instructed by Dr MENDOZA Norman Biliwang, Post-doctoral Fellow, Department of Curriculum and Instruction, Faculty of Education and Human Development, The Education University of Hong Kong (EdUHK) and Ms YANG Danlin Lynn, Program Manager of FEHD, EdUHK.

### **3.3.6. Challenges and Way Forwards**

The number of graduates in the academic year 2021-2022 is lower than our target with the ratio 43/63, as most of M2 students who enrolled in research-based pathway need to fulfill the publication requirement. On average, it takes more than 1.5 years to achieve this. To cope with this difficulty, more restrictive recruitment and extending the duration of study can be considered. Another challenge is the reliance of scholarships of our full-time master students, as some main projects such as AFD-EU, one of the main scholarship funding sources, will be concluded by 2023. Only a few master students who have already been employed were sent to join our programs by their employers. To cope with this challenge, we will do more communications, especially between ITC and stakeholders, about our programs and consider credit-accumulating programs in the form of module-based programs. In so doing, we can find more funding sources for students and enable more bachelor's holders already employed to take part in the programs. They can join parts of our training to get certified credits, then for a suitable duration, number of credits earned, and when they wish to enroll in our program, they can do it within our full-time framework.

### **3.3.7. Conclusion**

For this academic year, 8 full-time master programs are operated (with 8 research-based programs). The number of enrollments in academic year 2022-2023 increased by 18%, compared with academic year 2021-2022. Around 45% of our master students are scholarship recipients (full or partial scholarships). There are in total 320 Master graduates (80 females) from our programs. Whereas, in the academic year 2021-2022, there were 43 Master graduates (19 females) from 7 master's programs. By March 2023, under HEIP projects, 4 Master programs, namely M-AIE, M-WEE, M-DAS and M-ETM have been evaluated by external experts' panels. From the released reports, the results of evaluations of these programs are satisfactory. Satisfactory results and comments from the evaluators serve as models and guidelines for the rest of the program to follow. To promote our master programs and attract more students, we will increase our communications, especially between ITC and relevant stakeholders, about our programs and consider credit-accumulating programs in the form of module-based programs.

For doctoral programs, for the academic year 2022-2023, there are 54 students enrolled in the 5 fields. Among these, 28 (12 females) doctoral students registered in cotutelle programs with French and Belgian partner universities. In total, 12 students obtained their doctoral degrees (11 double-degree students), 4 students in 2020-2021 and 8 students in 2021-2022. To promote our doctoral programs, “*Thèse CIFRE*” style programs should be implemented and collaboration with private sectors is important.



# **4. Capacity Building and Professor Dispatch**

## **4.1. Capacity Building (2022-2023)**

### **4.1.1. Long-term overseas capacity building for lecturers and students**

From year to year, the number of teachers and students undergoing postgraduate training abroad is increasing remarkably. The 2022-2023 academic year bears witness to this. Indeed, the ITC has 17 lecturers (4 post-doctorates, 12 doctoral students, 1 master) and 52 students (2 engineering degrees, 45 masters, 4 doctoral students and 1 post-doctorate). They are distributed in different partner establishments around the world. For more information, please see Annex 11 and 12.

### **4.1.2. Short-term overseas capacity building for lecturers and students**

Within the framework of international cooperation, 92 missions for lecturers and 31 missions for students (a total of 123 missions) were carried out abroad. For more information, please see Annex 13 and 14.

Obviously, the professional development missions for ITC lecturers are essential to ensure the quality of teaching. For students, they allow them to acquire new scientific experiences with foreign lecturers.

### **4.1.3. Local capacity building for lecturers and students in the form of seminars**

In addition to the training missions abroad, thanks to the cooperation with ministries, NGOs and other partners in Cambodia, our teachers and students from different departments have participated in 28 training courses in the form of local academic seminars organized by these different partners.

Such training would allow teachers and students to acquire new knowledge and to have exchanges with trainers. In addition, it is an opportunity for lecturers and students to interact with participants from different organizations. Details can be found in Annex 15.

In addition, it should be noted that we have other seminars organized by the University Industry-Linkage (UIL) which are not included in this table.

## **4.2. Professor dispatch at ITC (2022-2023)**

In general, teachers from our ITC partner universities can come on international mobility to ITC. For this school year 2022-2023, we had 32 mobility of teachers from abroad.

1. M.VERNIER Nicolas, IUT d'Orsay, Paris Saclay University
2. Mme YAM Navy, IUT d'Orsay, Paris Saclay University
3. M. LECOEUR Philippe, IUT d'Orsay, Paris Saclay University
4. M.VERNIER Nicolas, IUT d'Orsay, Paris Saclay University
5. Mme YAM Navy, IUT d'Orsay, Paris Saclay University
6. Mme AURELIE Carnins, IUT d'Orsay, Paris Saclay University
7. Mme ANNE Migan, IUT d'Orsay, Paris Saclay University
8. M. BRUNO Darracq, IUT d'Orsay, Paris Saclay University
9. M. PASCAL Aubert, IUT d'Orsay, Paris Saclay University
10. M. BASTIEN Vincke, IUT d'Orsay, Paris Saclay University
11. Prof. Maurice Fadel, Toulouse INP

12. Prof. Pascal Maussion, Toulouse INP
13. Dr. Gaetan Blandin, Universitat de Girona
14. Prof. Ignasi Rodriguez-Roda Layret, Universitat de Girona
15. Dr. Antonina Torrens Armengol, FUNDACIO SOLIDARITAT UB
16. Assoc-Prof. Sunil Herat, Griffith University
17. Prof. Melissa E. Lenczewski, Northern Illinois University
18. Prof. Jacques Mercadier, Université de Pau et des Pays de l'Adour
19. Prof. Aurore Degré, University of Liege
20. Prof. Vincent CHAPURLAT, IMT Mines Alès
21. Prof. Sebastien HARISPE, IMT Mines Alès
22. Prof. Riadh DHAOU, Toulouse INP
23. Prof. Nathalie RAVEU, Toulouse INP
24. Prof. Gregory ZACHAREWICZ, IMT Mines Alès
25. Dr. Guillaume Lacombe, CIRAD
26. Dr. Marine Hermann, IRD
27. Dr. Sylvain OUILLON, IRD
28. Dr. NGO Duc Thanh, University of Science and Technology Hanoi
29. Dr. Hubert Loisel, Université du Littoral Côte d'Opale
30. Dr. Charles VERPOORTER, from Université du Littoral Côte d'Opale
31. Prof. CHARLES Yann, Université Paris 13
32. Prof. Ignasi Rodriguez-Roda Layret, Universitat de Girona (UdG)

Details can be found in Annex 16.

# **5. Research and Innovation Center**

## 5.1. Background of Research and Innovation at ITC

Institute of Technology of Cambodia (ITC) contributes to maintain sustainable development and decrease the inequalities within our society through its internal functioning and opening-up to foreign countries and the way their students get admitted. ITC enjoys numerous cooperative agreements with European, Regional, and local Universities. These agreements help improve the quality of the educational program, create new degrees, and enable collaboration in new research projects and mobility of researchers, lecturers and students. ITC also enjoys privileged relations with a great number of Cambodian companies and multinationals which have branches throughout Cambodia.

Beside the education as engineer and technician, ITC also committed to promote the research activity by gathering the alumni, offering Master and PhD degree program locally and internationally through partnership programs, approaching the industries and local enterprises, and collaborating researches both local and international universities. To promote research activities, ITC has created 2 statuses, i.e., contracted lecturer-researcher with 50% of their time contributed to research (established on 31 May 2010) and full-time researcher (established on 18 June 2012). Further, ITC's first **Research and Innovation Center (RIC) was** established which is supported by JICA on July 14, 2015. In 2017, five research units have been established: (1) Energy Technology and Management (ETM), (2) Food Technology and Nutrition (FTN), (3) Mechatronics and Informatics Technology (MIT), (4) Materials Science and Structure (MSS), and (5) Water and Environment (WAE).

To sustain the research quality as well as to evaluate and orientate the research activities, RIC organizes the meeting of all lecturer-researchers/full-time researchers semi-annually at the beginning and at the end of academic year. In addition, the monthly meeting has been internally conducted by research unit and quarterly meeting has been conducted with participated by RIC management team. The main objective of the meeting is to recall the statuses, contracts, and evaluation criteria for researcher performance. At the same way, Head of research unit as well as RIC management team can solve the issue immediately as well can advise to researchers who have slow progress. In this academic year, under the recovery of covid-19 pandemic, the meeting has been conducted physically. Prior to the meeting, all researchers are required to submit their research progress and challenges in the form of PowerPoint to their Unit Head followed by their presentations and new projects granted.

This chapter is made to report the information related to research and innovation that have been conducting, especially for academic year 2022-2023 to a very important scientific council of ITC. The scientific council composed of the Direction Board, Director and deputy directors of RIC, Deans of faculties and a representative from each Department chaired by Director General of ITC, is in charge of orientation and evaluation of scientific research and teaching program of the institute.

## 5.2. Research and Publication

### 5.2.1. Research Project and Researcher

With regard the engineering field and commercialization of research, ITC has employed up to 110 researchers in this 2022-2023 academic year (this number includes also those who hold Admin positions but also conducted research). This number as well as that of research project is constantly maintained around 95 research projects in 2022-2023, the data of the last five years are shown in Figure 13.

Figure below presents the evolution of researcher numbers between 2018-2019 and 2022-2023. Importantly, the number of fulltime researchers increased remarkably in 2021-2022 due to the support from HEIP projects, BGF and MoEYS, and others supports.

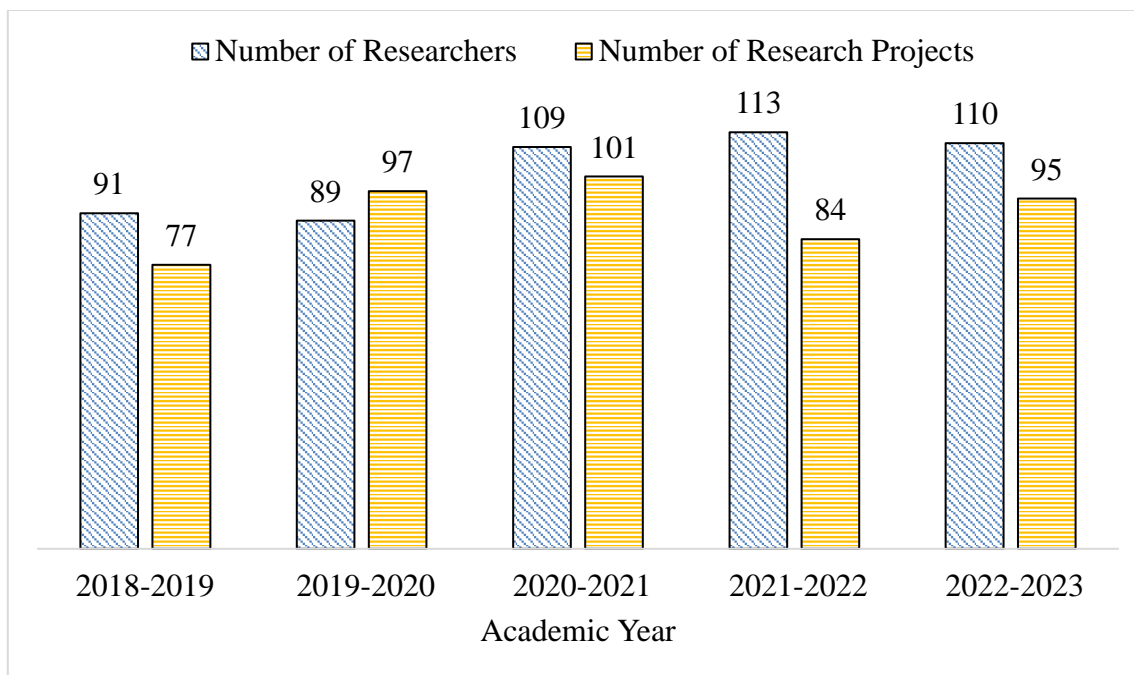


Figure 13. Number of researchers and research projects in last 5 years.

### 5.2.2. Research Project and Researcher by Research Unit for 2022-2023

This academic year (2022-2023), 95 projects are on-going and implemented by 110 Researchers classified into three categories: Senior researchers<sup>1</sup>, Lecturer-Researchers, and full-time researchers.

- Energy Technology and Management-ETM (11 projects) : 19 Researchers including 10 Senior researchers, 03 Lecturer-Researchers, and 06 full-time Researchers.
- Food Technology and Nutrition-FTN (26 projects) : 28 Researchers including 10 Senior researchers, 08 Lecturer-Researchers and 10 full-time Researchers.
- Mechatronics and Information Technology-MIT (19 projects) : 21 researchers including 09 Senior researchers, 03 Lecturers-researchers, and 09 full-time researchers.
- Material Sciences and Structure-MSS (20 projects) : 15 Researchers including 8 Senior researchers, 02 Lecturer-Researchers, and 05 full-time Researchers.
- Water and Environmental-WAE (19 projects): 27 researchers including 7 Senior researchers, 15 Lecturer-Researchers, and 05 Full-time Researchers.

Figure 14 below presents the number of projects and the number of researchers by research unit (2022-2023). The fact that all unit, number of project is less than number of researcher because all research units participated by many senior researchers who share the project with full-time researchers and/or lecturer-researchers. However, MSS shows the higher number of research projects compare with number of researchers in the unit.

<sup>1</sup> Senior researchers in our term refer to those under management teams and group direction who have not been contracted as researchers but have been conducting researches on their own projects.

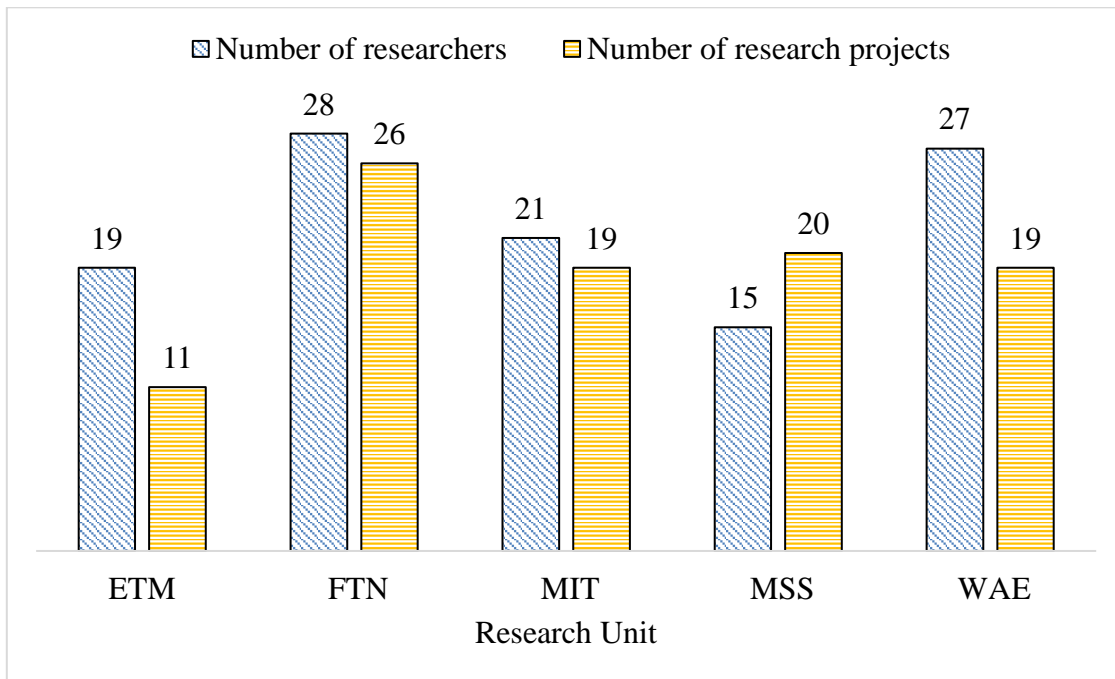


Figure 14. Research projects by each research unit (2022-2023).

Researches are conducted with the support and/or under the collaboration with ARES-CCD (Belgium), AgroSup Dijon (France), AUF, JST/JICA (Japan), Cambodia Climate Change alliance (Cambodia), AUN/Seed-Net JICA, JSPS (Japan), Kanazawa University (Japan), Ambassade de France, INSA de Rennes (France), ACIAR (Australia), CDRI (Cambodia), USAID (United States of America), US-Airforce (United states of America), Takashi Foundation (Japan), Kurita Foundation (Japan), United Kingdom Trust Fund, Pierre Fable (France), Researcher Institute of Development (IRD-France), Ministry of Environment (Cambodia) and Higher Education Improvement Program (Cambodia).

Through the collaboration with Japanese partners, a grand research project has been awarded to ITC entitled "*Establishment of conservation platform for Tonle Sap Lake, Cambodia*" from April 2016 to March 2022. This project requires a participation of 40 researchers in which 23 from GRU and GCA of ITC, and RUPP, and other 20 Japanese partners (Tokyo Institute of Technology, Yamagata University, Institute for Global Environmental Studies), in collaboration with Ministry of Environment, Ministry of Water Resources and Meteorology and Tonle Sap Authority. This project provided a lot of achievement such as two policy recommendations, a platform for aquatic ecosystem research (PAER), two technical books, 120 journal publications and 6 international symposiums. Following this successful project, a new project focusing "Establishment of Risk Management Platform for Air Pollution in Cambodia". This project is participated by both Japanese and Cambodian counterparts such as Kanazawa University, Nagasaki University, Osaka Ohtani University, Partical Plus Co., Ltd., Institute of Technology of Cambodia, University of Health and Science, National Univesity of Management and Ministry of Environment. The project was start in July 2022 and expected to last for five years.

Under the support of JICA, totally 49 Laboratory Based Enducation-LBE (42 projects completed respectively in March 2023 and 7 new projects in 2023-2024 are on going) projects for strengthening engineering education and research for industrial development in Cambodia have been extended the awards to implement until March 2024. This project has produced more than 150 papers within 4 years period.

### 5.2.3. Classification of Research Project by Unit

Research projects have been classified according to the partners involved in the implementation of the project. Projects are classified into National, Regional and International cooperation levels (Figure 15). National cooperation stands for collaboration and partners within local institutions and SMEs, whereas regional cooperation covers the cooperation partners within Asian countries, and international cooperation includes all other countries outside Asian.

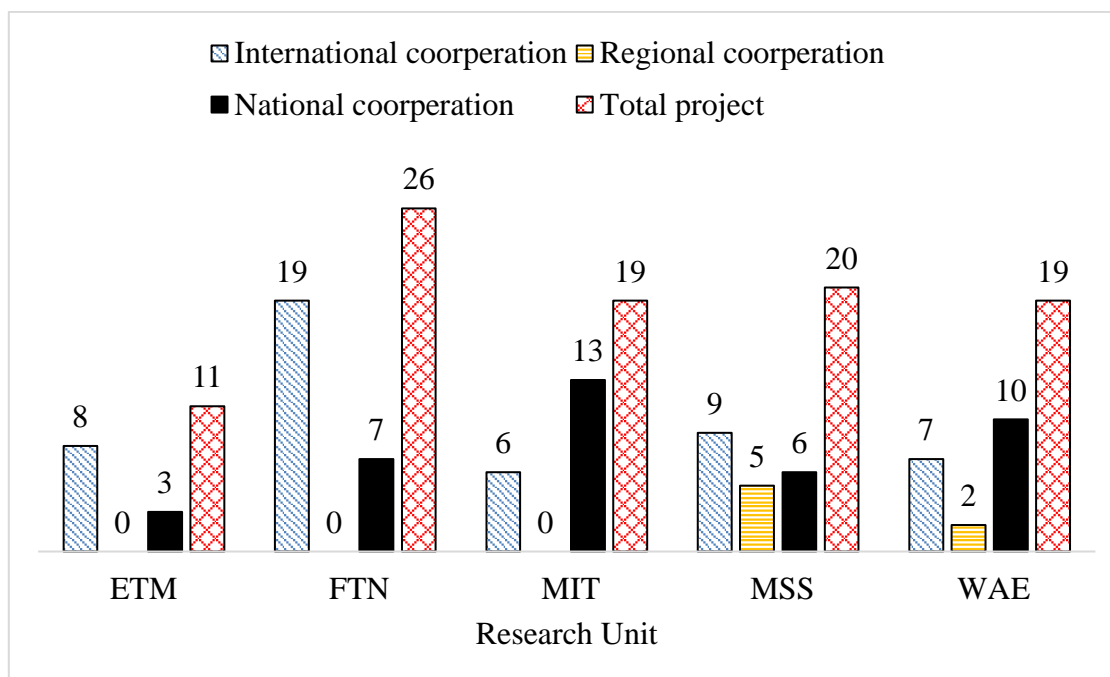


Figure 15. Classification of research project by research unit (2022-2023).

The projects are also classified into two types: Basic research project, Applied and development research, Start-up and Tech-transfer (**Error! Reference source not found.**). In our terms, Basic research is an approach to knowledge-specific that seeks to expand knowledge in a field of study. Applied and development research are those research activities, which focus on providing innovative or practical solutions to a specific problem and contribute to development at any scale. Among the 95 on-going projects, there are 21 Basic researches and 74 Applied and development researches. Start-up<sup>2</sup> and Tech-transfer<sup>3</sup> are under RIC development plan for 2030.

<sup>2</sup> Start-up projects refer to an organization or a process of forming or managing business that uses innovation as the core of its business model under uncertainty conditions and has risks, yet high potential to growth fast (source: Techo Startup Center).

<sup>3</sup> Tech-transfer projects refer to the research projects that could lead to the process of commercialization by technology licensing or Intellectual Property (IP) rights transferred.



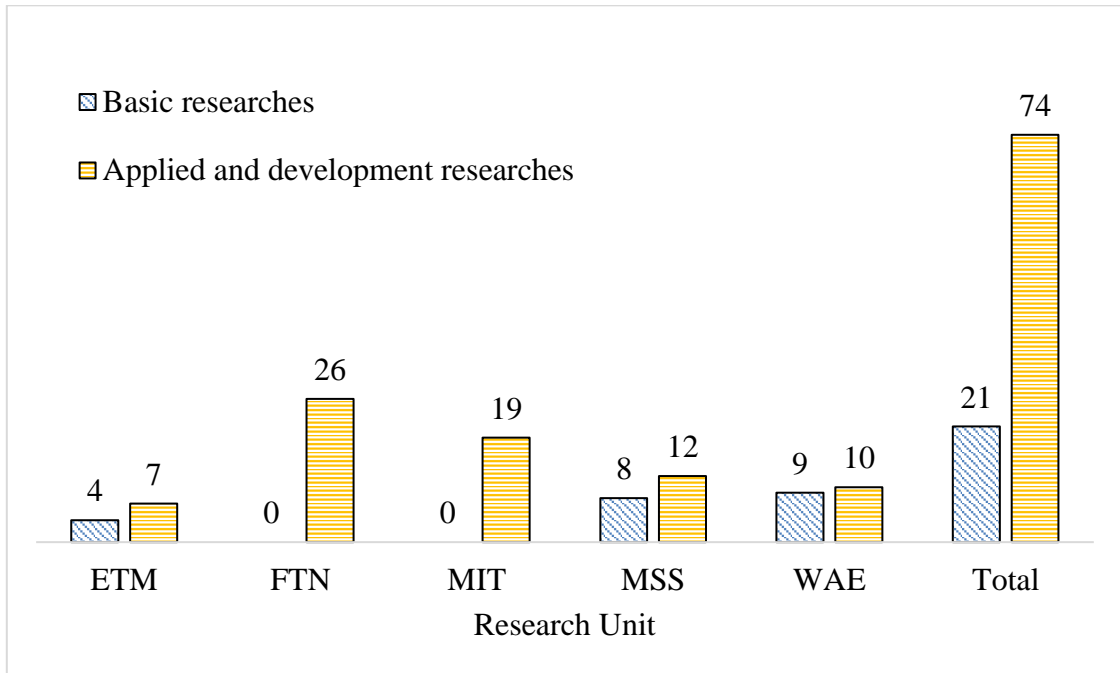


Figure 16. Classification of project types by research unit (2022-2023).

#### 5.2.4. Publication

In term of scientific journal publication for the last five academic year, from 2018-2019 to 2022-2023, researchers published their research articles of 212 international published papers and 82 in local published papers (**Error! Reference source not found.**). The fact that local published papers decreased from 94 papers in March 2023 to 82 in June 2023 is due to the upgrading of local papers to international indexed papers. Indexed papers refer to the publication in international journal and non-indexed papers refer to the publication in local journal and Techno-Science research journal of ITC. Researchers also did their research results presentation in more than 270 conferences and scientific events.

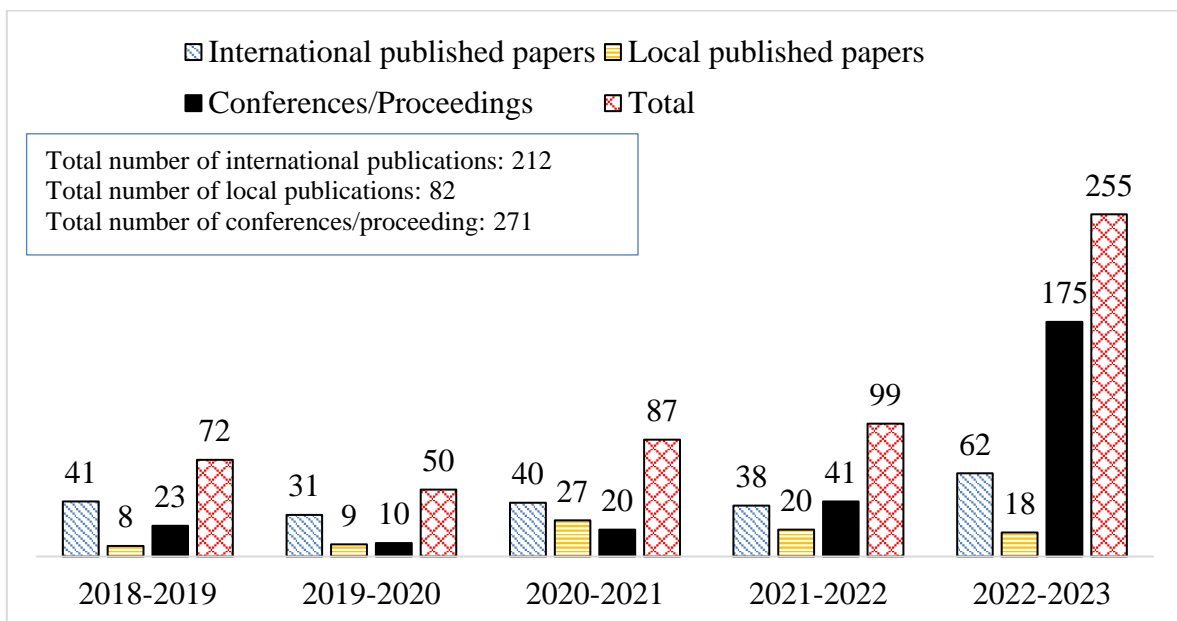


Figure 17. Number of publications in last 5 years.

## **5.3. High Impact Research and Innovation Projects**

### **5.3.1. Platform for Aquatic Ecosystem Research (PAER)**

#### **5.3.1.1. Introduction**

A platform for Aquatic Ecosystem Research (PAER) for Tonle Sap Lake (TSL) is established under the Institute of Technology of Cambodia to promote research, development, and education in environmental science and technology focusing on aquatic ecosystems under the tropical climate. PAER was established through the financial support of SATREPS, which stands for Science and Technology Research Partnership for Sustainable Development. This project was funded by the Japan International Cooperation Agency (JICA) and Japan Science and Technology Agency (JST). SATREPS is a 5-year project starting from April 2016 to March 2021. However, it was extended to March 2022 due to the COVID-19 pandemic. The main institutions of the projects were: (1) the Tokyo Institute of Technology, Japan, and (2) the Institute of Technology of Cambodia (ITC), Cambodia. Besides these, there are also the Institute for Global Environmental Strategies (IGES, Japan), Yamagata University (YU, Japan), Tonle Sap Authority (TSA, Cambodia), Ministry of Water Resources and Meteorology (MOWRAM, Cambodia), Ministry of Environment (MOE, Cambodia), Ishikawa Prefectural University (Japan), Toyama Prefectural University (Japan), Iwate University, and University of Tokyo (Japan).

The principal roles and responsibilities of PAER Committees are subjected to make a decision and give advice on the following issues:

- Preparing of the overall implementation plan of PAER at ITC, including a long-term vision of curriculums with PAER
- Collaboration with MOE, TSA, and MOWRAM by enhancing and supporting evidence-based environmental management policy to the related governmental agencies
- Serving as a hub (i.e. liaison) for connecting individuals and organizations regarding research, technical support and management of Tonle Sap water environment
- Publishing research report/journals on a regular basis (i.e., Tropical Limnology, Tropical Lake)
- Maintaining the environmental database about Tonle Sap Lake
- Holding regular academic meetings/conference
- Library with relevant books, journal papers, proceedings, and movies
- Other issues necessary for the establishment of PAER

#### **5.3.1.2. Structure**

The management team of PAER composes of one Chairman, several advisory boards, one director, and members such as:

- Chairperson: Director General of the Institute of Technology of Cambodia
- Advisory board: National, international experts, the governmental agency who are in the related field and head of the research unit of water and environment as well as RIC director

- Director: A faculty member appointed by Chairperson
- Management team: 5 executive members appointed or recruited by the director to manage each division/office (Figure below), such as:
  - Division/Office of Database and Model Application (WEAT).
  - Division/Office of Research and Development
  - Division/Office of Public Relationship and Engagement
  - Division/Office of Facility Management
  - Division/Office of Administration and Finance
  - Each division/office can recruit supporting staff as necessary

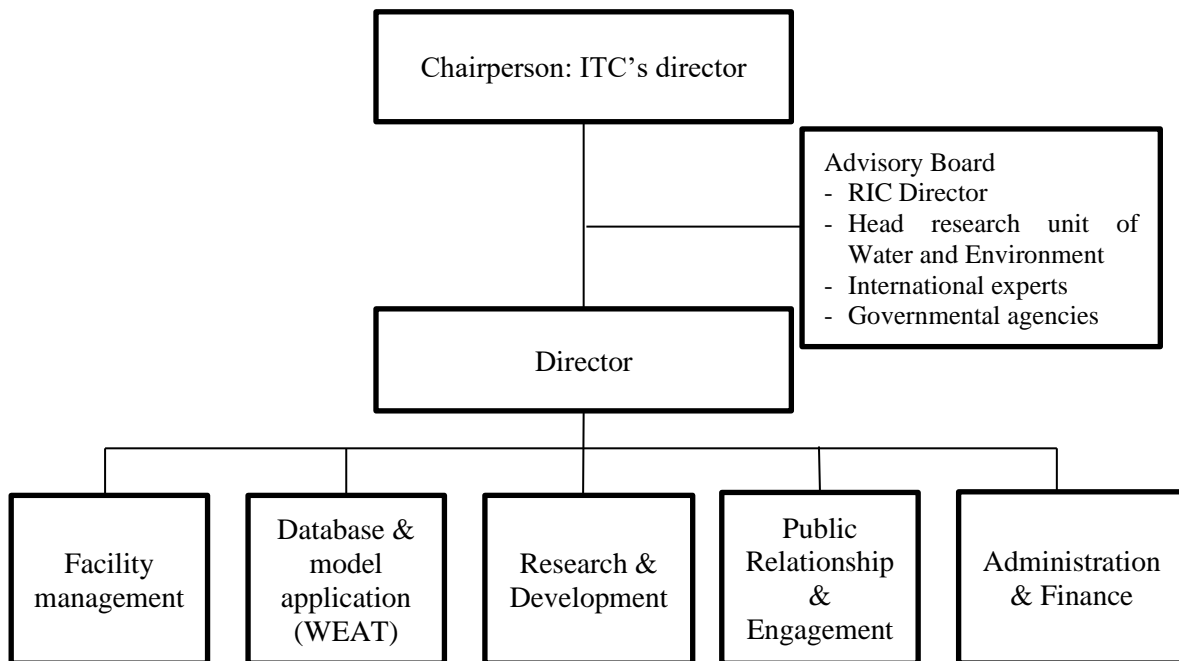


Figure 18. PAER management structure.

### 5.3.1.3. Laboratory and Capacity Building Training

A platform for Aquatic Ecosystem Research consists of 3 research laboratories: Environmental Microbiology Laboratory, Environmental Chemistry Laboratory, and Environmental Observation Laboratory. Currently, these facilities host the activities of 8 different projects on water and environment at ITC:

1. Higher Education Improvement Project (HEIP) funded by World Bank through MoEYS: HEIP#5, HEIP#17, HEIP#25
2. Water and Health Risk (WAT-HEALTH) funded by Institute for Research and Development (IRD), and French Embassy
3. Provincial Water Supply and Sanitation (PWSS) funded by AFD/EU
4. Laboratory-Based Education (LBE) funded by JICA
5. Aquaculture Sustainability and Risk Prevention (AquaCAM) funded by IRD and French Embassy
6. Feed the Future Innovation Lab (FSIL), funded by USAID

Currently, 11 researchers and 55 research students are using the facilities of PAER laboratories. Each year, we provide training on basic laboratory safety, training on laboratory instruments (GC-MS, IC, etc.), and prepare laboratory entrance exams for research students. In 2022 the first safety training and the first period of the entrance exam were held in August 2022 with the participation of around 22 research students. Furthermore, on March 2022, we hosted our first lab seminar, inviting senior research students to share their experience in research productivity and organizing tips with junior research students. In September 2022, we conducted the “Book sharing session” to let students prepare themselves for working independently and effectively in the laboratory by reading and sharing the content of the provided book; At the bench, a laboratory navigator.

Moreover, from 28th – 29th July 2022, there was a training on the usage of ADCP (Acoustic Doppler Current Profile) for a technical officer from Tonle Sap Authority (TSA).

This training course has the following objectives:

- Strengthen the capacity officer to use and care for the ADCP tool and River Surveyor Live program
- Collect and analyze the collected data on the hydrological pattern, depth, bathymetry, etc.
- Introduce the importance of ADCP on rivers, lakes, hydrological changes, and climate change hydrology.

24 participants of TSA have been trained in this capacity-building program.

In addition, PAER also contributed as a joint host with ASACHA and IRD-Cambodia for the Final-Workshop of the FSPI-AquaCAM project on 20th November 2022. This workshop aimed to provide research outcomes of the two years project and future perspective on sustainable aquaculture development, aquatics disease investigations, and the emergence of antimicrobial resistance. Consequently, the event successfully gathered national and international researchers, scientists, relevant organizations, university lecturers, and students of about 50 people to participate in and present novel studies conducted in Cambodia and the South-East Asia region.



Figure 19. Laboratory Orientation Day for the academic year 2022-2023.



Figure 20. ADCP capacity building training to TSA staff by Mr. LUN Sambo under facilitation from PAER.

Aquaculture in Cambodia






Sustainability and risk prevention



THE GLOBAL GOALS



AquaCam-FSPI is a project funded by the French Ministry of Europe and Foreign Affairs. It aims to contribute to public policies in Cambodia for the development of sustainable aquaculture through research.

Session 1:  
One Health Approach  
Antimicrobial  
Resistance in water  
environment and  
Food Borne  
Trematodes (FBT)

Session 2:  
Sustainability and  
Agroecological  
integration of  
aquaculture in  
Cambodia





Figure 21. AquaCAM-Final Workshop held on 25, November 2022 at ITC.

### 5.3.2. SATREPS Project: « Establishment of Risk Management Platform for Air Pollution in Cambodia »

#### 5.3.2.1. Introduction

Cambodia is a developing country with an economic growth of 7% of GDP over the last few years. Meantime, transportation, factory, resident, and tourist are significantly increased in South-East Asia. Social infrastructure is often inadequate in these countries, with severe environmental pollution and poor hygiene. Environmental stress, such as increased traffic, is evident, exceeding the allowable limit of the infrastructure, and deteriorating environmental pollution, and causing sanitation problems.

Various social infrastructures as an excellent water supply system have been constructed in Cambodia. Because of the rapid growth of the urban areas as the capital city of Phnom Penh, have been an increase in environmental issues such as noise, waste, and air pollution. Air pollution is a global and local issue because all the urban, industrial, and agricultural areas have air pollution from various sources such as traffic, construction, fuel combustion, agriculture residue burning, and forest fire. Because the pollutant spreads crossing borders, it is also a global issue. Airborne infection issues such as COVID-19 also suggest the importance of indoor air quality management. However, this actual situation is not being investigated at this moment.

The proposal was accepted on May 20, 2021, with a budget of 4.5 MUSD. The implementation period is expected from 1 July 2022 to 31 June 2027.

### **5.3.2.2. Goal and Objective of the project**

Overall goal: To contribute to the creation and establishment of safe and comfortable living environment for residents and tourists from the viewpoint of air pollution, which leads to sustainable economic growth of Cambodia. The objectives of the project aim:

- To establish the structure/system to evaluate the present status and characteristics of air pollution in Cambodia
- To build the online network of monitoring sites with data management system
- To establish the structure/system to evaluate environmental risks
- To develop human resource, which is necessary for operation of the risk management platform for air pollution

### **5.3.2.3. Research Participants**

Japanese counterparts:

- Kanazawa University
- Nagasaki University
- Osaka Ohtani University
- Partical Plus Co., Ltd.

Cambodian counterparts:

- Institute of Technology of Cambodia
- University of Health and Science
- National University of Management
- Ministry of Environment
- Ministry of Education Youth and Sport

### **5.3.2.4. Activities to be implemented**

The 4 working groups are:

- Group 1: Overall management
- Group 2: Data sampling and monitoring setting up
- Group 3: Environmental risk assessment
- Group 4: social implementation

### **5.3.2.5. Activities work plan for five years**

#### **1. The structure/system to evaluate the present status and characteristics of air pollution in Cambodia**

- Understand status and characteristics of air pollution in Cambodia.
- Understand transboundary influences of air pollution.
- List emission sources up and prepare emission inventory.
- Visualize emission sources.
- Develop a low-cost and less-maintenance PM monitoring technology that can provide advanced information

#### **2. Online network of monitoring sites with data management system**

- Fundamental information for building the online network is surveyed and summarized.
- Preliminary test of the online monitoring network is conducted.
- The online monitoring network is built and started.
- Manage the monitoring and related environmental data.

#### **3. The structure/system to evaluate environmental risks**

- Extract macroscopic potential health risk factors
- Extract microscopic potential health risk factors.
- Examine scenarios for the mitigation of potential health risk.
- Prepare a risk data base for air pollution

#### **4. Human resource, which is necessary for operation of the risk management platform for air pollution**

- Determine the management policy of platform and roles of each participating organization.
- Propose action plans of the risk management platform of air pollution.
- Propose measures to mitigate potential health risks caused by air pollutants.
- Conduct advanced researches under the international collaboration and expand the human network between researchers over the world.

### **5.3.2.6. Activities in 2022**

#### **➤ Kick-off meeting and 1<sup>st</sup> Joint Coordination Committee Meeting (JCC)**

In the morning session, a kick-off meeting for the SATREPS-Air monitoring project was conducted on September 19, 2022. The JCC meeting was conducted the same day as the afternoon session. The meeting was held at ITC with many distinguished guests from MoEYS, key partners of projects from all institutions who joined physically and virtually. The kickoff meeting was officially celebrated as the start of project activities and a time when all researchers get to know each other and understand the project background, expected output, and action plan. At the same time, JCC meeting aims to communicate between the JCC and the research group by introducing the participating and collaborating institutions to the project and discussing key findings/issues for the project. The project's nature was also spotlighted in social media and TV for public outreach/awareness (<https://news.btv.com.kh/article/15436>).

### ➤ **Laboratory set up**

The laboratory for the project is expected to be on the fourth floor of A building, where it is accessible for outdoor air sampling. Currently, the room is under renovation and clean for setting up all procured equipment from Japan and start experimental activities are expected from April 2023.

### ➤ **Air sampling training**

The sampling training seminar was conducted on November 2022 by a researcher from Kanazawa University. Participants included ITC students and researchers. The seminar aims to introduce the participant to the standard sampling technique and cleaning procedure for accurately collecting the sample and on-site monitoring for key parameters such as particle matter distribution.

### ➤ **Bi-weekly core member and monthly all-member meeting**

Core members of Cambodia and Japanese sides have been meeting every two weeks. While all member meetings have been held every month. The aim of the meeting is to discuss project activities and key challenges and seek a possible solution.

## **5.3.3. Higher Education Improvement Projects**

The HEIP activities are funded by an IDA Credit for improving the quality of higher education of Cambodia. The objective of the HEIP project is to improve the quality and relevance of higher education and research mainly in STEM and Agriculture at target higher education institutions, and to improve governance in the sector. The project is expected to be implemented over a 6-year period – starting in September 2018 and ending in June 2024 with the total budget of 92.5M USD. Institute of Technology of Cambodia (ITC) is funded by IDA Credit of 22.5M USD and by Counterpart Fund of 0.625M USD to implement the project activities comprised of two components: Component 1: Improving Teaching and Learning Capacity - aims to enhance quality of teaching and learning capacity of targeted HEIs in the fields of STEM and agriculture (approximately 15.5M USD equivalent). Three sub-components including sub-component 1.1: Improving Teaching and Learning (approximately 14.12M USD equivalent), sub-component 1.2: Improving Institutional Capacity (approximately 1.38M USD equivalent) and sub-component 1.3: HEIP Restructuring; and Component 2: Improving Research in STEM and Agriculture (approximately 7.0M USD equivalent).

Under Component 2, ITC obtained 25 research projects with 7.92M USD grant (23 research projects linked with industries and 2 research projects supported policy). The research projects received the sub-grant agreement in two rounds:

- Round 1 (4.72M USD) obtained the sub-grant agreement in November 2019 till April 2020 and consists of 11 research projects linked with industry (window 1) and 1 research project supported policy (window 2), in which 3 research projects collaborated with industry led by female.
- Round 2 (3.02M USD) obtained the sub-grant agreement in February 2021 and consists of 12 research projects collaborated with industry and 1 research project supports policy (window 2), in which 5 research projects linked with industries and led by female.



Table 12. Proposals selected for World Bank loan of Cambodian government grant (HEIP).

No	PI	Sex	Unit	Win.	Research title	Remark
<b>Round 1</b>						
1	Dr. Kim Bunthern	M	MIT	1	Applied Control and Automation for Agriculture in Cambodia (ACAAC)	Implementing
2	Dr. Pec Rothna	M	MIT	1	Toward Production Innovation via FabLab-ITC	Implementing
3	Dr. Thoun Kosorl	M	MIT	1	Initiative towards electrical and electronic products testing and certification by EMC Lab	Implementing
4	Dr. Suong Malyna	F	FTN	1	Biotechnology for Integrated Pest Management towards pesticide reduction in Cambodia	Implementing
5	Dr. Tan Reasmey	F	FTN	1	Development of Fermentation Process of Cambodian Soy Sauce	Implementing
6	Dr. Hin Raveth	M	MSS	1	Chemical strengthening of large scale glass pieces for construction and other engineering applications	Implementing
7	Dr. Vai Vannak	M	ETM	1	Development of a virtual Cambodian power system – Towards an Innovation Micro-Grid in Cambodia	Implementing
8	Dr. In Sokneang	F	FTN	1	Valorization of high-value dry food products (agricultural products including herbal and spices) and other by-products in Cambodia	Implementing
9	Dr. Mith Hasika	M	FTN	1	Improvement and development of rice-based products toward the growth of SMEs/Industries in Cambodia	Implementing
10	Dr. Valy Dona	M	MIT	2	Ancient Manuscript Digitization and Indexation	Delay
11	Dr. Bun Kimngun	M	MSS	1	Development and optimization of ceramic tile using Cambodian clays incorporating with industrial wastes	Ended 31st March 2023
12	Dr. Yos Phanny	M	MSS	1	Cambodian Natural Rubber Composites with Different Type of Minerals Fillers for Floor Mat Shock Absorbing Applications	Ended 31st March 2023
<b>Round 2</b>						
13	Dr. Or Chanmoly	M	ETM	1	Applied geophysics for investigating hydrocarbon potential and study of depositional environment at Block VIII, Kampong-som Basin, onshore of Cambodia	Implementing
14	Dr. Eng Chandoeun	M	ETM	1	Quality assurance of concrete pile integrity and soil properties investigation in Phnom Penh city using seismic and electrical resistivity tomography approaches	Implementing

No	PI	Sex	Unit	Win.	Research title	Remark
15	Dr. Bun Saret	M	WAE	1	Development of Eco-friendly and Low-cost Wastewater Treatment System as an On-site Product	Implementing
16	Dr. Kret Kakda	M	ETM	1	Investigation the production potential of the Cambodian offshore reservoir considering effects of phase behavior and rock-fluid interaction	Implementing
17	Dr. Peng Chanthol	F	FTN	1	Improvement and development of fish and meat products for better preservation using innovative technology	Implementing
18	Dr. Houg Peany	F	FTN	1	Valorization of agricultural by-products in Cambodia through extractions and formulations of essential oils and bioactive compounds	Implementing
19	Dr. Oeurng Chantha	M	WAE	2	Strengthening flood and drought risk management and early warning system in lower Mekong basin of Cambodia	Implementing
20	Dr. Ket Pinnara	F	WAE	1	Integrated approach of precise irrigation and sustainable Soil management to improve crop water productivity in Cambodia through ITC soil laboratory development: the focus on rice farming	Implementing
21	Mr. Kong Sela	M	FTN	1	Development of cooking oil processes for commercialization	Implementing
22	Dr. Doung Piseth	M	MSS	1	Initiative on development of the wind load requirements for design of building structures in Cambodia	Implementing
23	Ms. Hang Leakhena	F	WAE	1	Development of a Biofilter System Model to Control of Air Pollution toward Industrial Application	Implementing
24	Dr. Song Layheang	M	WAE	1	Development of Climate Data Information System for Cambodia	Implementing
25	Dr. Heu Rina	F	WAE	1	Improving sustainable water supply and sanitation in Cambodia: case of Tonle Sap lake's floating villages	Implementing

22 projects will be completed at the end of 2023 while 2 projects were completed in March 2023 (2 projects linked with industries) and 1 project supported policy is delayed. With support of HEIP projects as well as the other projects, ITC are able i) to enhance the capacity of researchers in writing proposal to an acceptable standard quality; ii) to enhance research planning and management; iii) to enhance research capability in providing services to industries (research and development toward technology transfer and supply chain). Meanwhile, HEIP projects can increase the number of publication and reputation of the institution, produce human resources to support social need, establish and upgrade laboratories to serve industries and SME, and develop prototypes qualified to market quality either national or international to boost economic growth. The achievement and expectation of HEIP project are described as below.

➤ **Publications**

According to the Intermediate Result Indicator (IRI) of HEIP, 24 articles are expected to submit to the international peer-reviewed journals; moreover, 39 international journal articles are committed to submit. Up-to-date, 42 articles have been submitted to the peer review international journals in which 33 articles were published. It has already achieved 175% of the end target (24 articles). 19 articles have been submitted to peer-reviewed national journals in which 11 were published. Furthermore, 69 proceeding papers were presented in the international conferences.

➤ **Human resources**

15 upgraded staff are expected to graduate within the projects: 7 Master Degree (1 Female) and 8 PhD Degree (3 Females); the upgraded staffs are co-funded from HEIP (Component 1 and Component 2) and other projects in term of research grant and/or tuition fee. By date, there are 27 enrollment of staff upgrade (7 Master Degree and 20 PhD Degree) in which 5 Master candidate graduated (1 Female), and 3 PhD candidates graduated (2 Females). Furthermore, the students involved in the projects (enrollment students and staff upgrade) can support the social need in the specific fields in the number of: 22 enrolled PhD candidates, 52 enrolled Master candidates, and 93 involved Undergraduate students. Due to the workload and timeframe of Master and PhD Degree, it is expected that the enrolled candidates will be graduated by 2024/2025.

➤ **Laboratories**

9 laboratories are planned to set-up to serve their services to the industry. With the need to specific field and demand as well as project productivities with industries, 3 more laboratories are expected to establish (Table below). The 12 expected laboratories are as below:





Table 13. Laboratories established under HEIP project




No	Research Unit	New Laboratory
1	Energy Technology and Management (ETM)	1. Exploration Geophysics Laboratory 2. Smart Grid Laboratory
2	Food Technology and Nutrition (FTN)	3. Plant Health Laboratory 4. Drying Technology Training Center 5. Rice-based Processing Laboratory
3	Mechatronic and Information Technology (MIT)	6. Digital Fabrication Laboratory 7. EMC Laboratory
4	Material Science and Structure (MSS)	8. Ceramic Laboratory 9. Rubber Processing Laboratory 10. Glass Laboratory
5	Water and Environment (WAE)	11. Water and Wastewater Laboratory 12. Air Pollution Laboratory





➤ **Prototypes**


10 Prototypes are planned to develop by the end of projects; with the right support mechanism and commitment of the researchers, 20 prototypes are currently developed that provide the fruitful results over the planned. The developed prototypes are shown in the table below.


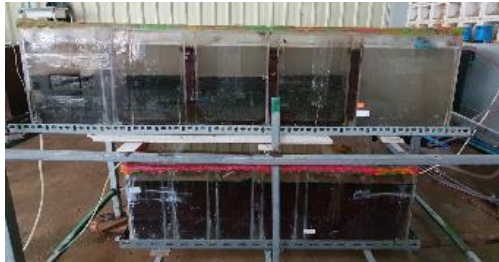


Table 14. Prototypes created under HEIP project.

Research Unit	SGA#	Prototypes developed	Image
Food Technology and Nutrition (FTN)	SGA#05	1. Soy sauces	
	SGA#08	2. Seasoning spices (turmeric)	
	SGA#09	3. Grain cereals	
	SGA#09	4. Instant noodle	

Research Unit	SGA#	Prototypes developed	Image
	SGA#17	5. Fish nem (germinated fish roll)	
	SGA#17	6. Fish sausages	
	SGA#17	7. Fish cake	

Research Unit	SGA#	Prototypes developed	Image
	SGA#18	8. Essential oil	
	SGA#18	9. Soap	
	SGA#21	10. Soybean oil	
	SGA#21	11. Sachi inchi oil	

Research Unit	SGA#	Prototypes developed	Image
Mechatronics and Information Technology (MIT)	SGA#01	12. E-tuk tuk	
	SGA#02	13. Smart irrigation device	
	SGA#02	14. Agri-parameter tester	
Materials Science and Structure (MSS)	SGA#06	15. Tempered glass	
	SGA#11	16. Roof tile	

Research Unit	SGA#	Prototypes developed	Image
	SGA#12	17. Floor mat	
Water and Environment (WAE)	SGA#15	18. Wastewater reactor	
	SGA#23	19. Bio-filter system	
	SGA#25	20. Bio-sand filtration	



### 5.3.4. Laboratory-Based Education (LBE) Project

The LBE project for strengthening engineering education and research for industrial development in Cambodia at ITC is funded by JICA.

#### 5.3.4.1. Project Goal and Purpose

Target universities enhance their education and research capabilities, which meet the needs of the industry sector in Cambodia. Institute of Technology of Cambodia (ITC) enhances its education and research capabilities as a national resource institution in the field of engineering.

#### 5.3.4.2. Expected Outputs and Selected Projects

There are three main expected outputs as following description:

- Capabilities of ITC to implement Laboratory Based Education (LBE) are developed
- Capabilities of ITC strengthen capacities of other universities in LBE are developed
- University-Industry linkage is enhanced at ITC.

The 16 granted research topics of LBE project for 2022-2023 at ITC are presented in the Table 15. All these projects were successfully completed in March 2023. Moreover, the seven new research topics selected for the 2023-2024 LBE project are shown in Table 16.

Table 15. LBE Research Project for 2022-2023.

No.	PI	Sex	Dept.	Unit	Research title
1	Dr. KRET Kakda	M	GGE/RIC	ETM	Integration of Landsat-8, ASTER, and Sentinel-2 for mapping of mineral prospective, hydrothermal alteration and geological structures for porphyry copper and epithermal gold deposits in the north Cambodia.
2	Dr. BOEUT Sophea	F	GGE	MSS	Subsurface mapping of soil bearing capacity in Phnom Penh area, Cambodia
3	Dr. VAI Vannak	M	GEE	ETM	Planning and Operation of Active Distribution Systems
4	Dr. BUN Saret	M	GRU	WAE	Kinetic and Influence of Iron Co-Presence on Arsenic Removal from Groundwater
5	Dr. TAN Reasmey	F	GCA/RIC	FTN	Development of Cambodian Fermented Cucumbers by using Freeze-Dried Lactic Acid Bacteria with their Potential Use as Aromatic and Bacteriocin-producing Starters
6	Dr. SROY Sengly	F	GCA	FTN	Assessment on nutritional profiles, storage stability and sensory evaluation

					of dried fish powder made by low-value small fish species
7	Dr. VALY Dona	M	GIC/RIC	MIT	Plagiarism Detection System for Khmer Language
8	Dr. KET Pinnara	F	GRU	MIT	Prototyping of Low-cost and Smart In-vessel Composter for converting Spent Mushroom Substrates to Bio-Organic Fertilizer
9	Dr. NGET Rithea	M	GTR	MIT	Design and Implementation of Health Data Collection Communication Protocol Using Physical-Layer Network Coding
10	Dr. CHRIN Phok	M	GEE	MIT	Smart farming for qualified vegetable using mechatronics techniques
11	Dr. SEANG Sirisokha	F	GGE	MSS	Geological, Geochemical Characteristics and Genesis of Gold Mineralization, Gemstone and Rare Earth Element in Ratanakiri, Kampot, and Pailin province, Cambodia
12	Dr. YOS Phanny	M	RIC/GGE	MSS	Physical Properties and Mineralogy of Ancient Brick from Temples at Sambor Prei Kuk area, Kampong Thom, Cambodia
13	Dr. DOUNG Piseth	M	RIC/GCI	MSS	Evaluation of Mechanical Behavior of Post-Installed Bundled Reinforcement Used for Concrete Connections
14	Dr. CHAN Rathborey	M	GRU	WAE	Influence of locally made effective microorganisms (EM) on the treatment of domestic wastewater using conventional septic tank
15	Dr. PHUN Veng Kheang	M	Master of Transport Eng.	-	How the Poor Commute in Cambodian Cities and Their Intention towards Public Transport System
16	Dr. ENG Chandoeun	M	GGE	ETM	Geological and geophysical studies of hydrocarbon potential in Tonle Sap Basin, Onshore Cambodia

Table 16. LBE Research Project for 2023-2024.

No.	PI	Sex	Dept.	Unit	Research title
1	Dr. CHHITH Saosometh	M	GIM		Experimental Identification of Hardening Behavior of G300 Steel Grade
2	Dr. HEU Rina	F	WEE		Development of locally-produced ceramic pot filter for household

					groundwater purification in rural Cambodia
3	Dr. KHON Kimsrornn	M	GEE		Optimal energy-management system in smart-building
4	Dr. TY Boreborey	F	GCA		Development of monitoring and controlling of IoT-based aquaponics system using green energy (Acronym: Smart Aquaponic Project)
5	Dr. PICH Bunchoeun	M	GGG		Fluid Inclusion and Geochronology of Igneous Rock at Memot Prospect, Choam Tamao Commune, Memot District, Tboung Khmum Province, Cambodia.
6	Dr. SANG Davin	F	WEE		Development of Electrocoagulation-Floatation (ECF) Reactor for Removal Turbidity, Color, and Oil & Grease from Slaughterhouse Wastewater
7	Dr. OR Chanmoly	M	RIC		Optimization of Algae Cultivation for Biofuel Production in Cambodia

### 5.3.5. AFD/EU Projects

This project supports to Master Program of Urban Water and Sanitation Engineering and implements with the financial support of the European Union and administered by AFD. There were 9 research projects (8 from WAE and 1 from FTN) implemented in the First Phase starting from January 2020 to December 2021 (Table 17). 6 papers published in international journal. Furthermore, more than 10 papers were published and presented in regional conference. Approximately 10 papers were presented in the 12<sup>th</sup> Scientific day 2023.

3 research projects have been implemented in the Second Phase starting from July 2022 to June 2023 (Table 18).

Table 17. AFD Research Project for 2020-2021 (Phase I).

No.	PI	Sex	Dept.	Unit	Research title
1	Dr. TY Boreborey	F	GCA	WAE	Arsenic Removal from Groundwater using ECAR Technology: Case Study at Koh Thom, Kandal, Cambodia
2	Dr. DOUNG Ratha	M	GRU	WAE	Impact of Climate and Land use Change on Hydrology Pattern in the Coastal Zone of Cambodia
3	Dr. Khoeurn Kimleang	F	GCA	WAE	Application of Low-cost Adsorbents in Wastewater Treatment

4	Mr. LUN Sambo	M	GRU	WAE	Formulizing the Design Criteria for the Piped-water System in Cambodia
5	Dr. CHAN Rathborey	M	GRU	WAE	Spatio-temporal Assessment of Surface Water Quality Affected by Urban and Aquaculture Wastewater: Case Study in Tamouk Lake Area
6	Dr. PENG Chanthol	F	GCA	WAE	Antibiotic-Resistant Bacteria in Water Environment
7	Dr. HEU Rina	F	GRU	WAE	Assessment of Silicon (Si) in Water and Surface Sediment in Tonle Sap Lake: an Implication for Highly Productive Ecosystem
8	Mr. KIM Lengthong	M	GRU	WAE	Assessment Flood Risk on Urban Areas due to Flow Alteration of Lower Mekong River Urban Development
9	Dr. TAN Reasmey	F	GCA	FTN	Micropollutant Removal by Powdered Activated Carbon Injected at the Flocculation-coagulation-settling Step in Drinking Water Treatment Plants

Table 18. AFD Research Project for 2022-2023 (Phase II).

No.	PI	Sex	Dept.	Unit	Research title
1	Dr. BUN Saret	M	GRU	WAE	Occurrence and Distribution Analysis of Microplastics in Different Environmental Mediums of Cambodia
2	Dr. HEU Rina	F	GRU	WAE	Investigation of the Effects of Algal Bloom in TSL Source Water on Water Supply Treatment Efficiency
3	Dr. TAN Reasmey	F	GCA	FTN	Removal of diclofenac and caffeine from different water sources using activated carbons made from different wastes

### 5.3.6. Capacity Building Project Linked to Innovation (FoodSTEM)

#### 5.3.6.1. Introduction

**FoodSTEM** (Training a new generation of entrepreneurs in sustainable agriculture and food engineering) is an EU co-funded project by Erasmus + Capacity Building in the field of Higher Education program designed to build partnership between Cambodian and European universities, and to create a favorable condition in the 4 Cambodian partners universities for the emergence of student entrepreneurship and micro or small enterprises. This project is coordinated by the Institute of Technology of Cambodia, a higher education institution (HEI) in Cambodia that trains students in science, technology and engineering.

### 5.3.6.2. Goals

With the support of 3 European HEIs, FoodSTEM project aims at building the capacity of 4 major public universities in Cambodia in order to create a new generation of food chain entrepreneurs, with a strong emphasis on safety, quality and sustainability.

### 5.3.6.3. Partners

- 4 Cambodian Universities: Institute of Technology of Cambodia (ITC), Royal University of Agriculture (RUA), Royal University of Law and Economics (RULE), University of Battambang (UBB).
- 3 European partners: Institut Agro/Supagro Montpellier, Toulouse INP (Purpan and ENSAT), and Université de Liège.

### 5.3.6.4. Project's Activities

With the aim of “FoodSTEM” project in building the higher education capacity in order to train a **new generation of entrepreneurs in sustainable agriculture and food engineering**, the project was organized into 8 work packages (WP):

- **WP1:** Project preparation
- **WP2:** Improve academic programs through e-learning courses development in 4 Cambodian partner university (ITC, RUA, UBB, and RULE)
- **WP3:** Create a new pathway of Master program “Project Management and Entrepreneurship” at RULE university
- **WP4:** Upgrade management skills and technical facilities for pre-incubation of students’ projects “Agri-foods Innovation Challenges” in ITC, RUA, and UBB
- **WP5:** Provide capacity building on food safety management by creating Food Safety Labs in ITC, RUA, and UBB
- **WP6:** Project management
- **WP7:** Project quality monitoring
- **WP8:** Dissemination and exploitation

### 5.3.6.5. Expected and Achieved Outputs

FoodSTEM project is expected to have four main outcomes as the followings:

- **8 E-learning courses** dedicated to the Agri-Food chain are developed at bachelor/engineering/master level and included in the curriculum of the Cambodian partner Universities. These courses are focused on entrepreneurship, product development, food market, factory design, sustainable processing, supply chain management, etc.
- With the e-learning courses developed during the project, a new pathway of the Master program “**Project Management and Entrepreneurship in Agri-Food**” will be implemented at RULE by early 2022.

- The project will organize **3 innovation challenges** in the agri-food sector for students and young entrepreneurs. The winners of the challenges will earn some prizes and be pre-incubated in one of the partner universities in Cambodia to develop their idea.
- **A capacity building program:** during the project the Agri-food and food safety labs, and 4 e-learning classrooms will be set up in Cambodian partner universities. Various training session for e-learning courses development and labs management will be organized for Cambodian lecturers, researchers, technicians, and students.

To date, under the framework of the F-STEM project, some of the activities were achieved as the following:

- i) Preparation (set up the project and committees), this working package activity has already been completed. The project management unit (PMU) is recruited, and well structured. A kick-off meeting was organized with the principal stakeholders of the field of agriculture and food sectors (20-23/01/2021).
- ii) Improvement of academic programs through e-learning courses development, which response to the current health sanitation crisis due to Covid-19.
  - E-learning equipment and e-learning classrooms were set up at 4 Cambodian University partners: the Institute of Technology of Cambodia (ITC), the Royal University of Agriculture (RUA), the Royal University of Law and Economics (RULE), and the National University of Battambang (NUBB).
  - 8 e-learning courses (i.e. Entrepreneurship, Food Market, Food Product Development, and Agri-Food supply chain) have already developed and available on the Moodle platform of ITC.
  - A new pathway of Master program “Food-Industry Entrepreneurship” have already created at RULE, current there are 6 Master students willing to enrolled for this new pathway of Master Program.  
Here is the link to access to the Master Program:  
<https://ddprule.org/masters-degree-in-entrepreneurship-and-project-management/>
  - More than 30 of Cambodian lecturers from Cambodian university partners (ITC, RUA, RULE, and NUBB) have been building their capacity in e-learning course development for higher education (i.e engineer degree, and Master degree).
- iii) Upgrade management skills and technical facilities for pre-incubation of student projects in ITC, RUA, and NUBB.
  - 3 Innovation Challenge has been carried out at ITC, RUA, and NUBB.
  - 3 Agri-Food Processing laboratory has been set up at ITC, RUA, and NUBB to support the students in prototyping their food product, and the practical work in the Food product development course.
- iv) Provide capacity building on food safety management in ITC, RUA, and NUBB (Food Safety laboratory): 3 Food safety laboratories was set up at the 3 Cambodian universities (ITC, RUA, and NUBB).
- v. Project management: Grant management guide has already been written (Attachment 6) and shared with all partners through the F-STEM Drive and Website. 18 Operational committee and 4 steering committee meetings between PMU and all involved partners.
- vi. Dissemination and exploitation: communication plan of the project, logo, stickers, leaflet, press articles of the project, Facebook page, and website are developed were conducted.

### **5.3.6.6. Impact to Society**

- The project improves the quality of higher education and enhance its relevance for the labor market and society.
- The project is strongly connected to the needs to raise agriculture and food transformation to the best international standards by providing qualified and innovative work force to the market.
- The project includes the development of e-learning classes and the Quality and Safety Lab to control products all along a food chain.

## **5.4. Research Promotion and Collaboration**

### **Creation of Research Unit**

Based on the approval from the council administration 2015-2016, ITC has clustered the researchers in different units according to field of expertise and research. The researchers in each unit have been discussed and below is the way forward for each research unit.

#### **5.4.1. Energy Technology and Management (ETM Unit)**

##### **Cambodia Context**

Cambodia has enjoyed an average rate of economy growth of about 7% per annum during the last decade. To insure sustainable and inclusive high growth, the country has set to promote industrial development for economic diversification, strengthening competitiveness and promoting productivity. Consequently, the country has experienced steep increases in energy demand and consumption. For sustainable development of the country, Energy Security is extremely important, requiring the development of energy sector infrastructure and human resources to match the pace of socio-economic progress. The Rectangular Strategy-Phase IV pointed out that one of the remaining challenges of diversification and value creation in industry and service sector is high energy price (electricity rates) compared to neighboring countries. Until recently, Renewable Energy cost has drastically decreased within short period of time, especially for solar photovoltaic and onshore wind energy. Expanding the share of renewables in the country energy mix, along with diversification and utilization of locally available resources, implementing energy efficiency and energy conservation measures; would be key for the advancement of energy sector in Cambodia.

##### **The Research Unit**

The research unit, dedicated to energy technology and management of energy, brings an expertise with international recognition in specific areas in connexion with Cambodian needs, contributing to the exploration of conventional energy resources and the development of new and renewable energy and energy efficiency and conservation; through researches, collaborations with international partners, private sectors and relevant government agencies and development of competent human resources. The prioritised areas of research and collaboration including but not limited to the conversion of biomass and agricultural waste and by-products into energy, solar PV and thermal energy, Wind energy, innovative smart grid, micro-grid for remote area, energy consumption measurement and analysis, energy management system, simulation of large energy system, and the exploration of conventional energy resources.

## Vision

To be leading contributor in supporting national energy security through research and innovation, knowledge creation and technology transfer with focus on energy sources diversification, efficient use of energy and environmental friendliness.

## Mission

- Producing competent human resources in energy related fields.
- Conducting researches in new and renewable energy, energy conversion and recovery, energy conservation, saving and management, and exploration of conventional energy resources to address local and regional issues.
- Closely collaborating with related Ministries, national and international partners and private sectors.
- Disseminate research findings and transfer technologies to the society

## Research Themes

The multidisciplinary team addresses scientific issues in the following sectors:

- New and Renewable Energy: Biomass, Solar PV, Solar PV/T, and Wind Turbine with a focus on design and modelling of processes, fuel and emissions measurements, lab and pilot scale equipment;
- Energy Efficiency and Conservation: Heat recovery, Waste to energy, thermal systems optimization, energy consumption measurement and modelling;
- Smart grid: connexion from renewable sources and optimization of grid electricity distribution and micro-grid for remote areas.
- Energy Management: energy management system, modelling and optimization of large energy systems.
- Exploration of conventional energy resources: depositional environment and reservoir characterization, mapping of hydrothermal alteration, geological mapping and investigation of hydrocarbon potential

## Projects and Research Topics

The list of projects and research topics that are implementing in ETM unit shows in the table below. For more detail information refers to a table in Annex 17.

Table 19. Research topics in ETM unit for the academic year 2022-2023.

No.	Name of PI (FAMILY First name)	Sexe	Project/Research Topic	Funding source	Period	Collaboration scale *	Project Type*
1	Dr. Or Chanmoly	M	Applied geophysics for investigating hydrocarbon potential and depositional environment of sediments at onshore prospect, southern Cambodia	HEIP	2021- 2023	I	1 1 = Basic 2 = Applied & Development 3 = Start-up 4 = Tech- transfer



2	Dr. Vai Vannak	M	Development of a Virtual Cambodian Power System-Towards an Innovation Micro-Grid in Cambodia	HEIP	2020-2024	I	2
3	Dr. Kret Kakda	M	Integration of Landsat-8, ASTER, and Sentinel-2 for mapping of mineral prospective, hydrothermal alteration and geological structures for porphyry copper and epithermal gold deposits in the north Cambodia.	JICA-LBE	2021-2023	I	2
4	Dr. Kret Kakda	M	Investigation the production potential of the Cambodian offshore reservoir considering effects of phase behavior and rock-fluid interaction	HEIP	2021-2023	I	2
5	Dr. Vai Vannak	M	Planning and Operation of Active Distribution Systems	JICA-LBE	2021-2023	N	2
6	Dr. Eng Chandoeun	M	Quality Assurance of Concrete Pile Integrity Soil Properties Investigation in Phnom Penh City using Seismic and Electrical Resistivity Tomography Approaches	HEIP	2021-2023	I	2
7	Dr. Vongchanh Kinnalesh	F	Study on impact of heat stress to human productivity and economic in Cambodia	CCCA3	2020-2023	I	1
8	Mr. Chhlonh Chhith	M	Optimal Fault Location, Isolation, and Restoration Procedure for LV Microgrids	BGF	2021-2024	I	1
9	Dr. Or Chanmoly	M	The Optimization of Algae Cultivation for Biofuel Production in Cambodia	JICA-LBE	2023-2024	N	2
10	Dr. KHON Kimsrornn	M	Optimal energy-management system in smart-building	JICA-LBE	2023-2024	N	2
11	Dr. Or Chanmoly	M	Accelerating Digital Transformation for Higher Education Institutions in Southeast Asia (DX.SEA)	Erasmus +	2023-2025	I	1

## Researchers

### Senior researchers (9M, 1F)

Dr. KRET Kakda, (Head of ETM Research Unit), Ph.D in Geophysics, Kyushu University, Japan  
*Geophysical exploration, remote sensing, economic geology which uses physical methods including seismic, magnetic, electrical and resistivity methods.*

Dr. OR Chanmoly (Director of RIC), Ph.D. in Petroleum Production Engineering, Kyushu University, Japan  
*Enhanced oil recovery; reservoir engineering; CO<sub>2</sub> sequestration; biomass to energy*

Dr. CHAN Sarin (Head of Industrial and Mechanical Engineering Department), Ph.D. in Engineering, Institute of Technology Bandung, Indonesia and Keio University, Japan  
*Renewable energy, waste heat recovery and heat-activated cooling system*

Dr. AM Sokchea, Ph.D in Energy Engineering, France  
*Energy Power System*

Dr. VONGCHANH Kinnaleth, Ph.D. Institute of Technology Bandung (ITB) and Hokkaido University (HU)  
*Energy Efficiency, Renewable energy, Biomass energy, Drying, Heat Stress*

Dr. BUN Long, Ph.D. in Electrical Engineering, INP Grenoble, France  
*Power system, renewable energy system, fault diagnosis*

Dr. CHRIN Phok, Ph.D. in Electrical Engineering, Université Paul Sabatier, Toulouse, France  
*Renewable energy, frugal engineering, asynchronous generator*

Dr. VAI Vannak, Ph.D. in Electrical Engineering, Université Grenoble Alpes, France  
*Power distribution system planning, Rural electrification, Optimization*

Dr. KIM Bunthern, Ph.D in Electrical and Electronics Engineering, Toulouse INP, France  
*Control systems, Renewable energy, Robotics*

Dr. ENG Chandoeun (Head of Faculty of Geo-resources and Geotechnical Engineering), Ph.D. in Geophysics, Kyushu University, Japan  
*Geophysical exploration, Economic geology, Oil and Gas Energy*

#### **Lecturer-researcher (1M, 2F)**

Mr. KHON Kinsrornn, Ph.D, Power system, University of Toulouse III  
*Power System, Microgrid, Optimization, Planning*

Mrs Eng Samphors, Master degree, Institut Teknologi Sepuluh November (ITS)  
*Distribution Management System, Renewable Energy Micro grid planning & Energy Storage, Distribution automation & Real time monitoring system*

Mr. HENG Rathat, Master degree, Institute of Technology of Cambodia  
*Petroleum Geology, Mineral and Petroleum Exploration, Characteristic of Mineral Deposit and Petroleum System*

#### **Fulltime-researcher (3M, 3F)**

Mr. ETH Udaya, Master degree, Chulalongkorn University, Thailand  
*Renewable energy, Power system analysis, Energy efficiency, Rural electrification, control system*

Ms. HENG Muoy Yi, Ph.D student, Geophysics, ITC  
*Geophysical exploration*

Ms. PECH Sopheap, Ph.D student, Geophysics, ITC  
*Petroleum geology*

Mrs. SIO Sreymean, Ph.D student, Petroleum Geology, ITC  
*Petroleum Geology, Mineral and Petroleum Exploration, Characteristic of Mineral Deposit and Petroleum System*

Mr. Heang Latin, Master degree, Institute of Technology of Cambodia  
*Biomass to energy, Mechanical design, Heat Stress*

Mr. CHHLONH Chhith, Ph.D candidate, University Grenoble Alpes (UGA), France  
*Fault detection, reconfiguration, restoration, load balancing on LV system, Renewable Energy*

### **Academic and Research Partners**

Universiti Teknologi Malaysia (UTM)  
University of Liège  
Université Claude Bernard Lyon 1  
Kyoto University (KU)  
Université Grenoble Alpes (UGA)  
Kyushu University  
National University of Singapore (NUS)  
The Hong Kong Polytechnic University (PolyU),  
Kyoto University (KU)

### **Non-academic partners**

Ministry of Mines and Energy, Cambodia  
Ministry of Education, Youth and Sports, Cambodia  
Ministry of Industry, Science, Technology and Innovation, Cambodia  
Cambodian Climate Change Alliance  
APSARA Authority  
The Energy Conservation Center Japan (ECCJ)  
Asean Center of Energy (ACE)  
JICA  
G2Elab

### **Industrial Partners and NGOs**

Electricité du Cambodge  
GERES  
ORBIT P. A Co.,Ltd  
Health & Environment International Trust (HEIT)  
Institut Francais pour la Performance du Batiment (IFPEB)  
EnergyLab  
GGGI  
ATS  
Sevea Consulting  
EnerCam Co.,Ltd  
Samnang Angkor Development Co Ltd  
IMECS (CAMBODIA) CO.,LTD  
SMEs involved in Solar Energy development  
Angkor Resources Corp  
Matlab Co., LTD

## Publications of ETM researchers for the last 5 academic years

From 2018-2019 to 2022-2023, there are in total 100 research outputs from ETM unit classified into three categories: Index publications, Non-index publications, and Conferences as shown in the table below.

Table 20. Summary of number of publications in last 5 years.

Publication classification/year	2022-2023	2021-2022	2020-2021	2019-2020	2018-2019	Total
Index publications	5	12	10	11	6	<b>44</b>
Non-index publications	0	0	2	1	0	<b>3</b>
Conferences	37	5	4	1	6	<b>53</b>
<b>Total</b>	<b>42</b>	<b>17</b>	<b>16</b>	<b>13</b>	<b>12</b>	<b>100</b>

### List of Index publications for academic year 2022-2023

1. Khon, K., Chhlonh, C., Vai, V., Alvarez-Herault, M. C., Raison, B., & Bun, L. (2023). Comprehensive Low Voltage Microgrid Planning Methodology for Rural Electrification. *Sustainability*, 15(3), 2841.
2. Kimsrornn KHON, Chhith Chhlonh, Vannak VAI, Marie-Cecile ALVAREZ-HERAULT, Bertrand RAISON and Long BUN. 2023. Comprehensive low voltage microgrid planning methodology for rural electrification. <https://ieeexplore.ieee.org/abstract/document/10000324>
3. O. Eth, V. Vai, L. Bun, S. Eng and K. Khon, "Optimal Radial Topology with Phase Balancing in LV Distribution System Considering Energy Loss Reduction: A Case Study in Cambodia," 2022 4th International Conference on Electrical, Control and Instrumentation Engineering (ICECIE), Kuala Lumpur, Malaysia, 2022, pp. 1-6, doi: 10.1109/ICECIE55199.2022.10000324.
4. Ikeda, M., Kret, K., Tsuji, T., Ikeda, T., Tsuji, T., Onishi, K., & Nishizaka, N. (2022). Pore fabric anisotropy and elastic moduli of fault rocks from the Median Tectonic Line, Shikoku, southwest Japan. *Tectonophysics*, 834, 229366.
5. Kinnaeth VONGCHANH, Sarin CHAN, A preliminary study on investigation of the heat stress affecting the labor productivity, a case study: garment factory Phnom Penh, *ASEAN Engineering Journal*, 2022, Accepted.

### List of Conferences for academic year 2022-2023

1. Oeun Sothea, Eng Samphors, Vai Vannak, Chim Charkya, So Phanit, Sary Monychot, LV System Modelling Considers Reverse Power Flow Analysis using Relay Vs Battery, the 12th scientific day of ITC, 8-9 June 2023, Phnom Penh, Cambodia.
2. SARY Monychot, VAI Vannak, ENG Samphors, SO Phanit, OEUN Sothea, CHIM Chakrya, Optimize Phase Balancing and Sizing DGs at the Rural Village in Cambodia, the 12th scientific day of ITC, 8-9 June 2023, Phnom Penh, Cambodia.

3. Chim Chakrya, Oeun Sothea, Eng Samphors, Vai Vannak, So Phanit, Sary Monychot, Rural Electrification with Off-Grid system, the 12th scientific day of ITC, 8-9 June 2023, Phnom Penh, Cambodia.
4. Thyra Thon, Vannak Vai, Darong Sorn, Samphors Eng, Techno-Economic Analysis of Feeder Routing for MV Distribution Systems, the 12th scientific day of ITC, 8-9 June 2023, Phnom Penh, Cambodia.
5. Kimtheng Thieng, Vannak Vai, Oudaya Eth, Samphors Eng, Study of the Technical Impact of Battery Energy Storage on PV Hosting Capacity in LVAC Distribution System: A Case Study in Cambodia, the 12th scientific day of ITC, 8-9 June 2023, Phnom Penh, Cambodia.
6. Rorn, K., Seang, S., Kret, K., Oy, K. and Ammugauan, J. (2023) Lithology, Alteration Minerals, and Ore Mineralization in Memot, Tbong Khmum Province, Cambodia. Proceedings of the ITC's 12th Scientific Day, 8-9 May 2023
7. Por, V., Seang, S., Kret, K., and Oy, K. (2023) Lithology, Ore mineralization, and Hydrothermal Alteration of Canada Wall Porphyry Cu-Mo-Au at Andongmeas, Ratanakiri, Cambodia. Proceedings of the ITC's 12th Scientific Day, 8-9 May 2023
8. Neov Yoklin, Oudaya Eth, Kimsrornn KHON, Comparative Analysis of Different Clustering Techniques in Hybrid AC/DC Microgrid, Proceedings of the ITC's 12th Scientific Day, 8-9 May 2023.
9. Pheak Kor, Latin Heang, Jackie Yang Yang, Kinnalesh Vongchanh, Sarin Chan, Assessing on the Impact of Heat Stress on Construction Labor Productivity during Cool Season in Cambodia, Proceedings of the ITC's 12th Scientific Day, 8-9 May 2023.
10. Sophal Pey, Sarin Chan, Kinnalesh Vongchanh, Simulation of an indirect evaporative cooling system using the 2-D model cross flow for Cambodia's climates, Proceedings of the ITC's 12th Scientific Day, 8-9 May 2023.
11. K Vongchanh and S Chan, Testing the hydraulic press machine for densification of biomass briquette for household use, International postgraduate conference for energy research, December 19, 2022, Kuala Lumpur, Malaysia.
12. Pheakdey Choun, Viza Heang, Sarin Chan, Kinnalesh Vongchanh, Simulation of Energy consumption for Flat using EnergyPlus, the 11th scientific day of ITC, 5-6 May 2022, Phnom Penh, Cambodia.
13. V. Chea, L. Heang, K. Vongchanh, S. Chan, A Descriptive Results on Environment Affecting Pupils in Cambodia – Case Study Primary Schools in Phnom Penh, 2nd ASEAN International Conference on Energy and Environment, 14-15 September 2022, Phnom Penh, Cambodia.
14. Morn Mengly, Kinnalesh VONGCHANH, CHAN Sarin, Latin HEANG, A Descriptive Results on Environment Affecting Pupils in Cambodia – Case Study Primary Schools in Phnom Penh, 2nd ASEAN International Conference on Energy and Environment, 14-15 September 2022, Phnom Penh, Cambodia.
15. Samoeurn Cheng, Kinnalesh Vongchanh, Sarin Chan, Latin Heang, Pisal Ken, Exergy Analysis of Biomass Briquette System, The 15th Regional Conference on Energy Engineering And The 13th International Conference on Thermofluids 2022, 25-26, October, 2022, Yogyakarta, Indonesia.
16. Pisal Ken, Kinnalesh Vongchanh, Sarin Chan, Latin Heang, Samoeurn Cheng, Thermal Properties of Biomass Briquettes made from Waste Materials. (2022). The 15th Regional Conference on Energy Engineering and The 13th International Conference on Thermofluids 2022, 25-26, October, 2022, Yogyakarta, Indonesia.

17. Kinnaleth Vongchanh, Sarin Chan, Testing the hydraulic press machine for densification of biomass briquettes for household use, The International postgraduate conference for energy research 2022, 19 December 2022, Kuala Lumpur, Malaysia.
18. Ly, P., Seang, S., Kret, K., Oy, K., Yonezu, K., Watanabe, K., Sreu, T. (2022) Lithology, hydrothermal alteration, and ore characteristics of Area-1 in Koh Sla, Chhouk district, Kampot Province, southern Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan.
19. Chheuy, P., Kret, K., Seang, S., Or, C., Kong, S., Kry, R., Oy, K., Chan, C., Sreu, T., Hoeun, S., Hoeun, S., Chhun, C., Neak, K. (2022) Hydrothermal Alteration Mineral Mapping by Integrating of ASTER and Landsat-8: A case study in Phnom Peam Louk, Kompong Chhang Province, Southwest Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022.
20. Neak, K., Kret, K., Sreu, T., Or, C., Seang, S. (2022). Petrophysical and Petrographical Studies for Characterization of Reservoir Quality of Cambodian Offshore: A Case Study on the Khmer Basin in the Gulf of Thailand. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022.
21. Boeurn, C., Seang, S., Kret, K., Yonezu, K., Watanabe, Zaw, K. (2022) Geology and Hydrothermal Alteration of Skarn Deposit in Area 4, Phnom So Ngam Tenement, Chhouk District, Kampot Province, Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022.
22. Kim, C., Kret, K., Seang, S., Kong, K., Or, C., Oy, K., Ammugauan, J., Heoun, S., Chhun, C., and Neak, K. (2022) Lithological Analysis of Koh Nheak, Mondoukiri Province Using Landsat-8 OLI and ASTER. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022.
23. M. Morn, K. Vongchanh, S. Chan, L. Heang (2022), A Descriptive Results on Environmental Affecting Pupils in Cambodia – Case Study Primary Schools in Phnom Penh, The 2nd ASEAN International Conference on Energy and Environment.
24. V. Chea, L. Heang, K. Vongchanh, S. Chan (2022), Workers' Perceptions of Occupational Heat Stress- a survey among garment workers in Phnom Penh, The 2nd ASEAN International Conference on Energy and Environment.
25. P. Ken, K. Vongchanh, S. Chan, L. Heang, S. Cheng (2022), Investigation of Briquette Thermophysical Properties and Gas Emissions, Seminar Thermofluid UGM
26. S. Cheng, S. Chan, K. Vongchanh, L. Heang, P. Ken (2022), Investigation of Briquette Thermophysical Properties and Gas Emissions, The 11<sup>th</sup> Scientific Day
27. P. Ken, K. Vongchanh, S. Chan, L. Heang, S. Cheng (2022), Exergy Analysis of Biomass Briquette System, The 11<sup>th</sup> Scientific Day.
28. Muoy Y. H., Chungyeun L., Saranyu H., Chandeoun E., Frederic N., 2022. Quality assurance of Concrete pile using Cross-hole Sonic Logging and Soil Profile. International Symposium on Earth Science and Technology 2022.
29. KEO T., HENG. M. Y., CHORK S., LANG R., HENG H., 2022., The Primary Geochemistry Evaluation on the Geothermal source in Te Teuk Pus Hot Spring in Oral district, Kompong Speu province, Cambodia., International Symposium On Earth Resources And Geo-Environmental Technology 2022.
30. Chungyeun L., Chandoeun E., Muoy Y. H., Phanny Y., 2022., Concrete Pile Defect Identification: Insights from Cross-Hole Sonic Logging and High Strain Dynamic Pile Test., The 4th ICCEE Proceedings.

31. Chungyeon L., Chandoeun E., Muoy Y. H., Phanny Y., 2022., Cross-Hole Sonic Logging and Dynamic Load Test for Concrete Pile Integrity Analysis., THE 11TH SCIENTIFIC DAY, Phnom Penh.
32. Sreymean Sio, Chandoeun Eng, Chanmoly Or. (2022). Seismic Interpretation and Tectonic Evolution of Tonle Sap Basin, Onshore Cambodia, the 11<sup>th</sup> Scientific Day of ITC
33. Sreymean Sio Chanmoly Or, Chandoeun Eng (2022). Review of Sedimentary Basin Formation and Petroleum System of Khmer Basin, Offshore Cambodia, the International Symposium on Earth Science and Technology 2022.
34. Sopheap PECH, Chandoeun ENG, Chanmoly OR, Sreymean SIO, Ratha HENG, Chitra BUTH (2022). Geochemistry of Shales and Limestones in Battambang Province: Implications for Depositional Environment, the 1<sup>st</sup> International Conference on Earth Resources and Geo-Environment Technology 2022,
35. Sreyleap Koem, Chandoeun Eng, Sopheap Pech, Kimhouy Oy, Sreymean Sio (2022). Sedimentary Facies and Sandstone Characteristics of Outcrop at Phnom Thippadei, Battambang Province, Cambodia, the 1<sup>st</sup> International Conference on Earth Resources and Geo-Environment Technology 2022.
36. They Chhun, Chandoeun Eng, Kimhouy Oy, Sopheap Pech, Sreymean Sio, Chaimongkhon Proeung. (2022). Petrography and geochemistry properties of limestone at Sampov Mountain in Battambang province, Cambodia, the 1<sup>st</sup> International Conference on Earth Resources and Geo-Environment Technology 2022.
37. Vechheka OEUR, Chandoeun ENG, Sopheap PECH, Kimhouy OY, Sreymean SIO. (2022). Lithofacies identification of outcrop in Takream mountain at Pouy Svay village, Takream Commune, Banan District, Battambang Province, Western Tonle Sap Basin, Onshore Cambodia, he 1<sup>st</sup> International Conference on Earth Resources and Geo-Environment Technology 2022.

#### **5.4.2. Food Technology and Nutrition (FTN Unit)**

##### **Cambodian Context**

Although Cambodia is still mainly a rural country with 58% of the population being farmers, the processing of agricultural products is generally family-based or within informal industrial structures, with a low added value and a low level of technology, thus limiting their ability to compete in international markets. Only 10% of the industrial workers are in the food-beverage sector, a great majority (97%) of them working in micro-enterprises with no foreign investment. Besides the need of training technicians and engineers with a focus on agricultural products transformation and quality control, research centres with high level faculty staff are needed to do research on food processes, develop original and innovative products adapted to Cambodian tastes and habits (dry or fermented products), and assist the growing industrial sector in the quality and safety assessment of the food chain.

##### **The Research Unit**

The research unit Food Technology and Nutrition is established to enhance the development of food and beverage industries in Cambodia through cost-effective collaborative research and innovation programs between a diverse range of economic partners and the researchers of the Institute of Technology of Cambodia. The Research Unit promotes technical platforms and research projects to support the sectors of food and feed processing, food storage and preservation, and innovative products from agriculture and forestry. Other aspects as product design, cost-

effectiveness, waste and by-products minimization, energy consumption reduction or valorisation of Cambodian biodiversity are also studied in the Research Unit. The main goal of this unit is to become a reliable center for research, training and consultancy services in food processing improvement, food fermentation, food product development and innovation, value addition of agricultural products, food nutrition, food safety, food quality analyses and food preservation in order to sustain the development of Cambodia.

### **Vision**

To be an excellent unit for research, innovation, training and consultancy services in the field of food science and technology contributing to sustainable development of Cambodia.

### **Mission**

- To increase the visibility of FTN research unit by strengthening researchers' capacity in food related fields to be nationally and regionally recognized
- To create standardized laboratories for research and hall technology for pilot scale
- To boost the research activities through local and international collaborations (Universities, Government, SMEs, NGOs)
- To promote prototyping and technology transfer; and to provide training and consultancy services to food industries and relevant stakeholders
- To disseminate scientific outputs through national and international publications and scientific events

### **Research Theme**

- Drying technology
- Biotechnology (fermentation, microbiology, plant)
- Extrusion technology
- Extraction and purification technology
- Beverage technology
- Food product development and innovation
- Food safety and shelf life improvement
- Food composition and food contaminant analysis

### **Projects and Research Topics**

The list of projects and research topics that are implementing in FTN unit shows as shown in the table below. For more detail information refers to a table in Annex 18.



Table 21. Research topics in FTN unit for the academic year 2022-2023.

No.	Name of PI (FAMILY First name)	Sexe	Project/Research Topic	Funding source	Period	Collaboration scale * N = National R = Regional I = International	Project Type* 1= Basic 2 = Applied & Development 3 = Start-up 4 = Tech-transfer
1	Dr. SUONG Malyna	F	Biotechnology for Integrated Pest Management towards pesticide reduction in Cambodia	HEIP	2019-2023	I	2
2	Dr. IN Sokneang	F	Valorization of high-value dry food products (agricultural products including herbal and spices) and other by-products in Cambodia	HEIP	2019-2023	I	2
3	Dr. MITH Hasika	M	Improvement and development of rice-based products toward the growth of SMEs/Industries in Cambodia	HEIP	2019-2023	I	2
4	Dr. TAN Reasmey	F	Development of Cambodian Soy Sauce by Fermentation Method	HEIP	2019-2023	I	2
5	M. KONG Sela	M	Development of Cooking Oil Processes for Commercialization	HEIP	2021-2023	I	2
6	Dr. PENG Chanthol	F	Improvement and development of fish and meat products for better preservation using innovative technology	HEIP	2021-2023	I	2
7	Dr. HOUNG Peany	F	Valorization of agricultural by-products in Cambodia through extractions and formulations of essential oils and bioactive compounds	HEIP	2021-2023	I	2
8	Dr. SUONG Malyna	F	Sustainable Rice Production within an Agroecology Framework (HEALTHYRICE)	IRD	2019-2022	I	2
9	Dr. PO Kimtho	M	FOODI (MSc course in Food Processing and Innovation)	Erasmus + KA2	2019-2022	I	2
10	Dr. IN Sokneang	F	Training a new generation of entrepreneurs in sustainable agriculture and food engineering (FoodSTEM)	Erasmus +	2019-2023	I	2
11	Dr. HOUNG Peany	F	Agroecology and Safe Food System Transitions (ASSET)	EU/AFD and GRET	2020-2025	I	2
12	Dr. PENG Chanthol	F	Reducing Foodborne Pathogen Contamination of Vegetables in Cambodia: Innovative Research, Targeted Interventions, and Impactful, Cambodian-Led Engagement	USAID	2020-2024	I	2
13	Dr. TAN Reasmey	F	Development of Cambodian Fermented Cucumbers by using Freeze-Dried Lactic Acid Bacteria with their Potential Use as Aromatic and Bacteriocin-producing Starters	LBE-JICA	2021-2023	I	2

14	Dr. YOEU Sereyvath	M	ASEAN Network for Green Entrepreneurship and Leadership/ ANGEL	Erasmus +	2021-2024	I	2
15	Dr. TAN Reasmey	F	Removal of diclofenac and caffeine from different water sources using activated carbons made from different wastes	EU/AFD	2022-2023	I	2
16	Dr. SROY Sengly	F	Assessment on nutritional profiles, storage stability and sensory evaluation of dried fish powder made by low-value small fish species	LBE-JICA	2022-2023	N	2
17	Ms. CHIN Lyda	F	Impact of initial composition and processing techniques on aromatic quality of mango	BGF & MoEYS, Tonle sap project	2021-2024	I	2
18	Ms. SIENG Sreyvich	F	Development of alternative salt process to manufacture refined table salt from coarse salt	AFD	2022-2023	N	2
19	Dr. MITH Hasika	M	Development of high nutritional value farmed fish and safe processed products (smoked and fermented fish) in Cambodia	ARES	2022-2027	I	2
20	Dr. SUONG Malyna	F	HEALTH OF PLANTS IN THEIR SOCIO-ECOLOGICAL ECOSYSTEM (Plant Health)	GDA (MAFF)	2022-2024	I	2
21	Dr. SUONG Malyna	F	Deciphering the function of the plant parasitic nematode microbiome in suppressive soils (DEPPAS)		2022-2024	I	2
22	Dr. IN Sokneang	F	Improving fresh-water fish powder production for versatile use in Cambodian diets	CAPFish - UNIDO-EU	2022-2023	N	2
23	Dr. HOUNG Peany	F	Improvement of Dried Fish Quality through Drying Technology Development	CAPFish - UNIDO-EU	2022-2023	N	2
24	Mr. KONG Sela	M	Development of Instant Fish Soups for Commercialization	CAPFish - UNIDO-EU	2022-2023	N	2
25	Dr. EK Pichmony	F	Development of nutrient-dense waffle rolls for children by incorporating Cambodian freshwater fish powder	CAPFish - UNIDO-EU	2022-2023	N	2
26	Dr. MORM Elen	F	Shelf life improvement and development of fish Jerky products	CAPFish - UNIDO-EU	2022-2023	N	2

## Researchers

### **Senior researcher (10F)**

Dr. PHAT Chanvorleak (Head of FTN Research Unit), Ph.D in Food Chemistry, Chung-Ang University, Anseong, South Korea

*Food chemistry, Food Contaminant Analysis, Agrochemical Analysis, Mycotoxin Analysis*

Dr. TAN Reasmey (Deputy Director of RIC), Ph.D in Bioengineering, Tokyo Institute of Technology, Japan

*Food Biotechnology (Vegetable and cereal fermentation), Food Product Development and Innovation, Food and Water Microbiology, Anaerobic Digestion*

Dr. IN Sokneang (Dean of Faculty of Chemical and Food Engineering), Ph.D in Science and Processes of Food and Bio-products, AgroParisTech, Paris, France

*Food Safety and Risk Assessment, Nutrition, Food Processing*

Dr. HOR Sivmey, Ph.D in Biochemical and Physicochemical of Food, SupAgro Montpellier, France

*Post-harvest Quality, Transformation of Tropical Fruits*

Dr. HOUNG Peany Ph.D in Chemical Science and Engineering, Tokyo Institute of Technology, Japan

*Chemical Engineering*

Dr. EK Pickmony, Ph.D. in Food Science, Washington State University, USA

*Food Analysis, Cereal Science, Extrusion, Food ingredients, Food Quality, Starch, Biopolymers, Carbohydrates, Plant Proteins*

Dr. SROY Sengly, Ph.D in Nutrition and Food Science, Montpellier SupAgro University, France

*Food Nutrition, Food Processing and Food Development*

Dr. MORM Elen, Ph.D in Chemical Engineering (Transfer, Interfaces and Processing), Free University of Brussels, Belgium

*Drying of Agricultural Crops and Herbal, Bioethanol*

Dr. PHUONG Heangsim, PhD in Processing Engineering, University of Nantes, France

*Enzymes, Enzyme Activity, Biomass, Sugar, Proteins, Carbohydrate Biochemistry*

Ms. YIN Molika, Ph.D in Food Science and Nutrition, Institute Agro/SupAgro Montpellier, France

*Food Product Development and Sensory Evaluation*

### **Lecturer-Researcher (4M, 4F)**

Dr. MITH Hasika, Ph.D in Food Science, Université de Liège, Belgium.

*Plant's Essential Oils/Extracts, Antimicrobials, Antioxidants, Food Microbiology, Food Preservation and Processing, Agro-Food Industry Management*

Dr. YOEUN Sereyvath, Ph.D in Science, Chonnam National University, South Korea

*Biotechnology, Organic Compounds Analysis (Pesticides and others)*

Dr. SUONG Malyna, Ph.D in Bioengineering, University de Montpellier II, France

*Plant Biodiversity, Microbiology, Genetic Engineering*

Mr. KONG Sela, Master in Chemical Engineering, Gadjah Mada University, Indonesia  
*Chemical Engineering*

Ms. SIENG Sreyvich, Master in Chemical Engineering, Gadjah Mada University, Indonesia  
*Chemical Engineering*

Ms. NAT Yukleav, Master in Chemical Engineering, Sirindhorn International Institute of Technology, Thammasat University, Thailand  
*Chemical Engineering*

Mr. HENG Oudam, Master of Biotechnology, Royal Melbourne Institute of Technology (RMIT) University, Australia  
*Genetics and proteomic technology, Next generation sequencing*

Ms. THENG Sokuntheary, Master of Sciences in Microbiology, Montana State University, Bozeman, MT, USA  
*Bacterial cell culture, Protein purification, Cloning, Data analysis*

***Full-time researchers (4M, 6F)***

Mr. NGET Sovannmony, Ph.D candidate in Meat Preservation, Ecole Nationale Vétérinaire Oniris, France  
*Meat Preservation, Chemical Contamination in Food, Nutrient Analysis in Food*

Ms. CHIN Lyda, Master in Agro-Industrial Product Development, Kasetsart University, Thailand  
*Food processing, Food product development*

Mrs. THANH Channmuny, Master in Health and Food Science, University of Montpellier, France  
*Food science, Food microorganism*

Ms. PHAL Sivchheng, Master in Environment Design, Kanazawa University, Japan  
*Environmental Design*

Mr. LY Luka, Master in Agro-Industrial, Institute of technology of Cambodia, Cambodia  
*Food processing, Quality control*

Mr. SAY Manith, Master of Science in Food Technology, Khon Kaen University, Thailand  
*Snacks production, Frying process*

Ms. OEUM Kakada, Master of Science in Basic Science, Chungnam National University, South Korea  
*Cell Biology, Microbiology, Cancer Biology, Cell cycle, Immunology, and Entomology*

Ms. MAO Socheata, Master in AgroFood Chain, UMR LEREPS/ENSFEA, France  
*Volatile compound analysis*

Mrs. MOM Vattana, Master in Food Science, Kasetsart University, Thailand  
*Food processing, Food product development*

Mr. LAY Sovannmony, Master in Chemical Engineering, De la Salle University, Philippines  
*Extraction*

### **Academic and Research Partners**

Tokyo Institute of Technology, Japan  
Yamagata University, Japan  
Université de Liège, Belgium  
Université de Bruxelles, Belgium  
SupAgro-Montpellier, France  
AgroSup-Dijon, France  
Polytech Lille, France  
Institut National Polytechnique de Toulouse (INP Toulouse), France  
French Agricultural Research Centre for International Development (CIRAD), France  
Institut de recherche pour le développement (IRD), France  
Aix-Marseille Université, France  
Université Claude Bernard Lyon 1, France  
Kasetsart University, Thailand  
Hanoi University of Science and Technology (HUST), Vietnam  
Chung-Ang University, South Korea  
Chonnam National University, South Korea

### **Non-academic partners**

Ministry of Education, Youth and Sports, Cambodia  
Ministry of Industry and Handicraft, Cambodia  
Ministry of Commerce, Cambodia  
General Secretariat of the National Science and Technology Council, Ministry of Planning  
National Productivity Centre of Cambodia (NPCC), Cambodia  
Ministry of Environment, Cambodia  
Tonle Sap Authority, Cambodia  
Department of Agro-industry, Ministry of Agriculture, Forestry and Fisheries, Cambodia  
Ministry of Rural Development, Cambodia

### **Industrial Partners and NGOs**

LyLy Company Co. Ltd  
Cambodia Brewery Limited  
Baca-Villa Productions Co Ltd  
Cambodia Beverages Company  
Mee Chiet  
Eche Ngov Heng Food Production of Kampot Co., Ltd  
Kang Sosedo Enterprise  
Phnom Penh Safe Food  
Healthy Food Enterprise  
Dara Food Enterprise  
DKSH  
Indochina Rice Mill Limited  
Food Enterprise  
Confirel  
Golden Silk  
Rosmeric Paper  
Chaktomuk Pest Services Co., Ltd (Orkin Cambodia)  
Ringacam  
Khmer Fresh Milk Co., Ltd  
Bodia Spa  
Aprati Foods (Cambodia) Ltd

## Publications of FTN researchers for the last 5 academic years

For the last 5 academic years, there are in total 130 research outputs from FTN unit classified into three categories: Index publications, Non-index publications, and Conferences as shown in the table below.

Table 22. Summary of number of publications in last 5 years.

Publication classification/year	2022-2023	2021-2022	2020-2021	2019-2020	2018-2019	Total
Index publications	14	8	7	6	6	41
Non-index publications	6	7	14	1	1	29
Conferences	16	11	14	7	12	60
<b>Total</b>	<b>36</b>	<b>26</b>	<b>35</b>	<b>14</b>	<b>19</b>	<b>130</b>

### List of Index publications for academic year 2022-2023

1. Nget, S., Mith, H., Boué, G., Curet, S., & Boillereaux, L. (2023). The Development of a Digital Twin to Improve the Quality and Safety Issues of Cambodian Pâté: The Application of 915 MHz Microwave Cooking. *Foods*, 12(6), 1187.
2. Houg, P., Ly, K., & Lay, S. (2023). Valorization of kaffir lime peel through extraction of essential oil and process optimization for phenolic compounds. *Journal of Chemical Technology & Biotechnology*. DOI 10.1002/jctb.7354
3. Yin, M., Bohuon, P., Avallone, S., In, S., & Weil, M. (2022). Postharvest treatments of turmeric (*Curcuma longa* L.) in Cambodia-Impact on quality. *Fruits*, 77 (6) : pp. 1-13. <https://doi.org/10.17660/th2022/026>
4. Yin, M., Weil, M., Avallone, S., Maraval, I., Forestier-Chiron, N., Servent, A., ... & Bohuon, P. (2022). Impact of cooking, drying and grinding operations on chemical content, functional and sensorial qualities of *Curcuma longa* L. *Journal of Food Measurement and Characterization*, 1-11.
5. Chin, L, N. Therdthai and W. Ratphitagsanti. (2022). Effect of conventional and microwave cooking conditions on quality and antioxidant activity of Chinese kale (*Brassica alboglabra*). *Applied Food Research*. 2 (1). Article ID 100079. <https://doi.org/10.1016/j.afres.2022.100079>
6. Lorn, S.; Ket, P.; Or, C.; Kong, S.; Um, D.; Aun, S.; Taing, C.; Hang, L. Health Impact Assessment from Rice Straw Production in Cambodia. *Appl. Sci.* 2022, 12, 10276. <https://doi.org/10.3390/app122010276>
7. Chea, C. , Ket, P. , Taing, L. , Kong, S. , Um, D. , Taing, C. , Or, C. , Aun, S. and Hang, L. (2022) Life-Cycle Impact Assessment of Air Emissions from a Cement Production Plant in Cambodia. *Open Journal of Air Pollution*, 11, 85-99. doi: 10.4236/ojap.2022.114007.
8. Hor S., Lechaudel M., Lebrun M., Avallone S., Bugaud C.. (2022). How cold storage influences physicochemical properties of mango cv. 'Kent' according to the density. *Fruits*, 77 (3) : p. 1-11.
9. Siesto, G., Pietrafesa, R., Infantino, V., Thanh, C., Pappalardo, I., Romano, P., & Capece, A. (2022). In Vitro Study of Probiotic, Antioxidant and Anti-Inflammatory Activities among Indigenous *Saccharomyces cerevisiae* Strains. *Foods*, 11(9), 1342. (F : 5.561)

DOI: <https://doi.org/10.3390/foods11091342>

10. Richter, J. K., Pietrysiak, E., **Ek, P.**, Dey, D., Gu, B.-J., Ikuse, M., Nalbandian, E., Žak, A., & Ganjyal, G. M. (2022). Extrusion characteristics of ten novel quinoa breeding lines. *Journal of Food Science*, 87, 5349– 5362. <https://doi.org/10.1111/1750-3841.16360>
11. Richter, J. K., Gu, B.- J., **Ek, P.**, Dey, D., Saunders, S. R., & Ganjyal, G. M. (2022). Potential interactions between starch and fruit pomace may impact the expansion ratio of direct expanded extrudates. *Journal of Food Science*, 87, 3513– 3527. <https://doi.org/10.1111/1750-3841.16240>
12. Yin, M., Weil, M., Avallone, S., Lebrun, M., Conejero, G., In, S., & Bohuon, P. Impact of cooking and drying operations on colour, curcuminoids and aroma of *Curcuma longa* L. *Journal of Food Processing and Preservation*, e16643. (**IF : 2.190**)  
DOI: <https://doi.org/10.1111/jfpp.16643>
13. Phuong, H., Masse, A., Dumay, J., Vandanjon, L., Mith, H., Legrand, J., & Arhaliass, A. (2022). Enhanced liberation of soluble sugar, protein, and R-phycoerythrin under enzyme-assisted extraction on dried and fresh *Gracilaria gracilis* biomass. *Frontiers in Chemical Engineering*, 21. (**IF:4.204**)  
DOI: <https://doi.org/10.3389/fceng.2022.718857>
14. Masson A.S., Vermeire M.L., Leng V., Simonin M., Tivet F., Thi H. N., Brunel C., **Suong M.**, Kuok F., Moulin L., & Bellafiore S. (2022). Enrichment in biodiversity and maturation of the soil food web under conservation agriculture is associated with suppression of rice-parasitic nematodes. *Agriculture, Ecosystems & Environment*, 331,107913. (**IF : 5.567**)  
DOI:[10.1016/j.agee.2022.107913](https://doi.org/10.1016/j.agee.2022.107913)

### List of Non-index publications for academic year 2022-2023

1. A. Chung, S. Yoeun, S. Chek, C. Chey, T. Sriv, V. Soav, K. Phon (2022). Assessment of pesticide contamination in water sources in the vegetable farms in S’ang Kandal province. *The Bulletin of Cambodian Chemical Society* Vol 13.
2. L. Set, S. Sroy, L. Chor, H. Mith, S. Yoeun, S. Doeurn, C. Thanh, C. Peng\* (2022). Chemical and Microbiological Analysis of Traditional Fermented Fish and Meat Products Collected from Battambang, Cambodia. *Techno-Science Research Journal* Vol 10.
3. L. Thourn, C. Phat, M. Suong, S. Sieng, S. Heng, S. Yoeun (2022). Identification of Pesticide Contamination in Water Sources Surrounding Agrochemical-Free Rice Farming in Battambang Province. *Techno-Science Research Journal* Vol 10.
4. P. Chhay, P. Houng, and S. Lay, 2022. Effect of pretreatment on extraction of essential oil from kaffir lime leaves. *Techno-Science Research Journal* Vol 10.
5. S. Song, P. Houng, and S. Lay, 2022. Optimization of extraction conditions for phenolic compounds extracted from Cassumunar ginger (*Zingiber montanum*). *Techno-Science Research Journal* Vol 10.
6. S. Met, P. Houng, P. Ek, P. Yun, and S. Lay, 2022. Drying kinetic and the changes of physicochemical properties and bioactive content of dried tomatoes during hot air drying. *Techno-Science Research Journal* Vol 10.

### **List of conferences for academic year 2022-2023**

1. MA Chiva, Tep Channeath, PENG Chanthol, HENG Oudom, (2023). Identification and Characterization of Lactic acid bacteria isolated from fermented products (Nem Sbak Chrouk) in Battambang province. The 14th International Conference on Environmental and Rural Development at Siem Reap, Cambodia, 3-5 March 2023.
2. Lengheang CHOENG, Chanthol PENG, Leangey SET, and Seyha DOEUN (2023). Determination of Histamine Level and Its Correlation with Viable Bacterial Count in Cambodian Fermented Fish. In The 14th International Conference on Environmental and Rural Development at Siem Reap, Cambodia, 3-5 March 2023.
3. Set LeangEy, Tep Channeath, Peng Chanthol, (2022). Traditional fermented products from Battambang, Cambodia: Their lactic acid bacteria and physicochemical characteristics. In the FOODI International Conference 2022, Nov. 2022.
4. Seyha Doeurn, Channeath Tep, Chanthol Peng, Oudom Heng, LeangEy Set, (2022). Diversity of Lactic Acid Bacteria Isolated from Nem Trey, A Traditional Fermented Fish Product of Cambodia. In the FOODI International Conference 2022, Nov. 2022.
5. Y. Nat, L. Vorleak, K. Tongor, S. Kong, S. Manit, C.P. Tan, R. Tan (2022). Effect Of Different Extraction Techniques On Yield And Physicochemical Properties Of Sacha Inchi Oil. Foodi International Conference 2022 (FOODI 2022), Universiti Teknologi Malaysai, Kuala Lumpur, Malaysia, 07-09 November, 2022.
6. S. Kong, V. Chanthy, P. Heng, M. Say, Y. Nat, C.P. Tan, R. Tan (2022). Evaluating Shelf-Life Of Commercial Soybean Oil Using An Empirical Modelling: A Case Study In Phnom Penh, Cambodia. Foodi International Conference 2022 (FOODI 2022), Universiti Teknologi Malaysai, Kuala Lumpur, Malaysia, 07-09 November, 2022.
7. M. Bunthan, S. Kong, T. Keang, M. Say, Y. Nat, T. Chin Ping, R. Tan (2022). Soybean oil extraction by hydraulic pressing. 6th International Conference of Chemical Engineering & Industrial Biotechnology (ICCEIB 2022), Universiti Malaysia Pahang, Malaysia, 15-16 August 2022.
8. Y. Nat, V. Leng, M. Say, S. Kong, T.C. Ping, R. Tan. Application of Response Surface Methodology on Extraction of Sacha Inchi Oil Using Conventional Solvent Extraction. 6th International Conference of Chemical Engineering & Industrial Biotechnology (ICCEIB 2022), Universiti Malaysia Pahang, Malaysia, 15-16 August 2022.
9. S. Kong, T. Keang, M. Bunthana, M. Say, Y. Nat, T. Chin Ping, R. Tan (2022). Effect of pressure and pressing time on oil yields of sachu inchi using hydraulic cold-pressed extraction. 6th International Conference of Chemical Engineering & Industrial Biotechnology (ICCEIB 2022), Universiti Malaysia Pahang, Malaysia, 15-16 August 2022.
10. S. Lay and P. Houg, 2022. Effect of pickling on bioactive compounds variation of lime. Foodi International Conference 2022, Kuala Lumpur, Malaysia 07-09 November, 2022.
11. K. Ly, P. Houg and S. Lay, 2022. Determination of essential oils content for development of herb and spice powders. Foodi International Conference 2022, Kuala Lumpur, Malaysia 07-09 November, 2022.
12. S. Sen, P. Houg and S. Lay, 2022. Effect of extraction of essential oil on aromatic compounds of red pepper powder. Foodi International Conference 2022, Kuala Lumpur, Malaysia 07-09 November, 2022.



13. S. Lay, and P. Houn, 2022. Maximizing yield of phenolic compounds extracted from white turmeric through extraction process design. 2022 International Conference on Functional Material and Chemical Engineering (ICFMCE, 2022), Nanjin, China 23-25 September, 2022.
14. K. Ly, S. Lay, and P. Houn, 2022. Valorization of kaffir lime peel waste through extraction of phenolic compounds and process optimization. 6th International Conference of Chemical Engineering and Industrial Biotechnology (ICCEIB 2022), Pahang Darul Makmur, Malaysia 15-16 August 2022.
15. S. Sen, S. Lay, and P. Houn, 2022. Effects of solvent extraction condition on yield of phenolic compounds from red pepper (*piper nigrum* l.). 6th International Conference of Chemical Engineering and Industrial Biotechnology (ICCEIB 2022), Pahang Darul Makmur, Malaysia 15-16 August 2022.
16. Thourn, L., Yoeun, S. Phat, C. Suong, M., 2022. Analytical Methods For Pesticide Residues in Paddy Rice and Soil Using Gas Chromatography Mass Spectrometry (GC-MS): A Review. The 11<sup>th</sup> Scientific Day, Institute of Technology of Cambodia, Phnom Penh, Cambodia.

### **5.4.3. Mechatronics and Information Technology (MIT Unit)**

#### **Cambodian Context**

The booming of the IT and communication sector in Cambodia enables to transfer large amount of data from every single part of the territory at low cost. At the same time, agriculture, climate and weather authorities, public health institutions, energy firms, and town councils produce a growing amount of data with the support of smartphones or data acquisition devices. The processing and the correct use of this information is a challenge in Cambodia under the threat of epidemics, climate change or air pollution events where fast processing and fast reactions are required.

On another hand, the food, mining and manufacturing industries do also require data science not only for quality control but also for actions and corrections, therefore an academic expertise in automatics and control, robotics, embedded objects are likely to trigger the development of cheap, smart devices (smartphones apps, small robots, controllers) for SMEs focused on high technology but with small capital investment.

#### **Vision**

To be a center of excellence in Intelligent Mechatronics and Intelligent Decision Support System.

#### **Mission**

To advance applied multidisciplinary research of Mechatronics, Artificial Intelligence, Telecommunication, and Aerospace through national and international collaborations for fostering national academic community and serving society.

#### **The Research Themes**

The combination of the different areas: information science and mechatronics allows developing specific topics related to the Cambodian context as:

- Aerospace and Space Engineering
- Artificial Intelligence (Machine Learning, Deep Learning, and Optimization)
- Intelligent Mechatronics
- Telecommunication and Internet of Things
- Operation Research
- Supply Chain Management

## Projects and Research Topics

The list of projects and research topics that are implementing in MIT unit as shown in the table below. For more detail information refers to a table in Annex 19.

Table 23. Research topics in MIT unit for the academic year 2022-2023.

No.	Name of PI (FAMILY First name)	Sexe	Project/Research Topic	Funding source	Period	Collaboration scale * N = National R = Regional I = International	Project Type* 1= Basic 2 = Applied & Development 3 = Start-up 4 = Tech-transfer
1	Dr. VALY Dona	M	Ancient Manuscript Digitization and Indexation	HEIP	2020-2023	N	2
2	Dr. VALY Dona	M	Plagiarism Detection System for Khmer Language	LBE JICA	2022-2023	N	2
3	Dr. PEC Rothna	M	Toward Product Innovation via FabLab-ITC	HEIP	2020-2024	N	2
4	Dr. KET Pinnara	F	Prototyping of Low-cost and Smart In-vessel Composter	LBE JICA	2021-2023	I	2
5	Dr. KET Pinnara	F	Integrated approach of precise irrigation and sustainable soil management to improve crop water productivity in Cambodia through ITC soil laboratory development: the focus on rice farming	HEIP	2021-2024	N	2
6	Mr. PICH Reatrey	M	DNS Tunneling Detection Based on DNS over HTTPS Data Analysis	ARES	2021-2025	I	2
7	Mr. CHHORN Sopheaktra	M	Controller system for smart greenhouse	HEIP + YG	2022-2023	N	2
8	Mr. CHHORN Sopheaktra	M	SOLAGEO's Internet of Energy	HEIP + Trade without Border	2022-2023	N	2
9	Ms. OUM Sotheara	F	Development of omnidirectional semi-autonomous mobile robots for robot competition	AI Farm	2022-2023	N	2
10	Mr. KEO Chivorn	M	Development of Dual Axes Solar Tracker for a use on a UAV	AOARD US Airforce	2022-2023	N	2
11	Mr. LY Leangchheng	M	Design a boat for SUV car		2022-2023	N	2
12	Dr. NGET Rithea	M	Design and Implementation of Health Data Collection Communication Protocol	LBE JICA	2022-2023	N	2

			Using Physical-Layer Network Coding				
13	Dr. THOURN Kosorl	M	Initiative towards electrical and electronic product testing and certification by EMC Laboratory	HEIP	2019-2024	N	2
14	Mr. KUY Movsun	M	Investigation of configuration issues related to SDN/NFV deployments	ARES	2020-2024	I	2
15	Dr. KIM Bunthern	M	Contribution to the optimal design, control and diagnostic of an e-tuk-tuk	HEIP	2021-2024	N	2
16	Mr. CHIN Chan Daraly	M	The vehicle as an intelligent thing		2022-2025	I	2
17	Dr. CHRIN Phok	M	Smart farming for qualified vegetable using mechatronics techniques	LBE JICA	2022-2023	I	2
18	Mr. TEP Sovichea	M	Smart Mushroom Control System Development	iDE	2023-2024	N	2
19	Dr. VALY Dona	M	Integrated Decision Support System for Non-Communicable Ocular Diseases using Machine Intelligence	ASEAN IVO	2023-2024	I	2

## Researchers

Dr. VALY Dona (Head of MIT research unit), Ph.D. in Engineering Science and Technology, Université catholique de Louvain, Belgium.

*Document Image Analysis, Computer Vision, Natural Language Processing*

Dr. SRANG Sarot, Ph.D. in Engineering, Tokyo Institute of Technology, Japan

*Instrumentation, estimation, control and robotics, dynamic modelling, simulation, Artificial Intelligence.*

Dr. PEC Rothna, Ph.D. in Communication Engineering, Tokyo Institute of Technology, Japan.

*Digital Signal Processing; radio communication; microwave and RF systems*

Dr. PO Kimtho, Ph.D. in Communication Engineering, Tokyo Institute of Technology, Japan.

*Digital Signal Processing; radio communication; microwave and RF systems*

Dr. SRENG Sokchenda, Ph.D. in Telecommunication Engineering, INP Toulouse, France

*Wireless communications, satellite communications, digital image processing*

Dr. SIM Tepmony, Ph.D. in Information Science, Electronics and Communications, Telecom Paris, France

*Markov theory; statistics; probability; maximum likelihood*

Dr. THOURN Kosorl, Ph.D. in International Development Engineering, Tokyo Institute of Technology, Japan

*Computational methods for electromagnetics, electromagnetic compatibility, wave propagation, pattern recognition, image processing, computer vision*

Dr. KIM Bunthern, Ph.D. in Electrical Engineering, INP Toulouse, France

*Control system, robotics, renewable energy, automation, energy generation system*

Mr. SOK Kimheng, Ph.D. candidate in Computer Science, Université de Namur, Belgium.  
*Privacy, Security, Blockchain*

Dr. NGET Rithea, Ph.D. in information Science, Japan Advanced Institute of Science and Technology, Japan  
*Network coding and IoTs*

Mr. HEL Chanthan, Master in Telecommunication, Chulalongkorn University, Thailand  
*Wireless communication, Technology for agriculture*

Mr. CHHORN Sopheakra, Master in Electrical and Energy Engineering from Chulalongkorn University, Thailand.  
*Measurement instrument, Internet of Thing and Medical device*

Mr. KUY Movsun, Ph.D. candidate in Computer Network, Université de Namur, Belgium.

Mr. PICH Reatrey, Ph.D. candidate in Network and Cyber Security, Université de Namur, Belgium.

Mr. CHIN Chan Daraly, Ph.D. candidate in Network and Machine Learning, INP-ENSEEIH  
Toulouse, France.

Mr. TEP Sovichea, M.Sc in Electronic System for Embedded and Communication Applications, INPT-ENSEEIH  
Toulouse, France.  
*Digital circuit design, PCB design and manufacturing, Internet of things, wireless sensor node, smart grid communication, industrial networks*

Mr. KEAN Jeudy, Ph.D. candidate in Telecommunication Engineering, INP-ENSEEIH  
Toulouse, France.

Mr. KEO Chivorn, Master in Industrial and Mechanical Engineering from Institute of Technology of Cambodia, Cambodia.

Mr. BUN Menghorng, Ph.D. candidate in Control and Diagnostic of Electrical System, INP-ENSEEIH  
Toulouse, France.

Ms. OUM Sotheara, Master of Engineering in Robotics, Institute of Technology of Cambodia, Cambodia.

Mr. LY Leangcheng, Master of Engineering, Institute of Technology of Cambodia, Cambodia

### **Academic Partners**

Tokyo Institute of Technology, Japan  
Toyohashi University of Technology, Japan  
INP Toulouse, France  
Institut Mines-Telecom, France  
Université de Namur, Belgium  
Université de Liège, Belgium  
Université catholique de Louvain, Belgium  
Universitas Pendidikan Ganesha, Indonesia  
Universiti Kebangsaan Malaysia, Malaysia

## Non-academic partners

Asian Office of Aerospace Research and Development  
Ministry of Education, Youth and Sports, Cambodia  
Ministry of Water Resources and Meteorology, Cambodia  
Ministry of Rural Development, Cambodia  
Ministry of Industry and Handicraft, Cambodia  
Ministry of Public Works and Transport, Cambodia  
Ministry of Environment, Cambodia  
Ministry of Health, Cambodia  
Ministry of Culture and Fine Art. Cambodia  
JICA, Japan  
Institut Pasteur du Cambodge

## Industrial Partners and NGOs

The Sirea Group  
Solar Green Energy Co., Ltd. Cambodia  
Louvain Cooperation  
Eclasio  
iDE  
Yamato Green Co., Ltd.

## Publications of MIT researchers for the last 5 academic years

From 2018-2019 to 2022-2023, there are in total 101 research outputs from MIT unit classified into three categories: Indexed Publications, Non-indexed Publications, and Conference Papers as shown in the table below.

Table 24. Summary of number of publications in last 5 years.

Publication classification/year	2022-2023	2021-2022	2020-2021	2019-2020	2018-2019	Total
Indexed Publications	10	6	6	3	10	<b>35</b>
Non-indexed Publications	2	6	6	1	2	<b>17</b>
Conferences	45	1	0	1	2	<b>49</b>
<b>Total</b>	<b>57</b>	<b>13</b>	<b>12</b>	<b>5</b>	<b>14</b>	<b>101</b>

## List of Index publications for academic year 2022-2023

1. Movsun KUY, Laurent Schumacher, Sokchenda Sreng "Experimental demonstration of NFV deployment with RPi and MAAS", NetSoft2023. IEEE, 2023.
2. Chanreng Sey Nhim, Nita Chek, Chanthan Hel, and Rothna Pec, "Experiment on Smart Mushroom Cultivation Using the Environmental Control System", The 14th International Conference on Environmental and Rural Development at Angkor Paradise Hotel, Siem Reap, Cambodia, March 3rd to 5th, 2023
3. Sopheaktra Chhorn, Sovichea Tep, Chanthan Hel, Rothna Pec, "Development of ESP32-Based Smart Greenhouse Controller", IEEE IoT World Forum, 2022

4. Born, Seanghort, Dona Valy, and Phutphalla Kong. "Encoder-Decoder Language Model for Khmer Handwritten Text Recognition in Historical Documents." In 2022 14th International Conference on Software, Knowledge, Information Management and Applications (SKIMA), pp. 234-238. IEEE, 2022.
5. Kumar, K. Dinesh, Sarot Srang, and Dona Valy. "A Review of Generative Adversarial Networks (GANs) for Technology-Assisted Learning: Solving Teaching and Learning Challenges." In 2022 International Conference on Automation, Computing and Renewable Systems (ICACRS), pp. 820-826. IEEE, 2022.
6. Ratha Siv, Matei Mancas, Bernard Gosselin, Dona Valy, and Sokchenda Sreng. "People Tracking and Re-Identifying in Distributed Contexts: Extension Study of PoseTReID." In 2022 9th International Conference on Electrical Engineering, Computer Science and Informatics (EECSI), pp. 337-342. IEEE, 2022.
7. Kong, Phutphalla, Matei Mancas, Bernard Gosselin, and Kimtho Po. 2022, "DeepRare: Generic Unsupervised Visual Attention Models" *Electronics* 11, no. 11:1696. <https://doi.org/10.3390/electronics11111696>
8. Chanreng Sey Nhim, Chanthan Hel, Sopheaktra Chhorn, Sovichea Tep, Rothna PEC, "Development of Multi-Parameter Tester for Agricultural Application", The 9th International Conference on Information Technology, Computer, and Electrical Engineering, 2022.
9. Sok, K., Colin, J.N., Po, K. (2022). Multi-authority Decentralized Attribute-Based Authorization Framework. In: Horkoff, J., Serral, E., Zdravkovic, J. (eds) *Advanced Information Systems Engineering Workshops. CAiSE 2022. Lecture Notes in Business Information Processing*, vol 451. Springer, Cham. [https://doi.org/10.1007/978-3-031-07478-3\\_2](https://doi.org/10.1007/978-3-031-07478-3_2)
10. Rothvichea Chea, Kosorl Thourn, Sopheaktra Chhorn, "Improving V-I Trajectory Load Signature in NILM Approach", IEECON 2022, Korn Khen, Thailand, March 2022.

#### **List of Non-index publications for academic year 2022-2023**

1. Sotheara Oum, Sarot Srang, Phayuth Yonrith, "Integration of RRT\* Path Planning with Trajectory Tracking for Wheeled Mobile Robot", *Techno-Science Research Journal*, 2022, Cambodia.
2. Penghuy Srean, Morokot Sakal, Maximilien Berthet and Sarot Srang, "Development of Orbital Simulator for Cambodian CubeSat Mission in LEO", *Techno-Science Research Journal*, 2022

#### **List of Conference for academic year 2022-2023**

1. Vannkinh Nom, Dona Valy, Sökkhey Phauk. "Word Spotting on Khmer Palm Leaf Manuscript Documents". The 12th Scientific Day of ITC, 2023
2. Chanchen Pork, Dona Valy, Sökkhey Phauk. "Text-image reconstruction and reparation for Khmer Historical Documents". The 12th Scientific Day of ITC, 2023
3. Huon Sophy, Valy Dona. "Plagiarism Detection System for Khmer Language". The 12th Scientific Day of ITC, 2023
4. Kao Visal, Valy Dona, Yorn Vanda, Aing Hongsin, Korn Monit, Ham Heng, Yin Soknara, Phal Kimheng, Sophart Chhordaphea, Chhorn Kakada, Sor Sopheak, Hang Sonimith. "Air Handwriting Recognition for Khmer Characters". The 12th Scientific Day of ITC, 2023

5. Sothy Sek, Dona Valy. "Masked Language Modeling for Khmer Palm Leaf Manuscript". The 12th Scientific Day of ITC, 2023
6. Meng Thong Oeng, Ye Kyaw Thu, Zera Soeum, Sethserey Sam. "Two SignWriting Keyboard layouts for Cambodian Fingerspelling". The 12th Scientific Day of ITC, 2023
7. Dararith Khun, Dara Tith, Jean-Noël Colin, Dona Valy. "Reputation Model for Trust-Based Policy in Self-Sovereign Identity Systems". The 12th Scientific Day of ITC, 2023
8. Sothy Chhoem , Dara Tith, Jean-Noël Colin, Dona Valy. "The Trust Model in Self-Sovereign Identity Systems". The 12th Scientific Day of ITC, 2023
9. Bunthorn Liv, Dara Tith, Jean-Noël Colin, Dona Valy. "Security Enhancement of Digital Wallet in Self-sovereign Identity of Healthcare System". The 12th Scientific Day of ITC, 2023
10. Vannaroth Korn, Kimheng Sok, Rathpisey Heng. "Enhancing the accuracy and reliability of docker image vulnerability scanning technology". The 12th Scientific Day of ITC, 2023
11. Ngounhak Heng, Kimheng Sok, Rathpisey Heng. "Case Study of Organization-Task-Based Access Control (OTBAC)". The 12th Scientific Day of ITC, 2023
12. Sokserey Srey, Sarot Srang. "Comparison of Control Performance for a Low-cost DC Motor with Single-loop and Cascade Control Architecture". The 12th Scientific Day of ITC, 2023
13. Dear Moeurn, Sarot Srang. "Performance Comparison of Ball Image Detection using Deep Learning Models, UNet, Unet Crop, and FCNN". The 12th Scientific Day of ITC, 2023
14. Rattana Seng, Sarot Srang. "Development of Control Freamwork Based on ROS Platform for a 3-Axis Gimbal". The 12th Scientific Day of ITC, 2023
15. Alexander Virak, Somonika Virak, Sarot Srang. "Hardware Development of 6 Degree-of-Freedom Robot manipulator". The 12th Scientific Day of ITC, 2023
16. Sovanvichea Hort, Vannthorng Him, Sarot Srang. "Investigation of Rocket Motor Performance with Syrup-Mixture Propellant". The 12th Scientific Day of ITC, 2023
17. Piseth NUON, Kosorl THOURN. "Development a Low Cost Air Leak Testing System to Analyze Pipes Quality based on Raspberry Pi and OpenPLC". The 12th Scientific Day of ITC, 2023
18. Sok Oeun Un, Kimtho Po, Kosorl Thourn, Rathna Pec. "Communication Back-up for Natural Disaster by Emergency Amateur Radio OperatorImplemented using APRS as Location Tracker in Cambodia". The 12th Scientific Day of ITC, 2023
19. Thavath Sai, Sovichea Tep, Chanthan Hel, Rothna Pec. "Development of Smart Greenhouse Controller using IoT". The 12th Scientific Day of ITC, 2023
20. Song Sok, Kosorl Thourn, Kimtho Po. "Development Model of Non-Intrusive Appliance Load Monitoring for Household Energy Improvement Basing on VI Trajectory". The 12th Scientific Day of ITC, 2023
21. CHUN Dara, THOURN Kosorl. "Design an Electromagnetic Wave Absorber using Time-Domain Techniques". The 12th Scientific Day of ITC, 2023
22. Panhapich Khe, Tithnorakneath Em, Mengkong Keng, Sambath Chhorn, Try Kot, Rithea Ngeth. "Indoor Location Tracking using UWB". The 12th Scientific Day of ITC, 2023
23. Leakana Ouk, Rothna Pec, Sopheaktra Chhorn. "Design Efficient Cell Identification Technique for 5G Terrestrial Cellular System". The 12th Scientific Day of ITC, 2023
24. Sokheng Din, Sokkhey Phauk. "Anomaly Detection of Time Series Data Based on Deep Learning for Feature Learning". The 12th Scientific Day of ITC, 2023

25. Khun Eng, Sokkhey Phauk, Sothea Has, Sokheng Din. "The Study of Cambodia's Commodity Price Flow Trade: The Cereal Price Prediction for Anticipate Price Fluctuation by Using the ARIMA Model". The 12th Scientific Day of ITC, 2023
26. Seng Hak Leng, Sokkhey Phauk, Sothea Has. "An Empirical Investigation of Gold Price Prediction Using LSTM Model". The 12th Scientific Day of ITC, 2023
27. OEUN Sothea, MENG Sokheng, NHIM Chanreng Sey, HEL Chanthan, CHHORN Sopheaktra, TEP Sovichea , KET Pinnara, "Development of Lab-Scale Composter for Mushroom Substrate Residual", LMS 2023
28. BUNTHEOUN Sophanarith\*, KIM Bunthern, and VAI Vannak. "Optimal Placement of Electric Vehicle Charging Stations using Mixed-Integer Linear programming: A Case Study in Cambodia", LMS 2023
29. Sopheaktra Chhorn, Sovichea Tep, Chanthan Hel, Rothna Pec, "Development of ESP32-Based Smart Greenhouse Controller", IEEE IoT World Forum, 2022
30. Sotheara Oum, Sarot Srang, Phayuth Yonrith, "Integration of RRT\* Path Planning with Trajectory Tracking for Wheeled Mobile Robot", 2022 Annual Conference on Electronics, Information and Systems, 2022, Japan
31. Sophy Huon, Dona Valy, "Handwritten Khmer Digit Recognition using Artificial Neural Network", The 11th Scientific Day of ITC, 2022, Cambodia
32. Seanghort Born, Dona Valy, Phutphalla Kong, "Encoder-Decoder Language Model for Khmer Handwritten Text Recognition on Historical Documents (Sleuk-Rith)", The 11th Scientific Day of ITC, 2022, Cambodia
33. Vanny Ratanak Chheang, Dara Tith, Dona Valy, "Distributed Authentication Infrastructure using Public Key Infrastructure and Blockchain", The 11th Scientific Day of ITC, 2022, Cambodia
34. Sotheara Oum, Sarot Srang, Phayuth Yonrith, "Integration of RRT\* Path Planning with Trajectory Tracking for Wheeled Mobile Robot", The 11th Scientific Day of ITC, 2022, Cambodia.
35. Povnemol Gnhiok, Sarot Srang, Phayuth Yonrith, "PI Controller for Velocity Controller Design based on Lumped Parameter Estimation of a Low-Cost PMDC Motor", The 11th Scientific Day of ITC, 2022, Cambodia.
36. Chanvireak Samrit, Sarot Srang, Phayuth Yonrith, "Design Structure for Plug and Play Wheel Mobile Robot", The 11th Scientific Day of ITC, 2022, Cambodia.
37. Vichetra Yi, Sarot Srang, Chivorn Keo, "Roll and Pitch angle Estimation by using Unscented Kalman filter", The 11th Scientific Day of ITC, 2022, Cambodia.
38. Rattana Seng, Sarot Srang, Chivorn Keo, "Flight Transition State Machine Design for Vertical Takeoff Landing for Fixed-Wing Unmanned Aerial Vehicle", The 11th Scientific Day of ITC, 2022, Cambodia.
39. Sothea Oeun, Sokheng Meng, Chanreng Sey Nhim, Sopheaktra Chhorn, Sovichea Tep, Chanthan Hel, Pinnara Ket, "The Prototype of Smart Compost Bin (S-Mush Bin)", The 11th Scientific Day of ITC, 2022, Cambodia.
40. Sereiwathna Ros, Dona Valy, "Face Mask Recognition using ResNet and DenseNet", The 11th Scientific Day of ITC, 2022, Cambodia
41. Hutmonineat Sea, Dona Valy, Phutphalla Kong, "Insects and Abnormalities Detection using Convolutional Neural Network", The 11th Scientific Day of ITC, 2022, Cambodia



42. Sochetra Than, Dona Valy, Phutphalla Kong, “Crop Disease Data & Detection using Convolutional Neural Network”, The 11th Scientific Day of ITC, 2022, Cambodia
43. Seangly Ny, Dona Valy, Phutphalla Kong, “Lock and Unlock Door with Face Detection using OpenCV, Python and Arduino Board”, The 11th Scientific Day of ITC, 2022, Cambodia
44. Lykong Un, Dona Valy, “Isolated Khmer Character Recognition”, The 11th Scientific Day of ITC, 2022, Cambodia
45. Rasin Koun, Pocvenh Ly, Tithtola Vong, Sopheapanha Bun, Hoksong Tim, Chivorn Keo, " Concept Study of Dual Axes Camera Tracker and Rocket Detection by Using Color Based Detection", The 11th Scientific Day of ITC, 2022, Cambodia.

#### **5.4.4. Materials Science and Structure (MSS Unit)**

##### **Cambodian Context**

Cambodia has a long history of engineering skills in materials and structures. Looking back at Angkorian times, the Khmer empire built a considerable amount of constructions in bricks and stone such as religious buildings, bridges, dams (Barray). Some of these heritage buildings now are in unstable conditions because of the deterioration of the materials and the damages of structures. The preservation of Khmer heritage is an important issue for or rich cultures and also the tourism industry. Currently, Cambodian universities are producing human resources with both science and practical capacity to do research and preservation their heritages, which is an important step to reach solutions.

In the present days, new challenges have to be met: the construction sector has boomed in 2016 with a total investment of 8.5 b\$. There are over 900 high-rise buildings (more than 5 floors), the majority of them in Phnom Penh and Kompongson. The fast evolution of Cambodian cities causes issues of quality (qualified human resources, redefining building standards) and of sustainability (depletion of local resources in construction materials).

Research in materials science and structure for improvement of manufacturing local value-added products and construction needs are steps towards development in eco-friendly concrete or building components adapted to local resources. Furthermore, study and reinforce the stability of embankments, dams, slopes, especially in a context of variable conditions of soils between the rainy and the dry season are also parts of materials science and structure.

Materials science and structure is not limited to the building industry, as there are also big challenges in recycling or recovering materials from waste, replacing polymers from fossil origin with natural polymers, and producing sustainable products from local materials. Materials Science and Structure Research Unit was established to build up researcher group with similar skill and working fields as an interdisciplinary for creating new materials and structures which serve for various applications.

##### **The Research Unit**

The Material Sciences and Structure Research Unit focuses on the innovation and trends in construction material, especially with low carbon impact materials and light structures, including geotechnical engineering, underground structures, structural engineering, minerals, polymers, ceramics and alloys to address specific Cambodian needs.

The whole set of available natural materials in Cambodia (silk, wood, agricultural by-products, starch, bamboo, clay, limestone, natural rubber) is also reconsidered to produce sustainable goods and products. The Research Unit works among an international network on heritage preservation with a specific dedication on materials science (stones, bricks, iron, and other alloy components). An important effort is made on modelling and simulations with high standards numerical tools associating mechanics, heat transfer and fluid mechanics.

### **Vision**

MSS Research Unit will be nationally and internationally recognized for one of the first destination for education and research in materials and structure by industries and academic institutions. MSS Research Unit will be a source for technical innovation transfer, scientists and engineers.

### **Mission**

- To strengthen research capacity in the field of materials and structure
- To enlarge and improve the Materials and Structure Laboratory
- To boost the research activities through local and international collaborations (Universities, Government, SMEs, NGOs)
- To promote technology transfer and provide training and consultancy services
- To increase national and international publications
- To host scientific events

### **Research Theme**

- Mineralization
- Physical and mechanical characteristics of infrastructure and construction materials
- Polymer composites and plastic waste recycling, eco-materials for construction (concrete, binder), alloy, and traditional ceramic
- Mechanical behavior of concrete and steel structures
- Earthquake design and structural engineering
- Building Information Modelling (BIM)
- Heritage preservation (structure, source of rock...)
- Air pollution control

### **Projects and Research Topics**

The list of projects and research topics that are implementing in MSS unit as shown in the table below. For more detail information refers to Annex 20.

Table 25. Research topics in MSS unit for the academic year 2022-2023.

No.	Name of PI (FAMILY First name)	Sex	Project/Research Topic	Funding source	Period	Collaboration scale * N = National R = Regional I = International	Project Type* 1= Basic 2 = Applied & Development 3 = Start-up 4 = Tech-transfer
1	AUN Srean	F	Air Pollution Monitoring in Phnom Penh	In kind	2019-2023	I	1
2	BUN Polyka	F	Development and optimization of ceramic tile using Cambodian clays incorporating with industrial wastes	HEIP	2020-2023	R	2
3	KETH Kannary	F	Managing the interdisciplinary collaboration in construction 4.0: ITC's workshop case	ARES-Cambodia	2021-2024	I	1
4	SEANG Sirisokha		Geological, Geochemical Characteristics and Genesis of Gold Mineralization, Gemstone and Rare Earth Element in Ratanakiri, Kampot, and Pailin province, Cambodia	LBE-JICA	2022-2023	R	2
5	YOS Phanny	M	Cambodian natural rubber/different minerals composites for floor mat shock absorbing application	HEIP	2020-2023	R	2
6	YOS Phanny	M	Physical Properties and Mineralogy of Ancient Brick from Temples at Sambor Prei Kuk area, Kampong Thom, Cambodia	LBE-JICA	2022-2023	N	1
7	YOS Phanny	M	Polyethylene (PE) Waste Recycling for Asphalt Concrete Pavement Application	MoE	2021-2022	N	2
8	DOUNG Piseth	M	Initiative on the development of wind load for design of building structures in Cambodia	HEIP	2020-2023	N	1
9	DOUNG Piseth	M	Energy-based design for buildings and Steel ring damper for seismic application	KMUTT	2020-2024	R	2
10	DOUNG Piseth	M	Evaluation of Mechanical Behavior of Post-Installed Bundled Reinforcement Used for Concrete Connections	LBE-JICA	2022-2023	R	1
11	HIN Raveth	M	Chemical Strengthening of Large-scale glass Pieces for Construction and Other Engineering Applications	HEIP	2020-2024	I	2
12	TAING Kimneth	F	Green BIM - Analysis of BIM approach for designing a bioclimatic building	ARES	2020-2024	I	1
13	LONG Makara	M	Sustainable building designs integrated life-cycle assessment (LCA), for best strategies to design the green	ARES – COMBOI A Project	2021-2025	I	2

			residential building in Phnom Penh, Cambodia				
14	Dr. KAN Kuchvichea	M	Designing and Implementing a Pilot to Promote Waste Circularity in Phnom Penh	UNDP	2022-2023	N	2
15	AUN Srean	F	Development of Starch-Based Film for Biodegradable Packaging Using Cambodian Cassava as Starch Source	Takahashi	2023-2024	N	2
16	SOM Chansamnung	M	Effect of The Addition of Natural Fibers on Shrinkage, Cracking Risk and Healing Capacity of Cementitious Materials	BGF-ITC	2023-2026	I	1
17	PROK Narith	M	Performance of FRP Anchor Embedded into Concrete Cylinder	Fyfe Asia	2022-2023	N	1
18	Yos Phanny	M	ERASMUS KA-171 (French Partners): Capacity building on Materials Engineering	Erasmus	2023-2025	I	2
19	Yos Phanny	M	ERASMUS KA-171 (Turkish Partner): Capacity building on Materials and Civil Engineering	Erasmus	2023-2025	I	2
20	Yos Phanny	M	FSIP-R: Capacity building on metal materials	French Embassy	2023-2024	I	2

## Researchers

Dr. DOUNG Piseth (Head of MSS Research Unit), PhD in Civil Engineering, Tokyo Institute of Technology, Japan

Steel structures, Tall steel/concrete building systems, Earthquake engineering and structural dynamics, Bridge engineering

Dr. YOS Phanny, PhD in Materials Engineering, Kyushu University, Japan

Natural rubber, Natural rubber latex, Polymer composites

Dr. HAN Virak, PhD in Civil Engineering, Kochi University of Technology, Japan

Civil engineering materials, concrete, modeling

Dr. HIN Raveth, PhD in Material Engineering, University of Rennes 1, France

Mechanical behavior of Materials, Civil Engineering

Dr. PROK Narith, PhD in Civil Engineering, KOCHI University of Technology, Japan

Soil-structure interaction; earthquake; tsunami

Dr. RATH Sovann Sathya, PhD in Civil Engineering, KOCHI University of Technology, Japan

Dr. KAN Kuchvichea, PhD in Civil Engineering, Université Libre de Bruxelles, Belgium

Soil mechanics, Construction materials

Dr. BUN Polyka, PhD in Material Engineering, Institute of Technology of Cambodia, Cambodia

Simulation of thin wall structures, Concrete and ceramic materials

Dr. SEANG Sirisokha, PhD in Economy Geology, Kyushu University, Japan

Earth mineral, Mineralization, Geology

Ms. AUN Srean M. Eng., Chulalongkorn University, Thailand  
Biomaterials/ Bioplastic innovation, Air pollution control

Dr. HENG Sounean, D. Eng., Insa Rennes, France  
Mechanics of materials and structures

Ms. KETH Kannary, PhD candidate, Université Libre de Bruxelles, Belgium  
Architectural design, Building Information Modeling (BIM)

Ms. TAING Kimnenh, PhD candidate, Université Libre de Bruxelles, Belgium  
Sustainable design, Architecture, Numerical model

Mr. LONG Makara, PhD candidate, Université Libre de Bruxelles, Belgium  
Sustainable building design, Life cycle assessment, Green building

Mr. SOM Chansamngang, Master's Degree in Civil Engineering, Beijing Jiaotong University, China  
Effect of the addition of natural fibers on shrinkage, Cracking risk, and Healing capacity of cementitious materials

### **Academic and Research Partners**

King Mongkut's University of Technology Thonburi (KMUTT), Thailand  
Chulalongkorn University, Thailand  
Universiti Sains Malaysia  
International University of Batam, Indonesia  
Tokyo Institute of Technology, Japan  
Kyoto University, Japan  
Kyushu University, Japan  
Kanazawa University, Japan  
INSA de Rennes, France  
Université Libre de Bruxelles, Belgium  
Université de Liege, Belgium  
University of Stuttgart, Germany

### **Non-academic partners**

Ministry of Education, Youth and Sports, Cambodia  
Ministry of Public Works and Transport, Cambodia  
Ministry of Culture and Fine Arts, Cambodia  
Ministry of Mines and Energy, Cambodia  
Ministry of Environment, Cambodia  
General Directorate of Rubber, Cambodia

### **Industrial Partners and NGOs**

SNP-PT International Co., Ltd, Thailand  
Minebea (Cambodia) co.ltd  
Edotco Cambodia Co., Ltd  
Nikko-Kinzoku (Cambodia) Co.,Ltd  
Fyfe Asia Pte Ltd, Singapore  
IKEE group, Cambodia  
HILTI, Thailand

## Publications of MSS researchers for the last 5 academic years

From 2018-2019 to 2022-2023, there are in total 91 research outputs from MSS unit classified into three categories: Indexed Publications, Non-indexed Publications, and Conference Papers as shown in the table below.

Table 26. Summary of number of publications in last 5 years.

Publication classification/year	2022-2023	2021-2022	2020-2021	2019-2020	2018-2019	Total
Indexed Publications	6	2	3	2	2	15
Non-indexed Publications	3	1	2	1	0	7
Conference Papers	54	9	2	1	3	69
<b>Total</b>	<b>63</b>	<b>12</b>	<b>7</b>	<b>4</b>	<b>5</b>	<b>91</b>

### List of Index publications for academic year 2022-2023

1. Kan, K., & François, B. (2023). Triaxial tension and compression tests on saturated lime-treated plastic clay upon consolidated undrained conditions. *Journal of Rock Mechanics and Geotechnical Engineering*. <https://doi.org/10.1016/j.jrmge.2023.03.017> (IF = 5.915)
2. Mao, P., Hashikawa, H., Sasaoka, T., Shimada, H., Wan, Z., Hamanaka, A., Oya, J. (2022) Numerical Investigation of Roof Stability in Longwall Face Developed in Shallow Depth under Weak Geological Conditions. *Journal of Sustainability*. 14(3). <https://doi.org/10.3390/su14031036> (IF = 3.889)
3. Bun, P., Cyr, M., Lanieste, P., Bun, K. N., Idir, R. (2022) Concrete made of 100% recycled materials - Feasibility study. 180 (2022). 106199. <https://doi.org/10.1016/j.resconrec.2022.106199> (IF = 13.716)
4. Mom, A., Hoeun, S., Bernard, F., Kamali-Bernard, S., Han, V. (2022) The Effect of Thermal Contact Conductance (TCC) between Aggregate Inclusion and Matrix on Thermal Conductivity of Cement-based Material. *International Journal of Integrated Engineering*. 14(5). pp. 99-106.
5. Chea, C., Ket, P., Taing, L., Kong, S., Um, D., Taing, C., Or, C., Aun, S. and Hang, L. (2022) Life-Cycle Impact Assessment of Air Emissions from a Cement Production Plant in Cambodia. *Open Journal of Air Pollution*, 11, 85-99. doi: [10.4236/ojap.2022.114007](https://doi.org/10.4236/ojap.2022.114007). (IF = 0.79)
6. Lorn, S., Ket, P., Or, C., Kong, S., Um, D., Aun, S., Taing, C., Hang, L. (2022) Health Impact Assessment from Rice Straw Production in Cambodia. *Appl. Sci*, 12, 10276. <https://doi.org/10.3390/app122010276> (IF = 2.838)

### List of Non-Index publications for academic year 2022-2023

1. Seang, S., Kan, K., & Okamoto, M. (2022). Feasibility Study of Using Recycled Waste Plastic in Bituminous Concrete Application. *Techno Science Research Journal*. 10(2).
2. Oeung, K., Doung, P., Leelataviwat, S., Han, V. (2022) Analytical Assessment of Earthquake Energy Demand in Single Degree of Freedom Systems, *Techno Science Research Journal*. 10(1).

3. Doung, P., Leelataviwat, S. (2022) Direct Seismic Design Methods for Buckling-Retrained Knee-Braced Frames with Single Plate Shear Connections. *Techno Science Research Journal*. 10(1).

### **List of Conferences for academic year 2022-2023**

1. Taing, K., Leclercq, P., Han, V. (2023) Visualisation d'une design timeline et des outils mobilisés en conception architecturale bioclimatique, ModACT Conference, Paris, France
2. Taing, K., Han, V., Leclercq, P. (2023) BIM Model and BES Model Approach in Designing a Bioclimatic Building, The 12<sup>th</sup> Scientific Day 8-9 June 2023, Phnom Penh, Cambodia
3. Keth, K., Han, V., Rajeb, B-S. (2023) Guideline/Protocols for Collaborative Design and Build Process in Cambodia, ITC's 12<sup>th</sup> Scientific day, 8-9 June 2023, Cambodia
4. Long, M., Han, V., Leclercq, P., Reiter, S. Sustainable Building Design Strategy from Life Cycle Thinking Perspective Case Study: A Townhouse in Phnom Penh, Cambodia, ITC's 12<sup>th</sup> Scientific day, 8-9 June 2023, Cambodia
5. Vong, S., Chin, R., Doung, P. (2023) Evaluated Evaluation of Gust Loading Effects on Tall RC Building in Cambodia: A Comparison between International Load Standards. Extended Abstract of The ITC's 12<sup>th</sup> Scientific day, 8-9 June 2023, Cambodia
6. Thai, R., Chhin, R., Han, V., Doung, P. (2023) A comparative evaluation of directionality factor between international load codes for low-rise steel building and their conformity to Cambodia wind. Extended Abstract of The ITC's 12<sup>th</sup> Scientific day, 8-9 June 2023, Cambodia
7. Sovann, D., Heng, S., Doung, P. (2023) Evaluation of strength and failure of post-installed bundled rebar in concrete using finite element analysis. Extended Abstract of The ITC's 12<sup>th</sup> Scientific day, 8-9 June 2023, Cambodia
8. Raksa, S., S, Aun., Worrador, P., Mitsuhiko, H., Leakhena, H., Muhammad, A., Chanmoly, O., Masami, F. (2023) Seasonal Variation of Carbon Composition in Total Suspended Particles in Phnom Penh, Cambodia. Extended Abstract of The ITC's 12<sup>th</sup> Scientific day, 8-9 June 2023.
9. Muhammad, A., S, Aun., Leakhena, H., Chanmoly, O., Mitsuhiko, H., Masami, F. (2023) Preliminary assessment of personal exposure to ultrafine particle (UFP) in Phnom Penh, Cambodia. Extended Abstract of The ITC's 12<sup>th</sup> Scientific day, 8-9 June 2023.
10. E, Torabi., S, Aun., M, Hata., M, Amin., Leakhena, H., M, Furruchi. (2023) Development of a Small Nano-Particle Sensor Using Light Scattering and its Application to On-line Ambient Monitoring. Extended Abstract of The ITC's 12<sup>th</sup> Scientific day, 8-9 June 2023.
11. Kouleam, S., Prok, N., Rath, S. S. (2022) Experimental Study on Performance of Fiber Anchor Under Axial Tension, NPIC Conference Proceeding. 12<sup>th</sup> December 2022, Cambodia
12. Chan, R., Prok, N., Rath, S. S. (2022) Experimental Study of the Effectiveness of Anchor Fibers Inserting into Concrete Cylinder Confined by Glass Fiber Reinforcing Polymer, NPIC Conference Proceeding. 12<sup>th</sup> December 2022, Cambodia
13. Keth, K., Ben Rajeb, S., Han, V. (2023) Collaborative Works in Construction Project in Cambodia: Toward a Workflow Scenario Identification. COLLA 2023: The Thirteenth International Conference on Advanced Collaborative Networks, Systems and Applications 13-17 March, 2023 - Barcelona, Spain.
14. Rorn, K., Seang, S., Kret, K., Oy, K. and Ammuguan, J. (2023) Lithology, Alteration Minerals, and Ore Mineralization in Memot, Tbong Khmum Province, Cambodia. Proceedings of the ITC's 12th Scientific Day, 8-9 May 2023

15. Por, V., Seang, S., Kret, K., and Oy, K. (2023) Lithology, Ore mineralization, and Hydrothermal Alteration of Canada Wall Porphyry Cu-Mo-Au at Andongmeas, Ratanakiri, Cambodia. Proceedings of the ITC's 12th Scientific Day, 8-9 May 2023
16. Sreng, L., Seang, S., Azura, A.R., Yos, P. (2022) Characterization of Cambodian natural rubber/common clay composites for shock absorption applications: Primary results. *Materials Today: Proceedings*. 66(5). pp. 3112-3115, <https://doi.org/10.1016/j.matpr.2022.08.013>.
17. Taing, K., Leclecrq, P. (2022) Adoption contextuelle des pratiques pédagogiques: entre écosystèmes physique et logiciel, le cas de l'architecture bioclimatique en Asie du sud-est. *SHS Web of Conferences*. 147(2022). <https://doi.org/10.1051/shsconf/202214707002> (open access)
18. Doung, P., Leelatawivat, S., Chea, L., Sorn, C. (2022) Experimental Assessment of Strength and Failure Modes of Post-Installed Bundled Rebar in Concrete. Second International Conference on Construction Materials and Structures (ICCMS-2022). 13-20 December 2022, National Institute of Technology Calicut (NITC), India (online)
19. Ly, P., Seang, S., Kret, K., Oy, K., Yonezu, K., Watanabe, K., Sreu, T. (2022) Lithology, hydrothermal alteration, and ore characteristics of Area-1 in Koh Sla, Chhouk district, Kampot Province, southern Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan
20. Chheuy, P., Kret, K., Seang, S., Or, C., Kong, S., Kry, R., Oy, K., Chan, C., Sreu, T., Hoeun, S., Hoeun, S., Chhun, C., Neak, K. (2022) Hydrothermal Alteration Mineral Mapping by Integrating of ASTER and Landsat-8: A case study in Phnom Peam Louk, Kompong Chhang Province, Southwest Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022
21. Neak, K., Kret, K., Sreu, T., Or, C., Seang, S. (2022) Hydrothermal Alteration Mineral Mapping by Integrating of ASTER and Landsat-8: A case study in Phnom Peam Louk, Kompong Chhang Province, Southwest Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022
22. Boeurn, C., Seang, S., Kret, K., Yonezu, K., Watanabe, Zaw, K. (2022) Geology and Hydrothermal Alteration of Skarn Deposit in Area 4, Phnom So Ngam Tenement, Chhouk District, Kampot Province, Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022
23. Kim, C., Kret, K., Seang, S., Kong, K., Or, C., Oy, K., Ammuguan, J., Heoun, S., Chhun, C., and Neak, K. (2022) Lithological Analysis of Koh Nheak, Mondoukiri Province Using Landsat-8 OLI and ASTER. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022
24. Seang, S., Kan K., & Okamoto, M. (2022). Feasibility Study of Using Recycled Waste Plastic in Bituminous Concrete. Proceedings of Conference on Business, Social Sciences and Technology (CoNeSciNTech), 2(1), 59-66.
25. Lin, L., Chhin, R., Han, V., Doung, P. (2022) Prediction of Basic Wind Speed for Battambang Province. Conference on Business, Proceedings of Social Sciences and Technology (CoNeSciNTech). 2(1), pp. 67-72. ISSN 2808-5485
26. Lin, L., Chhin, R., Han, V., Doung, P. (2022) Determination of Basic Wind Speed for the Design of Buildings in Cambodia. The 4th International Symposium on Civil and Environmental Engineering (ISCEE 2022). Universiti Tun Hussein Onn Malaysia, 3-4 October 2022. (online)



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28. Keth, K. (2022) Understanding the Collaborative Works in Construction Projects in Phnom Penh, Cambodia. AUN/SEED-NET Joint Graduate Research Seminar in Civil Engineering. Institute of Technology of Cambodia, 21 December 2022
29. Keth, K., Ben Rajeb, S., Han, V. (2022) Multidisciplinary Collaboration in Construction projects in the Cambodian Context. Séminaire inaugural de l'école doctorale thématique (Architecture, Urbanisme, Ingénierie Architecturale et Urbaine – EDT 62, Brussels, 4 March 2022
30. Long, M., Leclercq, P., Han, V., Reiter, S. (2022) Life Cycle Assessment Approach for the Future Green Affordable Housing in Phnom Penh, Cambodia. AUN/SEED-NET Joint Graduate Research Seminar in Civil Engineering. Institute of Technology of Cambodia, 21 December 2022
31. Long, M., Leclercq, P., Han, V., Reiter, S. (2022) Green Building Design Strategy for a House in Phnom Penh from Life Cycle Assessment. Young Researchers Overseas Day, 12 December 2022
32. Khim, R., Han, V., Doung, P. (2022) Performance-Based Plastic Design and Evaluation of Tall Knee-Braced Frames with Simple Connections. AUN/SEED-NET Joint Graduate Research Seminar in Civil Engineering. Institute of Technology of Cambodia, 21 December 2022
33. Vong, S., Chhin, R., Doung, P. (2022) Basic wind speed analysis and serviceability evaluation of tall reinforced concrete building subjected to wind and earthquake: a case study in Phnom Penh. NPIC Conference Proceeding. 12<sup>th</sup> December 2022, Cambodia
34. Sorn, C., Heng, S., Doung., P. (2022) Assessment of Bond Behavior of Post-Installed Bundled Reinforcement using Finite Element Method. NPIC Conference Proceeding. 12<sup>th</sup> December 2022, Cambodia
35. But, R., Heng, S., Doung., P. (2022) Bond Strength Assessment of Post-Installed Single Reinforcement using Finite Element Analysis. NPIC Conference Proceeding. 12<sup>th</sup> December 2022, Cambodia
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37. Karagianni, C., Schwede, D., Taing, K., Han, V., (2022) Smart technology supporting traditional and bioclimatic building functions in reducing cooling energy demand in Cambodia, Digital Insights
38. Taing, K., (2022) Bio-climatic design as a solution for residential building thermal comfort in tropical climate, 2nd Biennial of Tropical Architecture of Reunion Island, Reunion Island
39. Hun, P., Chung, C., Doung, P. (2022) A Comprehensively Comparative Review of Wind Load Codes for the Conformity to Cambodia Wind. 4th National Research Forum. 20-21 October 2022, Phnom Penh, Cambodia
40. Lim, M., Seang, S., Kret, K., Oy, K., Ammugauan, J. (2022) Ore Mineralization, Hydrothermal Alteration of China Wall Porphyry Cu-Mo-Au at Adongmeas, Ratanakiri, Cambodia. Proceedings of the ITC's 11th Scientific Day, 5-6 May 2022

41. Boeurn, C., Seang, S., Kret, K., Oy, K., Kong, S., Kong, S. (2022) Petrography and Hydrothermal alteration of Skarn prospect in Area 4, Phnom Sro Ngam Tenement, Chhouk District, Kompot province, Cambodia. Proceedings of the ITC's 11th Scientific Day, 5-6 May 2022
42. Ly, P., Seang, S., Kret, K., Oy, K., Kong, S., Ammugauan, J., Kong, S. (2022) Hydrothermal Alteration and Ore Mineralization of Area-1 in Koh Sla, Chhouk district, Kampot Province, Southern Cambodia. Proceedings of the ITC's 11th Scientific Day, 5-6 May 2022
43. Kim, C., Kret, K., Seang, S., Kong, S., Or, C., Kry, R., Oy, R., Ammugauan, R., Keat, L., Neak, K., Chhun, C., Hoeun, S., Hoeun, S., Sreu, T. (2022) Lithological Mapping using Landsat-8 Oli and Aster Multispectral Data in Koh Nheak, Mondukiri Province, Northeast Cambodia. Proceedings of the 1st International Conference on Earth Resources and Geo-Environmental Technology 2022
44. Boeurn, C., Seang,S., Oy,K., Kret,K., Kong,S., Ammugauan, J. (2022) Lithology and Skarn Mineralogy in Area 4, Phnom So Ngam Tenement, Chhouk District, Kampot Province, Cambodia. Proceedings of the 1st International Conference on Earth Resources and Geo-Environmental Technology 2022
45. Sreng, L., Seang,S., Rashid,A,A., and Yos, p. (2022) Performance Study of Cambodian Natural Rubber/Clay Composites for Shock Absorption Application: Primary Results.Proceedings of the 1st International Conference on Earth Resources and Geo-Environmental Technology 2022
46. Chheuy,P., Kret, K., Seang,S., Or,C., Kong,S., Kry,R., Keat,L., Chhun,C., Hoeun,S., Sreu,T. (2022) Application of ASTER and Landsat-8 for hydrothermal alteration mineral mapping for prospective mineral deposits exploration in Kompong Chhnang, in Southwest of Cambodia Proceedings of the 1st International Conference on Earth Resources and Geo-Environmental Technology 2022
47. Yuth, Y.O., Kret, K., Seang, S., Or, C., Kong, S., Sokeang, Hoeun, S., Hoeun, S. (2022) Estimation of Land Surface Temperature Using Landsat-8 in Teh Teuk Pus Geothermal Field, Kompong Speu province, Southwest Cambodia. Proceedings of the 1st International Conference on Earth Resources and Geo-Environmental Technology 2022
48. Ly, P., Seang, S., Hlaing, K.M., Oy, K., Kret, K. (2022) Initial investigations on the alteration mineralogy and ore characteristics of Area-1 in Koh Sla, Chhouk district, Kampot province, southern Cambodia. Proceedings of the 1st International Conference on Earth Resources and Geo-Environmental Technology 2022
49. Lin, L., Chhin, R., Han, V., Doung, P. (2022) Prediction of Basic Wind Speed for Design of Building in Sihanoukville. the ITC's 11th Scientific Day, 5-6 May 2022
50. Soung, R., Doung, P. (2022) Numerical Performance Evaluation of Steel Ring Damper Under Uni-axial Cyclic Loading. Proceedings of the ITC's 11th Scientific Day, 5-6 May 2022
51. Sion, R., Chhin, R., Han, V., Doung, P. (2022) Estimating Basic Wind Speed used for Building Design in Phnom Penh. Proceedings of the ITC's 11th Scientific Day, 5-6 May 2022
52. Mut, M., Phann, P., Ung, C., Yuos, O., Sry, V. (2022). Tensile Properties of PE/rPETG blend from 3D printing. Proceedings of the ITC's 11th Scientific Day, 5-6 May 2022
53. Mai, S., Sok, S., Soun, N., Prok, N., Rath, S.S. (2022) Durability of Concrete beam Strengthened with Fibrwrap® System and of Fiber Composite Laminate. Proceedings of the ITC's 11th Scientific Day, 5-6 May 2022
54. Oeung, K., Doung, P., Leelataviwat, S., Han, V. (2022) Assessment Study of Energy Demand in Multi-Story Steel Moment Frames. The Regional Conference in Civil Engineering, 22-23 January 2022, Malaysia. (online)

#### **5.4.5. Water and Environment Unit (WAE Unit)**

##### **Cambodian Context**

Water is a huge issue in the world and particularly in Cambodia. Although the country is crossed by the Mekong River and possesses a large fresh water lake (the Tonle Sap Great Lake), Cambodia is vulnerable to the succession of annual floods and droughts with severe episodes. Many problems arise due changes in land use, natural resources exploitation and climate change. Moreover, there is concern with current and future situation of intensive use of ground water for irrigation in the dry season, sea water intrusion in the coastal areas, heavy metals release due to mining activities, non-point source pollution from agriculture, soil erosion, air pollution, and urbanization with no waste water treatment. Besides regional water environmental issues, the quality of water is low in rural areas or low-income urban environments with contamination of crops, faecal contamination and strong arsenic concentration in ground water in the Lower Mekong area.

Research plays a pivotal role in environmental protection by providing the knowledge to better understand and manage issues such as climate change and water quality & availability. In parallel, the development of innovative and environmentally friendly technologies can offer sustainable economic opportunities through the responsible management of both natural and man-made resources. Often, environmental challenges go beyond national frontiers and require a coordinated approach in ASEAN and at global level.

##### **Vision**

Our vision is to become a well-known knowledge hub to provide the scientific research information on utilization and management of water and environment for sustainable development in the region.

##### **Purposes**

- To bring together institutional-wide centers and researchers to tackle national, regional and global water and environmental issues through multi and interdisciplinary research under Research and Innovation Center.
- To develop and offer graduate program on Science in Water and Environmental Engineering that support to country development and benefit to civil society.
- To provide knowledge, skill, tool, and awareness pertaining to water and environmental quality and human-environment interactions in order to improve and sustain the function of environmental systems, protect human health and economic growth.

##### **Mission**

- Conducting multi-disciplinary and interdisciplinary both basic and applied research on the utilization and protection of the environment, minimization and treatment of pollution particularly to the water resources, hydrological and ecological systems.
- Developing, demonstrating and disseminating new finding and methodology supporting to science and engineering for the environmental management and monitoring, disaster management, ecological restoration, treatment and disposal of pollution.
- Collaborating on the local and global scale in research and education to protect the precision resources that comply with national policy and SDG to sustain human life.
- Educating and training personnel for management, supervision and operation of water resources and environmental systems.

## Research Theme

The research unit Water and Environment is established to address the needs of Cambodia in this very large field. The research Unit has strong interactions with a worldwide community of researchers and stakeholders focused on various research theme. The research activity and themes include the following but not limited to:

1. **Hydrology and Water Resources Management:** Hydrological Modeling and Analysis, Hydrogeological Analysis, Groundwater and surface water interaction, Water Balance, Soil Erosion, River Bank Erosion and failure, Land Use Change, Environmental Modelling, Watershed Carrying Capacity, GIS and Remote Sensing, Hydraulic Structure ...
2. **Climate Change and Disaster Risk Management:** Weather Forecasting, Weather Forecasting, Climate Change Modeling, Climate Change Downscaling, Climate Change Impacts, Climate Change Vulnerability and Adaptation, Tropical Meteorology, Flood/Drought Management, other hazards...
3. **Urban Water Supply, and Wastewater Treatment:** Drinking Water Assessment and Treatment, Pollution Management, Waste Water Treatment, WASH, Water Treatment Technology, Microbiology, Water Quality Modeling, Water Biochemistry...
4. **Coastal and Marine Environment (CME):** Seawater Intrusion, Coastal Processes and Sediment Transport, Coastal Wetland Ecosystem, Sea Surface Current, Sea Grass and Coral Protection, Wave Impact on Coastal and Offshore Structures, Coastal Karst Landforms, Coastal Geology, Coastal Flood Management...
5. **Soil and irrigation:** Soil-Plant-Water Relation, Agricultural Water Management, Soil Quality...
6. **Urban Environmental Management (UEM):** Air Pollution Management, Solid Waste Management, Hazardous Waste Management, Environmental Health and Risk Assessment...

## Projects and Research Topics

The list of projects and research topics that are implementing in WAE unit as shown in the table below. For more detail information refers to Annex 21.

Table 27. Research topics in WAE unit for the academic year 2022-2023.

No.	Name of PI (FAMILY First name)	Sex	Project/Research Topic	Funding source	Period	Collaboration scale * N = National R = Regional I = International	Project Type* 1= Basic 2 = Applied & Development 3 = Start-up 4 = Tech-transfer
1	Dr. OR Chanmoly	M	SATREPS: Establishment of Risk Management Platform for Air Pollution in Cambodia	JICA-JST	2022-2027	I	2
2	Dr. DOUNG Ratha	M	Water Evolution and Vulnerability Under Global Changes in	IRD	2019-2022	I	1

			Coastal Catchments of Cambodia				
3	Dr. BUN Saret	M	Occurrence and Distribution Analysis of Microplastics in Different Environmental Mediums of Cambodia	EU/AFD	2022-2023	N	1
4	Dr. HEU Rina	F	Investigation of the Effects of Algal Bloom in TSL Source Water on Water Supply Treatment Efficiency		2022-2023	N	1
5	Ms. AUN Srean	F	Air pollution in Phnom Penh/East Asia-Nanoparticle monitoring network (EA-Nanonet)	Kanazawa University	2011-Present	I	1
6	Dr. HANG Leakhena	F	Development of a bio-filter system model to control air pollution toward industrial application	HEIP	2021-2023	I	2
7	Dr. HEU Rina	F	Improving Sustainable Water Supply and Sanitation in Cambodia: Case of Tonle Sap Lake's Floating Villages		2021-2023	N	2
8	Dr. KET Pinnara	F	Integrated approach of precise irrigation and sustainable soil management to improve crop water productivity in Cambodia through ITC soil laboratory development: the focus on rice farming		2021-2023	N	1
9	Dr. BUN Saret	M	Development of Eco-Friendly and Low-Cost Wastewater Treatment System as an On-Site Product		2021-2023	N	2
10	Dr. SONG Layheang	M	Development of Climate Data Information System for Cambodia		2021-2023	I	2
11	Dr. OEURNG Chantha	M	Strengthening Flood and Drought Risk Management and Early Warning System in Lower Mekong Basin of Cambodia		2021-2023	N	2
12	Ms. MOUN Ratha	F	Termite bioturbation in Cambodia-From Characterization to Application (PhD project)		ITC and BGF	2019-2022	I
13	Dr. CHAN Rathborey	M	Development of Electrocoagulation Reactor Integrated Sedimentation for Turbidity and Color	LBE-JICA	2021-2023	N	2

			Removal from Industrial Wastewater				
14	Dr. THENG Voulay	F	Preventing zoonotic diseases emergence	AFD-RD	2022-2027	I	1
15	Ms. DOEURN Seyha	F	Antimicrobial Resistance Circulation along the Mekong and its Delta (ARCIMED)	FSPI (French Government)	2022-2023	R	1
16	Dr. PEN Sytharith	M	Ecosystem-base Adaptations for Sustainable Groundwater Resources Management in the Transboundary Cambodia-Vietnam Mekong Delta Aquifer, Lower Mekong Region (GEBa)	Stockholm Environment Institute (SEI)	2022-2023	R	1
17	Dr. SANG Davin	F	Development of Electrocoagulation-Flootation (ECF) Reactor for Removal Turbidity, Color, and Oil & Grease from Slaughterhouse Wastewater	LBE/JICA	20223-22024	N	2
18	Dr. HEU Rina	F	Development of locally-produced ceramic pot filter for household groundwater purification in rural Cambodia	LBE/JICA	20223-22024	N	2
19	Dr. TY Boreborey	F	Development of monitoring and controlling of IoT based aquaponics system using green energy (Acronym: smart aquaponics project)	LBE/JICA	20223-22024	N	2

## Researchers

### *Senior Researcher (4F, 3M)*

Dr. PENG Chanthol (Head of WAE Research Units), Dr. Eng. in Life Science and Technology, Tokyo Institute of Technology, Japan.

*Food and Environmental Microbiology, Water Quality Monitoring*

Dr. OEURNG Chantha, Ph.D in Water Resources Engineering, INP, Université de Toulouse, France

*Hydrological modelling, Irrigation and Watershed Management*

Dr. CHHOUN Kong, Ph.D. in Environmental Engineering, University of the Philippines-Diliman and Tokyo Institute of Technology, Japan.

*Environmental Hydrology, integrated water resources management, watershed hydrology*

Dr. ANN Vannak, Ph.D in Water Science and Technology, Universitat de Girona, Spain  
*Water-Soil-Plant-Microorganism Interactions and Biodiversity, Hydrologic processes in a river basin, Climate change-related topics*

Dr. KET Pinnara, Ph.D. in Agricultural Science and Biological Engineering, University of Liege-Gembloux Agro-Bio Tech, Belgium  
*Irrigation water saving for crop production*

Dr. TY Bore Borey, Ph.D. in Environmental Engineering, University of the Philippines-Diliman and Hokkaido University, Japan  
*Leaching, Wastewater Treatment, Water and Wastewater Treatment, Ion Exchange Resins*

Dr. KHOEURN Kimleang, Ph.D. in Sustainable Resources Engineering, Hokkaido University, Japan.  
*Water and Wastewater Treatment, Mine Water and Remediation, Heavy Metal Leaching and speciation, Extraction, Sorption-Desorption Processes, Environmental Chemistry, Geochemical Modeling, Environmental Pollution and Waste Management*

*Lecturer-Researcher (6F, 9M)*

Dr. DOUNG Ratha, PhD in Environmental Engineering, University of Philippines Diliman (UPD) and Tokyo Institute of Technology (TIT), Japan  
*Hydrogeology; groundwater modeling; coastal aquifer management*

Dr. PEN Sytharith, Ph.D in Environmental engineering, Hokkaido University, Japan  
*Bed instability in suspended load dominated environments*

Dr. EANG Khy Eam, Ph.D. in Sustainable Resources Engineering, Hokkaido University, Japan.  
*Environmental Geochemistry, Water Environment, Hydrogeology, Geochemical Modeling and Solute Transport, Sustainable Resources Management, Geomechanics and Rock Slope Stability*

Dr. SOK Ty, PhD in Functional Ecology and Environment (Double Degree) from National Polytechnic Institute of Toulouse (INP-Toulouse), France.  
*Hydrology, Water Resources, Climate change and Environmental Monitoring and Assessment*

Dr. SONG Layheang, PhD in Continental Surfaces and Interfaces, Hydrology, Université Toulouse III - Paul Sabatier, France.  
*Hydrology, Soil Erosion, Disaster and Agricultural Irrigation and Modeling.*

Dr. HEU Rina, Dr. Eng. in Civil and Environmental Engineering, Tokyo Institute of Technology, Japan.  
*Water Quality and Environmental Assessment, Water Treatment Technology, Environmental Ecosystems, Water Supply and Sanitation*

Dr. UK Sovannara, Dr. Eng. in Civil Engineering, Tokyo Institute of Technology, Japan  
*Water Environment, Hydrology, and Hydrochemistry*

Dr. THENG Vouchlay, Dr.Eng. in Civil and Environmental Engineering, Tokyo Institute of Technology, Japan.  
*Water Quality Modelling and Assessment, Water and Wastewater Treatment*

Ms. SANG Davin, Master in Environmental Engineering, Kasetsart University, Thailand  
*Water and Wastewater Treatment, Membrane Technology*

Mr. KIM Lenthong, Master in Water Resources and Environmental Engineering University of Peradeniya, Sri Lanka  
*Hydrology, Hydraulic model, Hydrodynamics model, Hydrologic model*

Mrs. CHANTO Monychot Tepy, Master in Environmental Design, Kanazawa University, Japan  
*Water Quality and Pollution, Biological Wastewater Treatment, Environmental Biotechnology, Microbial Community Analysis, Environmental and Food Microbiology*

Mr. CHAN Ratboren, M. Eng. in Environmental Engineering, Kasetsart University, Thailand.  
*Water Quality Assessment, Water and Wastewater Treatment, Membrane Bioreactor, Antibiotics Treatment.*

Mrs. HANG Leakhena, M. Eng. in Environmental Engineering, University of The Philippine Diliman, Philippine.  
*Indoor/Outdoor air pollution*

Ms. DOEURN Seyha, Master in Environmental Management, Kyoto University, Japan  
*WASH (Water, Sanitation, and Hygiene), Drinking water quality, Water Supply, and Wastewater characterization*

Mr. MA Chiva, Master in Agro-food industries, l'Institut Agro-Montpellier, France.  
*Microbiology, Antibiotic Resistance in Water Environment*

#### ***Full-time Researcher (4F, 1M)***

Ms. PHOEURN Chanarun, Master in Environmental Engineering, University of the Philippines-Diliman  
*Water Quality, GIS, Irrigation System*

Mr. Kimhuy Sok, Master in Water Resources Engineering, Chulalongkorn University, Thailand  
*Water Resources Management, Drought Assessment, Shoreline Evolution, Nearshore Sediment Transport, Radiometric Dating of Sediment*

Ms. MUON Ratha, Master in Environmental and Water Resource Engineering, University of Peradeniya, Sri Lanka  
*Soil science, Water management, Wastewater management*

Ms. May Phue Wai, Master in Water and Environmental Engineering, Institute of technology of Cambodia, Cambodia  
*Water Quality and Watersheds Management, Water Treatment Technologies, Clean Water and Sanitation*

Ms. LAI Chenda, Ph.D candidate (double degree) in Water and Environment, Institute of Technology of Cambodia, Cambodia and Agronomy and Bio-engineering at ULiège, Belgium.  
*Water Quality, Nutrient Leaching Management, Soil Science, Agronomy, Plant Nutrition*

#### **Academic Partners**

Royal University of Agriculture, Cambodia  
Royal University of Phnom Penh, Cambodia  
Tokyo Institute of Technology, Japan



Tokyo University of Agriculture and Technology, Japan  
 University of Girona, Spain  
 Université de Toulouse, France  
 Université de Liège-Gembloux, Belgium  
 CARE, Ho Chi Minh City, Vietnam  
 Guilin University of Technology, China  
 Wuhan University, China  
 Kanazawa University, Japan  
 Kyoto University, Japan  
 Chulalongkorn University, Thailand  
 University of Nantes, France  
 CNRS, France  
 IRD, France  
 Etc.

### **Non-academic partners**

Ministry of Education, Youth and Sports, Cambodia  
 Ministry of Water Resources and Meteorology, Cambodia  
 Ministry of Rural Development, Cambodia  
 Ministry of Industry and Handicraft, Cambodia  
 Ministry of Public Works and Transport, Cambodia  
 Ministry of Environment, Cambodia  
 JICA, Japan  
 JST, Japan  
 AFD, France  
 APN, Japan  
 Etc.

### **Industrial Partners and NGOs**

Phnom Penh water supply Authority  
 SAFEGE  
 BORDA  
 GRET  
 B2G  
 Weventure

### **Publications of WAE researchers for the last 5 academic years**

In last five academic year from 2018-2019 to 2022-2023, there are in total 143 research outputs from WAE unit classified into three categories: Indexed Publications, Non-indexed Publications, and Conference Papers as shown in the Table below.

Table 28. Summary of number of research publications in last 5 years.

<b>Publication classification/year</b>	<b>2022-2023</b>	<b>2021-2022</b>	<b>2020-2021</b>	<b>2019-2020</b>	<b>2018-2019</b>	<b>Total</b>
Indexed Publications	27	10	14	9	17	<b>77</b>
Non-indexed Publications	7	6	3	5	5	<b>26</b>
Conference Papers	25	15	-	-	-	<b>40</b>
<b>Total</b>	<b>59</b>	<b>31</b>	<b>17</b>	<b>14</b>	<b>22</b>	<b>143</b>

(-) stand for missing information.

## List of Index publications for academic year 2022-2023

1. Wai, M.P.; Chem, V.; Eang, K.E.; Chhin, R.; Siev, S.; Heu, R. (2022). Accessing the Impact of Floating Houses on Water Quality in Tonle Sap Lake, Cambodia. *Sustainability*, 14, 2747. <https://doi.org/10.3390/su14052747> (IF: 3.25)
2. Jouquet, P., Harit, A., Hervé, V., Moger, H., Carrijo, T., Donoso, D., Eldridge, D., Cunha, H., Choosai, C., Janeau, J.L., Maeght, J.L., Thu, T.D., Briandon, A., Skali, M.D., Thuayne, J.V., Mainga, A., Florian, Q., Issa, O., Podwojewski, P., Rajot, J.L., Tureau, T., Smaili, L., Labiadh, M., Boukbida, H., Shanbhag, R., Muon, R., Ann, V., Cheik, S., Fall, S., Traoré, S., Dupont, S., Chouvenec, T., Mullins, A.J., Syaokani, S., Zaiss, R., Tien, T., Šobotník, J., Auclerc, A., Qiu, R., Tang, Y., Huot, H., Dussès, D., Bottinelli, N. (2022). The impact of termites on soil sheeting properties is better explained by environmental factors than by their feeding and building strategies, *Geoderma*. *Geoderma*, 412: 115706. <https://doi.org/10.1016/j.geoderma.2022.115706> (IF: 6.1)
3. Chan, R., Chan, R., Sok, T., Bun, S., Kaing, V., Mong, M., Oeurng, C. (2022). Relative Distribution of Pollutants from Urban Canal and Aquaculture Farm onto Natural Wetland of Phnom Penh, Cambodia. *Pollution Research*. (IF: 0.516)
4. Sang, D., Cimetiere, N., Giraudet, S., Tan, R., Wolbert, D., & Le Cloirec, P. (2022). Online SPE-UPLC-MS/MS for herbicides and pharmaceuticals compounds' determination in water environment: A case study in France and Cambodia. *Environmental Advances*, 8, 100212. <https://doi.org/10.1016/j.envadv.2022.100212> (Citescore 1.2)
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6. Sok, T., Oeurng, C., Kaing, V., Sauvage, S., Lu, x., Pérez, J. (2022). Nutrient transport and exchange between the Mekong River and Tonle Sap Lake in Cambodia, *Ecological Engineering*, Volume 176, <https://doi.org/10.1016/j.ecoleng.2021.106527> (IF: 4.05)
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17. Borin Heang, Saret Bun, Rathborey Chan, Phaly Ham. (2022). Comparative Study of Septic Tank, Anaerobic Filter, and Anaerobic Baffled Reactor for Treating Domestic Wastewater **(IF: 0.403)**
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19. Phaya Seng, Saret Bun, Rathborey Chan, Phaly Ham. (2022). Optimize System Configuration and Operation Condition of Anaerobic Baffled Reactor (ABR) and Anaerobic Filter (AF) for Treating Domestic Wastewater **(IF: 0.405)**
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### List of Non-index publications for academic year 2022-2023

1. Khut, S., Heng, O., Peng, C., & Domenico, C. (2022). Preliminary Study on Physicochemical Quality and Antibiotic-Resistant *E. coli* and *Aeromonas* spp. in Aquaculture of Pangasius in Kampong Thom Province. *Techno-Science Research Journal* Vol 10.
2. Khen, C., Ich, I., Sok, T., Try, S., & Oeurng, C. (2022). Hydrological Components and Catchment Scale Sediment Delivery in Prek Thot River Basin, Cambodia. *Techno-Science Research Journal*.
3. Huong, O., Samrith, C., Sok, T., Ich, I., Try, S., Chan, R., & Oeurng C. (2022). Trend and Stationarity Analysis of Streamflow in Prek Thnot River Basin. *Techno-Science Research Journal*.
4. Ket, D., Sok, T., Ich, I., Chum, K., Lim, S., Chan, R., Pech, P., & Oeurng, C. (2022). Flow Alteration under Land use Impact in Sen River Basin of The Tonle Sap Lake. *Techno-Science Research Journal*.
5. Yos, C., Ich, I., Sok, T., Chan, R., Kaing, V., Khen, C., & Oeurng, C. (2022). Impact of Climate Change on Sediment and Nitrate load in Prek Thnot River basin of the Lower Mekong River. *Techno-Science Research Journal*.
6. Harn, N., Pen, S., & Heng, S. (2022). Twin Bridge Hydraulics Analysis Using HEC-RAS Model. *Techno-Science Research Journal*
7. Sang, D., Chhun, M., & LUN, S. (2022). Formulizing the design criteria for piped water supply in Cambodia: A case study in Anlong romiet Province. *Techno Science Research Journal*.

### List of Conferences for academic year 2022-2023

1. Ly, V., Peng, C., Heng, O., Domenico, C. (2023). Antibiotic-Resistant *Escherichia coli* and *Aeromonas* spp. in Mono Cage Culture of *Channa Micropeltes*. The 14th International Conference on Environmental and Rural Development, at Angkor Paradise Hotel, Siem Reap, Cambodia, 03-05 March, 2023.
2. Samrith, C., Sok, T., Try, S., Ich, I., Chan, R., Oeurng, C. (2022). Assessing flood risk using analytical hierarchy process (AHP) and geographical information system (GIS): application in Prek Thnot river basin, THA 2022 International Conference, January 2022.
3. Huong, O., Try, S., Sok, T., Phy, S.R., Chan, R., Oeurng, C. (2022). Historical flood simulation and evaluation the performance of gridded precipitation dataset in Prek Thnot river basin, THA 2022 International Conference, January 2022.
4. Phy, S.R., Try, S., Sok, T., Ich, I., Oeurng, C. (2022). Assessing Flood Inundation in the Lower Prek Thnot River Basin under Climate Change Using RRI Model Coupled with SWAT, THA 2022 International Conference, January 2022.
5. Tes, D., Sok, T., Ich, I., Song, L., Chan, R., Oeurng, C. (2022). Improving Flood Management through Future Reservoir Development and Operation in the Tonle Sap Largest Tributary, THA 2022 International Conference, January 2022.
6. Try, S., Sayama, T., Sok, T., Phy, S.R., Oeurng, C. (2022). Real-time Flood Forecasting Using Numerical Weather Prediction System Through NICAM-LETKF Data Assimilation in the Prek Thnot River, Cambodia, EGU General Assembly, May 2022.
7. Try, S., Sayama, T., Sok, T., Ly, S., Oeurng, C. (2022). Impact of Climate Change and Dam Construction on Rice Damages in the Cambodian Floodplain of the Mekong River Basin, THA2022 International Conference, January 2022.

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9. Tes, D., Ich, I., Sok, T., Say, V., Chan, R., Try, S., Song, L., Oeurng, C. (2022). Extreme Flow Reduction through the Integration of Hydrological and Reservoir Operation Models: The Case Study of Sen River Basin in Cambodia, the 11th Scientific Day Conference on “Smart Technology for Sustainable Economic Growth”, May 2022, Phnom Penh.
10. Koun, P., Sok, T., Ich, I., Tes, D., Try, S., Oeurng, C. (2022). Spatial distribution of groundwater recharge and trend in Cambodia Mekong Delta, the 11th Scientific Day Conference on “Smart Technology for Sustainable Economic Growth”, May 2022, Phnom Penh.
11. Huong, O., Try, S., Sok, T., Phy, S.R., Chan, R., Oeurng, C. (2022). Flood Modeling and Satellite Precipitation Datasets Evaluation in the Prek Thnot River Basin of the Lower Mekong River, the 11th Scientific Day Conference on “Smart Technology for Sustainable Economic Growth”, May 2022, Phnom Penh.
12. Khoeun, C., Sok, T., Hout, M., Koun, P., Ith, S., Tes, D., Ich, I., Try, S., Oeurng, C. (2022). Extreme Rainfall Indices and Trends in Stung Sen River Basin, the Largest Tributary of Tonle Sap Lake Basin, the 11th Scientific Day Conference on “Smart Technology for Sustainable Economic Growth”, May 2022, Phnom Penh.
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16. Muon, R., Lai, C., Bureau-Point, E., Chassagne, F., Wieringa, F., Berger, J., Sok, K., Audibert, M., Podwojewski, P., Marchand, S., Ann, V., and Jouquet, P. (2022). Termite mounds in Cambodian paddy fields. Are they always kept for improving soil quality? (No. EGU22-55). Copernicus Meetings. p. 5194 at <https://doi.org/10.5194/egusphere-egu22-55>
17. Chann, K., Sok, T., & Oeurng, C. (2022) Investigation of hydrological alteration in Sekong and Sesan River Basins of the Lower Mekong Basin, The 11th Scientific Day Conference on “Smart Technology for Sustainable Economic Growth” May 2022, oral presentation.
18. Hen, C., Sok, T., Try, S., Chan, R., Ich, I., & Oeurng, C. (2022). Association between extreme precipitation and hydrological extreme in Prek Tnot River Basin of the Lower Mekong River in Cambodia, 4th International Conference on Environment, Resources and Energy Engineering (EREE 2022), June 10-12, 2022 in Bangkok, Thailand.
19. Chan R., Sok, T., Veth, V., Phy, S., Try, S., Ich, I., Oeurng, C. (2022). Assessment of Annual Streamflow Change Under Climate Change Scenarios in Prek Thnot River of the Lower Mekong Basin, Cambodia, 4th International Conference on Environment, Resources and Energy Engineering (EREE 2022), June 10-12, 2022 in Bangkok, Thailand.

20. Lay, V., Doung, R., & Pen, S. (2022). Application of Water Quality Index in GIS Tool to Assess the Quality of Groundwater at Preah Sihanouk Province, Cambodia. Proceedings of the 11th Scientific Day Conference on ""Smart Technology for Sustainable Economic Growth"", May 2022, Phnom Penh
21. Sang, D., Cimetiere, N., Giraudet, S., Tan, R., Wolbert, D., & Le Cloirec, P. (2022). Effect of simultaneous dosing PAC and Coagulant on Adsorption-Desorption of organic micropollutant during coagulation-flocculation-sedimentation process. JEM-3M, Rennes.
22. Leakhena Hang, Sokles Lorn, Srean Aun, Dalin Um, Chanreaskmey Taing. (2022). Assessment of People's Perception of Air Quality in Phnom Penh, the Capital City of Cambodia. Malaysia
23. Leakhena Hang, Phalla Try, Srean Aun, Dalin Um, Sela Kong, Chanreaskmey Taing and Chanmoly Or. (2022). Springer book series: Environmental Science and Engineering. Japan
24. Sopannha Chy, Srean Aun, Leakhena Hang, Muhammad Amin, Mitsuhiko Hata, Chanmoly Or, Sela Kong, Chanreaskmey Taing, Dalin Um, Masami Furuuchi. (2022). Determination of Particulate Matters and Total Suspended Particles Emit from Incense Burning. IOP Conference Series: Earth and Environmental Science. Phnom Penh
25. Pengsreng Ngoun, Srean Aun, Muhammad Amin, Leakhena Hang, Mitsuhiko Hata, Chanreaskmey Taing, Sela Kong, Chanmoly Or, Dalin Um, Masami Furuuchi. (2022). Monitoring Particulate Matters and Total Suspended Particles Along the Roadside and Public Area

## 5.5. Research Facilities

Due to the international collaboration (Embassy of France, ARES-CCD, AUF), ITC is able to launch the teaching activities and research. From 2010-2011, ITC has received a number of new equipment from Japanese government. Other equipment has been supported during 2014-2015 due to the research project financed by ARES-CCD. These equipments will facilitate the research activities, teaching and strengthen the cooperation activities with industries. It is important to note that the SATREPS project, approximately 1.5 M\$ are reserved for the purchase of new equipment for research. About 90% of research equipment has been delivered to ITC. In this 2019, ITC received 350 MRiels from the government of Cambodian through the ministry of education, youth and sport for research facility. Furthermore, ITC also received 7.9 M\$ from the government of Cambodia under HEIP project. Table below presents the laboratory of ITC by research unit.

Table 29. Laboratories of ITC by research unit.

Research unit	Name of laboratory
ETM	<ul style="list-style-type: none"> <li>• Power System Lab</li> <li>• Renewable Energy and Energy Efficiency Lab</li> <li>• Thermal Lab</li> <li>• Fluid Mechanics Lab</li> <li>• Internal Combustion Engine Lab</li> <li>• Biomass Energy Lab</li> <li>• Geophysics Laboratory</li> </ul>

FTN	<ul style="list-style-type: none"> <li>• Drying technology lab.</li> <li>• Rice-based product lab.</li> <li>• Physicochemical lab.</li> <li>• Healthyrice lab.</li> <li>• Fermentation lab.</li> <li>• Extraction lab.</li> <li>• Hall Technology</li> <li>• Chromatography Lab (ASS, HPLC and GC-MS)</li> <li>• Plant Biotechnology Lab</li> </ul>
MIT	<ul style="list-style-type: none"> <li>• Dynamic and Control Lab</li> <li>• Control System Lab</li> <li>• Telecommunication Lab</li> <li>• Electronics Fablab</li> <li>• EMC Lab</li> <li>• Computer Vision and NLP Lab</li> </ul>
MSS	<ul style="list-style-type: none"> <li>• Nano-structure and Chemical Analysis Lab</li> <li>• Glass Structure Lab</li> <li>• Rubber Processing lab</li> <li>• Materials Science and Engineering Lab</li> <li>• Geotechnical Lab</li> <li>• Civil Engineering Lab (Asphalt Lab, Materials Engineering Lab and Soil Mechanic Lab)</li> <li>• XRD and XRF Lab</li> </ul>
WAE	<ul style="list-style-type: none"> <li>• HydroMet and Disaster Management Lab.</li> <li>• Water Environment Lab*</li> <li>• Soil Lab*</li> <li>• Topography Lab*</li> <li>• GIS and Remote Sensing Lab*</li> <li>• Coastal &amp; Wetland Environmental Lab.</li> <li>• Environmental Chemistry Lab (SATREPS Lab.)</li> <li>• Environmental Microbiology Lab (SATREPS Lab.)</li> </ul> <p>*Lab served for both practice and research, the rest serve for only research purpose</p>

## 5.6. Research and Innovation Dissemination

### 5.6.1. Techno-Science Research Journal

Techno-Science Research Journal (Techno SRJ) is a peer reviewed Journal that is hosted and published by Research and Innovation Centre (RIC) of ITC. In 2013, Techno-Science Journal was published its first volume containing 11 research papers and covering various engineering fields such as Chemical Engineering and Food Technology, Civil Engineering, Electrical and Energy Engineering, Geo-resources and Geotechnical Engineering, Industrial and Mechanical Engineering, Information and Communication Technology, and Rural Engineering. In 2022,

volume 10 of 20 papers (Annex 22) has been published. Therefore, in total, there are 10 volumes of Techno-Science Research Journal with a total paper of 120 research papers have been published by December 2022. In 2023, volume 11 and its first issue consisting of 10 articles will be published by the end of June 2023. To disseminate the research output, the research findings in those search papers have been organized to share in national and international conferences. Furthermore, each volume of Techno SRJ has been printed out for about 100 hard copies distributing to relevant institutions and stakeholder among our networks. Moreover, RIC is currently working on finalization of Techno-SRJ online platform. In that platform, previous articles published from volume 9 will be uploaded. The online platform for the Techno-SRJ is expected to be launched within this year. Then, the manuscript and peer-review process as well as published articles will be available in the online system. In addition to the publication activity, Techno SRJ team have done other activities to support the research and publication as listed in table below.

Table 30. Activity of Techno-Science Research Journal in 2021-2022 and until June 2023.

No.	Activity	Schedule	Remark
1	Publication of Volume 11, Issue 1	June 2023	All articles are from ITC students and researchers. There will be 3, 3, 3, and 1 paper from WAE, FTN, MIT, and MSS, respectively. These articles will be in a new format template and available online in the Techno-SRJ platform.
2	Publication of proceeding extended abstract of the 12 <sup>th</sup> Scientific Day of ITC	July 2023	There are 105 extended abstracts from the 5 research units will be combined and published as hard copy
3	3 <sup>rd</sup> workshop on “Improving of Scientific Paper Writing”	05 April 2023	Targeted junior researchers, graduate students, and year 5 engineering students at ITC
4	Publication of Volume 10, Issues 1 and 2	Febraury 2023	Published as hard copy. All papers are from ITC’s researchers and graduate students. Number of published papers are from the following fields: 4 papers from MSS, 7 papers from WAE, 1 paper from MIT, 4 papers from FTN, 2 papers from ETM, and 2 papers from others. No other papers outside ITC had been received.
5	2 <sup>nd</sup> workshop on “Improving of Scientific Paper Writing”	April 2022	Targeted junior researchers, graduate students at ITC
6	Publication of proceeding abstract of the 11 <sup>th</sup> Scientific Day of ITC	July 2022	Pulished as hard copy
7	Developing Techno-SRJ website platform ( <a href="http://techno-srj.itc.edu.kh/">http://techno-srj.itc.edu.kh/</a> )	Started since January 2022	This is in the process of finalization. Submission of research manuscript, editorial and publication process will be done through the platform instead of the manual process by 2023



## 5.6.2. RIC Website

Research and Innovation Center (RIC) of ITC has published an own website (<https://ric.itc.edu.kh/>) supported by ARES-CCD since 2018. This website is created with two main purposes, to provide descriptive information on research units as well as RIC research potential and to facilitate the communications (external and internal). Data management and record including online researcher application form has been established and used from 2018-2019 then the online permission request for researchers has been updated in 2019-2020. In 2021-2022, under KPI improvement part of HEIP project, RIC website has been kept for improving for smooth operation such as KPI, research profile, payroll for researcher, and online permission.

## 5.7. Conclusion

The structuring of research units at ITC has been a substantial move to promote the research at ITC. The research activities at ITC plays an important role. New equipment and Research and Innovation Center will facilitate the research and teaching activities. The equipment also contributes to the project development between ITC and industries as well as other partners. Due to the scientific publication and participation in conferences by researchers, the research capacity of ITC researchers has been well recognized with the increasing ITC visibility in the field of engineering. It is noted that ITC has committed our best to finance the research activities at ITC. Since 2012, ITC has secured 20% of its annual budget for research and innovation. In addition, the commitment from the government of Cambodia has shown a lot of positive improvement to ITC as provided 7.92 MUSD for research and innovation.

Comparing to previous year, the number of research projects keep maintain around 80 research projects. Recently, the number of full-time researchers who are PhD candidates are significantly increased. It is the positive sign for improving the human resources which will reflect the development and growth of ITC in the near future. Among 80 ongoing projects in 2022-2023 (excluded 7 new LBE projects expected to be announced in March 2022), about 70% of the projects are applied and development researches which contribute to social development, and strengthening the collaboration with industries. For example, one of the grant projects which is SATREPS contributes significantly to the society through the creation of Platform for Aquatic Ecosystem Research and the international symposium has been held every year to share the research outputs to stakeholders. The research results are in response to the policy of Ministry of Environment, Ministry of Water Resources and Meteorology, and Tonle Sap Authority. On the other hand, 25 research projects with private sectors have been conducted within this fiscal year. For instance, Higher Education Improvement Project (HEIP) projects, ARES-CCD projects, Pierre Fabre, Erasmus+ projects are in close collaboration with private sectors, which is in accordance with ITC perspective. Furthermore, there are many other small research projects with SMEs which are the usual practical collaboration between each department and private sectors and SMEs.

In conclusion, it is clear that most of these projects contribute mainly to the development of Cambodia through the research applications. Nevertheless, the RIC should keep improving the research governance and research environment of RIC/ITC to moving forwards.

# **6. National and International Cooperation**

## 6.1. Memorandum of understanding and Memorandum of agreement

In the context of internationalization, ITC, like major schools around the world, wishes to have more new local, regional and international partners, in order to be able to develop collaborations and expand its multilateral relations. As a result, for the 2022-2023 academic year, 25 MoUs, 8 Framework Agreements and 6 MoU renewals were signed between ITC and its partners. The table below illustrates this data. It should be noted that among these 39 documents, we have 16 concerning the private sector, that is to say the companies that are partners of the ITC. The following table only illustrates MoUs and MoAs with academic partners.

No	Nom de l'institution	Pays	Date	Type (MoU/MoA)
1	ECAM LaSalle (Double Degree Agreement)	France	2023-05-09	Accord-cadre (MoA)
2	INSA Rennes (Création Coursus: Master Matériaux et structures de l'ITC et Master Ingenierie de conception de l'Insa Rennes)	France	2023-04-07	Accord-cadre (MoA)
3	Erasmus+ Programme: Inter-institution agreement, Learning mobility for higher education students and staff	France	2023-06-14	Accord-cadre (MoA)
4	Yamanashi University	Japon	2023-05-31	Protocole d'accord/MoU
5	Ministère des Postes et des Télécommunications	Cambodge	2023-05-22	Protocole d'accord/MoU
6	Yokohama National University	Japon	2023-04-20	Protocole d'accord/MoU
7	Dhruva Space Private Limited	Inde	2023-03-20	Protocole d'accord/MoU
8	Sanjivani Group of Institutes, Kopargaon	Inde	2023-03-15	Protocole d'accord/MoU
9	Universiti Sains Malaysia	Malaisie	2023-02-22	Protocole d'accord/MoU
10	EDC + Institut Polytechnique de Grenoble	Cambodge	2023-02-21	Protocole d'accord/MoU
11	La Régie des Eaux de Phnom Penh	Cambodge	2023-02-20	Protocole d'accord/MoU
12	Institut Français du Cambodge	France	2022-09-17	Protocole d'accord/MoU
13	Tra Vinh University	Vietnam	2022-08-09	Protocole d'accord/MoU
14	The National Authority of Preah Vihear	Cambodge	2022-07-31	Protocole d'accord/MoU
15	Schlumberger Overseas S.A	Thaïlande	2022-07-26	Protocole d'accord/MoU
16	Nihon Fukushi University	Japon	2022-07-25	Protocole d'accord/MoU
17	Nantes Université	France	2022-07-22	Protocole d'accord/MoU
18	Centre de coopération internationale en recherche agronomique pour le développement (CIRAD)	France	2023-06-08	Renouvellement du MoU

19	Thammasat University	Thaïlande	2023-06-06	Renouvellement du MoU
20	INSA Toulouse	France	2023-05-09	Renouvellement du MoU
21	IMT Mines Alès	France	2023-05-09	Renouvellement du MoU
22	INSA Toulouse (Accord-cadre: Échange d'étudiant)	France	2023-05-09	Renouvellement du MoU
23	INP Toulouse	France	2023-04-26	Renouvellement du MoU

This table clearly shows that there is an increase in the number of memorandums of understanding and framework agreements, for the post-Covid 19 period.

## 6.2. Internship and visit

### 6.2.1. Foreign student at ITC

As part of multilateral inter-university exchanges, for the first semester of this 2022-2023 school year, the number of foreign students rose to 48 students compared to 10 last year. This is a good indicator that reflects the resumption of academic activities and international mobility within the framework of inter-university partnerships, and we hope that this number will continue to increase next semester. Detail information is shown in Annex 28.

### 6.2.2. Big university visits/meetings and other

For the period from July 2022 to March 2023, as part of the strengthening of international relations, several official visits and meetings took place, one after the other at the ITC. The following table illustrates only 49 visits/meetings which are the most important against 25 last year for the same period.

No	Name of organization or university	Country	Date
1	Visite des délégués de la Banque Asiatique de Développement	ADB	2023-6-20
2	Visite de l'ambassadeur du Japon	Japan	2023-6-19
3	Visite de l'industrie CART Tire Co., Ltd.	China	2023-6-13
4	Visite de M. David Cavanaugh, directeur exécutif de la Banque Asiatique de Développement	ADB	2023-6-6
5	Visite de courtoisie de M. Sanui Kazumasa, nouveau représentant de Jica Cambodia Office	JICA	2023-6-6
6	Réunion avec ECAM LaSalle et Kasesart University	ECAM LaSalle et KU	2023-5-26
7	Meeting with Prof. Frank Theodore Koe, Fulbright specialist (Engineering Entrepreneurship)	USA	2023-5-25
8	Chinese Entrepreneur Delegation (CIIC International Education Technology (Beijing) Co., Ltd.	China	2023-5-23
9	Meeting of ITC and UHS with the ambassador of the Czech Republic and his colleagues	Czech Republic	2023-5-17
10	Kirirom Food Production Co., Ltd	Cambodia	2023-5-16

11	Réunion avec GANSU de Chine	Chine	2023-5-16
12	Visite de SAULT COLLEGE du Canada	Canada	2023-5-11
13	Visite de Hohai University	Chine	2023-5-10
14	Visite de Handong Global University	Korea	2023-5-09
15	MCC (SHANGHAI BAOYE (Cambodia) Co., Ltd.	Chine	2023-4-19
16	Institute for the Study of the Environment, Sustainability, and Energy Earth, Atmosphere, and Environment of Northern Illinois University, USA	USA	2023-3-30
17	Capol GmbH	Germany	2023-3-24
18	Visite et cérémonie de signature de MoU avec Sanjivani Group of Institutes, Kopargaon	India	2023-3-15
19	Réunion de travail avec les délégués d'University of Central Missouri	USA	2023-3-9
20	Réunion avec M. Pierre VINCENT, attaché de Coopération et d'Action Culturelle, Ambassade de France au Cambodge	France	2023-2-16
21	Réunion avec les délégués de Westline Education Group Co., Ltd	WEG	2023-2-15
22	Réunion de préparation de la commémoration du 70ème anniversaire des relations entre le Japon et le Cambodge (Prof. SAKO, Architecte)	Japan	2023-2-14
23	Kick-off Meeting on Cyber University Network	CUN	2023-2-14
24	Réunion de travail avec M. François ROGER, CIRAD (Prolongation de MoU)	CIRAD	2023-2-8
25	Réunion de travail avec les hauts délégués de Belgique, Prof. Michel VERLEYSSEN, professeur d'intelligence artificielle à l'UCLouvain et responsable du Projet ARES-CCD, 2022-2027	Belgique	2023-2-6
26	Réunion avec les délégués de l'Institut Teknoogi Sepuluh Nopember (ITS)	Indonesia	2023-2-6
27	Rencontre interuniversitaire: ITC-ECAM LaSalle, De LaSalle et Kasetsart University	France-Thailand-Philippines	2023-1-16
28	Le 5ème CONSORTIUM annuel avec le secteur privé	Cambodia	2022-12-23
29	Réunion de travail ITC-Chulalongkorn et ITC (reprise des activités post-covid)	Thailand	2022-12-19
30	Séminaire de dissémination des résultats du projet PURSEA (8 universités d'Europe et 8 universités dont 6 du Vietnam et 2 du Cambodge)	PURSEA	2022-12-5
31	Visite des délégués de l'IMT Mines Alès	France	2022-11-24

32	Visite de M. DOKO Shigeru, membre de la Chambre des conseillers et ses principaux délégués	Japan	2022-11-23
33	Réunion de discussion avec Professor Alamir Hossain, Vice-Director of CamTech	CamTech	2022-11-22
34	Visite de la directrice de l'IRD et innauguration de la boratoire KHEOBS	France	2022-11-17
35	Réunion et cérémonie de signature de MoU avec CamboJob Technology	Cambodia	2022-11-14
36	Visite de courtoisie de M. Cristian Aedo, directeur exécutif de l'éducation pour l'Asie de l'Est et le Pacifique de la Banque mondiale	World Bank	2022-10-17
37	Réunion de travail avec M. DESPLANCHE Didier, directeur général de l'ECAM LaSalle de Lyon	France	2022-10-17
38	Visite de la directrice de l'Agence Française de Développement (AFD)	France	2022-10-13
39	Visite de François ROGER, CIRAD (Centre de coopération internationale en recherche agronomique pour le développement)	France	2022-10-6
40	Kick-Off Meeting of SATREPS Project: Establishment of Risk Management Platform for Air Pollution (ERMPAP)	Japan-Cambodia	2022-9-19
41	Visite de Dr. KITAOKA Shinichi, conseiller spécial du président (ancien président) de l'Agence japonaise de coopération internationale (JICA)	Japan	2022-9-15
42	Fin de mission de Mme TOKUGAWA Shiori, représentante du bureau de la JICA au Cambodge en charge de la section développement social	Japan	2022-9-2
43	Visite et cérémonie de signature de MoU avec l'autorité nationale de Preh Vihear	Cambodia	2022-8-31
44	Visite de Mlle Shomi KIM, représentante au pays chez Global Green Growth Institute (GGGI)	Korea	2022-8-30
45	Visite du professeur Takae Ito, Counselling and Cultural Exchange Section de l'Université Yamanashi	Japan	2022-8-24
46	Visite de M. Laurent SERMET, Directeur de la direction régionale Asie-Pacifique de l'Agence Universitaire de la Francophonie	AUF	2022-8-14
47	Visite des délégués et cérémonie de signature de MoU avec Tra Vinh University	Vietnam	2022-8-9
48	Visite et cérémonie de signature de MoU avec WOWNOW, FoodDelivery Company	Cambodia	2022-7-28
49	Visite de hauts délégués de The Chinese People's Political Consultative Conference (CPPCC)	China	2022-7-19

### 6.2.3. Foreign organizations on the ITC campus

As the Cambodia Institute of Technology places more emphasis on research and innovation, we have foreign organizations on our campus that are involved in different areas of research with ITC researchers. These international partners are as follow:

1. Agence Universitaire de la Francophonie (AUF-3)
2. Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD-2)
3. Institut de Recherche pour le Développement (IRD-11)
4. Laboratory Based-Education (LBE-3)
5. Global Green Growth Institute (GGGI-8)
6. Establishment of Risk Management Platform for Air Pollution (ERMPAP-SATREPS Project-1)

For the operation of these organizations, they employ 28 people, including 9 of Cambodian nationality (staff, researchers, and international experts) who are in full activity from different countries: United States, Australia, United Kingdom, Belgium, France, Italy, Japan, and Laos.

## 6.3. Collaboration with industries

### 6.3.1. Organizing seminar and workshop for lecturer and student

Between ITC and Industries, under good collaboration, 36 seminars and workshops were organized to share experiences and knowledge both hard and soft skills to ITC lecturers and students.

No .	Date	Subject	Organizer (Faculty / Department)	Co-organizer (Industry)	Participants
1	23/06/2022	Smart Construction Technology	GRU	N/A	GRU
2	30/06/2022	Collaboration to organize a seminar on Siemens Digital Industries Software. This seminar was about spreading awareness to students about the future of manufacturing, the next generation of product design solutions and digital manufacturing	GIC	Steaming Cambodia and Siemens Company	GIC
3	07/07/2022	Special Talk on Water and Life in Tonle Sap Lake	GRU	N/A	GRU
4	20/07/2022	A career seminar to introduce students to the future leader program in Thailand	UIL	CP Group	GCA, GIM, GEE
5	27/07/2022	Finalizing Graduate Student Manual for Improving Graduate School Management at ITC under HEIP	Graduate School	N/A	Graduate School staff
6	27/08/2022	Membrane Technologies for Water Reuse	GRU	N/A	GRU
7	02/09/2022	Professional Development Workshop in Teaching and Learning	N/A	N/A	N/A
8	02/09/2022	Special Session on Problem-Based Learning	GRU	N/A	GRU

9	22/10/2022	Alternative of clean energy in Cambodia	GIM (Thermal Lab)	N/A	GIM
10	23/11/2022	IP PBX Fundamental	N/A	KHCOLO	N/A
11	23/11/2022	How to Grow Your Career	N/A	HRFirst Consulting	N/A
12	30/11/2022	Sustainable Energy, Energy Efficiency, and SWITCH Garment	GEE	GERES	GEE
13	07/12/2022	ICT Competition Road Show by Huawei	N/A	Huawei	N/A
14	07/12/2022	Electronic and Service, Fintech and Banking	GEE	IG Tech	GEE
15	23/12/2022	Young Talent Program and SMT Technology	GEE	SVI (AEC) Cambodia Limited	GEE
16	04/01/2023	Nature-based Solutions and Resources Recovery	GRU	N/A	GRU
17	08/01/2023	Seminar on Pile Foundation in Cambodia	ITC, GGG	N/A	GGG
18	17/01/2023	Deep Learning, internships, and scholarship opportunities	N/A	National Chung Cheng University	N/A
19	18/01/2023	Workshop on unlocking the potential of AI	N/A	ZTOA	N/A
20	25/01/2023	New Training Centre and the Opportunities to Work with Korean companies	N/A	EMCAST	N/A
21	25/01/2023	Electrical solutions, Power Distribution Panel & Power Protection Devices, CRT & Busbar system (25 January, 01 and 04 February 2023)	GEE	Legrand	GEE
22	25/01/2023	Career talk	UIL	YI DA Manufacturer Company	GCA, GIM, GEE (76 students)
23	01/02/2023	Soft Skill Development Seminar - Job preparation by Mr. Phirom Morm - Professional Development by Mr. Sokda Kry - Entrepreneurship by Mr. Lo Chay	UIL	SVI (AEC) Company Limited TEM Company Water Partners Cambodia	GCI, GRU, GGG, GCA, GIM (159 students)
24	02/02/2023	The Reduction of Plastic Waste through the Application of the 4R Strategy	GRU	N/A	GRU
25	15/03/2023	Precast Concrete Seminar	UIL, GCI	VCON Cambodia	GCI (I4 & I5 students)
26	24/03/2023	Trend & Innovation of confectionary and Chocolate	UIL, GCA	Capol GmbH (Germany) and Bluetechni	GCA-FST students (I4)
27	04/04/2023	Building Information Modelling (BIM) Technology	UIL, GCI	Shanghai Baoye (Cambodia) Co., Ltd	GCI students
28	05/04/2023	Oil and Gas Production Operation of Block A	GGG	Ministry of Mines and Energy, GDP	GGG (I4 students)
29	26/05/2023	Feed and Feed Production	UIL, GCA	De Heus TMH Co., Ltd	GCA-FST students (I4)
30	29/05/2023	Engineering Entrepreneurship for ITC lecturer and researcher	UIL	Prof. Dr. Frank Theodore Keo, Penn State University (Fulbright project)	All faculties
31	31/05/2023	Engineering Entrepreneurship for ITC students	UIL	Prof. Dr. Frank Theodore Keo, Penn State University (Fulbright project)	All faculties (I4 & I5 students)



32	07/06/2023	Workshop on Piped Water Supply Business	GRU	Cambodia Australia Partnership for Resilient Economic Development (CAPRED)	GRU (I3 & I4 WEE)
33	13/06/2023	Career and Internship Opportunities for ITC students	UIL, GGG	Cart Tire Co., Ltd	GIM, GGG, GCA, GEE, AMS
34	14/06/2023	Career Journey and Soft Skills Sharing	UIL	Chip Mong Insee	GIM, GEE and GCA-ChE students (I4 & I5)
35	22/06/2023	Oil and Gas Exploration and Production Contract (22-26 June 2023)	GGG	Total Energies	GGG (14 students)
36	31-06-23	Chemical injection and crude oil assay	GGG	Ministry of Mines and Energy, GDP	GGG (14 students)

### 6.3.2. Joining seminar and workshop organized by organization/ministries/ universities/ abroad

At least 10 seminars and workshops were organized by organizations, ministries and universities abroad and the representative of ITC were invited to join those seminars and workshops in order to gain knowledge relevant to the topic as follows:

No.	Date	Subject	Organizer	Participate	Faculty / Department
1	26/10/2022	Designing the high-resolution geological map using GMT (26-28 October 2022)	Kyushu University	GGG lecturer and students	GGG
2	16/11/2022	Consultation workshop with the skills sector council (a private sector platform) (16-17 November 2022)	ADB	GIM	GIM
3	23/02/2023	ASEAN Technology Management Hub (TMH): Identifying stakeholder priorities and designing the TMH platform Jakarta, Indonesia (23-24 February 2023)	National Research and Innovation Agency (BRIN)	Dr. Molika Yin (Head of UIL)	UIL
4	02/03/2023	Development of the ASEAN Plan of Action on Science, Technology, and Innovation (APASTI)	CDRI	Dr. Piseth Doung (Head of MSS)	RIC
5	06/03/2023	Communication and marketing (06-08 March 2023)	Ministry of Labour and Vocational Training (S4C/ADB/AFD project)	Dr. Molika Yin (Head of UIL) Mr. Mesa Mut (GIM)	UIL, GIM
6	13/03/2023	Mid-term and Match Making Event of Switch Garment Project	Ministry of Industry, Science, Technology and Innovation	Management Team of GEE	GEE

7	14/03/2023	Workshops and competitions on information retrieval and use of patents (14-15 March 2023)	Ministry of Industry, Science, Technology and Innovation	Dr. Molika Yin (UIL/GCA) Mr. Manit Say (GCA) Mr. Sela Kong (GCA) Ms. Marinich Neth (GCA) Ms. Monika Mich (GCA) Ms. Samphors Eng (GEE) Mr. Chandaraly Chin (GEE)	UIL, GCA, GEE
8	26/04/2023	World Intellectual Property Day "Women and Intellectual Property Accelerate Innovation and Innovation"	Ministry of Commerce	Dr. Reasmey Tan (RIC/GCA) Mr. Manit Say (GCA) Ms. Monika Mich (GCA) Ms. Khuntheng Ruos (GCA) Ms. Mouykeang Det (GCA) Mr. Chan Seyha But (GCI) Mr. Sonimith Hang (GIC) Mr. Visal Kao (GIC) Mr. Maysenghong Kruoch Mr. Ty Sreng (GCI) Mr. Monit Korn (GIC)	RIC, GCA, GCI, GIC
9	03/05/2023	Workshop on Establish Incubation Center (03-05 May 2023)	Higher Education Improvement Project (HEIP), Ministry of Education, Youth and Sport	Dr. Kimngun Bun (Deputy-Director General) Dr. Phanny Yos (Deputy Director of RIC) Dr. Molika Yin (Head of UIL) Dr. Saroth Srang (Head of Incubation Center) Dr. Piseth Doung (Head of MSS)	Direction, RIC, UIL, Incubation Center
10	15/05/2023	Visit Trip to MJIT, UTM (15-18 May 2023). The purposes are: - To conduct discussions with Malaysia-Japan International Institute (MJIT) towards future collaboration. - To learn the sustainable system of iKohza and seek future joint research between ITC and MJIT. - To learn the system and good practices of university-industry linkage, especially their patent system, commercialization of the product prototype and SME/start-up at MJIT.	LBE Project	Dr. Kimngun Bun (Deputy-Director General) Dr. Phanny Yos (Deputy Director of RIC) Dr. Molika Yin (Head of UIL) Ms. Chiho Miyake, Industrial Linkage/Project Coordinator, ITC-LBE Project	Direction, RIC, UIL

### 6.3.3. Industry visit at ITC

ITC welcomed 36 companies and industries to visit ITC campus with the aim of seeking future collaborations and developing joined projects:

No.	Date	Industries	Subject	Participant (ITC)	Faculty / Department
1	24/06/2022	Crystal International Group	Discuss about - introduce their company - career program for freshly graduated students - the possibility of MoU and career fair organization	UIL, Vice-dean of GCA and GGG	UIL, GCA, GGG
2	05/07/2022	WOWNOW	Discuss about MoU and event organization on the career session	Dr. Peany Houng (Deputy-Head of UIL)	UIL
3	07/07/2022	GTV Motor Co., Ltd	Discuss about study program on the car industry linked with Chongqing University in China	ITC and UIL	ITC, UIL
4	12/07/2022	dP Fluiteq	Visiting GGG Department	GGG	GGG
5	28/07/2022	WOWNOW	Signing MoU	ITC	ITC
6	01/12/2022	Schneider Electric	Visiting GEE Department	GEE	GEE
7	23/12/2022	IG Tech	Visiting GEE Department	GEE	GEE
8	03/01/2023	Intersys Solutions Co., Ltd	Discuss about short course training on Energy Efficiency	GTR	GTR
9	31/01/2023	EnerCamp Resources Co	Visiting GGG Department	GGG	GGG
10	01/02/2023	SVI (AEC) Company Limited	Discuss on short course training program	ITC and UIL	UIL, ITC
11	28/02/2023	The European Chamber of Commerce in Cambodia (EuroCham) and Estron (CEO)	Discuss about - recruiting engineers, - salary scales - the overall qualification level	Dr. Chantha Oeurng (Deputy-Director General) Dr. Molika Yin (Head of UIL) Mr. Koksai Chou (Deputy-Head of GEE)	Direction, UIL, GEE
12	03/03/2023	Ung Rithy Group (Cambodia) and Kitahama Global Management Co., Ltd (Japan)	To discuss the possibility to recruit Cambodian students to work in Japan	Dr. Molika Yin (Head of UIL) Mr. Hav Ly (Vice-Dean of GCI) Mr. Koksai Chou (Deputy-Head of GEE)	UIL, GCI, GEE
13	10/03/2023	GTV Motor Co., Ltd	Discuss about - MoU between ITC, CQUT and GTV Motor Co., Ltd. - CQUT and GTV Motor will invite ITC top management and representatives from UIL and the three departments (GIM, GEE and GIC) to visit CQUT (in China) together with the 4 students who get the scholarship to study in	Dr. Molika Yin (Head of UIL) Dr. Saosameth Chhith (Deputy-Head of GIM) Mr. Vandy You (Deputy-Head of GIC) Mr. Koksai Chou (Deputy-Head of GEE)	UIL, GIM, GEE, GIC

			<p>CQUT (maybe in May 2023). During that visit, we will sign the MoU.</p> <ul style="list-style-type: none"> <li>- Two cars (SUV and Truck) will be given to ITC (in June) for students in GIM to study.</li> <li>- about 150 students from ITC can intern at GTV Motor, the company will provide incentives and lunch for the students</li> </ul>		
14	17/03/2023	<p><b>Shanghai Construction (Cambodia) Co., Ltd</b> - HR Manager and his colleague</p>	<p>Discuss about the collaboration between 2 parties. The company will:</p> <ul style="list-style-type: none"> <li>- provide a seminar for GCI students on BIM (annually)</li> <li>- welcome lecturers and students from GCI to visit, intern and work with the company</li> <li>- want to sign MoU with ITC</li> <li>- organize an event for ITC students and public about "Sharing experiences on Civil engineering" in April 2023.</li> </ul>	<p>Dr. Molika Yin (Head of UIL) Dr. Virak Han (Dean of GCI) Mr. Hav Ly (Vice-Dean of GCI)</p>	UIL, GCI
15	28/03/2023	<p><b>MEP-E Co., Ltd.</b> Mr. Wilfrid Dutruel, Managing Director</p>	<p>Discuss about the recruitment of ITC students and feedback from the company</p>	<p>Prof. Bruno Dagues (Advisor of ITC Director) Dr. Molika Yin (Head of UIL)</p>	Direction, UIL
16	28/03/2023	<p><b>De Heus TMH Co., Ltd</b> - Ms. Daroth Vantha, Lab Supervisor</p>	<p>Discuss about testing service at ITC and possibility to sign MoU together</p>	<p>Dr. Molika Yin (Head of UIL)</p>	UIL
17	31/03/2023	<p><b>Husk Ventures</b> Mr. Sama Vin, Business Development Manager</p>	<p>Discuss about testing service at ITC</p>	<p>Dr. Molika Yin (Head of UIL) Dr. Chanthol Peng (Head of WAE)</p>	UIL, WAE
18	31/03/2023	<p><b>European Chamber of Commerce in Cambodia (EuroCham Cambodia)</b> - Ms. Ambrine Kateb, Advocacy Intern</p>	<p>Discuss about the event organized by EuroCham and Scientific Day at ITC</p>	<p>Prof. Bruno Dagues (Advisor of ITC Director) Dr. Molika Yin (Head of UIL)</p>	Direction, UIL

19	19/04/2023	<b>International Development Enterprise (iDE)</b> - Mr. Kevin Robbins, Country Director and his colleagues)	Signing MoU	Dr. Chantha Oeurng (Deputy-Director General) Dr. Molika Yin (Head of UIL) Dr. Tepmony Sim (Director of GS) Dr. Phok Chrin (Head of GEE) Mr. Chanthan Hel (UIL Representative of GTR)	UIL,
20	20/04/2023	<b>EnergyLab</b> - Ms. Phalkun Out and her colleagues	Discuss about the event organization at ITC: - planning to organize an event at ITC on 11 August 2023	Dr. Molika Yin (Head of UIL) Mr. Ratboren Chan (UIL)	UIL
21	24/04/2023	<b>De Heus TMH Co., Ltd</b> - Mr. Harry Schimmel, General Director - Ms. Uka Sun, HR Manager - Ms. Daroth Vantha, Lab Supervisor	Discuss about the collaboration between 2 parties - want to sign MoU with ITC - welcome lecturers and students from GCA to visit (production line), intern and work with the company - organize 3h seminar of year 4 students at GCA on 26/05/2023 from 1-4PM - discuss the possible research collaboration between FTN and the company.	Dr. Chantha Oeurng (Deputy-Director) Dr. Molika Yin (Head of UIL) Dr. Chanvorleak Phat (Head of FTN)	UIL, FTN
22	26/04/2023	<b>YURA Group</b> - Management team	Discuss about the possibility to recruit ITC students	Dr. Kollika Nguon (Deputy-Director General) Dr. Molika Yin (Head of UIL) Dr. Chanmoly Or (Director of RIC) Dr. Sarin Chan (Head of GIM) Dr. Phok Chrin (Head of GEE) Mr. Heng Lay (Head of GIC)	Direction, UIL, RIC, GIM, GEE, GIC
23	11/05/2023	<b>Smile Shop</b> - Mr. Sovannareth Theab, Chief Operating Officer	Discuss about - want to sign MoU with ITC - provide promotional discount/no interest for ITC students who buy study items in Smile Shop app - provide internship opportunity for ITC students - silver sponsor and booth rental for 12th Scientific Day at ITC	Dr. Molika Yin (Head of UIL)	UIL

24	12/05/2023	<b>Phnom Penh Autonomous Port</b> - Ms. Seng Kunthea, HR manager - Mr. Sokrath Rim, Deputy Manager of Personnel/Training Office	Discuss about the collaboration between 2 parties - want to sign MoU with ITC - welcome lecturers and students from GTR, GEE, GIM, GIC, GCI and Data Science to visit, intern and work with the company - need the training services and collaboration with ITC	Dr. Molika Yin (Head of UIL) Dr. Sambath Ky (UIL Representative of GCI) Dr. Saosameth Chhith (Deputy-Head of GIM) Mr. Vandy You (Deputy-Head of GIC) Mr. Koksall Chou (Deputy-Head of GEE) Mr. Chanthan Hel (UIL Representative of GTR)	UIL representatives
25	15/05/2023	<b>De Heus TMH Co., Ltd</b> - Mr. Harry Schimmel, General Director - Ms. Uka Sun, HR Manager - Ms. Daroth Vantha, Lab Supervisor	Signing MoU	Dr. Chantha Oeurng (Deputy-Director General) Mr. Ratboren Chan (UIL) Dr. Sokneang In (Dean of GCA) Dr. Chanvorleak Phat (Head of FTN)	Direction, UIL, GCA, FTN
26	16/05/2023	<b>Kirirom Food Production Co., Ltd</b>	Discuss about: - wastewater treatment - install the mango peeler and cutting machine - produce charcoal from mango seeds, etc. - want to sign MoU with ITC - examine the possibility of initiating certain activities in order of priority.	Dr. Thavarith Chhunhieng (Adviser) Mr. Ratboren Chan (UIL/GRU) Dr. Sereyvath Yeoun (GCA) Dr. Saosameth Chhith (Deputy-Head of GIM)	UIL, GCA, GIM, GRU
27	18/05/2023	Khmer Fresh Milk Co., Ltd	To look for possibility for research collaboration on freeze-drying of lactic acid bacteria	Dr. Reasmey Tan (Deputy of RIC)	RIC
28	23/05/2023	<b>Institut Francophone International, Vietnam (Online meeting)</b> - Mr. Hồ Tường Vinh, Deputy President of the Scientific and Academic Council - Ms. Bùi Thanh Hằng, In charge of Cooperation and Development	Introduction of the two institutes and exchange of activities from 2 sides (DAAS 2023)	Dr. Chantha Oeurng (Deputy-Director General) Dr. Molika Yin (Head of UIL) Dr. Tepmony Sim (Director of GS) Dr. Mongkolsery Lin (Head of AMS)	Direction, UIL, GS, AMS
29	27/05/2023	Heng Channy Angkor Meas	Research discussion on CAPFish project	Dr. Reasmey Tan (Deputy of RIC) Mr. Sela Kong (Lecturer/researcher)	RIC

30	28/05/2023	Phnom Pich Bunkhea Fish Sauce Enterprise	To look for possibility for research collaboration on soy sauce	Dr. Reasmey Tan (Deputy of RIC) Mrs. Monychot Tepy Chanto (Lecturer/Researcher)	RIC
31	29/05/2023	<b>CP Cambodia Co., Ltd</b> Mr. Pinan Phang Ms. Sreynech Meun	Discuss about training service at ITC and drafting MoU. The MoU is drafted and sent to the company to check and set date for the MoU signing	Dr. Molika Yin (Head of UIL)	UIL
32	30/05/2023	BAUER Special Foundation (Cambodia) Co., Ltd	- To better understanding each other - To discuss on finding the common interest for future collaboration	Dr. Chandoeun Eng (Dean of GGG) Mr. Sopheap Pech (Vice-dean of GGG) Dr. Phanny Yos (Lecturer of GGG, Deputy Director of RIC) Dr. Sophea Boeut (Lecturer of GGG)	GGG
33	06/06/2023	<b>Digital Workforce Development</b> - Ms. Kalyan Yim, Program Director - Ms. Nita Pov, Business/Relationship Manager	Discuss about: - possibility to establish "Career Center" for ITC under project of USAID - suggest to visit NUM Career Center and prepare proposal to submit to USAID with in kind support from private sector and contribution of ITC	Dr. Molika Yin (Head of UIL) Dr. Sokkhey Phok (Deputy-Head of AMS)	UIL, AMS
34	09/06/2023	<b>Meng Yee Garment Manufactory Co., Ltd.</b> - Mr. Anthony Wong, HR Manager	Discuss about: - recruitment of ITC students to work at company - problem of turnover of ITC students from one company to another and looking for the solution - invite ITC representative to visit their company on 14 June 2023 to discuss about the possible collaboration	Dr. Peany Houng (On behalf of UIL Office)	UIL

#### 6.3.4. ITC lecturers and students visit industries

ITC lecturers and students from different faculties and departments visited 35 companies and industries to strengthen collaboration and provide the knowledge at the workplace to students in the relevant skills.

No.	Date	Industries	Subject	Participant	Faculty / Department
1	07/06/2022	YHS (Cambodia) Food & Beverage Pte Ltd (Yeo's) (7-10 June 2022)	Internship in the Production and Warehouse Departments	Three GIM lecturers	GIM
2	24/06/2022	YHS (Cambodia) Food & Beverage Pte Ltd (Yeo's) (24-28 June 2022)	Visit and study to understand more about the standards and quality of mechanical machines in the beverage industry	Dean and lecturers of GIM	GIM
3	11/08/2022	Card Tire Co., Ltd (11-12 August 2022)	Visit and discuss in order - to establish a Memorandum of Understanding (MoU) on the research - development of human resources in the fields of chemistry, industry, mechanics, electricity, energy, standards and quality	Deputy Head of UIL, Deans, Lecturers, Researchers and Students of GCA, GGG, GIM and GEE	UIL, GCA, GGG, GIM, GEE
4	19/09/2022	DENSO	Visit	Lecturers and students of GIM	GIM
5	21/09/2022	CRRRI (21-23 September 2022)	Visit for raw rubber analysis	Lecturers and students of GGG	GGG
6	18/11/2022	Chip Mong Industries	Visit the aggregate production plant	Lecturers and students of GGG	GGG
7	01/12/2022	Minebea (Cambodia) Co., Ltd.	Join the 10-year anniversary of Minebea (Cambodia) Co., Ltd.	GIM representative (on behalf of UIL-ITC)	GIM
8	17/12/2022	Kampot Cement Co., Ltd	Visit	Lecturers and students of GRU	GRU
9	19/12/2022	Kampot Cement Co., Ltd (19-21 December 2022)	Visit the mining operation and cement production plant	Lecturers of GGG	GGG
10	23/12/2022	Cambodia Beverages Company (Coca-Cola)	Visit	Lecturers of GEE	GEE
11	26/12/2022	X-Water Technology Co., Ltd	Visit	Lecturers and students of GRU	GRU
12	27/12/2022	Anko Water Supply Co., Ltd	Visit	Lecturers and students of GRU	GRU
13	13/01/2023	Crown Beverage Cans (Cambodia) Limited.	Visit	Lecturers and students of GEE	GEE
14	16/01/2023	CPAC Cambodia Co., Ltd	Visit	Lecturers and students of GRU	GRU
15	18/01/2023	Khmer Fresh Milk Co., Ltd	To understand more about the process of fresh milk production and yoghurt, in addition to the theory study in class	Year 4 students in the Department of Food Science and Technology (GCA)	GCA
16	18/01/2023	Cambodia Rubber Research Center	To understand the quality analysis of rubber and some research in the rubber sector in Cambodia	Year 5 students in the Department of Food Science and Technology (GCA)	GCA
17	23/01/2023	PaTech Co., Ltd	Visit	Lecturers of GEE	GEE
18	23/01/2023	Adtech Asia PTE Ltd	Visit	Lecturers of GEE	GEE



19	10/02/2023	Kirirom Food Production Co., Ltd	Project proposal and collaboration	Dr. Thavarith Chunhieng (Advisor of Director General) Dr. Saosometh Chhith (Deputy-Head of GIM) Dr. Sereyvath Yeoun (GCA) Mr. Phen Sieang (Head of Collaboration)	Direction, GCA, GIM, Collaboration Office
20	15/02/2023	YHS (Cambodia) Food & Beverages Pte Ltd (Yeo's)	Visit production line and collaboration (training) and 2 training courses will be provided to their staffs	Dr. YIN Molika (Head of UIL) Dr. Sereyvath Yeoun (GCA) Dr. Boreborey Ty (Head of Agro-Industry, Master Program) Dr. Hengsim Phoung (GCA) Dr. Saosometh Chhith (Deputy-Head of GIM) Mr. Rithymean Khoun (GIM) Mr. Mesa Mut (GIM) Mrs. Sompors Eng (GEE) Mr. Chanthan Hel (Representative of GTR)	UIL, GCA, GTR, GIM, GEE, Graduate School
21	17/02/2023	SVI (AEC) Cambodia Limited	Visit production line	Mr. Chanthan Hel (Representative of GTR) Mr. Sovichea Tep (GTR) Mr. Sopheaktra Chon (GTR) Mr. Bunrong Preung (GTR) Mr. Chan Rainsy Nhim (GTR)	GTR
22	24/02/2023	Ajinomoto (Cambodia) Co., Ltd	Visit and discuss about - the possibility of collaboration (MoU) - the technical needs of the company and the possibility to join the project proposal	Lecturers of GCA and GIM	GCA, GIM
24	03/03/2023	Renaissance Mineral (Cambodia) Limited (03-05 March 2023)	Use HEIP budget (UIL office) to visit the mining site and collect the mining waste samples and to discuss on research collaboration between GGG-ITC and Renaissance Mineral (Cambodia) Limited and update the curriculum of engineering program at GGG-ITC.	Dr. Chandoeun Eng (Dean of GGG) Ms. Sopheap Pech (Vice-Dean of GGG) Dr. Phanny Yos (Deputy-Director of RIC) Mr. Heng Ratha (Researcher/Lecturer of GGG)	GGG, RIC
25	14/03/2023	Vital Premium Water	Collaboration	Dr. Chanvorleak Phat (Head of FTN) Dr. Boreborey Ty (Head of Agro-Industry, Master Program) Dr. Sereyvath Yeoun (GCA) Mr. Chanthan Hel (Representative of GTR) Dr. Easeng Siv (GIM)	FTN, GCA, GTR, GIM

26	24/03/2023	Kirisu Farm and Soma Kobelco	Visit production line and collaboration	Mr. Sambo Lun (GRU) Mrs. Leakhena Hang (GRU) Dr. Pinnara Ket (GRU) Dr. Davin Sang (GRU) Dr. Vouchlay Theng (GRU)	GRU
27	27/03/2023	Kirirom Food Production Co., Ltd	Project proposal and collaboration	Dr. Thavarith Chunhieng (Advisor of Director General) Dr. Sarin Chan (Head of GIM) Dr. Sereyvath Yeoun (GCA) Mr. Phen Sieang (Head of Collaboration)	GCA, GIM
28	19/04/2023	<b>Shanghai Baoye (Cambodia) Co., Ltd</b> - Management team	Visiting and sign MoU	Dr. Chantha Oeuring (Deputy-Director) Dr. Molika Yin (Head of UIL) Dr. Virak Han (Dean of GCI) Mr. Hav Ly (Vice-Dean of GCI) Mr. Phen Sieang (Head of Collaboration)	Direction, UIL, GCI, Collaboration Office
29	05/05/2023	Kirirom Food Production Co., Ltd	Project proposal and collaboration	Dr. Thavarith Chunhieng Dr. Chhith Saosometh (Deputy-Head of GIM) Dr. Sereyvath Yeoun (GCA) Mrs. CHANTO MONYCHOT Tepy (GCA)	GCA, GIM
30	17/05/2023	Cashew nut processing community in Kampong Cham (17-19 May 2023)	Use ARES budget to seek company needs in term technology or training	Dr. IN Sokneang (Dean of GCA), Dr. PHAT Chanvorleak (FTN)	GCA, FTN
31	25/05/2023	Cart Tire Co., Ltd	- Visit the production chain of car tire - Discuss student internship, staff-returning to industry, and company involving academic event (conference, curriculum updates) - Discuss on the agenda for MoU ceremony on 13 June 2023	Dr. Chandoeun Eng (Dean of GGG) Dr. Phanny Yos (Lecturer of GGG, Deputy director of RIC) Ms. Laymey Sreng (Lecturer of GGG) Mr. Makara Long (Lecturer of GAR)	GGG, GAR
32	06/06/2023	Cambodian Natural Gas Corp	- Visit the production chain of natural gas in Cambodia - Discuss student internship, staff-returning to industry, and company involving academic event (conference, curriculum updates)	Dr. Chandoeun Eng (Dean of GGG) Dr. Phanny Yos (Lecturer of GGG, Deputy director of RIC) Dr. Sophea Boeut (Lecturer of GGG) Mr. Sokvireak Say (Lecturer of GGG)	GGG, RIC

33	07/06/2023	<b>Yi Da Manufacturer Ltd</b> - Mr. Jack Lim, General Manager - Mr. Kelvin Mo, HR Manager	Visit production line and discuss collaboration. Mr. Koksai Chou is willing to collaborate with the company to produce a technology to control the quality of textile	Dr. Molika Yin (Head of UIL) Dr. Saosometh Chhith (Deputy-Head of GIM) Dr. Easeng Siv (IQA of GIM) Mr. Chanthan Hel (Representative of GTR) Mr. Koksai Chou (Deputy-Head of GEE)	UIL, GIM, GTR, GEE
34	14/06/2023	<b>Meng Yee Manufactory Co., Ltd</b> - Mr. Dennis Chung, Managing Director - Mr. Anthony Wong, HR Manager	Visit production line and discuss the needs of company and possible collaboration. The company want to recruit 2 electricians and 1 IT manager from ITC. Managing director would like to visit ITC lab facilities	Dr. Molika Yin (Head of UIL) Dr. Peany Houng (In charge of Techno-SRJ) Mr. Koksai Chou (Deputy-Head of GEE)	UIL, GEE, Techno-SRJ
35	21/06/2023	<b>Phnom Penh Autonomous Port</b> - Ms. Seng Kunthea, HR manager - Mr. Sokrath Rim, Deputy Manager of Personnel/Training Office	Visit production line and discuss the problems, needs, possible collaboration and training.	Dr. Molika Yin (Head of UIL) Dr. Saosometh Chhith (Deputy-Head of GIM) Dr. Easeng Siv (IQA of GIM) Dr. Sokkhey Phok (Deputy-Head of AMS) Mr. Vanndy You (Deputy-Head of GIC) Mr. Koksai Chou (Deputy-Head of GEE)	UIL, GIM, AMS, GIC, GEE

### 6.3.5. Event Organization

ITC organized 2 main events annually including industry consortium and scientific day.

No.	Date	Subject	Faculty/Department	Participant
1	23/12/2022	The 5th Industry Consortium and the discussion points are (more info in industry consortium report)	ITC, UIL, Dean of Faculty, Head of Department	13 participants (mostly directors) from 11 companies and industries
2	08/06/2023	The 12th Scientific Day: Engineering Technology and Innovation Toward the Development of Digital Economy and Society (08 - 09 June 2023)	ITC, RIC, UIL	Lecturers, Researchers and Students of ITC, Company, High school students

### 6.3.6. Project developed with private sectors and other services

ITC obtained 13 projects developed with SMEs, companies and industries in Cambodia:

No.	Date	Status	Industries	Subject	Coordinator and Trainers	Faculty / Department
1	July - August 2022	N/A	Trade Without Borders (Hong-Kong) Co., Ltd	Research Collaboration: Solageo's Internet Energy (IoE) Portal involving solar portal power systems (SPPS)	Mr. Chanthan Hel (Representative of GTR)	GTR
2	July - October 2022	N/A	Yamato Green Co., Ltd	Research Collaboration: A controller system for a smart greenhouse for an agricultural farm in Cambodia	N/A	N/A
3	October 2022 - June 2023	Completed	H.E. Tina Dith	Project: Boat for Individual SUV Car	Dr. Sarot Srang (Incubation Center)	GIM
4	Start from December 2022	On going	International Center for Neuromorphic Systems	Project: Robotic Ear Development	Dr. Sarot Srang (Incubation Center)	GIM
5	11-11-22	Received	Dynamics and Control Lab (DCLab-GIM)	A sponsor in cash for robot development for joining the national robot contest in June 2023	GIM	GIM
6	November 2022 - May 2023	N/A	TS Factory	Energy Audit Services	Dr. Sarin Chan (Thermal Lab)	GIM
7	Start from November 2022	N/A	Institute for Sustainable Communities (ISC)	Energy Audit services to the Alliance	Dr. Sarin Chan (Thermal Lab)	GIM
8	December 2022 - Mar 2023	N/A	WS Factory	Energy Audit Services	Dr. Sarin Chan (Thermal Lab)	GIM
9	Start from February 2023	On going	CAPFish Project (UNIDO)	Provision of hosting service for the food technology, research and innovation platform in Cambodia	Dr. Sokneang In (Dean of GCA)	GCA
10	Start from May 2023	On going	UNIDO Project No.190397	Development of the food safety training curricular and provision of training service	Dr. Sokneang In (Dean of GCA)	GCA
11	18-05-23	Completed	Mauso Co., Ltd	Training on "Improving truthful relationship and work performance in production line team" (18-20 May 2023)	S4C (WBL), GIM	GIM, 27 staffs of Mauso
12	June - August 2023	Approved	Mega Asset Management	Training on "Construction project management" with budget supported from	Dr. Molika Yin (Head of UIL) Mr. Chanthan Hel (Representative)	UIL, GCI

				Skills Development Fund (SDF)	of GTR and Coordinator for SDF Dr. Virak Han (GCI, Trainer) Dr. Raveth Hin (GCI, Trainer)	
13	June - July 2023	Approved	YHS (Cambodia) Food & Beverage Pte Ltd (Yeo's)	Provide 2 training course: - Training Course I: Basic Electrical Training for Industrial Applications - Training Course II: Basic Concept of Wastewater Treatment Parameters	Dr. Molika Yin (Head of UIL) Mr. Darong Sorn (GEE, Trainer) Mrs. Samphors Eng (GEE, Trainer) Dr. TY Boreborey Ty (GCA, Trainer) Dr. Kimleang Khoeun (GCA, Trainer) Dr. Hasika Mith (GCA, Trainer)	UIL, GEE, GCA

### 6.3.7. MoU and MoA with industry

From June 2022 to June 2023, 13 documents including 8 memoranda of understanding and 5 framework agreements were signed between ITC and its partners (industry).

No.	Industries	Type d'accord	Date effective	Date d'expiration	Pays
1	Yamato Green Co., Ltd.	MoA	01/07/2022	01/03/2023	Japan
2	Trade Without Border (Hong Kong) Limited	MoA	05/07/2022	05/12/2022	Hong Kong
3	U-life KH Super App Co., Ltd (WOWNOW)	MoU	28-07-2022	N/A	Cambodia
4	CamboJob Technology Co., Ltd	MoU	15-11-2022	N/A	Cambodia
5	Hexagon Mining Inc.	MoA	22/03/2023	22/03/2026	USA
6	Mega Asset Management Co., Ltd	MoA	13/03/2023	13/03/2024	Cambodia
7	TR Plus Engineering Co., Ltd	MoU	16/03/2023	16/03/2024	Cambodia
8	PD & E Power Engineering	MoU	16/03/2023	16/03/2024	Cambodia
9	INTERSYS Solution	MoU	16/03/2023	16/03/2024	Cambodia
10	International Development Enterprise (iDE)	MoU	02/03/2023	Indefinite	Cambodia
11	Shanghai Baoye (Cambodia) Co., Ltd	MoU	19/04/2023	19/04/2024	China

12	Cart Tire Co., Ltd	MoU	13/06/2023	N/A	China
13	Lotus Green Team	MoA	13/03/2023	13/03/2024	Cambodia
14	De Heus TMH Co., Ltd	MoU	15/05/2023	Indefinite	Netherlands
15	Kirirom Food Production Co., Ltd	MoU	21-06-2023	N/A	Cambodia

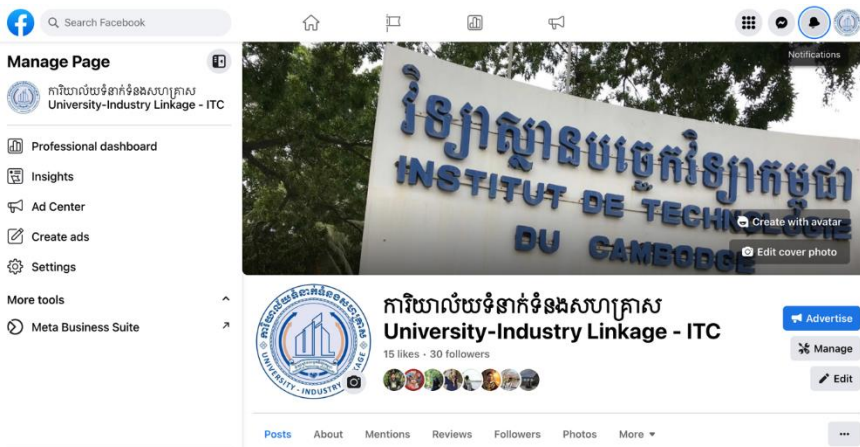
### 6.3.8. Other activities

A new format of quotation, invoice and receipt is developed with a clear reference number for each faculty and research unit. By using this new format, we can control the number of invoice and receipt effectively. The data/info related to UIL’s tasks are organized and managed, moreover, OneDrive platform has been used to share the data/info within the UIL main office and UIL representatives.

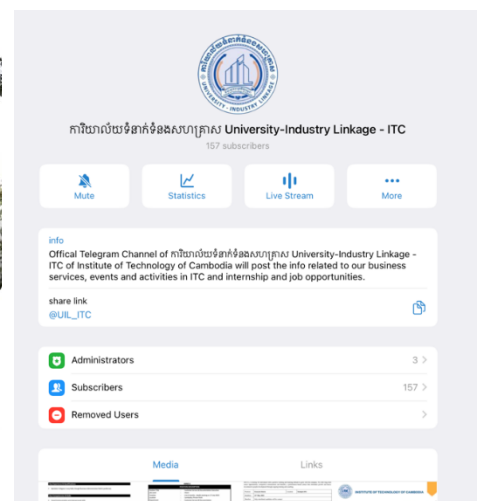
The **promotional booklets for ITC services** (faculty and department) are developed, but not yet for the research unit. We may need to prepare the brochure for each research unit differently from the faculty/department. This, we need more discussion with ITC management and relevant stakeholders.

Additionally, **the soft skill development seminar** (shared by guest speakers) **and entrepreneurship plan for ITC** (conducted by a Fulbright professor) **for ITC staff and students** were conducted.

UIL-ITC logo is created on 27/04/2023, additionally, new UIL-ITC Facebook page (ការិយាល័យទំនាក់ទំនងសហគ្រាស University-Industry Linkage – ITC, created on 02/05/2023, <https://www.facebook.com/profile.php?id=100091927646880>) and Telegram channel of UIL-ITC (ការិយាល័យទំនាក់ទំនងសហគ្រាស University-Industry Linkage – ITC, created on 27/04/2023, [https://t.me/UIL\\_ITC](https://t.me/UIL_ITC)) are created to communicate and share info related to seminar, workshop, career fair organization, to promote the internship and job opportunities to ITC student and also to promote the services of ITC.



Facebook page of UIL



Telegram channel of UIL

### **6.3.9. Conclusion**

The number of collaborations with industry (i.e., organizing seminar and workshop for lecturer and student, industry visit ITC, ITC lecturer and student visit industry, project developed with private sectors and other services as well as MoU and MoA with industry) is increased significantly compared to last year. Furthermore, we need to keep promoting ITC business services and collaboration by:

- Developing and updating the promotional booklets for ITC services
- Updating (regularly) Facebook page, Telegram Channel and website of UIL-ITC
- Preparing regular meetings with industries
- Engaging private sectors to research project
- Organizing seminar, workshop/, career fair, industry consortium and open house
- Strengthening internal support and collaboration (between the UIL office and UIL representatives of all faculties/departments/research units): we expect internal meetings with UIL representatives twice a year to better understand the difficulties and also to get feedback and suggestions from them to improve the UIL Office. Moreover, UIL office should encourage the UIL representatives and implementors by providing awards for the top three faculties and research units that are best in business service providing to private sectors and also individual awards for lecturers and researchers who are most active in UIL's task.

Additionally, UIL main office has been moved to new building (J-101). This space will be used as a career and training center. Additionally, the private sector can rent this space to organizing the event and to show their product/service. The product prototype of ITC students and researchers also can exhibit/show in this space to promote ITC to private sector.

# **Annex**



## Annex 1. Minutes of meeting of the Board of Trustees Meeting on 16 June 2022.



### COMPTE-RENDU DE LA RÉUNION DU 30<sup>ÈME</sup> CONSEIL D'ADMINISTRATION DE L'ITC, LE 16 JUIN 2022, À PHNOM PENH

#### Membres de droit présents

1. Présidente du Conseil d'Administration, S.E. Mme PHOEURNNG Sackona, Ministre de la Culture et des Beaux-Arts;
2. Ambassade de France au Cambodge, représentée par M. GIGAUDAUT Christophe, Attaché de Coopération et d'Action Culturelle;
3. Ministère de l'Éducation, de la Jeunesse et des Sports, par SE YUOK Ngoy, secrétaire d'État;
4. Ministère de l'économie et des Finances, représenté par SE CHOU Kim Leng, secrétaire d'État;
5. Ministère des mines et de l'énergie, représenté par S.E.Mme PEN Chhorda, Secrétaire d'État;
6. Directeur de l'ITC, S.E.M. PO Kimtho;
7. AUF, représentée par M. Laurent SEMET, directeur régional Asie-Pacifique;
8. SKD, représentée par M. LAY Meng Sun, Directeur et représentant du secteur privé au Cambodge

#### Membres invités présents

9. M. Thomas VALLEE, attaché de Coopération Universitaire et Scientifique
10. Prof. KOICHIRO Watanabe, representative of JICA Tokyo
11. M. THOEUNG Vongdy, program Officer, JICA Cambodia
12. TAKADA Jun-Ichi, Dean of the School of Environment and Society (Tokyo Institute of Technology) and Chief of LBE Project
13. Ms. Toyama Haruko, senior program officer of JICA Cambodia Office
14. Ms. Chikako SASAKI, LBE Project Coordinator
15. M. Pascal MAUSSION, vice-président des Relations Internationales de l'INP-Toulouse

#### Direction de l'ITC

16. Ancien directeur de l'ITC, SE Dr. OM Romny
17. Directeur adjoint, M. SOY Ty
18. Directeur adjoint, Dr. OEURNNG Chantha
19. Conseiller de l'ITC, Dr. CHUNHIENG Thavarith
20. Conseiller de l'ITC, M. NUTH Sothân
21. Conseiller à la Direction, M. Bruno DAGUES
22. Responsable pour la formation du troisième cycle, Dr. SIM Tepmony
23. Directeur du Centre de Recherche et d'Innovation, Dr. OR Chanmoly
24. Responsable des relations entreprises (UIL), Dr. IN Sokneang
25. Chef du département TC, Mme SREY Malis
26. Chef du département GCI, Dr. HAN Virak
27. Chef du département GEE, Dr. CHRIN Phok
28. Chef du département GIC, M. LAY Heng
29. Chef du département GIM, Dr. NGUON Kollika
30. Chef du département GRU, Dr. CHHUON Kong
31. Chef du département GGG, Dr. BUN Kim Ngun
32. Responsable de la section de français, Mme KHEMTRAN Krasel
33. Responsable de la section d'anglais, M. CHUM Tival

34. Responsable du campus ITC Tbongkhmum, LIN Mongkulserey
35. Responsable du service informatique, M. KHIEV Samnang
36. Responsable du bureau de qualité d'Assurance interne, M. KIM Vannada

## ACCUEIL DES PARTICIPANTS ET OUVERTURE DE LA RÉUNION

En introduction, S.E. Mme PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et **Présidente du Conseil d'Administration de l'ITC**, souhaite la bienvenue à l'ensemble des membres du Conseil d'Administration (CA) et les remercie pour leur participation à ce 30<sup>ème</sup> CA. Elle précise que le CA de l'ITC est âgé de 30 ans et qu'il est le plus âgé par rapport à d'autres CA dans d'autres établissements de l'enseignement supérieur au Cambodge.

La Présidente du CA témoigne de toute la reconnaissance de l'ITC pour ses partenaires venant des pays francophones (France, Belgique, Canada...) et aussi anglophones (Japon, Thaïlande...), puisque l'ITC est non seulement francophone mais aussi anglophone.

So, allow me to use three languages: Khmer, French and English. As you know, Cambodia was affected by the Covid-19. But this year, we can have the opportunity to be able to reorganize our meeting. I would like to confirm that our today's meeting is very important. First of all, I would like to present you the new Director of ITC, Dr. PO Kimtho. He is appointed by the extraordinary meeting of the Board of Trustees. We hope that Dr. PO Kimtho will continue to work to accomplish new tasks for ITC, with the support, of course, from Dr. OM Romny and the Direction of ITC. I take this opportunity to congratulate Dr. OM Romny who has achieved a lot during his mandate for the development of the ITC. Congratulations on his new position, Secretary of State at the Ministry of Education, Youth and Sport. It is thanks to its good management, patience, and great commitment that ITC has become a great university on an international scale. I also hope that the Minister of Education will appoint him as a great responsible to help ITC to progress again and again.

Je tiens aussi à féliciter tous les soutiens de nos partenaires pendant les périodes difficiles et ils sont toujours à notre côté pour parcourir encore un long chemin. Toutes nos réussites dépendent en tout cas de nos bonnes collaborations avec nos partenaires, telles que la France, le Japon, la Belgique.

Un grand merci à notre conseiller, Prof. Bruno DAGUES qui a beaucoup travaillé pour valoriser la coopération avec les universités ainsi que le secteur privé et faire progresser surtout la recherche à l'ITC.

All my thanks also go to the Japanese colleagues. If I remember correctly, our bilateral cooperation began in 2000. It started at Chulalongkorn University, in Thailand, with the AUN/Seed-Net network. And now we have a lot of projects, for example, the LBE project. It's not only for ITC but for other engineering universities in Cambodia, SAPTREPS project etc.

I also would like to thank Miss Chikako SASAKI, for her wonderful work, but her term of office is coming at the end of this month. So, a big thank you to you and your accomplishments for us, and ITC will always remember them.

Le partenariat avec la Belgique en fait aussi partie intégrante. Un nouveau projet « ARES » est en phase de discussion. Sachant que la coopération avec la Belgique a commencé en 1997. Ça fait donc plus de 20 ans. La poursuite de ce nouveau projet témoigne de notre bonne relation durable et aussi de la qualité de travail entre nos deux côtés ITC et belge. Nous espérons vivement que ce projet sera approuvé.

Aussi au représentant du secteur privé, OKNHA Lay Mengsun, un merci particulier. Il est là, avec nous, depuis la première réunion du CA de l'ITC.

Je tiens aussi à remercier madame Adèle MARTIAL pour son travail étant représentante du Consortium.

J'aimerais également mettre en évidence la mobilité des enseignants et des chercheurs de l'ITC à l'étranger et à l'inverse.

L'ITC a pu organiser quelques événements marquants pour le post-Covid : la journée portes ouvertes, la journée scientifique, le lancement du programme international de l'ECAM LaSalle de Lyon, accrédité par la CTI et bien sûr d'autres projets à l'échelle nationale et internationale.

Mes remerciements vont également aux chercheurs, aux enseignants, aux personnels et à leur direction.

Mes sincères remerciements s'adressent aussi à tous nos partenaires du Consortium et CA grâce à qui l'ITC est devenu ce qu'il est actuellement.

Pour continuer, j'aimerais laisser le temps à SE YUOK Ngoy, secrétaire d'État au ministère de l'Éducation, de la Jeunesse et des Sports.

**SE YUOK Ngoy, secrétaire d'État au ministère de l'Éducation, de la Jeunesse et des Sports :**

Merci Madame la présidente, je crois commencer mon intervention en anglais du fait que certains ne parlent pas français et que les Français comprennent l'anglais.

Excellencies,  
Distinguished Guests,  
Ladies and Gentlemen,

This morning, give me the pleasure and the great privilege, on behalf of the Minister of Education, Youth and Sports, to welcome all the members of the CA.

The Minister of Education, Youth and Sports greatly appreciates all the partners from ITC, France, Belgium, Japan, AUF, JICA and the private sector who continue their support for the ITC development. I would also like to thank the ITC team for their hard work led by his excellency director OM Romny who became Secretary of State of Education, Youth and Sport. In this occasion, I would like to wish you all hospitality, good health and success. Thank you for your attention.

Thank you, your excellency. I would like to give the floor to M. GIGAUDAUT Christophe, representative of French Embassy in Cambodia.

**M. GIGAUDAUT Christophe, représentant de l'Ambassade de France au Cambodge :**

Excellences,  
Mesdames,  
Messieurs,

D'abord, je voudrais féliciter à la fois le nouveau directeur SE PO Kimtho et à la fois SE OM Romny pour leur dynamisme et efforts. C'est toujours impressionnant pour l'Ambassade de France d'avoir l'ITC comme partenaire francophone même je sais que l'ITC reste trilingue. Cela ne pose aucun problème du fait que nous sommes pour le multilinguisme. Merci à tous et à toutes.

Encore une fois, pour l'Ambassade de France l'ITC est un partenaire privilégié, un partenaire pour la France. C'est un établissement très connu de son enseignement et de sa recherche, que madame la ministre vient de souligner, la collaboration avec les partenaires français, belge, qui sont en tout cas structurant. L'Ambassade de France continue d'octroyer des bourses du gouvernement français pour lesquelles un maximum d'étudiants viennent de l'ITC. Cette présence est très diverse : nous avons ici sur place IRD, CIRAD... qui sont des acteurs très importants pour le Consortium.

Et cette année, vous l'avez souligné l'audit de la CTI qui n'a sorti que des félicitations pour l'incroyable travail accompli. Nous avons bien sûr d'autres coopérations avec l'École Nationale des Ponts et Chaussées, Insa de Lyon, AgroParisTech, autant de partenaires français qui sont au premier plan. Vous avez signé les

accords -cadres avec INP Toulouse, Paris 13. Je crois que les Alumni vont nourrir cette coopération avec la France.

J'en profite pour vous dire, SE l'ambassadeur Jacques PELLET qui est en mission en Thaïlande, et son équipe soutiennent pleinement l'ITC pour son bon fonctionnement et je vous remercie.

**S. E. Mme PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC :**

Merci monsieur l'attaché. Now, I would like to give the floor to JICA, Ms. Toyma Haruko, senior program officer of Jica in Cambodia.

**Ms. Toyma Haruko, senior program officer of Jica in Cambodia:**

Good morning, everyone, my name is Toyama, representative of JICA in Cambodia. Thank you for inviting us to today's meeting. Professor Takada made today a very important project called LBE Project. Thank you for your invitation.

**S. E. Mme PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC :**

Thank you. I would like also to continue by giving the floor to regional Director of AUF.

**M. Laurent Sermet, Directeur de l'AUF-Asie-Pacifique:**

Merci madame la ministre,

Je prends la parole, en tant que nouveau directeur régional de la Francophonie pour l'Asie et le Pacifique. Vous savez, l'ITC est pour nous un partenaire extrêmement important, en ce qui concerne le développement des activités de la Francophonie. L'AUF possède son Antenne à Phnom Penh pour son soutien direct à des universités cambodgiennes et en particulier un soutien à l'ITC. Nous avons trois projets en cours actuellement. Un projet de soutien de mobilité étudiants. Depuis quelques années, l'AUF intervient non seulement dans son accord-cadre général de coopération mais aussi dans de projets. J'ai lu les documents préparatoires du conseil d'administration. Ils sont extrêmement informatifs pour nous tous et je crois que vous avez fait un travail considérable pour mettre en évidence toutes les réussites de l'établissement qui font l'objet de discussion.

Je suis désolé de ne pas pouvoir être présentiel avec vous mais je vais être bientôt au Cambodge et à l'ITC pour voir ce qu'on peut faire ensemble. Enfin, je vois que l'AUF et l'ITC partage ensemble la valeur de développement durable et un excellence conseil d'administration à vous tous. Merci madame la présidente.

**S. E. Mme PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC :**

Merci monsieur le Directeur. I would like to inform you that we have a lot of members onside and one line, rights members (official members) and invited members. So, if you have any comments or remarks, please, raise your hand. So, we can start now our meeting.

Comme vous le voyez, notre ordre de jour indique les activités prévues suivantes:

- 1) Ouverture de la séance par la Présidente du Conseil d'Administration
- 2) Mot de bienvenue par le Secrétaire d'Etat, MEJS
- 3) Adoption de l'ordre du jour
- 4) Présentation du rapport du Directeur de l'année 2021-2022
- 5) Document général et Dossier pédagogique pour l'année 2022-2023
- 6) Suivi des décisions du 29<sup>ème</sup> CA ; examen des réalisations de décisions et Avis du Consortium 2022
- 7) Rapport financier: bilan 2021-2022 et budget prévisionnel pour 2022-2023
- 8) Nomination de l'équipe de direction pour 2022-2023
- 9) Questions diverses

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- 1) Opening session by President of the Board of Trustees
- 2) Welcome remarks by Secretary of State, MoEYS

- 3) Adoption of the agenda
- 4) Presentation of Director's Report in 2021-2022
- 5) General and Pedagogical Documents for 2022-2023
- 6) Decision of 29<sup>th</sup> CA meeting; review of the achievement and Opinion of Consortium 2022
- 7) Financial Report: statement in 2021-2022 and provisional budget for 2022-2023
- 8) Nomination of ITC Direction Board for 2022-2023
- 9) Various questions

Vous voyez, à l'ITC, chaque année, le CA nomme l'équipe de direction. C'est important que tout le monde le sache. Est-ce que vous êtes d'accord avec cet ordre de jour? Comme je vois qu'il n'y pas d'objection, on peut continuer. It is the agenda of our meeting and if you don't have remarks or comments, we can continue.

**Mr. SOY Ty, directeur adjoint :**

Je me permets de vous présenter le suivi des décisions du CA 2021. Au total, il y a 9 points :

- 1) mise en place du programme international de l'ECAM LaSalle : réalisée
- 2) création de la faculté des sciences appliquées : en cours de réalisation
- 3) création de la faculté CYBER University: en cours de réalisation
- 4) création du programme des mathématiques appliquées et des statistiques pour les ingénieurs : réalisée
- 5) création de licence de génie des sciences de données (Data Science) : réalisée
- 6) création de master de génie des sciences appliquées : réalisée
- 7) création du nouveau département en génie alimentaire : réalisée
- 8) création du centre Startup : réalisée
- 9) création du département de transports et infrastructures : réalisée

À part ces 9 points, le CA de 2021 a aussi sollicité quelques recommandations complémentaires. 1) rendre le site web de l'ITC plus attrayant; à ce propos, l'équipe de l'ITC en a créé un et il est développé au fur et à mesure; 2) transformer l'ITC en UTC (université de Technologie du Cambodge); organiser le Symposium international pour chaque unité de recherche sous la tutelle du Centre de Recherche et d'Innovation : sur ce, on a atteint ce niveau mais à l'échelle du centre de recherche et d'innovation.

Voilà, c'est tout pour le suivi des décisions du CA de 2021.

**S. E. Mme PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC :**

Thank you. That is all for the recommendations for CA 2021. We move to remarkable events of ITC 2021-2022. If you have any questions, please, ask.

**SE Dr. PO Kimtho, directeur de l'ITC:**

Bonjour Excellences, Mesdames, Messieurs,  
 Merci pour votre présence.  
 Excellencies, Distinguished guests, Ladies, and gentlemen,

Cette année, nous avons organisé la 11<sup>ème</sup> conférence scientifique, présidé par SE monsieur le Ministre de l'Éducation, de la Jeunesse et de l'Éducation, avec les soutiens de l'ambassade de France, l'ambassade du Japon, de l'AUF, de la JICA, de l'IRD, du CIRAD. Cet événement était célébré en mode hybride, en présentiel et en ligne.

Le 24 décembre 2022, une médaille de travail (certificat de félicitations) de la JICA, a été remise à SE OM Romny, pour sa gouvernance et ses efforts qui contribuent au développement de l'économie du Cambodge.

Concernant le concours des robots, il y a eu deux compétitions à l'échelle nationale et internationale : le 12 décembre 2021. Onze pays y ont participé. L'équipe de l'ITC a obtenu Best Ideas Awards. Pour le niveau national, nous avons eu le Premier Prix.

Un programme international ECAM LaSalle a été importé à l'ITC pour le niveau Master en génie industriel et mécanique.

Les hauts délégués de l'ITC ont visité le champs des mines d'or « Renaissance Minerals (Cambodia) Limited » à Mondulkiri, pour renforcer les relations avec l'ITC en général et avec le département GGG en particulier.

With the support from JICA, especially under the Lab Based Education Program, a new Lab was inaugurated in ITC, with the budget of about 1 million USD. This lab is for Nanostructure and Chemical Analyses. I think that it is only ONE in Cambodia. We also are able to provide the service to industries.

Aussi, nous avons mis à la disposition un centre d'expérimentations scientifiques. Il a été inauguré par le ministre de l'Environnement. Ce centre sert à renforcer les travaux pratiques des étudiants du Tronc Commun. Il s'ouvre aussi aux étudiants venant des lycées pour qu'ils comprennent mieux les notions de base des applications scientifiques.

Yes, also we have developed a Biomedical Program with University of Health and Sciences, supported by the Czech Republic.

Nous avons aussi organisé les journées Portes Ouvertes à l'ITC auxquelles ont participé de nombreuses entreprises japonaises, françaises et autres.

We also organized the first International Conference with support from different partners of GGG. I think that it is very good, and we will continue for the next year. Of course, not only this field but we can expand for other unites as well.

Currently, we have 4 campuses: the main campus in Phnom Penh, the second campus in Tbong Khmum and there, we have programs: Civil Engineering and Food Chemistry Engineering and another one in Kampong Cham province with 1 hectare of area. Under the World Bank Project, we construct a new Workshop Station there. We inspected to able to finish at the end of this year. It is to provide short term trainings to high school teachers.

We will also build buildings next to the win-win monument with funding from the World Bank. The area is 5 hectares.

That's all for my presentation. Thank you very much for your attention.

**S. E. Mme S. PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration :**

You see ITC has grown : before one campus but now 4 campuses. We believe that ITC can provide new programs for the new generation who are interested in engineering, what is important for the development of the country's economy...

**Pour ne pas alourdir le CR, la partie suivante ne couvre que les commentaires et les remarques des membres du Consortium.**

**In order not to weigh down the minute of the meeting, the following part only covers the comments and remarks of the members of the Consortium.**

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**Remarques et discussions**

**M. Pascal MAUSSION, vice-président des Relations Internationales de l'INP-Toulouse :**

Thank you Dr. Chanmoly. I would like to know regarding research, what are the major challenges you have encountered? What mechanisms did you use to overcome these great difficulties?

**Dr. OR Chanmoly, directeur du Centre de Recherche et d’Innovation :**

Yes, thank you Professor. Currently, we have a lot of things. I think the biggest difficulty is the human resource. As you know, based on our presentation, we currently have 90 PhD holders and we have about 100 researchers. We have 40 candidates for doctoral training. These are young researchers. Another thing is that the research fields are still limited. The last thing is that researchers are overloaded. They are torn between teaching, research and going to work sites. I think all of these are our big challenges for us.

**S. E. Mme S. PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d’Administration :**

So, it's not human resources but time management. From what I know, ITC has a lot of PhDs and Masters compared to other universities.

**Dr. OR Chanmoly, directeur du Centre de Recherche et d’Innovation :**

Yes, madam, but I can give you an example, Japanese researchers want to work in a specialized way on a specialty. There, it is difficult sometime for us to find enough human resources to work with them. That's why I wanted to talk about human resources.

**Dr. OEURNG Chantha, directeur adjoint :**

Madam, In terms of research, our researchers are considered young. For the projects, we have the management team, the procurement team, the finance team, and the monitoring evaluation. Finding funding to support research activities is very important, I think even in Vietnam, Malaysia, Singapore, that is well considered. I think this is a good way to strengthen the quality of research in our institute.

**Oknha LAY Mengsun, représentant du secteur privé :**

The most important is project manager. When you start something and you are not able to manage the financing, the investor will not invest. Without the good project manager, the research is impossible. The project manager is in charge of everything in the project: construction, delivery ... That's why you have 100 researchers with 100 different ideas, it's hard to focus on just one idea. How can we focus on one or two ideas? For that the project manager is a priority. I think you don't have funding, you can discuss with consultants for management.

**M. Pascal MAUSSION, vice-président des Relations Internationales de l’INP-Toulouse :**

I agree with this idea. We are going to try a big project and we are going to train local people. The project manager oversees everything.

**Dr. OR Chanmoly, directeur du Centre de Recherche et d’Innovation :**

Actually, right now, we are starting to work with our human resources. We will select only the valuable research fields for which we have enough researchers.

**S. E. Mme S. PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d’Administration :**

Yes, I think that with our members of the Consortium, we can find specialists in a field of research and they can guide us.

Thank you for your comments.

**Professor Takada presents the LBE project.**

**S. E. Mme S. PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d’Administration :**

Yes. Thank you, professor Takada, for sharing important information about the LBE Project. It is not only for ITC but for the education of all Cambodia. All my best wishes to this project.

**Dr. OEURNG Chantha presents general documents:**

Excellencies, Ladies and Gentlemen,

Before I begin, I would like to provide you some information on the criteria for Professorship. I have already discussed with the Ministry of Education. So far, we need the internal discussion. I already relevant faculties to identify the candidates, applicants to apply. After this discussion, we will send to the scientific board of ITC. Then we will prepare the list to the committee of the ministry of Education, Youth and Sport. I ask you to double check before allowing applicants to submit. Please, make sur that I have sent you all the necessary documents. So, it is the progress that we need to alien with the ministry of Education.

**S. E. Mme S. PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration :**

Thank you. As you know, Dr Chantha presented ITC's perspectives until 2030 and perspectives and strategies for 2022-2023. I think a lot of presentations since this morning have been about activities, results. The following parts presented by Mr. SOY Ty will have to be adopted by the CA for next year. In this regard, he will present the number of students to be recruited, the tuition fees. The floor is yours now Mr. SOY Ty.

**M. SOY Ty, directeur adjoint:**

Je me permets de vous présenter les modalités du recrutement des étudiants pour l'an prochain.

- Recrutement des étudiants techniciens/Recruitment of student technicians :
  - Candidat ayant réussi ou échoué à l'examen du baccalauréat/ Candidate having passed or failed the baccalaureate exam
  - Sélection basée sur dossier/ Selection made based on high school transcripts
- Recrutement des étudiants ingénieurs/Recruitment of engineering students :
  - Candidat ayant réussi au baccalauréat/Candidate having passed the baccalaureate
  - Concours d'entrée : maths, physique-chimie et logique/Entrance exam: maths, physics-chemistry and logic
- Nombre d'étudiants à recruter/Number of students to be recruited :
  - Campus principal à Phnom Penh : 1300 élèves ingénieurs et 1000 techniciens/ Main campus in Phnom Penh: 1,300 engineering students and 1,000 technicians
  - Campus de Tbongkhmum : 300 élèves ingénieurs/ Tbongkhmum campus: 300 engineering students
- Frais de scolarité/Tuition fees:
  - Ingénieurs : 600USD pour garçons et 450USD pour filles/Engineers: 600USD for boys and 450USD for girls
  - Techniciens : 300USD pour garçons et 200USD pour filles/ Technicians: 300USD for boys and 200USD for girls
- Bourses/Scholarships :
  - Ingénieurs : 80 pour le campus principal à Phnom Penh et 120 pour Tbongkhmum/Engineers: 80 for the main campus in Phnom Penh and 120 for Tbongkhmum
  - Sans compter les autres bourses octroyées par le secteur privé et les autres institutions nationales et internationales/Not to mention other scholarships granted by the private sector and other national and international institutions
- Places ouvertes aux étudiants de 3<sup>ème</sup> année/Places open to 3rd year students :
  - 15% des étudiants inscrits en 1<sup>ère</sup> année techniciens seront exonéré de droit de scolarité/15% of students enrolled in the 1st year technicians will be exempt from tuition fees
  - Le nombre total prévu pour les ingénieurs de troisième année est de 1400/ The total planned number for third-year engineers is 1400



**S. E. Mme S. PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration :**

Thanks for the presentation. I would like to remind you that we need the approval of the Board. OK? I see you have no objection. This means the Board has adopted it. So, we can continue with the next part. The Board will also adopt the recommendations of the 2022 Consortium.

**M. SOY Ty, directeur adjoint :**

Je me permets de vous présenter le suivi des décisions du CA 2021 et les synthèses des avis du Consortium 2022.

Le tableau ci-après illustre le suivi des décisions du CA 2021.

NO	DÉCISIONS DU CONSEIL D'ADMINISTRATION 2021	2021-2022
1	Mise en place du programme international avec ECAM LaSalle	Réalisé
2	Création de la faculté des sciences appliquées	En cours de réalisation
3	Création de la faculté de l'ICT & Cyber Université	En cours de réalisation
4	Création du programme (département) de mathématiques appliquées et statistiques pour les ingénieurs	Réalisé
5	Création du Bachelor en génie des sciences de données (Bachelor of Engineering in Data Science)	Réalisé
6	Création du Master en génie des sciences des données	En cours de réalisation
7	Création du nouveau département de génie alimentaire	Réalisé
8	Création du centre Start-Up	En cours de réalisation
9	Création du département Transport et Infrastructure	Réalisé
10	Mettre à jour le site web de l'ITC et le rendre plus attractif	En cours de réalisation
11	Possibilité de transformer ITC en UTC	En cours de réalisation
12	Organiser le symposium international pour chaque unité de recherche	Réalisé au niveau du RIC

Le tableau suivant récapitule tous les points abordés et les avis du Consortium 2022 après la discussion et la présentation de tous les responsables de départements.

No	AVIS DU CONSORTIUM 2022	FAVORABLE
1	Demander le grade « Professeur Émérite » à la direction de l'ITC pour les grandes personnalités et les professeurs qui ont beaucoup travaillé pour le développement de l'ITC et ils vont partir à la retraite	X
2	La mise à jour du cursus de master génie de l'eau et de l'environnement (École doctorale)	X
3	La mise à jour du cursus de master génie agro-industriel	X
4	La mise à jour du cursus de master Génie de technologie et de gestion de l'énergie (École doctorale)	X

5	La mise à jour du cursus de master génie mécatronique, informatique et communication (École doctorale)	X
6	Demander de modifier le curriculum du programme de Télécommunications et Réseaux (Département GTR)	X
7	Ouverture du Département du Génie des Transports et des Infrastructures (GTI)	X
8	GIC update the curriculum of year 3, 4 and 5 to adapt to the change of the program in 2 <sup>nd</sup> year for students who choose to study in GIC, GTR, Data Science, in the future (GIC)	X
9	GGG updates the curriculum of year 3 for two courses on "Ore microscopy" and "Petrology and Mineralogy". These courses will be combined to increase the practical work, which can fulfill in the industry needs. Moreover, this course is the main core for the field mineral exploration and exploitation (GGG)	X
10	GGG updates the curriculum of year 4 for five courses on "Geophysics => added the TP class", "Rock Blasting Techniques => added TD class", "Mineral Exploration => added TD class", "Basic Geological Mapping => added TD class", "Mineral Characterization => removed this course due to the course of mineral exploration is covered this content already". The purpose of modified is to fulfill the requirement of current job market needed, especially in the field Mining, which is rapid growth in late 2021 (GGG)	X
11	GRU requested to modify the course "Construction of Rural Road" to "Road Engineering and Construction" for improving competent of student to meet the need of job market (GRU)	
12	GRU will work on the Technician program in order to modify the program for a specific skill need on Water Supply and setup water supply laboratory with support from Shanghai Micro Purification Co.,Ltd (GRU)	X
13	GRU will implement the Water and Environment Oriented Living lab by creating on more lab called "Coastal and Wetland Environmental Research Lab". The students and lecturer will do the real-life water demo sites and creating a multi-stakeholder virtual network (GRU)	X
14	Propose to establish the Cambodia Coastal Research Center. The detail structure, vision, mission, stakeholders, researcher and source of fund will be submitted in next consortium 2023 (GRU)	X
15	ITC is planning to launch 1year International Pre-degree Foundation Programs of Curtin in Oct 2022 at ITC and students could continue their undergraduate study for both Engineering (+4years) and Science (+3years) at any Curtin campus upon this foundation program completion. The pre-degree foundation program was established by technical assistant from both Curtin Perth, Australia and Curtin Malaysia under Higher Education Partnership Program of HEIP. The Establishment of Pre-degree Foundation Program in Eng. and Science will meet the Curtin's undergraduate entry requirement at any Curtin campus (International Program)	X

**S. E. Mme S. PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration :**

Thanks for the presentation. I would like to inform you that the opinions of the Consortium are technical proposals. We will see them and adopt them if there are no objections. No objection now, I consider that these proposals are adopted by the Board of Trustees.

We move to the next part, Financial Report for 2022-2023, so, please.

**S. E. Dr. PO Kimtho presents this part.**

**S. E. Mme S. PHOEURNG Sackona, Ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration :**

Thanks for the presentation. C'est une prévision pour la nouvelle année académique 2022-2023. Il s'agit tout simplement d'une prévision mais il est possible que les dépenses réelles dépassent ce budget prévisionnel. Nous avons besoin de l'approbation du CA. Est-ce qu'il y a des remarques? Si non, ce budget est adopté maintenant. Il nous reste deux choses : As you know, the management team is appointed by the Board every year. Knowing that some of us are retiring, Dr. OM Romny, Dr. CHUNHIENG Thavarith. The Chair of the Board and the Honorary Director of ITC are appointed by the Ministry of Education, Youth and Sport.

The following table shows this decision.

■ Nomination de l'équipe de direction de l'ITC pour 2022-2023

No	Nom et prénom	Fonction
1	Dr. PO Kimtho	Directeur général
2	Dr. OM Romny	Directeur honoraire
3	Prof. Ludovic PROTIN	Directeur honoraire
4	M. SOY Ty	Directeur général adjoint chargé des affaires académiques
5	Dr. OEURNG Chantha	Directeur général adjoint chargé de la planification et de la supervision de la recherche et d'innovation et des relations avec les entreprises (UIL)
6	Dr. BUN Kim Ngun	Directeur général adjoint
7	Dr. NGUON Kollika	Directeur général adjoint
8	Dr. CHUNHIENG Thavarith	Conseiller de la direction pour la coopération
9	M. NUTH Sothân	Conseiller de la direction pour la pédagogie, des études, de la jeunesse; - Assisté par M. SOY Sokhom, en collaboration avec l'association des étudiants
10	M. PENH San	Conseiller de la direction de l'ITC pour l'administration et les services internes
11	Prof. Bruno DAGUES	Conseiller de la direction
12	Dr. SIM Tepmony	Directeur du programme du 3 <sup>ème</sup> cycle - Assisté par Dr. HIN Raveth et Dr. EK Pichmony
13	Dr. OR Chanmoly	Directeur du Centre de Recherche et d'Innovation (RC) - Assisté par Dr. SOUNG Malyna et Dr. TAN Reaksmeay - Dr. CHAN Sarin, chef de l'unité : Technologie et gestion de l'énergie; - Dr. PHAT Chanvoleak, chef de l'unité : Technologie alimentaire et nutrition; - Dr. YOS Phanny, chef de l'unité : Science et structures des matériaux; - SRANG Sarot, chef de l'unité : Mécatronique et technologie de l'information Dr. PEN Chanthol, chef de l'unité : Eau et environnement
14	Dr. IN Sokneang	Doyenne de la faculté de génie chimique et alimentaire - Assistée par Dr. Khoeurn Kimleang et Dr. HOUNG Peany
15	Dr. HAN Virak	Doyen de la faculté de génie civil - Assisté par M. CHEA Chanly et Dr. Ly Hav
16	Dr. CHRIN Phok	Chef du département GEE - Assisté par VAI Vannak
17	Dr. SRENG Sochenda	Chef du département de Télécommunications et réseaux - Assisté par Dr. THOUN Kosal

18	M. LAY Heng	Vice-doyen de la faculté de mécatronique et chef du département GIC, assisté de M. YOU Vandy et M. YOU Vandy
19	Dr. CHHUON Kong	Doyen de la faculté d'hydrologie - Assisté par Dr. ANN Vannak
20	Dr. PHUN Veng Kheang	Chef du département de transports et Infrastructures et responsable du programme Master
21	Mme SREY Malis	Chef du département du Tronc Commun assisté de : - Dr. LIN Mongkolserrey responsable de mathématiques - M. LONG Sovann, responsable de physique - Mme KHEMTRAN Krasel, coordinatrice de la section de français - M. CHUM Tival, coordinateur de la section d'anglais
22	Dr. LIN Mongkolserrey	Responsable du campus ITC Tbongkhmum et chef du département de Mathématiques Appliquées et statistiques
23	Dr. BUN Long	Coordinateur du projet ADB, assisté par Dr. AM Sokchea
24	M. SIEANG Phen	Chef du bureau de la coopération internationale
25	M. KHIEV Samnang	Chef du service informatique, assisté par M. SIENG Chamroeun
26	M. KIM Vannada	Chef du bureau d'assurance de qualité
27	Mme HANG Vinchothy	Chef du bureau des personnels
28	M. MOEUNG Noi	Chef du bureau de planning et budget prioritaire (PB)
29	Mme KOY Sophary	Chef du bureau de comptabilité et des finances
30	M. EAM Kosal	Assistant du bureau de comptabilité et des finances
31	M. NHEM Sophal	Chef du bureau des achats
32	M. KEO Chhomsethy	Chef du bureau du service technique

Congratulations to these two new assistant directors. I hope you will work hard for ITC.

The last thing is that according to the government reform, in the near future, universities become public administrative institution. At that time, the Ministry of Economy and Finance manages the budget.

For ITC, we have our own statutes. This is why, we are in a particular context. Our CA is different from other CAs in other universities. Despite everything, we have the government's recommendation. It affects our CA. We have two options: the first, the number of board members is 5, 7, 9 or 11. These members are all Cambodian nationality. But our current situation shows that we have representatives from various French embassies, from Jica. We are discussing with the Ministry of Economy and Finance and the Ministry of Public Service.

Because if we look at the history of ITC, it's really exceptional.

We will determine this number of rights members (official members) and we will propose a group of consultant members. For the latter, there will be foreign people: France, Japan, Belgium, and others including the private sector.

This does not mean the ITC forgets France, Japan, Belgium but it is the new reform applied to all universities in the kingdom of Cambodia.

We hope that the Ministry of Economy and Finance and the Ministry of Public Service will understand our situation and let us continue to work together.

A big thank you to everyone for your loyalty and we look forward to seeing you again next year.

Après les derniers remerciements de la présidente du Conseil d'Administration adressés aux membres du Conseil d'Administration, à l'équipe de direction, la séance est levée.

## Annex 2. Minutes of meeting of the International Consortium Meeting 2023.



### COMPTE-RENDU DE LA RÉUNION DU CONSORTIUM INTERNATIONAL D'APPUI À L'ITC LES 22 ET 23 MARS 2023, À L'ITC, PHNOM PENH

#### MEMBRES DU CONSORTIUM 2023

#### I. Établissements étrangers

No	NOM ET PRÉNOM	NOM DE L'ÉTABLISSEMENT
1	Prof. WACHE Yves	Agro Sup Dijon (GCA et Formation de 3ème cycle)
2	Prof. DOSSANTOS-UZARRALDE Pierre	École Nationale Supérieure de Informatique pour Industrie et Entreprise (GIC)
3	Prof. MAUSSION Pascal	Institut National Polytechnique de Toulouse (GEE)
4	Prof. DEBASTE Frédéric	École Polytechnique de Bruxelles (GIM)
5	Prof. CHARLES Yann	Institut Galilée, Université Paris 13 (GIM)
6	Mme ANDRE Françoise	IMT Mines Alès (GEE, option énergie)
7	Prof. THIBON Isabelle	Institut National des Sciences appliquées de Rennes (GCI et GIM)
8	Prof. LAURIAC Florent	Institut National Polytechnique, INP de Toulouse (GEE)
9	Prof. DARRACQ Bruno	Institut Universitaire de Technologie d'Orsay (GEE)
10	Prof. SIREE Chaiseri	KASETSART University (GCA)
	Prof. KOTARO Yonezu	KYUSHU University (GGG)
11	Prof. JUN-ICHI Takada	Tokyo Tech (GEE)
12	Prof. VERLEYSEN Michel	Université catholique de Louvain (Programme Master et Doctorat)
13	Prof. ROUSSEAUX Frédéric	Université de La Rochelle (GIC)
14	Prof. LECLERCQ Pierre	Université de Liège (GCA/GCI)
15	Prof. COLIN Jean-Noël	Université de Namur (GIC)
16	Prof. CHABRIAT Jean-Pierre	Université de la Réunion (GEE)
17	Prof. DEQUATREMARE Michel	Université de Toulon (GEE et GIM)
18	Prof. ROGER François	Centre international de recherche agricole pour le développement (GCA)
19	Prof. GROS-MARTIAL Adèle	Institut de Recherche pour le Développement (GCA, GGG et GRU)
20	Prof. COLBEAU-JUSTIN Christophe	Université Paris-Sud
21	Prof. BOJAERT Jan	Université de Liège (GRU)
22	Prof. EPINETTE Olivier	Institut Mines-Télécom
23	Prof. PHALIP Vincent	Polytech Lille (GCA)
24	Prof. AVALLONE Sylvie	Montpellier SupAgro (GCA)
25	Prof. MERCADIER Jacques	École Nationale Supérieure en Génie des Technologies Industrielles (ENSGTI), UPPA
26	Prof. PREVEL Laurent	ENSIIE

#### II. Entreprises

27. M. TOUCH Franck, ancien président de KhmerDev

### III. Partenaires institutionnels

28. M. VINCENT Pierre, conseiller de coopération et d'action culturelle, Ambassade de France au Cambodge
29. S.E. le Dr. OM Romny, secrétaire d'État au ministère de l'Éducation, de la jeunesse et des sports (MEJS)
30. S.E. le Dr. PEN Chhorda, secrétaire d'État au ministère des Mines et de l'énergie
31. Mme BOUCHER Sandrine, directrice au Cambodge chez l'AFD
32. M. KE BIN Soreasmey, président de la CCIFC
33. Prof. KOICHIRO Watanabe, Senior Advisor of JICA
34. Mme TOYAMA Haruko, Senior Program Officer of JICA Cambodia
35. Mme SHOMI Kim, Country Representative of Global Green Growth Institute

### IV. Membres invités

36. M. VALLEE Thomas, attaché de coopération scientifique et universitaire, Ambassade de France
37. M. IM Kravong, responsable de l'Antenne AUF de Phnom Penh
38. Prof. YINDIZOGLU Murat, conseiller du MEJS
39. Prof. AUBERT Pascal, directeur du collègue universitaire de l'Université Paris-Saclay (TC)
40. Prof. VINCKE Bastien, enseignant-chercheur à l'Université Paris-Saclay
41. Prof. DESPLANCHE Didier, directeur général de l'ECAM
42. Prof. André SPIEGEL, directeur de l'Institut Pasteur du Cambodge
43. Prof. BRISSON Martin, Chambre de Commerce et d'Industrie Française du Cambodge
44. Prof. LEROY Christine, Université catholique de Louvain
45. Prof. REMACLE Éric, Université catholique de Louvain
46. Prof. DASNOY Christine, Université de Liège
47. Prof. Kylie STRINGFELLOW, International Relations Officer, Griffith University
48. Prof. SKRZYPEK Thibaut, coopération internationale, École nationale des ponts et chaussées
49. Prof. CYR Martin, professeur des universités, Université Toulouse III
50. Prof. OBRECHT Christian, maître de conférences, INSA de Lyon
51. Mme WYNAR Elodie, attachée de coopération pour le français, Ambassade de France
52. Prof. SANGLEBOEUF Jean-Christophe, professeur des universités, Universités de Rennes
53. Prof. AUBERT Pascal, professeur des universités, Université Paris-Saclay
54. Prof. VINCKE Bastien, maître de conférences, Université Paris-Saclay
55. M. THOEUN Vongdy, Program Officer, JICA Cambodia
56. Prof. VIVIEN Eric, directeur de l'office international, IMT Mines Alès
57. M. DURAND Cécile, coopération internationale, Institut Agro Montpellier
58. Prof. OGIER Jean-Marc, Président de l'Université de La Rochelle
59. M. MASSUEL Sylvain, Senior Researcher, IRD
60. Mme SESTER Mathilde, chercheuse, CIRAD
61. Prof. SUNIL Herat, Griffith University
62. Mme E. LENCZEWSKI Melissa, professor, Northern Illinois University
63. Mme LEFEBVRE Estelle, directrice, CCIFC
64. M. TIVET Florent, chercheur, CIRAD
65. Mme LE GOFF Gaëlle, directrice des affaires internationales, École Polytechnique
66. Mme DETOURBE Marie-Agnès, directrice, INSA de Toulouse
67. Mme DUCASSE Mireille, directrice des Relations Internationales, Institut National des Sciences appliquées-Rennes
68. Mme LEGEAI Béatrice, chargée de Mission Relations Internationales, IUT de Saint-Nazaire
69. Mme CECCARELLI Adeline, ingénieur formation Agroalimentaire, SupAgro Montpellier
70. Mme LAURIAC Florence, directrice du Rayonnement Institutionnel et de l'Internationalisation R2I, Toulouse INP
71. Mme MIYAKE Chiho, coordinator, LBE Project
72. M. MALEC David, directeur de l'école doctorale, Université de Toulouse
73. M. POURRUT Bertrand, chargé de mission Cambodge, INP Toulouse

74. M. KOTARO Yonezu, representative, KYUSHU University
75. Prof. KUZNIK Frédéric, professeur des Universités, INSA de Lyon
76. Mlle MANSSON-DELERCE Johanna, chargée de Mission Universitaire et Responsable de l'espace Campus France

## **V. Équipe de direction de l'ITC**

### **V. 1. Direction**

77. S.E. PHOEURNG Sackona, présidente du Conseil d'Administration et ministre de la Culture et des beaux-arts
78. S.E. le Dr. PO Kimtho, directeur de l'ITC
79. M. SOY Ty, directeur adjoint
80. Dr. OEURNG Chantha, directeur adjoint
81. Dr. BUN Kim Ngun, directeur adjoint
82. Dr. NGUON Kollika, directeur adjoint
83. Prof. Ludovic PROTIN, directeur honoraire de l'ITC
84. Prof. Bruno DAGUES, conseiller de direction de l'ITC
85. Dr. CHUNHIENG Thavarith, conseiller pour la coopération
86. M. NUTH Sothân, conseiller pour les affaires académiques
87. M. PENH San, conseiller pour l'administration

### **V.2. Facultés, départements, et sections**

88. Dr. OR Chanmoly, directeur du Centre de Recherche et d'innovation (RIC)
89. Dr. SIM Tepmony, directeur de la formation de 3<sup>ème</sup> cycle (GS)
90. M. SIEANG Phen, responsable du bureau des relations internationales (IRO)
91. Dr. BUN Kim Gnun, doyen de la faculté de géoressources et géotechnique (GGG)
92. Dr. HAN Virak, doyen de la faculté de génie civil (GCI)
93. Dr. CHHUON Kong, doyen de la faculté d'hydrologie (GRU)
94. Dr. IN Sokneang, doyenne de la faculté de génie chimique et alimentaire (GCA)
95. Dr. YIN Molika, responsable des relations avec les entreprises (UIL)
96. Dr. LIN Mongkolserey, vice-directeur du centre de recherche et d'innovation, coordinateur de l'ITC Tbongkhum et doyen de la faculté des sciences appliquées et chef de département des mathématiques appliquées et statistiques
97. Dr. CHRIN Phok, chef du département électrique et énergétique (GEE)
98. Dr. CHAN Sarin, chef du département de génie industriel et mécanique (GIM)
99. M. LAY Héng, vice-doyen de la faculté de génie électrique et chef du département de Génie Informatique et Communication (GIC)
100. Mme SREY Malis, chef du département de Tronc Commun (TC)
101. Mme KHEMTRAN Krasel, responsable de la section de français
102. M. SO Phea, responsable de la section d'anglais
103. M. KHIEV Samnang, responsable du service informatique
104. Dr. SRENG Sochenda, chef de département Télécommunications et Réseaux (GTR)
105. Dr. KHUN Veng Kheang, professeur et coordinateur de la formation master de transport
106. M. KIM Vannada, responsable d'assurance de qualité
107. M. POV Keangse, chef de département Transport et Infrastructure
108. Dr. SRANG Sarot, Responsable du Génie Mécanique et des Systèmes de Contrôle au Département de Génie Industriel et Mécanique et coordinateur du programme international ECAM LaSalle-ITC

Cette année, la réunion du Consortium international d'appui à l'ITC a repris son rythme habituel, soit une journée et demie, en présentiel. Malgré tout, étant donné que certains de nos membres étaient dans l'impossibilité de déplacement pour diverses raisons, nous avons décidé d'organiser une réunion hybride pour les séances plénières et les discussions dans les départements respectifs. Pour comprendre plus précisément, nous vous invitons à lire l'ordre du jour présenté ci-dessous:

**Mercredi 22 mars 2023**  
**8h30-17h00 heures au Cambodge**

Session plénière dans la salle 113-A

8h00-8h30 : Accueil des participants

8h30-10h30 :

- Discours de bienvenue de S.E. Mme PHOEURNG Sacoka, présidente du CA de l'ITC
- Méthodologie de travail et objectifs de la réunion du Consortium 2023

10h30-11h00 : Pause-café

11h00-12h00 : Perspectives et stratégies 2023-2023

12h00-13h30 : Déjeuner à l'ITC

Ateliers par département/unité de recherche/master

13h30-17h30 : Travail en groupe dans les départements/unités de recherche/master

18h30 : Dîner convivial organisé par la direction de l'ITC

**Jeudi 23 mars 2023**

Session plénière dans la salle 113-A

8h30-12h00 : Présentation des synthèses des groupes de travail

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**ACCUEIL DES PARTICIPANTS ET OUVERTURE DE LA RÉUNION**

En introduction, **S. E. Mme PHOEURNG Sackona**, ministre de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC, salue tous les membres du Consortium international d'appui à l'ITC, de France, du Japon, de Thaïlande et d'autres pays. « J'ai le plaisir de nous retrouver ici en présentiel », a-t-elle précisé. Elle rappelle les années historiques avec les partenaires privilégiés de l'ITC tels que la France, la Belgique, le Japon, la Thaïlande.

Vous voyez, l'ITC a beaucoup changé. Vous voyez ici les anciens directeurs de l'ITC, à savoir M. Ludovic PROTIN, Dr. OM Romny et moi-même. Maintenant, c'est le Dr. PO Kimtho qui prend le relais. L'ITC entre dans les mains des jeunes de la nouvelle génération. Vous voyez clairement le transfert de technologie à la sociétale et à l'ensemble de la population jeune en particulier.

Un grand merci à nos jeunes. L'avenir du Cambodge vous appartient maintenant. Je souhaite vivement que vous continuiez une bonne voie pour que l'ITC reste toujours un institut le plus avancé dans le domaine de la formation des ingénieurs et techniciens à l'échelle nationale, régionale et internationale.

Toutes mes gratitude à nos partenaires qui font partie du développement de l'ITC : la France, la Belgique, le Japon, la Thaïlande, la Banque Asiatique de Développement, la Banque mondiale, l'Agence Française de Développement, Jica et bien d'autres.

Pour commencer, j'invite son Excellence le Dr. OM Romny, secrétaire d'État au ministère de l'éducation, de la jeunesse et des sports, représentant de son excellence le Dr. HNAG Choun Naron, ministre de l'Éducation, de la jeunesse et des sports.

**SEM le Dr. OM Romny**, secrétaire d'État au Ministère de l'Éducation, de la Jeunesse et des Sports

*Excellences,*

*Mesdames,*

*Messieurs et chers collègues,*



*Permettez-moi de m'exprimer au nom du ministre de l'Éducation, de la Jeunesse et des Sports (MEJS). L'ITC demeure pour le ministère un des établissements clés pour la formation des ingénieurs et des techniciens du pays. Cet institut aide le ministère à réaliser ses stratégies qui sont liées fortement aux stratégies fixées par le gouvernement royal du Cambodge, selon lesquelles, le Cambodge deviendra un pays de haut revenu intermédiaire en 2030 et un pays de haut revenu en 2050.*

*Pour ce faire, l'ITC occupe une place importante en termes de la formation des ressources humaines pour être embauchées dans les entreprises au Cambodge. J'en profite pour vous dire que le ministère de l'éducation, de la jeunesse et des sports a mis en place beaucoup de projets qui touchent la formation du secondaire à l'université.*

*Vu l'importance de l'éducation des bases scientifiques au niveau secondaire, le MEJS s'intéresse à la mise en place de cette formation afin que les STEMS soient au cœur des études secondaires et que les élèves en soient accros.*

*Pour mener à bien ces activités, le le MEJS m'a nommé responsable de cette formation des STEMS pour le Cambodge. A mon sens, l'enseignement secondaire et l'enseignement universitaire se complètent, l'un a besoin de l'autre.*

*Pour l'instant, il manque d'enseignants dans ce domaine. C'est la raison pour laquelle l'ITC joue un rôle très important pour la formation des formateurs (Training Of Trainer). L'ITC reste toujours un des partenaires privilégiés pour assurer cette formation.*

*Au nom de son excellence monsieur le ministre de l'éducation, de la jeunesse et des sports et je tiens à remercier tous les partenaires de l'ITC pour leur coopération et leur fidélité. Et je vous souhaite bonnes discussions dans vos départements respectifs cet après-midi et une bonne réunion du Consortium 2023.*

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Merci son excellence monsieur le secrétaire d'État. J'en profite pour vous dire que cette année, le nombre de participants a atteint le record, 79 dont 14 sont en ligne. Il est à noter que 38 collègues viennent de loin de France, de Belgique, de Thaïlande etc.

Ensuite, Monsieur le représentant de l'ambassade de France, vous êtes prié de prendre la parole.

**M. Pierre VINCENT, conseiller de coopération et d'action culturelle de l'ambassade de France au Cambodge**

Merci beaucoup Madame la Ministre de m'accorder quelques mots pour l'ouverture de ce consortium. Permettez-moi tout d'abord de féliciter S.E. le Dr. PO Kimtho, directeur de l'ITC pour avoir associé tout au long de l'année la France à de nombreuses activités et de nombreux temps forts de l'ITC. Je pense particulièrement à la venue d'une délégation parlementaire mais aussi au lancement du laboratoire khmer d'observation de la Terre (KHEOPS). Vous savez, la France est très attachée à l'ITC. Et à ce titre, l'Ambassade de France ainsi que tous les partenaires français sommes prêts à vous accompagner, comme nous l'avons fait dans le passé, et encore pour l'avenir, de façon étroite et renforcée.

Madame la Ministre, Monsieur le Directeur,

Vous avez des stratégies 2021-2030 qui nous servent de feuilles de route, qui nous servent de guide et de cadres, et je pense que c'est une excellente chose qui nous permet de continuer main dans la main au bénéfice des étudiants cambodgiens. Permettez-moi aussi ce matin, de féliciter les cinq étudiants de l'ITC qui ont obtenu des bourses d'études dans de grandes écoles en France dont la prestigieuse École Polytechnique. Je tiens à les féliciter et nous les accueillerons à l'Ambassade avec mes collègues pour préparer au mieux cette nouvelle expérience qui les attend en France.

Je voudrais aussi dire, Madame la Ministre, que l'Ambassade, depuis plus de 5 ans, a octroyé plus de 50 bourses aux étudiants de l'ITC, aussi bien pour leurs thèses que leurs masters. Nous continuons à aider autant que nous pouvons les étudiants de l'ITC.

Pour conclure mon intervention, je voudrais souhaiter à ce Consortium des débats riches comme chaque année pour que l'on puisse prendre des orientations tous ensemble. Encore une fois, merci beaucoup de m'avoir invité, Madame la Ministre, Monsieur le Directeur ; je suis honoré de participer à cette session technique du Consortium. Merci beaucoup.

**S. E. Mme PHOEURNNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Merci beaucoup, monsieur le représentant de l'Ambassade de France pour votre témoignage qui nous touche profondément.

Merci pour les bourses octroyées par l'Ambassade de France dont je faisais partie. J'ai pu mener à bien mes études de master et doctorat, grâce aux bourses de l'Ambassade de France.

Maintenant, je laisse la parole à un autre partenaire de l'ITC depuis longtemps, l'Agence Universitaire de la Francophonie (AUF). Je crois que le directeur Asie-Pacifique de l'AUF, Monsieur Laurent SERMET nous rejoint à distance.

**Monsieur Laurent Sermet, Directeur Asie-Pacifique de l'AUF**

Je vous remercie Madame la Ministre, Monsieur le directeur de l'ITC, mesdames, messieurs, chers collègues. Vous savez, Monsieur le Recteur de l'AUF est venu au Cambodge accompagné Madame la Vice-Rectrice il y a une dizaine de jours. Nous avons eu beaucoup de rendez-vous à la fois politiques et techniques. Nous sommes allés à l'ITC, et aussi dans nos locaux à l'ITC, pour signer la mise en place d'un deuxième centre d'employabilité francophone au Cambodge.

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Madame la Ministre, Monsieur le Directeur, j'ai bien entendu les propos que vous avez développés qui sont extrêmement importants pour que le Cambodge obtienne le statut de pays à revenu intermédiaire élevé. C'est tout à fait satisfaisant et légitime que le pays se fixe cet objectif et je suis convaincu que l'enseignement supérieur cambodgien, dont l'ITC fait partie, joue un rôle clé à cet égard ; parce que nous avons besoin, comme dans les autres pays, de l'apport des universités à la montée en puissance à la fois économique, technologique et sociétale. Le travail que nous faisons aujourd'hui, il est loin d'être neutre, va contribuer à porter la volonté du gouvernement royal d'atteindre ce statut.

D'autre part, la politique que vous avez développée à l'ITC est une politique partenariale, vous avez la France, la Belgique, le Japon etc. Elle est excellente. Nous sommes tous dans cette perspective-là. Mais ce qu'offre l'AUF à l'ITC, en plus, c'est une collaboration multilatérale et non pas bilatérale, avec le potentiel des universités francophones de la planète. C'est-à-dire toutes les différentes parties de la Francophonie en Amérique, en Europe, en Afrique et en Asie.

Je serai demain au Cambodge, dans le cadre de la session du Conseil de Promotion de la Francophonie au Cambodge, pour défendre cinq objectifs suivants:

- 1) Nous souhaitons accompagner la compétence des universités membres dont l'ITC qui est un établissement de l'enseignement supérieur de premier plan. Le 10 mars dernier, nous

avons signé une convention avec l'Université Nationale de Battambang pour mettre en place un centre d'employabilité au sein de cette université. Nous souhaitons accompagner aussi les universités moins avancées ;

- 2) Nous souhaitons accompagner la transformation numérique des universités et là-encore l'AUF est présente au Cambodge ;
- 3) Nous souhaitons accompagner les projets de recherche au service de développement, par exemple, la mise en place du laboratoire khmer de l'observation de la terre. C'est un projet de premier plan ;
- 4) Nous souhaitons, comme vous le savez, Madame la Ministre, Monsieur le Directeur, favoriser l'employabilité. Le CEF est un centre d'accueil des étudiants de l'ITC et aussi des autres universités de la capitale où les étudiants peuvent entendre le français et suivre certaines formations qui puissent leur ouvrir la porte de l'employabilité ;
- 5) Nous soutenons également la jeunesse francophone en mettant en place des clubs de leaders-étudiants. Dans un avenir proche, c'est important qu'il y ait quelques clubs étudiants qui regroupent des autres étudiants francophones.

Je vous remercie Madame la Ministre et vous dis à bientôt.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Merci monsieur le directeur. Nous avons encore deux partenaires importants, l'un de Belgique et l'autre de Belgique. Mais comme nous avons un décalage horaire, notre collègue de Belgique ne peut pas nous joindre. Je laisse donc la parole à notre collègue japonais.

**Prof. Jun-Ichi Takada, vice president for international affairs at Tokyo Tech**

I apologize for not being able to be with you in person. In fact, I planned to join it with you but since today and tomorrow there are exams in our university, I have to stay there. I am incredibly happy to see the colleagues from France, Belgium, Jica office and other countries. I think that the pandemic is almost over, and I recognize that this kind of meeting would be organized because it is particularly important. I believe that the colleague from LBE Jica Project will update the project activities. I would like to congratulate you on the increase in the number of inhabitants for this International Consortium. I hope to be with you in person for the next meeting. Thank you very much.

M. SOY Ty présente les avis favorables du Consortium international 2022 et le relevé des décisions du Conseil d'administration 2022.

**Suivi des avis du Consortium et décisions du CA 2022**

No	Avis du Consortium et décision du CA 2022	2022-2023
1	Demander le grade « Professeur Émérite » à la direction de l'ITC pour les grandes personnalités et les professeurs qui ont beaucoup travaillé pour le développement de l'ITC et ils vont partir à la retraite	En réalisation
2	La mise à jour du cursus de master génie de l'eau et de l'environnement (École doctorale)	Réalisé
3	La mise à jour du cursus de master génie agro-industriel	Réalisé
4	La mise à jour du cursus de master Génie de technologie et de gestion de l'énergie (École doctorale)	Réalisé
5	La mise à jour du cursus de master génie mécatronique, informatique et communication (École doctorale)	Réalisé
6	Demander de modifier le curriculum du programme de Télécommunications et Réseaux (Département GTR)	Réalisé

7	Ouverture du Département du Génie des Transports et des Infrastructures (GTI)	Réalisé
8	GIC update the curriculum of year 3, 4 and 5 to adapt to the change of the program in 2nd year for students who choose to study in GIC, GTR, Data Science, in the future (GIC)	Réalisé
9	GGG updates the curriculum of year 3 for two courses on "Oremicroscopy" and "Petrology and Mineralogy". These courses will be combined to increase the practical work, which can fulfill in the industry needs. Moreover, this course is the main core for the field mineral exploration and exploitation (GGG)	Réalisé
10	GGG updates the curriculum of year 4 for five courses on "Geophysics => added the TP class", "Rock Blasting Techniques => added TD class", "Mineral Exploration => added TD class", "Basic Geological Mapping => added TD class", "Mineral Characterization => removed this course due to the course of mineral exploration is covered this content already". The purpose of modified is to fulfill the requirement of current job market needed, especially in the field Mining, which is rapid growth in late 2021 (GGG)	Réalisé
11	GRU requested to modify the course "Construction of Rural Road" to "Road Engineering and Construction" for improving competent of student to meet the need of job market (GRU)	Réalisé
12	GRU will work on the Technician program in order to modify the program for a specific skill need on Water Supply and setup water supply laboratory with support from Shanghai Micro Purification Co., Ltd (GRU)	En réalisation
13	GRU will implement the Water and Environment Oriented Living lab by creating on more lab called "Coastal and Wetland Environmental Research Lab". The students and lecturer will do the real-life water demo sites and creating a multi-stakeholder virtual network (GRU)	En réalisation
14	Propose to establish the Cambodia Coastal Research Center. The detail structure, vision, mission, stakeholders, researcher and source of fund will be submitted in next consortium 2023 (GRU)	En réalisation
15	ITC is planning to launch 1year International Pre-degree Foundation Programs of Curtin in Oct 2022 at ITC and students could continue their undergraduate study for both Engineering (+4years) and Science (+3years) at any Curtin campus upon this foundation program completion. The pre-degree foundation program was established by technical assistant from both Curtin Perth, Australia and Curtin Malaysia under Higher Education Partnership Program of HEIP. The Establishment of Pre-degree Foundation Program in Eng. and Science will meet the Curtin's undergraduate entry requirement at any Curtin campus (International Program)	En réalisation (2023-2024)

## DISCUSSIONS :

### S. E. Mme PHOEURNNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC

Chers collègues, voilà ce sont les avis favorables du Consortium international 2022 et le relevé des décisions du Conseil d'administration 2022. Si vous avez questions, elles sont les bienvenues.

J'ai une petite question à vous poser. Le 1er point : Demander le titre « PROFESSEUR Émérite » au Ministère de l'Éducation, de la Jeunesse et des Sports pour les grades personnalités et les professeurs qui ont beaucoup travaillé et ils vont partir à la retraite ou ils sont à la retraite. Je crois que nos collègues japonais ont sollicité cette proposition « PROFESSEUR Émérite » qui est le titre qui permet à un professeur des universités admis à la retraite de continuer à apporter un soutien aux activités des universités. Où vous en êtes ?

**M. SOY Ty, directeur adjoint chargé des affaires académiques**

La direction de l'ITC termine les documents nécessaires pour les soumettre au ministère de l'éducation, de la jeunesse et des sports.

**M. YILDIZOGLU Murat, conseiller du MEJS**

J'ai discuté au ministère pour que nous ayons la même équivalence en France. Le titre PROFESSEUR Émérite s'adresse uniquement aux professeurs qui ont fini leur carrière professionnelle et qui partent à la retraite et qui ont encore des doctorants. Il leur permet de pouvoir continuer leurs activités académiques et de recherche en termes de supervision de leurs doctorants. Sinon, on a d'autres classes pour les autres enseignants qui sont en activité.

**Prof. KOICHIRO Watanabe, Senior Advisor of JICA**

Probably, last year, I proposed the title Professor Emeritus to the direction board of ITC to prepare the documents for the MOEYS. For me, this title is very important for the professors and the leaders of ITC who will retire.

Professor Emeritus is different from Professorship.

I repeat it once again because you know in several countries when professors retire and these people have contributed a lot to the development of the university, we can attribute this title professor emeritus to them.

Professor Emeritus is only the title of honour, ITC does not need to prepare any budget, it is only the title. In this regard, I think the criteria are not complicated like those of professorship. Normally, the universities can decide this title themselves, without asking permission from the government.

I am convinced that HE Dr. PHOEURNG Sackona and HE Dr. OM Romney absolutely deserve this title. I hope to have the answer on the occasion of the meeting of the Board of Trustees in June 2023.

**M. YILDIZOGLU Murat, conseiller du MEJS**

"J'ai discuté au ministère pour que nous ayons la même équivalence en France. Le titre PROFESSEUR Émérite s'adresse uniquement aux professeurs qui ont fini leur carrière professionnelle et qui partent à la retraite et qui ont encore des doctorants. Il leur permet de pouvoir continuer leurs activités académiques et de recherche en termes de supervision de leurs doctorants. Sinon, on a d'autres classes pour les autres enseignants qui sont en activité."

**Prof. Jun-Ichi Takada, vice president for international affairs at Tokyo Tech**

I remember in last year's discussion, the process to apply for the title of professorship was complicated but for me, the title of Emeritus Professor is something else entirely.

It is a title that encourages retired professors to be able to participate in academic and research activities etc. It is an important contribution to the development of the university and the country. I think colleagues from different countries understand this title well because you have a similar system. I think this title is only a symbol, but it is a great honor for life.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

So we have different ways. According to M. YINDIZOGLU Murat, this title is intended only for lecturers who are about to retire. This title allows them to continue their activities at the university. According to Professor Takada, earning the title of Professorship is complicated in Cambodia. This is why he only wishes to obtain this title "professor emeritus" for the professors of the ITC who are retired. So, I ask colleagues from the ITC to work on this.

*SE le Dr. PO Kimtho, directeur de l'ITC présente les événements marquants de l'ITC.*

*M. SOY Ty, directeur adjoint chargé des affaires académiques présente les activités de l'année écoulée 2022-2023.*

**M. Thomas VALLEE, attaché de coopération scientifique et universitaire**

Merci pour la présentation. J'ai une question concernant le taux de réussite des étudiants de deuxième année. Vous avez entre 200 et 300 étudiants qui ont échoué ou abandonné. Je voulais savoir quelle était la principale cause d'échec ; le Covid ou une autre raison ?.

**M. SOY Ty, directeur adjoint chargé des affaires académiques présente les activités de l'année écoulée 2022-2023.**

Merci pour votre question. En fait, il existe plusieurs facteurs expliquant les causes d'abandon. Pour les meilleurs étudiants, ils ont décidé d'arrêter leurs études du fait qu'ils avaient bénéficié des bourses octroyées par les différents pays tels que la France, le Japon, la Chine et bien d'autres. Une autre raison, c'est que les autres établissements leur donnent les bourses d'études à 100%. Pour ces derniers, s'ils restent à l'ITC, les études sont payantes. La dernière raison est liée au niveau de vie mais pas beaucoup.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Pour moi, je ne vois pas les chiffres exacts qui témoignent de leur abandon. Ils sont combien ?

**M. SOY Ty, directeur adjoint chargé des affaires académiques**

Pour les autres groupes de 3ème, 4ème et 5ème année, nous avons les chiffres puisqu'ils ont fini leurs études mais pour les 1ères et 2èmes années, les études sont en cours. C'est pourquoi, nous n'en avons pas. J'ai pris note et je les mets en évidence pour le CA en juin.

**M. Ludovic Protin, directeur honoraire de l'ITC**

J'ai entendu avec plaisir le projet de construction d'un nouvel internat de l'ITC de 91 chambres. Permettez-mi de vous rappeler qu'en 2005 et 2006, nous avons fait construire un internat pour les filles sur le campus de l'ITC où nous sommes actuellement. Je voudrais savoir pourquoi cette nouvelle construction ne se fait pas ici. La deuxième question concernant la formation des techniciens faisait partie des discussions du Consortium et du CA depuis des années. L'ITC a du mal à former 200 techniciens par an. Maintenant, vous pouvez recruter 568 techniciens par année. Ça veut dire que le problème est résolu. C'est génial. Est-ce que vous des méthodes de recrutement efficaces ?

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Pour la première question, l'internat pour les filles venant de province sera construit au nouveau campus de l'ITC, à côté du nouveau stade olympique. C'est important parce que les filles ne peuvent pas aller vivre dans les pagodes. Il leur faut des internats.

Pour la seconde question, c'est important que le gouvernement accorde une importance au recrutement des techniciens parce que les entreprises en ont besoin. Par exemple, le gouvernement prévoit un budget pour former 1,500,000 techniciens pour l'an 2024. C'est la raison pour laquelle toutes les universités sont chargées de les former pour toutes les disciplines. Pour l'instant, il manque de mains d'œuvres au Cambodge.

**Prof. Jun-Ichi Takada, vice president for international affairs at Tokyo Tech**

May I have a question? I see that the number of students in Tbongkhmum is not much. You could explain why.

**SE le Dr. PO Kimtho, directeur de l'ITC**

Thank you, Professor Takada for your question. In fact, the enrollement at Tbongkhum is a lite bit low copare to other. If we compare with the last year, it is not much different. In terms of applicants, the number has gone down a bit, but the admission rate is not that much different from last year. In fact, we continue to send our teachers from Phnom Penh there to teach. For labs, we transport our students from Tbongkhmum to Phnon Penh. But at the same time, this year, we will develop Cambodia Cyber University and promote Elearning Contents. This is one of our strategies which seeks to develop more online courses for Tbongkhmum. By doing this we can optimize our operation.

We also have a workshop at our Kampong Cham campus, and we hope to put it into operation for the next academic year. Even, it is small, but some labs will be installed there. And there, the students of Tbongkhmum can do experiments in Kampong Cham as well. Thank you.

**Prof. Jun-Ichi Takada, vice president for international affairs at Tokyo Tech**

Thank you very much.

*Dr. SIM Tepmony, directeur du programme Master et Doctorat présente les programmes pour Master et Doctorat.*

**M. Thomas VALLEE, attaché de coopération scientifique et universitaire**

Je ne vois pas la présentation du programme du Master Ecam LaSalle. Je voulais savoir si les étudiants qui ne font pas leurs publications doivent se réinscrire pour une nouvelle année académique.

**Dr. SIM Tepmony, directeur de l'école doctorale**

For the first question, we have another person responsible, not me. For the second, yes, usually, we allow them to extend their publications. The main thing is that the students submit their publications first and we allow them to defend them after. For the defense, it is necessary to wait until their publications are accepted. We have the jury. It is he who decides according to character. So, they must wait and of course re-enroll for the new academic year.

**Dr. NGUON Kollika, directeur adjoint**

Thank you for question Mr. Thomas VALLEE. Actually, I am still involed with Dr. SRANG Sarot in the progress of international program ECAM LaSalle, but Dr. SRANG is the man coordinator for this program.

This international program ECAM LaSalle is for two years. For now, they are in their fifth year and after that, they have two years to do their master's degree.

A big thank you to Professor Didider DESPLANCHE for all the preparations he made so that this training was well put in place.

This afternoon, we will discuss more details because ECAM LaSalle International Porgram is under the Mechanical and Industrial Department.

*Mr. LAY Heng, vice-dean of Electrical Faculty and head of Computer Science Department présente la partie E-Learning Center présente les activités du centre de formation à distance*

*Mr. SOK Kimheng, responsable for the Library of ITC présente les activités de la bibliothèque STEM de l'ITC.*

*Mr. SIEANG Phen, head of International Relations présente le perfectionnement et la mission d'enseignement et la cooperation internationale.*

*Dr. YIN Molyka, head for University Industry Linkage présente les relations avec les entreprises.*

*Dr. OR Chanmoly, director of Recherche and Innovation Center présente les activités de recherche de l'ITC*

**Prof. Jun-Ichi Takada, vice president for international affairs at Tokyo Tech**

Thank you very much for your presentation Dr. OR Chanmoly. For me, it is not yet very clear the relationship between UIL and RIC. Some of the activities mentioned by Dr. YIN Molika are part of those of RIC. Is it possible to have a clarification on this?

**Dr. OR Chanmoly**, director of Recherche and Innovation Center présente les activités de recherche de l'ITC

Thank you, Professor, for your question regarding the restructuring of the roles of the RIC and UIL. This year, we have part of the ARES budget to work on that. We will review all the difficulties we faced in the past and we will remedy them by clarifying the roles of UIL and RIC. In fact, UIL has relations with the departments and the RIC. We hope to have good determinations of all the tasks that everyone needs to do for good management. I can't guarantee, but we're doing our best to work on it.

*Dr. BUN Kim Ngun, deputy director présente les perspectives et les stratégies pour l'année académique 2023-2024.*

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Merci beaucoup. Voilà la dernière présentation. Comme vous le savez, depuis ce matin, les différentes présentations se sont succédé les unes après les autres.

Pour cet après-midi, vous avez votre programme bien précis dans les départements respectifs. Sachant que les discussions se font dans les disciplines concernées et vous allez faire la synthèse pour demain matin pour la séance plénière.

**M. Thibaut Skrzypek, coopération internationale de École Nationale des Ponts et Chaussées**

Merci madame la présidente. J'ai une question sur les étudiants. Comment sont-ils associés à la gouvernance de l'ITC ? Les étudiants actuels et les anciens, les Alumni ? Comment se fait l'évaluation de l'enseignement par les étudiants ? Je crois que les Alumni de l'ITC influence tous les domaines du pays. Comment font-ils pour le levé des fonds, par exemple ?

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Merci pour la question. En fait, l'ITC garde le système que les Français nous ont laissés parce qu'ils nous semblent efficaces et avantageux : le Conseil des Études de la Vie Universitaire (CÉVU). Ce conseil se réunit deux fois par an, le premier à la fin du premier semestre et le second à la fin du second semestre. Le but de recueillir via les étudiants toutes les données nécessaires à l'amélioration de la formation et de la recherche. Les résultats issus de ces deux réunions sont présentés aussi dans les documents du Consortium et du Conseil d'administration.

Quand on parle des anciens étudiants, ils sont tous là, les jeunes qui prennent le relais. Les autres étudiants, où sont-ils ? Si vous allez dans différentes provinces, dans les ministères, vous rencontrez bien évidemment les anciens de l'ITC. Non seulement au Cambodge mais aussi à l'étranger, j'ai rencontré les anciens de l'ITC, en Inde, en France. Nous avons une association des anciens étudiants de l'ITC. Elle a moins d'activités du fait que son président est parti former sa propre entreprise privée. Je ne sais pas si elle a élu son nouveau président. Vous savez, les anciens étudiants de l'ITC sont répartis un peu partout dans les secteurs public et privé. C'est pour cela que nous avons une bonne relation avec eux et nos étudiants actuels peuvent trouver un stage facilement.

Vous savez, avec notre nouvelle technologie, nous avons nos groupes avec différentes plateformes Telegram, WhatsApp, Twitter ... C'est pas officiel mais quand il y a quelque chose, on le sait tout de suite. Quand l'un d'entre nous est malade et qu'il a besoin du sang, par exemple. On le poste, on s'entraide.



Voilà ce que je peux vous dire pour l'instant.

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### **SYNTHÈSES PAR DÉPARTEMENT DU 23 MARS 2023 (8H30-12H00)**

Je crois que vous avez bien travaillé hier après-midi. Aujourd'hui, nous allons écouter les synthèses que vous avez constituées après les discussions dans vos départements respectifs. Je tiens à rappeler que nous avons au total 13 présentations :

1. le département du Tronc Commun (TC);
2. le département de Génie Chimique et Alimentaire (GCA);
3. le département du Génie Civil (GCI);
4. le département de Génie de Géotechnique et Géoressource (GGG);
5. le département de Génie Rural (GRU);
6. le département de Génie Électrique et Énergétique (GEE);
7. le département de Génie Télécommunications et Réseaux (GTR);
8. le département de Génie Informatique et Communication (GIC)
9. le département des Sciences des Données
10. le département de Génie Industriel et Mécanique (GIM)
11. le programme international de l'ECAM LaSalle
12. le programme du 3<sup>ème</sup> cycle (GS)
13. le Centre de Recherche et d'innovation (RIC)

Je propose à tous les présentateurs de bien respecter le temps alloué. Les remarques sont faites après toutes les trois présentations.

*Mme SREY Malis, chef du département du Tronc Commun est chargée de présenter la synthèse de son département.*

*Dr. IN Sokneang, doyenne de la faculté de génie chimique et alimentaire est chargée de présenter la synthèse de son département.*

*Dr. HAN Virak, doyen de la faculté de Génie Civil présente la synthèse de son département.*

### **S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Vous voyez, trois présentations sont faites. Pour le Tronc Commun, vous voyez, c'est comme en France : deux ans pour le Tronc Commun et 3 ans pour les spécialités. À travers la présentation de Mme SREY Malis, on voit qu'il y a de plus en plus d'étudiants au TC. C'est pas facile en termes de gestion. Je laisse la parole à nos collègues qui souhaiteraient parler.

### **M. Thomas VALLEE, attaché de coopération scientifique et universitaire**

Merci madame la présidente.. Un commentaire sur les travaux pratiques (TP), les laboratoires et les consommables. Est-ce que le coût des consommables a été pris en compte dans l'augmentation des heures TP ? Par ailleurs, je voudrais savoir si l'ITC travaille aussi avec The National Health Products Quality Control Center qui contrôle notamment la qualité des médicaments au Cambodge.

### **Mme Adèle MARTIAL, représentante du pays chez l'IRD**

J'ai une question concernant le master en génie chimique et alimentaire, j'aimerais savoir s'il est prévu des modules de cours dans le domaine de nutrition et notamment de la physico chimie de la nutrition en lien avec le module relatif aux procédés alimentaires (course in agro-chemical

processing and analysis). C'est une dimension importante du génie alimentaire pour lequel une expertise importante existe en France. L'IRD pourrait contribuer en cohérence avec les projets de recherche en cours dans ce domaine.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Avez-vous d'autres questions? Moi, j'en ai une pour Dr. IN Sokneang et probablement aussi pour Dr. HAN Virak. Vous avez parlé d'une nouvelle formation de Bachelor Engineering de 4 ans. Comment peut-on expliquer si la durée est différente par rapport à la durée du diplôme d'ingénieur qui existe à l'ITC, soit 2 ans au TC et 3 ans dans les départements de spécialité. Ma question s'adresse à son excellence monsieur le Directeur. Si le nombre de TP augmente, on diminue le nombre de cours ou de travaux dirigés. Est-ce que dans ce cas-là, l'ITC a prévu suffisamment de budgets pour cela? Je ne comprends pas très bien cette démarche.

**SE le Dr. PO Kimtho, directeur de l'ITC**

Merci madame la présidente. Permettez-moi de l'expliquer en anglais. Regarding the cost of consommables, for the Foundation Year, as well as for the Chemical Engineering, we use a lot of consommables. When we increase the number of TP, we expense a lot money. So that why, one part, we use ITC's budget, the second, we must deal with developpement partners. For example, with the World Bank, with ADB. We planned some budget for buying some consommables. We can not use our budget to support this kind of activities. So, this is the way we try to use complement. For example, currently, I also would like to inform you that for Associate Degree as well, we try to increase the number of pratical works. So, when we are thinking to provide more skills to the students through the experiements, the cost also increases. We must keep our standard as well. For the experiment, we keep 25 students per class, but for tutoring, the number of students is 50 or 100. We are concerned about this. Thank you.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration de l'ITC**

Je voulais préciser que comme a mentionné monsieur le directeur, dans le département de génie chimique et alimentaire, il y a beaucoup de projets. Pour ce faire, tant d'expérimentations sont effectuées, ce qui entraine, selon monsieur le Directeur, le recours à d'autres sources de financements (ADB, World Bank, AFD...) pour l'achat des consommables.

Au niveau des laboratoires, nous avons nos partenaires comme l'Institut Pasteur du Cambodge et le laboratoire du ministère de l'Intérieur pour ce qui touche les drogues.

**Dr. IN Sokneang, doyenne de la faculté de génie chimique et alimentaire**

Comme Madame la Présidente l'a souligné, nous travaillons avec l'Institut Pasteur du Cambodge, le ministère de l'environnement, et aussi avec le secteur privé comme Bodia, la société française qui produit des produits cosmétiques au Cambodge, Phnom Penh Media Co., Ltd. (PPML). Cependant, le centre que vous avez cité, monsieur VALLEE Thomas, nous n'avons pas le contact. Si vous l'avez, je vous remercie de me le passer. On souhaite développer ce programme et qu'il soit connu de nombreux partenaires.

Pour madame Adèle MARTIAL, on n'a pas ajouté la chimie de la nutrition. Si l'on peut en discuter, ce serait mieux. Certains cours seront supprimés : pétroleum par exemple. On peut les remplacer par les cours qui sont liés aux aliments, a recommandé Sylvie AVELLONE. Merci.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration**

Merci. Qui peut expliquer la différence en termes de durée de 4 ans et de 5 ans, en ce qui concerne Bachelor Engineering à l'ITC?

**Dr. OEURNG Chantha, directeur adjoint**

Good morning, Madam president and good morning, ladies, and gentlemen. After the presentation about curriculum modifications on adding some more courses, for example, wastewater treatment, solid waste. I think I would suggest discussing with Dr. CHHUON Kong, because the Department of environmental Engineering is in his faculty. So, to avoid duplicating some course, because like water environment, solid waste, they are in the department of environmental engineering. So, we buy side as you know, that it also inside a gram of vitamin holes in the wing and of quantity of water is from. So, please discuss together how to differentiate the two programs. Otherwise like you have water wastewater treatment in GCA, and also in GRU. So, please try to specify, for example, what are the technical course that can be useful, for example, in material science, Food science or industrial science apart, like chemical contaminant in industry, something like that. That is useful for improving Agro processing, also pigsties. Also, in Industry Materials. So, I would strongly suggest to other department of chemical engineering, focus on that aspect for environment part, just that's going to discuss with Dr. IN Sokneang.

**Dr. HAN Virak, doyen de la faculté de génie civil**

L'autre programme en bachelier en Construction Management and Infrastructure est un programme inscrit dans le projet de la Banque Mondiale et nous avons Curtin University d'Australie comme partenaire et un partenaire thaïlandais. C'est un programme est prévu pour une durée de 4 ans. C'est différent par rapport au programme actuel qui dure 5 ans, intitulé le Diplôme d'ingénieur. Malgré tout, quel que soit la durée, l'essentiel est que le programme soit conforme aux critères déterminés par le ministère de l'éducation, de la jeunesse et des sports. Je vois que c'est avantageux du fait que cela convient aux normes dans les pays de l'ANASE. Pour passer aux études de Master, il faut 1 an pour les ingénieurs et 2 ans pour les bacheliers. La mise en place de ce système permettra à l'ITC d'avoir une reconnaissance à l'échelle de l'ANASE.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration**

Merci pour l'explication. Mais soyons attentifs et clairs là-dessus. Notre but, ce n'est pas d'avoir beaucoup d'étudiants. De toute évidence, nous devons garder le principe. Lequel va-t-on choisir maintenant? Nous, on a la formation des ingénieurs d'un cursus de 5 ans et maintenant, vous créez un autre programme de bachelor of engineering aussi pour un cursus seulement de 4 ans. Ce nouveau programme rend notre programme de la formation des ingénieurs problématique. Pour moi, 4 ans ou 5 ans, ça ne me gêne pas mais il ne faut pas avoir deux diplômes similaires dans le même établissement. Si l'on met cette formation, tout le monde choisit d'étudier en 4 ans et non pas 5 ans. Le problème est là. Je recommande à la direction de revoir bien cette problématique. Avec n'importe quel partenaire Banque Mondiale ou Banque Asiatique de Développement, si cela nuit au principe actuel qui existe depuis des années et des années. Si vous l'acceptez, il faut tout changer, y compris aussi le Tronc Commun. On ne peut pas accepter « Bachelor Engineering » de 4 ans et « Diplôme d'ingénieur » de 5 ans sous le même toit de l'ITC.

**Dr. SIM Tepmony, directeur de l'école doctorale**

May you permit me to express my opinion on this? I think ITC should consider this seriously. We should create something like, if I remember in École Polytechnique, they create something like international program also. So, they have four years, I think the same thing. And for ITC, we have to distinguish really the level of international Bachelor of engineering, we call international. So, I think the criteria for admission should be well define. The English language is very important. And

if I compare the volume of the language in the current program French and English, it shares around 500 hours. So, please correct me if I'm wrong. I don't have the correct statistic, but 500 hours, if we consider it's almost One year, it's almost one year. So, please, reconsider that.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration**

I suggest a discussion first between you, within the direction Board. But despite everything, two similar systems, one 4 years old and the other 5 years old in the same ITC, it does not work at all. I recommend stopping talking about it and giving time to other presentations. I will ask now the presentation from the Department of de geotechnical and georessource Engineering (GGG). The floor is yours now.

*Dr. ENG Chandoeurn, doyen du Département de Génie Géotechnique et Géoressource présente la synthèse de son département*

*Dr. CHHUON Kong, doyen de la faculté d'hydrologie présente la synthèse de son département*

*Dr. CHRIN Phok, chef du département de Génie Électrique et Énergétique présente la synthèse de son département.*

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration**

Voilà encore trois présentations sont faites. Avez-vous des commentaires ou remarques?

**M. Thomas VALLEE, attaché de coopération scientifique et universitaire**

Merci madame la présidente. J'ai trois remarques pour chacun des départements. La première concerne la séparation géotechnique et géoressource. Que faites-vous pour les étudiants en transition? Les étudiants en troisième, quatrième et cinquième année, comment ils choisissent leur département? Concernant le bachelor Degree on sustainable Business, je n'ai pas vu dans l'équipe pédagogique, les professeurs et les enseignants chercheurs en science de la gestion et en économie. D'où viendront ces compétences? Je me demande si l'ITC ne devrait pas renforcer les cours en management et en sciences de l'économie. Pour le département de GEE, je sais que l'Université Nationale de Battambang a créé un nouveau département de génie électrique et automation, je voulais savoir s'il y avait un nouveau partenariat qui allait se monter en collaboration avec la NUBB.

**M. Thibaut Skrzypek, coopération internationale de l'École Nationale des Ponts et Chaussées**

Merci madame la présidente. J'ai une remarque concernant la segmentation de Bachelor of Engineering et Diplôme d'ingénieur. On a exactement la même problématique dans mon établissement français. Bien sûr, il y a des opportunités qui émergent du marché international...

La première analyse qui pourrait vous intéresser. D'abord, à quelle clientèle s'adresse votre diplôme, votre formation? Vous avez, monsieur SIM, le Bachelor Engineering de l'École Polytechnique, c'est pour une clientèle internationale bien payante.

La deuxième analyse, c'est le système d'accréditation et de titre. Pour les pays anglosaxons, ils ont leur propre système et les pays francophones leur propre système aussi. Le fait d'utiliser le mot ingénieur est facile mais il ne faut pas que ce soit partout, sinon cela provoque une confusion. Ce mot INGENIEUR peut être utilisé, à condition que la formation soit une durée de Bac + 5 ou Bac +6.

La troisième, c'est le modèle financier. Dans notre établissement, le budget public qui nous accorde, c'est pour former des ingénieurs scientifiques et techniques. Pour les autres, programmes, débrouillez-vous. Il faut que ce soit équilibré et ça vous rapporte de l'argent.

J'ai une autre remarque concernant le cours d'entrepreneuriat qu'un département souhaite ajouter, en se basant sur les anciens étudiants qui en font partie. À ce sujet, je pense que c'est important que ce soit intégré, transversal pour que les étudiants de différents cursus et départements puissent en profiter.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration**

Merci beaucoup. Cela me préoccupe, en termes du titre de diplôme. Pour l'instant, l'ITC est doté de diplôme d'ingénieur, le Diplôme Universitaire de Technologie et le Bachelor Engineering pour la formation continue dont chacun a sa durée. Et maintenant, le même nom de Bachelor Engineering sera créé en plus, c'est exactement le même nom que le diplôme de la formation continue dans le même établissement. En termes de reconnaissance juridique, les statuts de l'ITC restent encore tels quels. Cela monte au ministère de l'éducation, de la Jeunesse et des Sports et au ministère de la Fonction Publique aussi. Si cela ne fait pas partie de nos statuts et que le ministère de l'économie et des finances, le ministère de l'éducation, de la jeunesse et des sports et le ministère de la fonction publique ne le reconnaît pas, c'est un grand problème.

Si le ministère de la fonction publique nous demande, madame, comment vous rénumérez ces gens-là? Je ne les vois pas dans votre statut que vous nous avez déposé. Que se passe-t-il à ce moment-là? C'est ça, la question. Je demande donc aux chefs de département de ne pas aller trop vite. Finalement, c'est la direction qui en est responsable.

Oui, une autre chose. Avant de mettre en place, un nouveau cours sur le marketing pour les ingénieurs, par exemple. C'est important que ce soit transversal. Il ne faut pas que ce soit créé uniquement pour un département. C'est un principe de base auquel c'est important d'y réfléchir.

**M. SOY Ty, directeur adjoint**

Pour répondre à la question de M. Thomas VALLEE, en ce qui concerne les deux options de GGG; je peux vous dire qu'elles ne concernent que les nouveaux étudiants et pour les étudiants dont leurs études sont en cours, ils ne sont pas concernés. Ils étudient comme si le département restait tel quel. Sachant que si nous avons l'avais favorable du CA, nous organisons les séances d'orientation à tous les étudiants concernés et intéressés pour qu'ils soient prêts pour la nouvelle année scolaire.

**Dr. CHRIN Phok, chef du département de Génie Électrique et Énergétique**

For the second question of Mr. Thomas VALLEE, in fact, we have a partnership with the National University of Battambang. We are involved for creating together the programs for electrical et automation engineering. It is important that this program addresses the needs of students who live around Tonle Sap Lake.

**M. Ludovic PROTIN, directeur honoraire de l'ITC**

Oui, c'est un complément. Par rapport à ce que Mme Sackona disait, le statut de l'ITC est un élément consultatif. Le Consortium fait une proposition au CA et c'est le CA qui décide en se basant sur le statut bien évidemment.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration**

Merci. J'en profite pour vous partager de mon expérience quand j'étais secrétaire d'État au ministère de l'éducation, de la jeunesse et des sports. À ce moment-là, il y avait beaucoup de diplômes Master et Doctorat devant de différentes universités privées. Le ministère de l'éducation

ne les reconnaissait pas. Alors, le problème se posait. Il fallait tout revoir de A à Z. Vous voyez, c'était compliqué.

Encore une fois, les documents reliés à l'ouverture d'un nouveau département, d'une nouvelle faculté doivent être prêts et soumis aux ministères concernés pour qu'ils soient reconnus officiellement. Ça, c'est fondamental. J'attire votre attention à ce sujet. Cependant, je souhaite qu'il y ait une réunion interne en vous référant aux expériences et expertises de nos partenaires français, belges, japonais...mais c'est important aussi que cela convienne aussi à la situation réelle du Cambodge.

Vous avez de la chance d'avoir des collègues de l'ITC formés dans plusieurs pays, de Thaïlande, de l'Europe de l'Est, de Malaisie, du Japon, des Philippines...Mettez-vous à table et faites une vive discussion pour avoir un consensus. Sinon, les étudiants diplômés n'ont pas de diplôme.

Bien, on va continuer. Je laisse la parole à Dr. SRENG Sokchenda, chef du département de génie de Télécommunications et Réseaux.

*Dr. SRENG Sochenda, chef du département de génie de Télécommunications et Réseaux présente la synthèse de son département.*

*M. LAY Heng, chef de département de génie informatique et communication présente la synthèse de son département*

*Dr. LIN Mongkulserrey, chef du département des sciences des données présente la synthèse de son département*

*Dr. CHAN Sarin, chef du département de génie industriel et mécanique présente la synthèse de son département*

**M. YINDIZOGLU Murat, conseiller du MEJS**

Thank you very much. I have a similar question with Engineering field. I don't see much documents in the report. Could you add more information about that?

**Dr. LIN Mongkulserrey, chef du département des sciences de données**

Initially, when we established our program with our partners, we proposed two options. One is data science and the other financial engineering. But based on our human resources, we can start only one program: Data Science. To ensure that our program is supported and formalized, we have invited the representative of the department of higher education to come and help us.

We have planned for the next two years, with the return of staff from partner universities, we can start another Financial Engineering option. That's why you only see one option in the document.

**M. Thomas VALLEE, attaché de coopération scientifique et universitaire**

In my opinion, it is important to clearly specify what graduates can do at the end of their studies in the private and public sector.

**Dr. LIN Mongkulserrey, chef du département des sciences des données**

In this regard, students can work in areas that affect computer science, artificial intelligence and we have planned to invite speakers with private sector experience to conduct conferences and share their experiences in terms of data sciences to students from the 3rd year.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration**

Thank you very much for the last presentation of department of Data Science.

**M. Ludovic PROTIN, directeur honoraire de l'ITC**

Juste une petite remarque, rapidement. Souvenez-vous il y a quelques années, les étudiants se plaignaient du nombre d'étudiants dans la classe, à cause du manque d'enseignants. Mais depuis

lors, la direction a pris en considération ce problème-là et on ne l'entend plus maintenant. De plus, tous les départements mettent au premier plan la qualité de la formation, en planifiant le recrutement des enseignants, la construction de nouveaux bâtiments. Il s'agit d'une qualité de la formation préventive. Une chose remarquable au Cambodge, c'est que les meilleurs étudiants qui sont partis en formation de master et doctorat à l'étranger reviennent. C'est pas tout à fait le cas ailleurs.

Un seul département pour lequel le problème de recrutement qui se pose, c'est le GIC. Depuis mon époque, il existe toujours une pression de l'extérieur. On propose un salaire trois fois plus élevé que le salaire de l'ITC au chef de ce département et aux enseignants de ce département. C'est pas la faute de ce département, ni la faute de la direction. C'est le besoin du marché. On pourrait donc demander au chef de département et aux enseignants de résister à cette pression de l'extérieur.

C'est une réflexion qui vous permettra d'y réfléchir pour mieux gérer ce département.

**M. Frank TOUCH, ancien fondateur de l'entreprise KhmerDev et partenaire fidèle et historique du département GIC de l'ITC**

Merci M. Ludovic Protin d'avoir soulevé le département GIC qui se met en situation de concurrence dont je fais partie. Je connais bien le secteur privé au Cambodge. Je suis le partenaire le plus fidèle à ce département depuis plus de 20 ans. Je vois un développement remarquable de ce département malgré cette pression extérieure. J'ai de belles choses dans ce département. Je reste toujours à la disposition de ce département voire de l'ITC, en termes de recherche de partenariat ou de conseil.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration**

Merci beaucoup. Résister à cette pression de l'extérieur, c'est pas facile.  
Bon, maintenant, nous passons aux trois dernières présentations.

**M. YILDIZOGLU Murat, conseiller du MEJS**

I have a remark regarding Industrial Engineering and Supply Chain Management. I think you contacted some companies. Have you visited some companies already? Have you met people who have sufficient skills to help you teach in English this area of Supply Chain Management?

**Dr. SRANG Sarot, coordinateur du programme international de l'ECAM LaSalle à l'ITC**

Thank you for comment and question. Actually, we have approach to contact some companies as well. The thing is, they might like an hour or two, something like that, but still not enough. They don't have time to prepare such a long lecture, especially they should know that people don't have much time. So, it's a bit difficult to help them.

**M. Thomas VALLEE, attaché de coopération scientifique et universitaire**

Madam President. To complete, just after my previous remark, I think that ITC deserves to have permanent lecturers in finance, economic because more and more, ITC needs them to teach courses as Supply Chain Management or Financial Engineering. I think that to ensure good quality teaching, it is necessary to have enough teachers who are specialist of the domains.

In terms of research, I would like to congratulate the increase in the number of international publications. Congratulations to the research team.

**M. Bruno DAGUES, conseiller de la direction de l'ITC**

Je crois que notre collègue du RIC n'a pas assez de temps pour s'exprimer même il a passé pas mal de temps. On peut la structuration de recherche à l'ITC et aujourd'hui, ça rapporte ses fruits. C'est bien visible.

Je voudrais revenir sur les événements qui ont eu lieu à l'ITC tous les ans. Il y a des événements majeurs comme réunion de Consortium, ce que nous sommes en train de vivre et on voit l'importance de cet événement. Il y a aussi le Conseil d'Administration qui s'organise à l'ITC tous les ans. Cette année, j'ai la chance de revivre le concours d'entrée à l'ITC. On peut le considérer comme événement majeur aussi. Un autre événement majeur également, c'est l'organisation de la journée scientifique de l'ITC qui va avoir lieu au mois de juin prochain. J'en profite pour vous lancer des appels à communication pour cette manifestation scientifique importante en juin 2023, à nos partenaires français, belges, américains, thaïlandais, japonais etc., surtout pour les universités partenaires de l'ITC qui accueillent nos enseignants, nos chercheurs. Cette journée scientifique est aussi un moment pour montrer l'internationalisation de la recherche à l'ITC par le biais de publications. Il s'agit de la 12ème Édition de la journée scientifique, si je ne me trompe pas. On voit chaque année accroître les publications conjointes, même si la date limite est passée, c'est pas grave. Je crois que notre collègue Channoly pourra faire des efforts pour revoir les articles. Merci.

**S. E. Mme PHOEURNG Sackona, Ministère de la Culture et des Beaux-Arts et Présidente du Conseil d'Administration**

Madame la Présidente tient à remercier grandement tous les membres du Consortium international et les partenaires de l'ITC pour leur participation très active et leur contribution fructueuse pour les discussions enrichissantes dans les départements respectifs de l'ITC.

Certes, on voit clairement une augmentation du nombre des ressources humaines qualifiées de l'ITC. C'est un progrès qui mérite d'être félicité. C'est grâce à la bonne coopération avec les universités, les institutions publiques et privées, la banque Asiatique de Développement, la Banque Mondiale... Cette harmonisation des ressources humaines et des infrastructures permet à l'ITC de se développer.

De toute évidence, les modifications ont été bien abordées dans les départements respectifs avec bien sur la participation de nos partenaires internationaux. Par exemple, l'augmentation des travaux pratiques et les moyens qui les accompagnent adéquatement.

On voit également l'importance de rendre certains cours accessibles à la majorité des étudiants de différents départements.

La compétence transversale nous préoccupe comme toujours. Chaque année, elle est soulevée. C'est pas facile à cet égard même à l'époque où j'étais directrice de l'ITC. Pour y remédier, il me semble que l'on fait appel à toutes les personnes et les entreprises compétentes afin de renforcer cette compétence auprès de nos étudiants, KhmerDev par exemple.

La mise en place du département des sciences de données pour répondre d'urgence au besoin du marché actuel. C'est une bonne chose.

L'ambiguïté des noms de formation, de diplôme nécessite une réunion pour revoir les détails dans le cadre du respect de statut et de règlement intérieur de l'ITC. La réunion est prévue le 3 avril 2023. Ce n'est pas interdit mais il faut tout bien préparer pour éviter des problèmes éventuels dans le futur.

Le titre Professeur émérite sera aussi discuté le 3 avril 2023, pour bien préparer les documents à soumettre au ministère de l'éducation.

Je reprends également ce que monsieur le Conseiller a mentionné tout à l'heure, les appels à communication pour la journée scientifique en juin 2023. C'est accessible à tous, localement et internationalement. Soyez en informés et venez nombreux !!!



Ce compte-rendu sera envoyé à tous les membres du Consortium pour relire et modifier si nécessaire. S'il n'y pas de retour, cela veut dire que vous êtes d'accord avec ce qui est dit et nous allons le soumettre au CA en juin 2023.

Chers collègues, comme le mandat du Consortium arrive à sa fin, c'est le temps de le renouveler pour une durée de 5 ans de plus, soit 2023-2028. Vous pourriez donc demander à votre établissement de nous envoyer sa lettre de candidature pour ce nouveau mandat et c'est le CA qui va le valider.

Un autre point, c'est la nomination du/de la représentant/e du Consortium au CA. Nous proposons encore madame Adèle MARTIAL. Je vois que tout le monde est d'accord, Madame. Vous êtes donc la représentante du Consortium 2023 au CA.

J'en profite pour exprimer mes remerciements aux collègues qui ont participé à plusieurs activités de l'ITC, surtout aux réunions du Consortium et qui doivent partir à la retraite ou dans d'autres missions dans d'autres endroits. I would like to thank Madam Siree Chaiseri, Mr. Thomas VALLEE for your contribution to the development of the ITC. The young leaders of the new generation of ITC cannot forget you and we wish you good luck for your new mission. On behalf of Dr. PO Kimtho and as president of Board of Trustees of ITC, I would like once again to express my sincere thanks to all members dans distinguished participants for your active participation and valuable contributions to the great success of this Consortium 2023 and, as you know, ITC is open to all of you. According to Cambodian tradition, when you come, you knock on the door, and it opens for you.

Le tableau suivant récapitule tous les points abordés après la discussion et la présentation de tous les responsables de départements.

No	Avis du Consortium 2023	Favorable
1	Renforcer les compétences transversales en développant des relations avec les partenaires publics et privés et les Alumni etc.	X
2	Une réunion d'urgence au sein de l'ITC pour revoir les statuts, les noms des diplômes qui sont offerts aux étudiants issus de leurs formations à l'ITC.	X
3	La possibilité de donner le titre « professeur émérite » aux professeurs de l'ITC.	X
4	Augmenter le nombre d'heures de travaux pratiques	X
5	Essayer de rendre transversales un certain nombre de formations	X
6	Bien promouvoir les nouvelles matières à travers les séances d'orientation : Data Science, par exemple	X

## Proposition d'option internationale à l'ITC selon la réunion du 3 avril 2023

*Demande de l'avis des membres du Consortium 2023 : Veuillez donner votre avis sur cette proposition (une semaine après avoir reçu cette proposition).*

Participants :

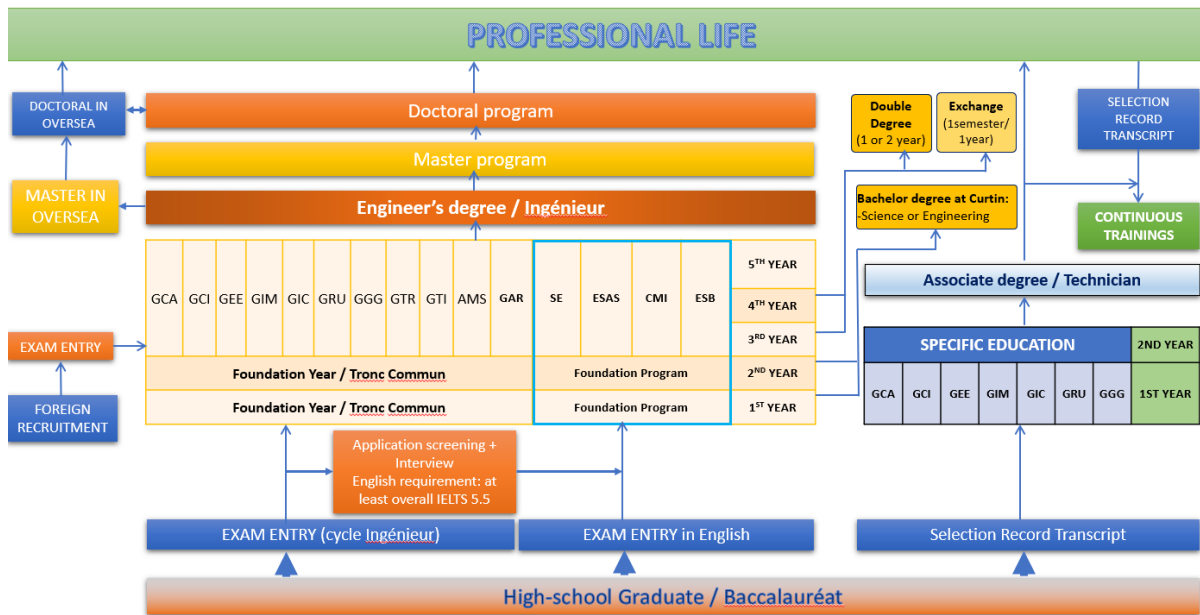
- 1) SE Madame PHEOURNG Sackona, Présidente du Conseil d'Administration
- 2) SE Monsieur PO Kimtho, Directeur de l'ITC
- 3) M. SOY Ty, Directeur adjoint
- 4) M. NGUON Kollika, Directeur adjoint
- 5) M. NUTH Sothan, Conseiller
- 6) M. AM Sokchea,
- 7) M. SRANG Sarot

Après avoir discuté, l'option internationale à l'ITC est proposée avec les critères suivantes :

- **Mode de recrutement** : il y a deux possibilités pour les candidats qui souhaitent intégrer dans les programmes internationaux :
  1. Concours d'entrée commun avec le recrutement du cycle d'ingénieur actuel. C'est-à-dire le mode de recrutement, la date, les horaires et les sujets du concours sont les mêmes mais en anglais.
  2. Ceux qui sont passés le concours du cycle d'ingénieur actuel peuvent aussi transférer aux programmes internationaux si il peuvent passer des critères (forme d'application, niveau d'anglais, interview, ...).
- **Durée** : Pour l'homogénéité de tous les programmes d'ingénieur à l'ITC, La durée d'études des programmes internationales est de CINQ ANS qui compose de deux ans du tronc commun et trois ans de la formation spécialisée (voir le schéma en annexe).
- **Tronc commun** : Deux ans du tronc commun en anglais qui suivent les documents législatifs au Cambodge et aussi s'adaptent aux besoins des partenaires pour les programmes en double diplomation. Après avoir fini un ou deux ans du tronc commun à l'ITC, les étudiants ont deux voies de continuation :
  1. Continuer avec les programmes à l'ITC.
  2. Intégrer dans les universités partenaires sous réserve de passer tous les critères demandés.
- **Spécialité** : Trois ans de la formation spécialisée. Quatre programmes internationaux proposés et gérés par les départements suivants :
  1. Software Engineering (SE), géré par le département de génie informatique et communication (GIC).
  2. Construction Management and Infrastructure (CMI), géré par la faculté de génie civil (GCI).
  3. Electronics and Smart Automation System (ESAS), géré par la faculté de génie électrique et énergétique (GEE).

4. Engineering and Sustainable Business (ESB), géré par la faculté de l'hydrologie et des ressources en eau (GRU).

- Le détail de chaque programme se trouve dans les annexes 9, 10, 11 et 12 du rapport Consortium 2023 – Perspective et Stratégie (A partir du page 76).
- **Le diplôme obtenu de l'ITC : Diplôme d'ingénieur**
- **Schéma de l'option internationale à l'ITC (SE, ESAS, CMI, ESB)**



### Annex 3. Overview of Decision of CA 2022 and Recommendation of Consortium 2023.

No	DECISION DU CA 2022	2022-2023
1	Demander le grade « Professeur Émérite » à la direction de l'ITC pour les grandes personnalités et les professeurs qui ont beaucoup travaillé pour le développement de l'ITC et ils vont partir à la retraite	En réalisation
2	La mise à jour du cursus de master génie de l'eau et de l'environnement (École doctorale)	Réalisé
3	La mise à jour du cursus de master génie agro-industriel	Réalisé
4	La mise à jour du cursus de master Génie de technologie et de gestion de l'énergie (École doctorale)	Réalisé
5	La mise à jour du cursus de master génie mécatronique, informatique et communication (École doctorale)	Réalisé
6	Demander de modifier le curriculum du programme de Télécommunications et Réseaux (Département GTR)	Réalisé
7	Ouverture du Département du Génie des Transports et des Infrastructures (GTI)	Réalisé
8	GIC update the curriculum of year 3, 4 and 5 to adapt to the change of the program in 2 <sup>nd</sup> year for students who choose to study in GIC, GTR, Data Science, in the future (GIC)	Réalisé
9	GGG updates the curriculum of year 3 for two courses on "Oremicroscopy" and "Petrology and Mineralogy". These courses will be combined to increase the practical work, which can fulfill in the industry needs. Moreover, this course is the main core for the field mineral exploration and exploitation (GGG)	Réalisé
10	GGG updates the curriculum of year 4 for five courses on "Geophysics => added the TP class", "Rock Blasting Techniques => added TD class", "Mineral Exploration => added TD class", "Basic Geological Mapping => added TD class", "Mineral Characterization => removed this course due to the course of mineral exploration is covered this content already". The purpose of modified is to fulfill the requirement of current job market needed, especially in the field Mining, which is rapid growth in late 2021 (GGG)	Réalisé
11	GRU requested to modify the course "Construction of Rural Road" to "Road Engineering and Construction" for improving competent of student to meet the need of job market (GRU)	Réalisé
12	GRU will work on the Technician program in order to modify the program for a specific skill need on Water Supply and setup water supply laboratory with support from Shanghai Micro Purification Co.,Ltd (GRU)	En réalisation
13	GRU will implement the Water and Environment Oriented Living lab by creating on more lab called "Coastal and Wetland Environmental Research Lab". The students and lecturer will do the real-life water demo sites and creating a multi-stakeholder virtual network (GRU)	En réalisation
14	Propose to establish the Cambodia Coastal Research Center. The detail structure, vision, mission, stakeholders, researcher and source of fund will be submitted in next consortium 2023 (GRU)	En réalisation

15	<p>ITC is planning to launch 1year International Pre-degree Foundation Programs of Curtin in Oct 2022 at ITC and students could continue their undergraduate study for both Engineering (+4years) and Science (+3years) at any Curtin campus upon this foundation program completion.</p> <p>The pre-degree foundation program was established by technical assistant from both Curtin Perth, Australia and Curtin Malaysia under Higher Education Partnership Program of HEIP. The Establishment of Pre-degree Foundation Program in Eng. and Science will meet the Curtin's undergraduate entry requirement at any Curtin campus (International Program)</p>	<p>En réalisation (2023-2024)</p>
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<b>No</b>	<b>Avis du Consortium 2023</b>	<b>Favorable</b>
<b>1</b>	Renforcer les compétences transversales en développant des relations avec les partenaires publics et privés et les Alumni etc.	<b>X</b>
<b>2</b>	Une réunion d'urgence au sein de l'ITC pour revoir les statuts, les noms des diplômes qui sont offerts aux étudiants issus de leurs formations à l'ITC.	<b>X</b>
<b>3</b>	La possibilité de donner le titre « professeur émérite » aux professeurs de l'ITC.	<b>X</b>
<b>4</b>	Augmenter le nombre d'heures de travaux pratiques	<b>X</b>
<b>5</b>	Essayer de rendre transversales un certain nombre de formations	<b>X</b>
<b>6</b>	Bien promouvoir les nouvelles matières à travers les séances d'orientation : Data Science, par exemple	<b>X</b>

#### Annex 4. Minutes of CEVU Meeting.

#### Problèmes soulevés pendant la réunion de CEVU (7 décembre 2022) et solutions

	Résolu pendant la réunion	Responsable sur problèmes restants	Date à résoudre
<b>I- Enseignement et recherche</b>			
<b>1- Enseignement scientifique</b>			
<b>I3-GCA</b> Manquer des matériels pour les TPs.			Janvier 2023
<b>I5-GCA</b> : Des ordinateurs dans la salle B-219 ne fonctionnent pas bien.		Service informatique	Décembre 2022
<b>I4-GEE</b> : Demander le support pour la visite de terrain.	√		
<b>I5-GEE</b> : La salle de TP est trop petite par rapport au nombre d'étudiants.	√		
<b>I3-GTI</b> : Manquer des documents scientifiques pour les étudiants de transport.	√		
<b>2- Internet et e-learning</b>			
<b>I1-DTC, I3-GEE, I5-GRU, T1-GCI, I3-GCI, I5-GCI, I3-GIM, I5-GIM, I3-I4-I5-GTR</b>			
- L'internet est lent et quelques fois pas de connexion.		Service informatique	Janvier 2023
<b>II- Matériel et hygiène</b>			
<b>Etudiants, Enseignants</b>			
- Réparer le ventilateur et les ampoules dans les salles A-311, A-312, A-420, F-402.		Service Technique	Déc. 2022 au jan. 23
- La fuite d'eau dans les salles E-304, F-304, F-305.			
- Installer les rideaux dans les salles de cours du bâtiment I.			

- LCD dans les salles S1, S2, F-403, F-401, E-201 ne fonctionnent pas bien.		Service Informatique	Déc. 2022
- Proposer le microphone pour les grandes salles.		Service Informatique	Déc. 2022
- Proposer de nettoyer les salles de cours et aussi des salles de professeur.	√		
<b>III- Parking</b>			
<b>Etudiants de tous les départements :</b>			
- Proposer de fixer le prix de parking à 500 Riels.	√		
- La politesse des personnels de parking.	√		

## Annex 5. List of Lecturer and Supervisors of GS for Master Programs.

### List of Lecturers and Supervisors of M-MSE

No	Name of Lecturer	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	CHHANG Sophy	M	Doctorate	France	2018	Civil Engineering
2	DOUNG Piseth	M	Doctorate	Japan	2020	Civil Engineering
3	ENG Chandoeun	M	Doctorate	Japan	2018	Geophysics
4	HAN Virak	M	Doctorate	Japan	2006	Construction Materials
5	HIN Raveth	M	Doctorate	France	2017	Mechanics of materials
6	KAN Kuchvichea	M	Doctorate	Belgium	2020	Geomchanics
7	KY Sambath	M	Doctorate	France	2017	Civil Engineering
8	LIM Sovanvichet	M	Doctorate	France	2013	Civil Engineering
9	POUV Keang Se	M	Doctorate	France	2011	Fluides mechanics
10	PROK Narith	M	Doctorate	Japan	2016	Civil Engineering
11	RATH Sovann Sathya	F	Doctorate	Japan	2016	Civil Engineering
12	SENG Sochan	M	Doctorate	Japan	2012	Civil Engineering
13	SEANG Chansopheak	M	Doctorate	France	2013	Mechanical Engineering
14	SIV Easeng	M	Doctorate	France	2019	Material Sciences
15	SRY Vannei	M	Doctorate	Japan	2018	Mechanical Properties of Materials
16	YOS Phanny	M	Doctorate	Japan	2014	Material Engineering

### List of Lecturers and Supervisors of M-ETM

No	Name of Lecturer	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	OR Chamoly	M	Doctorate	Japan	2014	Petroleum Production Engineering
2	ENG Chandoeun	M	Doctorate	Japan	2018	
3	Dr. NGOUN Kollika	M	Doctorate	Indonesia	2018	Mechanical Engineering
4	VAI Vannak	M	Doctorate	France	2017	Electrical Engineering
5	AM Sokchea	M	Doctorate	France	2016	Electrical and Energy Engineering
6	VONGCHANH Kinnaleth	F	Doctorate	Indonesia	2010	Engineering in Mechanical Engineering
7	CHAN Sarin	M	Doctorate	Indonesia	2011	Refrigeration and Air Conditioning
8	KHON Kimsorn	M	Doctorate	France	2022	Energy
9	Dr. CHRIN Phok	M	Doctorate	France	2016	Electrical and Energy Engineering
10	KIM Bunthern	M	Doctorate	France	2017	Electrical Engineering
11	BUN Long	M	Doctorate	France	2012	Energy
12	KRET Kakada	M	Doctorate	Japan	2019	Exploration Geophysics
13	Mr. CHHENG Monyvathna	M	Master	Philippine	2015	Electrical Engineering
14	Mr. SEAN Piseth	M	Master	Thailand	2009	Electrical Engineering
15	ENG Samphors	F	Master	Indonesia	2018	Electrical Engineering
16	ETH Oudaya	M	Master	France	2016	Electrical Engineering
17	CHHLONH Chhith	M	Master	Indonesia	2019	Electrical Engineering



### List of Lecturers and Supervisors of M-WEE

No	Name of Lecturer	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	TAN Reasmey	F	Doctorate	Japan	2011	Bio-engineering
2	KET Pinnara	F	Doctorate	Belgium	2019	Agricultural Science and Biological Engineering
3	OEURNG Chantha	M	Doctorate	France	2010	Hydrology and Water Resources
4	SOY Ty	M	Master	Belgium	2004	Soil Mechanics
5	ANN Vannak	M	Doctorate	Spain	2015	Water Science and Technology
6	VENG Huor	M	Master	Belgium	2001	Fluid mechanics
7	LUN Sambo	M	Master	Japan	2010	Environmental Engineering
8	OUCH Rithy	M	Doctorate	Thailand	2016	Geo Environment
9	HAK Danet	F	Doctorate	Japan	2016	Mechanical and Environmental Informatics, Environmental Engineering
10	HENG Sokchhay	M	Doctorate	Japan	2014	Water Resources
11	DOUNG Ratha	M	Doctorate	Philippines	2015	Environmental Engineering
12	TY Boreborey	F	Doctorate	Philippines	2016	Groundwater treatment process, Environmental Engineering
13	SONG Layheang	M	Doctorate	France	2021	Water Resources
14	SOK Ty	M	Doctorate	France	2021	Functional Ecology and Environment
15	CHHUON Kong	M	Doctorate	Philippines	2016	Environmental Engineering
16	PEN Sytharith	M	Doctorate	Japan	2018	Environmental Engineering
17	IN Sokneang	F	Doctorate	France	2012	Science and processes of Food and bio-products, Agriculture Biology Environment Health
18	SIM Tepmony	M	Doctorate	France	2016	Applied Mathematics, Signal and Image Processing
19	VONGCHANH Kinnaeth	F	Doctorate	Indonesia	2010	Engineering in Mechanical Engineering
20	THENG Vouchlay	F	Doctorate	Japan	2022	Civil and Environmental Engineering
21	SANG Davin	F	Doctorate	France	2022	Environmental Engineering
22	HEU Rina	F	Doctorate	Japan	2020	Civil and Environmental Engineering
23	BUN Saret	M	Doctorate	Japan	2019	Environmental Engineering

### List of Lecturers and Supervisors of M-AIE

No	Name of Lecturer	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	EK Pichmony	F	Doctorate	USA	2021	Food Science
2	TY Boreborey	F	Doctorate	Philippines	2016	Groundwater treatment process, Environmental Engineering
3	HOR Sivmey	F	Doctorate	France	2020	
4	SROY Sengly	F	Doctorate	France	2021	

5	PHAT Chanvorleak	F	Doctorate	South Korea	2016	Food Chemistry
6	MITH Hasika	M	Doctorate	Belgium	2014	Food Science
7	IN Sokneang	F	Doctorate	France	2012	Science and processes of Food and bio-products, Agriculture Biology Environment Health
8	YEOUN Sereyvath	M	Doctorate	South Korea	2014	
9	SOUNG Malyna	F	Doctorate	France	2017	Mécanismes des Interactions Parasitaires Pathogènes et Symbiotiques
10	MORM Elen	F	Doctorate	Belgium	2021	
11	KHOEURN Kimleang	F	Doctorate	Japan	2019	Sustainable Resources Engineering
12	PHAUK Sökkhey	M	Doctorate	Japan	2021	Interdisciplinary Intelligent Systems
13	PENG Chanthol	F	Doctorate	Japan	2019	Life Science and Technology
14	HOUN Peany	F	Doctorate	Japan	2019	Chemical Engineering

#### List of Lecturers and Supervisors of M-ECS

No	Name of Lecturer	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	VALY Dona	M	Doctorate	Belgium	2020	Science de l'ingénieur et technologie
2	KONG Phutphalla	M	Doctorate	Belgium	2021	Computer Vision and Engineering
3	TITH Dara	M	Doctorate	Japan	2020	Information Technology
4	PHAUK Sökkhey	M	Doctorate	Japan	2021	Interdisciplinary Intelligent Systems
5	MUTH Boravy	M	Doctorate	South Korea	2021	Nuclear Engineering
6	HENG Rathpisey	M	Master	Indonesia	2020	Electrical Engineering and Information Technology
7	TANN Chantara	F	Master	Cambodia	2010	Mathematics
8	CHAN Sophal	M	Master	Thailand	2020	Information Technology
9	PEN Chentra	M	Master	Cambodia	2011	Applied Mathematics
10	PHOK Ponna	M	Master	Cambodia	2010	Sciences in mathematics
11	TAL Tong Sreng	M	Master	Cambodia	2018	Information and Communication Technology
12	SOK Kimheng	M	Master	France	2008	Network System and Architecture
13	YOU Vandy	M	Master	India	2016	Computer Science

#### List of Lecturers and Supervisors of M-MIC

No	Name of Lecturer	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	IN Sokneang	F	Doctorate	France	2012	Science and processes of Food and bio-products, Agriculture Biology Environment Health
2	BUN Kimngun	M	Doctorate	Malaysia	2013	Materials Engineering

3	CHRIN Phok	M	Doctorate	France	2016	Electrical Energy
4	SRENG Sokchenda	M	Doctorate	France	2012	Telecommunications and Network
5	SIM Tepmony	M	Doctorate	France	2016	Applied Mathematics, Signal and Image Processing
6	AM Sokchea	M	Doctorate	France	2016	Electronics
7	TEP Sovichea	M	Master	France	2018	Telecommunication
8	VALY Dona	M	Doctorate	Belgium	2020	Science de l'ingénieur et technologie
9	THOURN Kosorl	M	Doctorate	Japan	2009	Electrical Engineering and Electrical Systems
10	CHHORN Sopheaktra		Master	Thailand	2018	Electronics - Bio-medical
11	KIM Bunthern	M	Doctorate	France	2019	Electrical Engineering
12	PEC Rothna	M	Doctorate	South Korea	2017	Electrical and Electronics Engineering, Communication and Signal Processing
13	CHIN Chandaraly	M	Master	Thailand	2016	Electrical Engineering – Telecommunication
14	SIV Easeng	M	Master	France	2011	Mécanique et Physique des Matériaux
15	NGUON Kollika	M	Doctorate	Japan	2012	Water Hammer, Fluid-Structure Interaction
16	LIM Sovanvichet	M	Doctorate	France	2012	Structural Engineering
17	SRY Vannei	M	Master	Indonesia	2011	Mechanical Engineering
18	CHHITH Saosometh	M	Master	South Korea	2010	Mechanical Engineering
19	SRANG Sarot	M	Doctorate	Japan	2014	Dynamical System Modeling, Estimation and Adaptive Control
20	SOUNG Malyna	F	Doctorate	France	2017	Mécanismes des Interactions Parasitaires Pathogènes et Symbiotiques
21	HIN Raveth	M	Doctorate	France	2017	Mechanics

### List of Lecturers and Supervisors of M-TIE

No	Name of Lecturer	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	BAN Sam	M	Master	Malaysia	2017	Mechanical Engineering
2	CHEA Savuth	M	Doctorate	France	2007	Highway Engineering and Design
3	HASH Chanly	M	Master	Japan	2008	Architecture, Urban and Regional Planning
4	HENG Sokbil	M	Doctorate	Japan	2011	Geotechnical Engineering
5	KAING Saoserey	M	Doctorate	France	2008	Bridge Engineering
6	LIM Iv	M	Doctorate	Japan	2007	Transport and Land Use Planning
7	LONG Borith	M	Doctorate	Japan	2014	Urban Transport Engineering and Planning
8	PHUN Veng Kheang	M	Doctorate	Japan	2013	Transport Engineering, Planning, Environment, and Policy
9	POUV Keang Se	M	Doctorate	France	2011	Fluids mechanics

10	RITH Monorom	M	Doctorate	Philippines	2019	Transport, Energy, and Policy
11	SAUM Narith	M	Doctorate	Thailand	2022	Transportation Engineering
12	SIM Tepmony	M	Doctorate	France	2016	Applied Mathematics, Signal and Image Processing
13	SRANG Sarot	M	Doctorate	Japan	2014	Dynamical System Modeling, Estimation and Adaptive Control
14	YEN Yat	M	Doctorate	China	2018	Urban Mobility and Sustainability

### List of Lecturers and Supervisors of M-DAS

No	Name of Lecturer	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	LIN Mongkolsery	M	Doctorate	Thailand	2014	Applied Mathematics
2	SIM Tepmony	M	Doctorate	France	2016	Applied Mathematics, Signal and Image Processing
3	PHAUK Sokkhey	M	Doctorate	Japan	2021	Interdisciplinary Intelligent Systems
4	MUTH Boravy	M	Doctorate	South Korea	2021	Nuclear Engineering
5	VALY Dona	M	Doctorate	Belgium	2020	Science de l'ingénieur et technologie
6	SRANG Sarot	M	Doctorate	Japan	2014	Dynamical System Modeling, Estimation and Adaptive Control
7	PEC Rothna	M	Doctorate	South Korea	2017	Electrical and Electronics Engineering, Communication and Signal Processing
8	HENG Rathpisey	M	Master	Indonesia	2020	Electrical Engineering and Information Technology
9	SOK Kimheng	M	Master	France	2008	Network System and Architecture
10	CHAN Sophal	M	Master	Thailand	2020	Information Technology
11	NHIM Malai	F	Master	Belgium		Biostatistics
12	TANN Chantara	F	Master	Cambodia	2010	Mathematics
13	PEN Chentra	M	Master	Cambodia	2011	Applied Mathematics
14	OL Say	M	Master	Philippines	2015	Cryptography
15	TOUCH Sopheak	M	Master	France	2015	Industrial Engineering
16	YOU Vanndy	M	Master	India	2016	Computer Science
17	TAL Tong Sreng	M	Master	Cambodia	2018	Information and Communication Technology

## Annex 6. List of Master Thesis.

(List arranged by degree, field/specialization, and chronological order)

### Master Program M-MSE

- KEO Pisey (2011). *Vérification de stabilité selon l'en 1993. Mise au point d'un logiciel d'application et d'abaques de dimensionnement*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- LIM Songly (2011). *Vérification de stabilité des poteaux hybride. Evaluation de l'applicabilité de l'eurocode 4 et de l'eurocode 2*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- REE Nim (2011). *Etude numérique du comportement des structures des chaussées pavées sous charges de trafic*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- HENG Soheat (2011). *Simulation expérimentale d'écoulement multiphasique dans les milieux poreux*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- Y Maneth (2011). *Simulation numérique de la modification du sol compressible environnant sous l'effet de la mise en place de colonnes balastées*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- KAN Kuchvichea (2012). *Simulation numérique du comportement hydro-mécanique des colonnes ballastées et du sol environnant*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- CHHENG Sochanavong (2012). *Réutilisation des sédiments de dragage dans la fabrication des écociments*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- SAYASANE Phettavanh (2012). *Intensification des échanges thermiques par l'utilisation de nanofluides à base de nanotube de carbone ntc/eau*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- HIN Sovannara (2012). *Modélisation de l'évolution de l'endommagement dans une poutre constituée de matériaux quasi-fragiles tel que béton*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- CHAO Ang Puth Both (2012). *Simulation numérique des écoulements et du transport granulaire sur les sols urbains-modèle de réseau de microcanaux*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- CHHORN Chamroeun (2012). *Valorisation de sédiments : l'influence d'un traitement thermique*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- PROK Narith (2012). *Influence de la pluie dans le transport de sédiment en ruissellement*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- EA Lysothearin (2012). *Recherche de la plus haute résistance du béton en utilisant des matériaux locaux (en province de Kompong Speu)*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- SOK Sim (2012). *Recherche de la plus haute résistance du béton en utilisant des matériaux locaux (en province de Siem Reap)*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- LIM Samreth (2013). *Contribution à la détection, à la localisation et au suivi, par méthode d'évaluation dynamique, de l'endommagement des câbles du génie civil*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- HENG Piseth (2013). *Développement d'un modèle (simple et multi-ddl) d'un poteau soumis à une charge du type impact (véhicule, projectile)*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- DIM Sreyleak (2013). *Etude numérique du comportement de poutres de couplage*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- HUOT Makara (2013). *Caractérisation et modélisation du comportement mécanique d'un alliage binaire titane-molybdène*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- KAN Soheat (2013). *Simulation numérique du comportement mécanique des structures de chaussées pavées*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

- LAN Rathanak (2013). *Etude des échanges thermiques dans les échangeurs thermiques et microcanaux par l'utilisation de nanofluides à base de nanotube de carbone*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- BAK Davan (2013). *Comportement d'un rupteur thermique à la ruine -détermination d'un critère de ruine combiné*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- CHHANG Sophy (2014). *Développement d'un modèle (simple et multi-ddl) d'un poteau soumis à une charge du type impact (véhicule, projectile)*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- KY Sambath (2014). *Etude des échanges thermiques dans les échangeurs thermiques et microcanaux par l'utilisation de nanofluides à base de nanotube de carbone*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- CHEA Kim (2014). *Contribution à la détection, à la localisation et au suivi, par méthode d'évaluation dynamique, de l'endommagement des câbles du génie civil*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- HIN Raveth (2014). *Identification the indentation behavior of chemically tempered glasses*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- SIM Viriyavudh (2014). *Simulation numérique du comportement mécanique des structures de chaussées pavées*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- EAR Bunpo (2014). *Etude numérique du comportement de poutres de couplage*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- TO Theany (2015). *Comportement d'un rupteur thermique à la ruine -détermination d'un critère de ruine combiné*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- TENG Kongou (2015). *Simulation numérique du comportement mécanique des structures de chaussées pavées*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- SOK Tetsya (2015). *Etude des échanges thermiques dans les échangeurs thermiques et microcanaux par l'utilisation de nanofluides à base de nanotubes de carbone*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- HO Lyeng (2015). *Etude numérique du comportement de poutres de couplage*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- LEANG Engkok (2015). *Contribution à la détection, à la localisation et au suivi, par méthode d'évaluation dynamique, de l'endommagement des câbles du génie civil*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- HEANG Longseng (2015). *Développement d'un modèle (simple et multi-ddl) d'un poteau soumis à une charge du type impact (véhicule, projectile, ..)*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- LENG Khundadino (2015). *Caractérisation et modélisation du comportement mécanique d'un alliage binaire titane-molybdène*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- CHHUN Kean Thai (2016). *Modifications de comportements mécaniques et physiques de sols gonflants par un ajout de chaux*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- DUCH Monirak (2016). *Etude géotechnique des fondations profondes des éoliennes terrestres*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- HUY Samphorstra (2016). *Etude des caractéristiques géométriques et géotechniques des berges de rivière pour analyser sa stabilité, application au Cambodge (Mékong, Bassac...)*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]
- SAO Sopanha (2016). *Etude comparative entre les essais triaxiaux et les essais en cisaillement direct sur les sols Phnom Penh non remaniés et remoulés*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

NUTH Vattanak (2016). *Recherche de la plus haute résistance du béton en utilisant des matériaux locaux (en province de Kampong Cham)*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

SARAY Puthera (2017). *Etude comparative entre les comportements d'un graveleux latérique et d'un sable argileux en technique routière au Cambodge*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

SENG Nora (2017). *Analyse numérique de l'interaction sol-pieu*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

MUY Meng Lay (2017). *Repairing of cracked concrete structural elements using fibrwrap® : experimental study*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

MOM Sokvisal (2017). *Dimensionnement de structures de chaussées bitumineuses avec utilisation d'agrégats d'enrobés régénérés*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

MENG Try (2017). *Poteaux hybrides*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

SONN Sokhom (2017). *Etude de comportement de la liaison d'acier-béton sur l'ancrage de slabe bz : expérimental via modèle élément fini*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

MUY Yeak Leang (2017). *Durabilité des bétons d'ouvrages: carbonatation et perméabilité*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHHORN Bun Theng (2017). *Optimisation de prix de plancher pour le bâtiment*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

LAY Sinnara (2017). *Réparation d'élément béton armé avec fibrwrap*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

SOK Sithpisey (2017). *Renforcement de la résistance des éléments structuraux en béton avec le système fibrwrap*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

SAROU Lynita (2018). *Modeling soil-pile interaction using Macro-element approach*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

HORM Rithymarady (2018). *Strength of silicate glass for aerospace application by biaxial flexure method, ring-on-ring configuration*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

HOURN Phanvichet (2018). *An energy momentum integration scheme for the nonlinear dynamics of 3D Timoshenko beam formulation*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

REM Sokkheang (2018). *Modélisation du comportement à basse température des enrobés bitumineux recyclés*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHENG Kim Chhoung (2018). *Development of connection of glass beam: a numerical study*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

KAO Sophea (2018). *Bearing capacity of pile foundation in frictional soil*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHHAY Lyhour (2018). *Behavior of concrete pavement in Cambodia under temperature effect*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

HENG Sounean (2018). *Développement d'un essai accéléré pour la Réaction Sulfatique Interne*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHHANG Vandeth (2018). *Traitement des graveleux latéritiques au ciment en technique routière au Cambodge*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHOR Phearin (2018). *Renforcement de la résistance des éléments en béton armé en utilisant de Fibrwrap: Études expérimentales*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

Y Sovann (2018). *Comportement thermodynamique des enrobés bitumineux régénérés*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHEA Leangheng (2019). *Effect on Capacity of RC Beam and Column Strengthened with Fibrwrap® System by Cyclic Exposure to Water and Salt Water*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

PHOEUK Menghay (2019). *Numerical study of the mechanical behavior of the innovative CLT-Concrete composite floor*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHHOENG Oudom (2019). *Finite element model for linear analysis of pipe elbow element subjected to in-plane/out-of-plane loading and internal pressure*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

NUT Sovanneth (2019). *Experimental study of lime additive and temperature effects on the mechanical characteristics of hma*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHAP Huysea (2019). *Mechanical Properties of RC Beam and Column Strengthened by Fibrwrap® System after being submerged into Different Exposure Solutions*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHORN Makara (2019). *Contribution à l'étude des scellements de galerie dans les ouvrages de stockage des déchets radioactifs à vie longue*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

NGET Pheara (2019). *Stress measurements of granular flow on the inclined plane using sensitive sensor*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

LEANG Chhainan (2019). *Experimental contribution to the characterization of concretes reinforced with high temperature organic fibers*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

LIM Chhoung (2019). *The influence of temperature on the fracture toughness of glasses with different transition temperatures*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

LOV Peng An (2019). *Parametric study of mechanical properties of mixture of commercial polymers-sikadurs*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHHOM Kanhara (2019). *Cyclic test and characterization of mechanical properties of Laser welded joints: Application to dual phase steels*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

PANG Chhay Narak (2019). *Improvement of mechanical behaviors of the Reclaimed Asphalt Pavements*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

HEU Reaksmeyvatana (2019). *Optimization by comparative study of PT and steel-mixed floor prices for building*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

NGUON Leangreng (2019). *Modification of Behavior of Soft Clay soil by using sand columns*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

CHREA Makkonakun (2019). *Etude Expérimentale De L'amélioration Des Sols Meubles Par Des Colonnes De Sable*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

KEN Koemhong (2020). *Experimental Study of Compaction Effect on Expensive Soil*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

LONG Hok Soeng (2020). *Cost Effective Foundation for Low-Rise Building*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

LEAV Menghuy (2020). *Numerical Study of Permeability Influenced by Tortuosity in Porous Media*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

KHEN Chanthorn (2020). *Development of Self-Healing Repairing Mortars*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

OUCH Vanthet (2020). *Experimental study on the behavior of mixed cross-laminated timber (CLT)-concrete slab*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

OENG Thaileng (2020). *Seismic and Soil Structure Interaction (SSSI)*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]



SUY Samnang (2020). *Study of the Mechanical Behaviour of Bamboo "BAMBUSA BURMANICA"*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

MEAS Chanbrosoeu (2020). *Thermo-Mechanical Modelling for Massive Structures*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

HOEUN Sela (2020). *Study of contact conductance between aggregate and matrix in cementitious materials*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

LINH Sunhok (2020). *Estimate the efficiency of bottle plastic pieces reinforced subgrade soil by experimental method*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

HOK Rathanaraingsey (2020). *Thermal behavior of double skin facades*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

SOURN Navy (2020). *Effect of Different Solution Submersion Exposure on Concrete Beam Strengthening with Fibrwrap® System and on Fiber Composite Laminate*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

RE Rong (2020). *The Effect of Column Offsets in Reinforced Concrete Structure*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

SOK Sopheakdey (2020). *Effect of Cyclic Exposure of Water and Salt Water to Concrete Beam Strengthening with Fibrwrap® System and to Fiber Composite Laminate*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

MUT Mesa (2020). *Numerical Study of Rail Stresses Induced by Wheel-Rail Contact using ABAQUS*, [Master Thesis, Civil Engineering, Institute of Technology of Cambodia]

OEUNG Kimheng (2021). *Assessment study of energy demand in multi-story steel moment frames*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

HENG Kimhong (2021). *Optimization of the ion exchange processing parameters for strengthening of a soda-lime silicate glass*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

HEM Bellydeth (2021). *Experimental study of the effectiveness of Tyfo® fibr anchors under tensile load*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

YUN Rith Pagna (2021). *Study on mechanical and microstructural properties of smaw butt-welded joints using various welding electrodes for structural steel fabrication*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

MONG Phanna (2021). *Study on mechanical properties characterization of tempered glass*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

MEAS Chandara (2021). *Design and build a lightweight chassis of a mini electric vehicle*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

SEANG Sotheany (2022). *Feasibility study of using recycled waste plastic in bituminous concrete*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

HEM Khunpanha (2022). *3D Finite Element Model of Experimental Test on Thermal Breaks System SLABE BZ in LS-DYNA*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

LIN Chanthorn (2022). *Basic Wind Speed Analysis and Development for the Design of Building in Cambodia*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

KOULEAM Soputhih (2022). *Experimental and Numerical Study on Performance of Tyfo® Fibr Anchors Under Axial Tension*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

LY Chungyeon (2022). *Evaluation of Quality Assurance of Concrete Pile Integrity*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

MAI Sokny (2022). *Durability of concrete beam strengthened with fibwrap® system and fiber composite laminate*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

ING Chhivkhim (2022). *Effect of Lime Content on the Swelling Behaviors of Soils for Road Structure*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

KHIM Radya (2022). *Performance-Based Plastic Design and Evaluation of Tall Knee-Braced Frames with Simple Connections*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

TUNG David (2022). *The Analysis of Concrete's Bearing Capacity of a Defect Bored Pile Under the Vertical Axial Loaded by Analytical and Numerical Method*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

NUTH Visal (2022). *Effect of wetting drying cycle on mechanical behavior of lime-treated soil*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

CHAN Rath (2022). *Experimental Study of Effectiveness of Tyfo® Fibr Anchors Inserted into Concrete Cylinder Confined by Glass Fiber Reinforced Polymer*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

OUK Darawatey (2022). *Study of Cross-Section Type for High Strength-to-Weight Ratio Glass Beam Using Finite Element Method*, [Master Thesis, Materials and Structural Engineering, Institute of Technology of Cambodia]

### **Master Program M-ETM**

THY Selaroth (2015). *Dynamic economic dispatch using model predictive control algorithm*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

PHOU Ty (2015). *Path planning for four omni-directional wheel robot*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

CHAN Sopheap (2015). *Development of multipoint vehicle tracking system*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

SON Chanvathana (2015). *Implementation of GSM network using openbts and gnu radio with universal software radio peripheral*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

ROS Vannak (2015). *Computer controlled electronic watt-hour meter via radio frequency*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

NONG Sovanneth (2015). *Impacts of grid connected PV on distribution network (low voltage)*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

YOU Hong (2015). *Cost optimization of a hybrid power system for rural communities in Cambodia*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

ING Sothy (2015). *Comparison of using artificial neural network and decision tree to do short term load forecasting*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

CHEA Vutha (2015). *Optimal placement of autorecloser and sectionaliser on radial distribution system 22kv*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

LAY Romnea (2015). *Bio-security controller for chicken farm (takeo province)*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

HUOT Samnang (2015). *Monitoring system for excavator base on sms technology*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

LENG Por (2015). *Development of metal detector to seek landmine unexploded ordinances (uxos)*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

CHHANG Vutha (2015). *Conversion of pork lard to biofuel*, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

SOM Chanthla (2015). The conversion of jatropha to bio-fuel, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

HENG Sok Meng (2016). Customized kits for automobile and OBD using k-line protocol communication, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

UL Dara (2016). Home connect integration over smart home, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

CHHUO Kreng (2016). Car security using Bluetooth tag and GPS, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

PHUNG Tolany (2016). Modeling of inter-turn faulty 3 phases transformer, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

SAM Tetra (2016). Improvement of solar power efficiency by cooling solar panel with water spray, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

CHRENG Sarin (2016). Conversion of used cooking oil to biofuel, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

ROATH Kulika (2016). Inter-turn short circuit fault detection of 3 phases transformer, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

SENGCHHORN Rady (2016). Conversion of fish oil to biofuel, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

MOUN Phat (2016). Conversion of oil used from KFC restaurant, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

SAR Tikhett (2016). Smart energy management system, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

CHHORN Sengchheang (2017). Implementation of wireless connectivity of upper secondary school in remote area, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

HEANG Latin (2020). Experimental Investigation on Sawdust and Tree Leaves Briquette Using Fish Residue Oil and Waste Deep Fried Oils as Binder, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

CHOENG Porchaing (2020). Experimental Investigation on Rice husk and Bagasse Briquette Using Fish Residue Oil and Waste Deep Fried oil as Binder, [Master Thesis, Electrical and Energy Engineering, Institute of Technology of Cambodia]

HENG Ratha (2022). Study on Organic Matter and Depositional Environment of Black Shale at Bokor Formation, Kampot Province, Cambodia, [Master Thesis, Energy Technology and Management Engineering, Institute of Technology of Cambodia]

### **Master Program M-WEE**

SY Hayean (2014). Assessment of crop water use in Chreybak river catchment using cropwat mode, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

OUN Sreymao (2014). Sustainable solid waste management in Cambodia, case study in Pursat, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SOT Ratha (2014). Plastic wastes recycling as a means to waste management in Phnom Penh, Cambodia., [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

PIN Bora (2014). Phnom Penh waste collection roadmap development, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

CHUM Sokhey (2015). Understanding the impacts of dam development in the 3 s rivers, Cambodia, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SUONG Sila (2015). Sediment load estimate in Chreybak river: the implication for integrated watershed management, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

OU Sothea (2015). Assessment of water use for improved water governance under climate changes, using weap model, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

KIM Mengersreang (2015). Assessment of urban runoff for improved strom water management in Phnom Penh, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

PHENG Ty (2017). Water supply management in Phnom Penh city, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SIM Sen (2018). Modeling of storm water network in a part of Pursat Town, Cambodia for performance improvement, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

VONG Dara (2018). Assessment of rice water use by CROPWAT model and water allocation management the irrigation system in Taing Krasaing catchment, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

VUTH Sivorng (2018). Enhancing Kampot Municipality Solid Waste Management System with 3R Option, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SOR Chhaya (2018). Water Quality Analysis for Agricultue in Sourtr Nikom District, Siem Reap Province a Comparison with National Standards, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

Y Puthealy (2019). Modelling drinking water distribution system at Pursat province using EPANET, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SREU Bora (2019). Digital Terrain Model (DTM) creation by different measurement methods for water resources study, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

CHUM Kimleang (2019). Assessment of Climate Change Impact on Urban Stormwater Quality in Boeng Trabaek Drainage Catchment, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

KE Sereyvath (2019). Lab scale of arsenic adsorption in synthesis water using iron ore as an absorbent, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

MENG Kea (2019). Water Resource Management in Detention Places of Cambodia, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SVAY Chhaly (2019). Long-Term Urban Drainage Modeling in Phnom Penh, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SEANG Kimsour (2019). Characterization of the Quality of Domestic Wastewater Discharge into Kob Srov Lake, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SUONG Chanmeakara (2019). Assessment of Environment Flow under Climate Change Scenarios – Case study of Stung Chinit Basin, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

HUOT Syradeth (2019). Multidrug-Resistant Bacteria (MRD) in Tonle Sap Lake, Tonle Sap River, Mekong Rivers, Bassac River and Discharged Wastewaters, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

NORNG Sopha (2019). Understanding Role of Women in Improving Access to WASH of Phnom Penh Urban poor, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

THOUN Lieang (2019). Spatial Variation of Water Quality in Boeng Tamouk Lake, Northern-part of Phnom Penh, Cambodia, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

CHOUN Lyhor (2019). Effectiveness of PAC and Calcium Hypochlorite Dose in Surface Water Treatment at Tonle Sap River, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

PHOEUK Sokny (2019). Microbial colonization distribution in a large tropical flood pulse ecosystem - Tonle Sap Lake, Cambodia, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

KOL Ponlok (2019). Application of SWMM to explore possible climate change impact on urban stormwater drainage, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

PHOEURN Sokhim (2019). Groundwater Assessment in Siem Reap-Angkor Region, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

EM Sophealeaksmey (2019). Studying on the efficiency of three natural coagulants for water treatment at Tonle Sap River water, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

KEO Samphors (2019). Characterization of Tonle Sap River water quality as influent by untreated domestic wastewater, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

CHEA Sypha (2019). Assessment of Land Use Change Impacts on Stormwater Runoff and Water Quality in Boeng Trabek Catchment, Cambodia, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

CHHEN Rotanak (2019). Mapping of groundwater vulnerability at coastal area of Preah Sihanouk province, Cambodia, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

LIM Dalika (2019). Development Municipal Wastewater Treatment Management with Lagoon System in Kampot Town, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

MELVIN Frick (2020). Pesticide Distribution in the Hydrological Compartments in Koh Thum district, Kandal, during the dry season, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

LAI Chenda (2020). Evaluation of Wastewater Treatment Efficiency Utilizing Coconut Fiber as Filter Media, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SDEUNG Ouk Sovannarith (2020). The Spatio-Temporal downscaling of rainfall under changing climate, focusing on the sub-daily (hourly) rainfall over Phnom Penh City area, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

CHEA Chandinan (2020). Micro-Scale Flood Hazard Assessment under Climate Change Scenarios: Case Study of Boeungkak 1 and Boeungkak 2, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

KHEANG Ratana (2020). Chemical Distribution Assessment of well Water in the Floodplain Areas along the Tonle Sap Lake, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SOU Phalla (2020). Correlation between physicochemical and microbiological properties of sewage and flooded water in Boeung Trabek Sewage Canal, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

MAO Theara (2020). Comparative Study of Polyvinyl Alcohol Gel and Coir Coconut Fiber Bio-Carriers in Moving Bed Bioreactor for Treating Wastewater from Institute of Technology of Cambodia, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SAM Sokyimeng (2020). Application of Electrocoagulation Process in Removing Turbidity and Bacteria of Water in Choeng Ek Lake, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

HOK Sreyrorth (2020). The Preliminary Study of Arsenic Removal from Groundwater by Utilizing Electrochemical Arsenic Remediation (ECAR), [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

CHHAM Amret (2020). Assessment of the Impact of Climate Change on Hydrological Processes in Stung Sen Catchment of the Tonle Sap 6Sub-Basin, Cambodia, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

VORNG Say (2020). Pollutants Removal by Chemical Coagulation and Filtration of Textile Dyeing Wastewater, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SENG Sapanha (2020). Influence of Water Quality on Microbial Colonization Distribution in a large Tropical River-Lake System, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

MATH Alpy (2020). Water Quality Study of Prek Te River, a Mekong River Tributary in Cambodia, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

SAM Socheata (2020). Study on Microbiology in Wastewater and Virus Treatment Method, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

KHEAM Chheng Ly (2020). Comparison of the Effectiveness of Alternative Bio-Adsorbents in Phosphate and Nitrogen Removal from Wastewater, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

KHIM Dara (2020). Design New Urban Drainage Network by Using PCSWMM, [Master Thesis, Rural Engineering, Institute of Technology of Cambodia]

YOU Rany (2021). Arsenic removal from groundwater by utilizing Electro-Chemical Arsenic Remediation (ECAR) technology at Koh Thom district, Kandal province, Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

MAY Phue Wai (2021). Assessment of dissolved silicon in surface water and its relation to ecosystem productivity in Tonle Sap lake: a case study around Chhnok Tru area, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

YENG Sovann (2021). The study of urban drainage system and urban flood modeling in Battambang town, Battambang province, Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

MONIROTH Sopheavattey (2021). Presence and characteristics of antibiotic-resistant *Aeromonas* spp. and *Escherichia Coli* in *Pangasius* aquaculture system in Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

RUOS Bunhuot (2021). Hydrogeochemical identification and quality assessment of groundwater at the floodplain area around Tonle Sap lake, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

HENG Chhenglang (2021). Effects of watershed land use and land cover changes on total suspended sediment in Tonle Sap lake, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

CHOUN Chakriya (2021). Development of aerated electrocoagulation-flotation reactor for color, turbidity and oil removal from slaughterhouse wastewater, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

SAING Kimleng (2021). The assessment of multi-pathway exposure to fecal contamination of urban poor settlements in Municipality of Phnom Penh (MPP), [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

CHEM Vibol (2021). Seasonal assessment of silica on in surface sediment fractions and its correlations to the productive ecosystem of Tonle Sap lake: a case study around Chhnok Tru area, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

OR Thaybona (2021). Improving removal efficiency of natural organic matters from drinking water treatment plant by powder activated carbon injection in coagulation process, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

ENG Khun (2021). Recovery nutrient from aquaculture wastewater: an aquaponic recirculation system, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

SENG Phaya (2021). Optimization of Anaerobic Baffled Reactor (ABR) and Anaerobic Filter (AF) as low-cost wastewater treatment system, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

HEANG Borin (2021). Comparative study of septic tank, anaerobic baffled reactor, anaerobic filter for treating domestic wastewater, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

KIM China (2021). The assessment of waste flows and plastic leakage into the environment in Kep municipality, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

SEM Sovandy (2021). Assessment groundwater quality in the coastal area of Preah Sihanouk province, Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

CHAN Sakdanuphol (2021). Impacts of land use change on hydrology of the Tonle Sap lake basin using SWAT, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

ROTHA Visal (2021). Assessment of hydraulic performance of water supply system in Takhmao city, using modeling approach, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

CHHUN Meng (2021). Formulizing the design criteria for the piped water supply system in urban area of Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

RANN Sophearon (2021). Assessment of pesticide residues in water from Kampong Thom, Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

VENG Visal (2021). Application of autodesk storm and sanitary analysis model on hydraulic modeling for urban storm drainage at Siem Reap city, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

PUOK Sreykeo (2021). Hydraulic modelling of suspended sediment transport through a sluice gate of Prek system in Kandal province, Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

Y Sona (2021). 2D-fluvial hydraulic characteristic assessment at Chaktomuk junction, Phnom Penh city, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

SEK Sreymao (2021). A survey of household water use and groundwater quality index assessment in a rural community of Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

PHOEUK Sophorn (2021). Urban flood modelling in Preah Sihanouk city using Storm Water Management Model (SWMM), [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

PHY Kosorl (2021). The application of PCSWMM to access the potential impact of urbanization on storm water flood at Dangkor district, Phnom Penh, Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

KUOCH Theary (2021). Distribution and ecological risk of heavy metal from artisanal gold mining in Chong Plah village Memang district Mondulkiri province, the north-east of Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

HAK Nalin (2021). Pesticide distribution in the hydrological compartment system in Koh Thum district, Kandal province during the dry and rainy seasons, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

SUN Bunneth (2021). Optimization on wastewater treatment efficiency using activated charcoal and coconut fiber as porous media, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

SARET Sovandara (2021). Hydraulic design of storm drainage system in Siem Reap city, using Autodesk Storm and Sanitary Analysis (ASSA), [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

KOH Somalay (2021). Evaluation on wastewater treatment system using Sewage Treatment Operation Analysis over Time (STOAT), [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

THEAM Andy (2022). Relative Effect of Iron Co-presence on Arsenic Removal from Domestic Groundwater, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

KIT Vanny (2022). Optimization of Aerated Electrocoagulation-Floatation Reactor for Simultaneous Removal of Color and Oil from Synthetic Slaughterhouse Wastewater, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

PANG Borith (2022). Optimization of Anaerobic Baffled Reactor (ABR) and Anaerobic Filter (AF) for Treating Medium-Strength Wastewater, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

SORN Panha (2022). Hydrogeochemical Evolution of Groundwater in the Coastal Area of Sihanoukville, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

CHEA Chanto (2022). Impact assessment of emission from a cement plant in Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

MA Laty (2022). Assessment of Groundwater Quality for Domestic Water Supply and Irrigation Purpose at Tonle Sap Lake Floodplain Area, Chhnuk Tru Commune, Kampong Chhnang Province, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

LEAP Phanith (2022). Development of Electrocoagulation Integrated Sedimentation in Continuous Mode for Turbidity and Color Removal from Synthetic Textile Wastewater, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

LORN Sokles (2022). Health Impact Assessment from Life Cycle of Rice Production in ASEAN, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

SOK Sereyvathana (2022). Assessment of activated carbon made from Banana peels for organic micropollutants removal in water, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

KEO Sombath (2022). Pesticide Residues Analysis in the Canal Irrigation System in Koh Thum District, Kandal Province, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

BOU Kimhor (2022). Optimization of Air Flotation Integrated Coagulation Process for Oily Wastewater Separation, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

YA Sreyleang (2022). Assessment of Groundwater Quality and Identification of the Chemical Distribution in the Floodplain Area around Tonle Sap Lake, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

VA Duongmony (2022). Study of eggshells and limestone to treat acid mine drainage from gold mining tailing in Mondulkiri province, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

KHENG Chanchornay (2022). Effect of Storm Water Management of Low Impact Development in Siem Reap City, Cambodia based on SWMM, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

VETH Vathanachannbo (2022). Assessment of seasonal variability in human disturbance and water quality of the lower Mekong River, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

THAING Srey Thuok (2022). Study on Different Coagulants for Developing a Packet Containing both Poly Aluminum Chloride and Calcium Hypochlorite for Treating Lake Water for Drinking, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

LAY Vichika (2022). Application of Water Quality Indices and GIS Tool to Assess the Quality of Groundwater at Preah Sihanouk Province, Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

NY Marady (2022). Determination of Suitable Drainage System Design Scenario for Improving Flood Control in Krong Kampot, Kampot Province, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

HEN Chhordaneath (2022). Influence of Precipitation and Land Use Change on Drought and Extreme Flow in Prek Thnot River Basin of Mekong River in Cambodia, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]



MEAS Mardi (2022). Water Quality Assessment of Tonle Sap Lake, Chhnok Tru Commune, Cambodia as Alternative Water Supply, [Master Thesis, Water and Environmental Engineering, Institute of Technology of Cambodia]

### **Master Program M-AIE**

HUOT Kimmeng (2015). Quantification of restricted substances in textile produced in Cambodia, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

EUNG Theara (2015). Regeneration process of the resin haix used for arsenic affected community in Cambodia, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

MOANG Darachampich (2015). Production of beverage from red glutinous rice, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

TUY Phearun (2015). Assessment of the nutritional components, total phenolic compounds and antioxidant activities in jamune, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

SENG Kong (2015). Methane generation in Dangkor landfill of Phnom Penh, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

HONG Kim Eang (2016). Optimisation de la fermentation de radis blancs avec son de riz, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

MENG Sophang (2017). Aroma analysis of Cambodian traditional dark purple rice wine, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

CHE Ratana (2017). Survival of escherichia coli k12 and detection of antibiotic-resistant bacteria in tonle sap river, Mekong river and Bassac river, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

EAV Chenda (2017). Seasonal variation and distribution of heavy metal in lake water and bottom sediment of Tonle Sap lake, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

SEN Veasna (2017). Mitigation of heavy metal from Dangkor landfill to groundwater, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

TAING Bun Leang (2017). Production process and quality control of fish sprinkle product, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

YAN Thary (2017). Dietary exposure assessment of nitrite from food streets in population in Phnom Penh, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

TANN Sarann (2017). Assessment of nutrient load from Chhnok true community of Tonle sap lake, Cambodia, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

LONG Samavatey (2017). Conversion of coconut oil to biofuel, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

VORN Thary (2018). Evaluation of DEWATS performance base on hydraulic with organic load and modify the grain filter system using Drainblock filter for School Base Sanitation in Cambodia, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

BEANG Polingkong (2018). Effect of the combination of pure strains on ethanol production during red rice fermentation process, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

KONG Channy (2018). Study of technology for alcohol production from cane molasses, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

THOUR Sokundara (2018). Determination of food additive in soft drink and pickle fruits by using high performances liquid chromatography (HPLC), [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

KEO Rachana (2018). Determination of eleven colors and three sweeteners in soft drink and sauce products by using high performance liquid chromatography, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

SUON Mala (2018). Distribution of Arsenic in water and sediment in Mekong and Bassac river of Cambodia, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

OENG Sivgech (2018). Selection of plants species for plant-gravel-filter in DEWATS, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

HOEUN Seanghai (2020). Optimization of White Pepper (*Piper Nigrum* L.) Processing by Enzymatic Activity, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

VANTHA Daroth (2020). Identification and Susceptibility of Antibiotic-Resistant *Enterococcus* Spp. in Fermented Vegetable, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

KAI Sokheng (2020). Analysis of pesticide residues in sediment from Chhnok Tru, Kampong Chhnang, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

PHOEM Visal (2020). Cambodian rice liquor product development: using *Rhizopus Oryzae*, *Saccharomyces Cerevisiae* and Alpha-amylase, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

LY Luka (2020). Market study and quality analysis of soy sauces sold in markets, [Master Thesis, Agro-Industry and Environment, Institute of Technology of Cambodia]

THOURN Lisang (2022). Assessment of Pesticide Contamination in Agrochemical-Free Rice Farming in Battambang Province, [Master Thesis, Agro-industrial Engineering, Institute of Technology of Cambodia]

CHHAY Phalla (2022). Extraction of Essential Oil and Bioactive Compounds from Cambodian Leafy Herbs, [Master Thesis, Agro-industrial Engineering, Institute of Technology of Cambodia]

SONG Sengnut (2022). Extraction of Essential Oils and Bioactive Compounds from Herbal Rhizomes, [Master Thesis, Agro-industrial Engineering, Institute of Technology of Cambodia]

MET Sreypha (2022). Optimization of drying condition for production of dried tomatoes with high contents of bioactive compounds, [Master Thesis, Agro-industrial Engineering, Institute of Technology of Cambodia]

### **Master Program M-ECS**

TITH Dara (2015). Predicting user access goal based on user's, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

CHUOR Porchourng (2015). Khmer optical character recognition using, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

LAY Vathna (2015). Mobile document capture indexation and information retrieval, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

TENG Dola (2015). Khmer and Latin optical character, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

HAN Sama (2015). Agent-oriented mobile application, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

SEAK Leng (2016). User centric travel recommendation system: case study tourist locations in Phnom Penh, Cambodia, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

PHAN Neth (2016). Long short-term memory based for Khmer optical character recognition, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

THUON Nimol (2017). Khmer semantic search engine, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

KUY Movsun (2017). Data protection in IOT system: under context of lora network technology, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

DUCH Dynil (2017). Romanization of Khmer language: automatic Latin-to-Khmer based text conversion, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

HENG Piseth (2017). Performance analysis and implementation of the data protection algorithms between portable devices and temperature sensors in the area of internet of things, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

TAL Tong Sreng (2018). Automatic Latin-to-Khmer-based text conversion, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

HEN Sodet (2018). Synthetic data for Khmer ancient document analysis, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

HUY Viriya (2018). Security and Privacy for the IOT Network by Block Chain, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

KHON Khemrin (2018). Keyword Extraction Method on Khmer Digitalized Documents, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

HUY Ketya (2018). Security and Privacy for the IOT Network by hyperledger, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

CHHUM Heng (2018). Centralise Policy Administration Point for Smart Home system, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

HOURK Savet (2018). Design and Implementation of metahub for Smart Home System, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

LENG Chanratanak (2018). Ios Mobile Development: e-Komnob Platform: content management, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

NHIK Kim Sang (2020). Cooperatives' Agricultural Products Mobile Application (CAP): Users & Transaction Management, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

CHOU Seakny (2020). Cooperatives' Agricultural Products Mobile Application (CAP): Product Management & Seller Management, [Master Thesis, Information and Communication Engineering, Institute of Technology of Cambodia]

BORN Seanghort (2021). Khmer language model for handwritten text recognition on historical documents, [Master Thesis, Computer Science, Institute of Technology of Cambodia]

LAY Leangsros (2021). Designing blockchain application for information exchange of blood banks, [Master Thesis, Computer Science, Institute of Technology of Cambodia]

NOP Phearum (2021). Digital platform for Cambodian agricultural produce based on social and human values, [Master Thesis, Computer Science, Institute of Technology of Cambodia]

CHOM Sreylam (2021). Mobile development for GIC department (GIC mobile app), [Master Thesis, Computer Science, Institute of Technology of Cambodia]

LY Sivheng (2021). Blockchain application for transparency, traceability and accessibility of the donated blood information for voluntary blood donors, [Master Thesis, Computer Science, Institute of Technology of Cambodia]

POENG Kok Thay (2022). Designing Access Control for Security Enhancement of Kubernetes Management in Case of Medical Information Exchange, [Master Thesis, Computer Science, Institute of Technology of Cambodia]

CHHEANG Vanny Ratanak (2022). Decentralized Blockchain Based-PKI for Patient Identification in the Blockchain Network, [Master Thesis, Computer Science, Institute of Technology of Cambodia]

## Master Program M-MIC

- NGETH Hongneng (2017). Experimental study on butt joints using shielded metal arc welding, [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- EM Sophat (2017). Experimental study on butt joints using mig welding, [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- CHEA Vabotra (2018). Effect of heat source temperature on organic Rankine cycle (ORC), [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- THEANG Sothy (2018). Dynamic modeling and simulation for a parallel-mechanism-mounted UAV, [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- PHAL Vannak (2018). Mass charge effect on organic Rankine cycle, [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- PICH Yanghav (2018). Development of Plastic Shredder for Recycling Plastic, [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- CHHAM Reaksmeay Khemra (2019). Study on Performance and Emission of Gasoline Engine by Using Ethanol-Blended Super Gasoline, [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- YEAN Sopheak (2019). Control Performance for Parallel-Mechanism-Mounted UAV, [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- TENG Van Oeurn (2019). Study on Performance and Emission of Gasoline Engine by Using Ethanol-Blended REGULAR Gasoline, [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- MIN Cheng Horn (2019). Study on Performance and Emission of Gasoline Engine Using Liquefied Petroleum Gas (LPG), [Master Thesis, Industrial and Mechanical Engineering, Institute of Technology of Cambodia]
- SETHY Boreth (2020). Pose Estimation of WMR using Multi-Sensor Data Fusion, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]
- KEO Chivorn (2020). Flight Controller and Structural Design for Fixed-Wing UAV, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]
- LY Leangchheng (2020). Modeling, Control and Simulation on 3DOF Robot Manipulator, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]
- TEM Lyhor (2020). CNC-Mill Construction and Automatic Control to Shape the Specimen by CAD/CAM, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]
- MORK Tongly (2020). Simultaneous Localization and Using Intel Realsense Camera, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]
- LIM Bunvireak (2020). Development of Smart Irrigation Controller for Gravity Irrigation System in the Rural Area, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]
- TIM Hoksong (2021). Preliminary design and performance prediction of mini hybrid rocket motor for a sounding rocket, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]
- THOK Piseth (2021). Study of sensorless control of permanent magnet synchronous motor in solar E-Tuktuk application, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]
- YONRITH Phayuth (2021). Path planning and control of wheeled mobile robot with occupancy grid map, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]

CHAO Vanyi (2021). Development of landing site tracker for UAV, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]

OUM Sotheara (2022). Integration of RRT\* Path Planning with Trajectory Tracking for Wheeled Mobile Robot, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]

SIEK Sok An (2022). Solar Hybrid Switch Controller and Monitoring System, [Master Thesis, Mechatronics, Information and Communication Engineering, Institute of Technology of Cambodia]

### **Master Program M-TIE**

YANG Panha (2021). Impact of COVID-19 on paratransit services operating with ride-hailing apps : the Phnom Penh case, [Master Thesis, Transport Engineering, Institute of Technology of Cambodia]

CHHENG Ratha (2021). A study on improvement of traffic flow along Russian boulevard: from 5 Makara skybridge to Kdan Pir intersection, [Master Thesis, Transport Engineering, Institute of Technology of Cambodia]

CHHIEV Vanda (2021). Impact of COVID-19 on food delivery service in Phnom Penh city, [Master Thesis, Transport Engineering, Institute of Technology of Cambodia]

SOTH Chrinthony (2022). Evaluation of Structural Pavement by Using Light Weight Deflectometer in Cambodia, [Master Thesis, Transport Engineering, Institute of Technology of Cambodia]

MORM Udor (2022). Factors Affecting Decision to Change from Bajaj Drivers to Other Jobs, Phnom Penh Case, [Master Thesis, Transport Engineering, Institute of Technology of Cambodia]

## **Annex 7. List of Publications by Master students.**

### **Lists of Publications M-MSE**

1. Chandara Meas, Dara To, & Easeng Siv (2021). Design and build a lightweight chassis of a mini electric vehicle. Proceeding in the 10th Scientific Day of ITC, 148-154
2. MONG Phanna, HIN Raveth, SRY Vannei, & HENG Kimhong (2021). Glass strength characterization: a review study. Proceeding in the 10th Scientific Day of ITC, 143-147
3. Kimhong Heng, Raveth Hin, & Chansopheak Seang (2021). Glass Strengthening by Ion Exchange Process: An Optimization Study. Proceeding in the 10th Scientific Day of ITC, 161-165
4. Kimheng Oeung, Virak Han, & Piseth Doung (2021). Energy Demand Assessment in Single Degree of Freedom Systems Using Perform 3D. Proceeding in the 10th Scientific Day of ITC, 132-137
5. Kimheng Oeung, Piseth Doung, Sutat Leelataviwat & Virak Han (2022). Analytical Assessment of Earthquake Energy Demand in Single Degree of Freedom Systems, *Techno-Science Research Journal*, vol. 10(1), 1-7
6. Sotheany Seang, Kuchvichea Kan & Masaaki Okamoto (2022). Feasibility Study of Recycled Waste Plastic Application in Bituminous Concrete. *Techno-Science Research Journal*, vol. 10(2), 32-39

### **Lists of Publications M-ETM**

1. Phoeurng Tork, Chan Sarin, & Kinnaeth Vongchanh (2021). Feasibility Study on the Use of Roof-top Solar PV as main Energy Supply for AC units in Residential Building. Proceeding in the 10th Scientific Day of ITC, 25-27
2. Ratha Heng, Sopheap Pech, Sreymean Sio, Chandoeun Eng & Chanmoly Or (2022). Study on Organic Identification of Black Shale in Bokor Formation, Kampot Province, Cambodia. Science Publishing Group (New York, NY 10020 U.S.A.), 2376-7669, 2376-7677

### **Lists of Publications M-WEE**

1. Vichhey Nall, Pinnara Ket, Boreborey Ty, Chanthan Hel, & Lyda Hok (2021). Evaluation of Physico-Chemical Properties of Vermicompost Using Different Food Sources and Mushroom Substrate. Proceeding in the 10th Scientific Day of ITC, 293-295
2. Vichika Lay, Sytharith Pen, & Ratha Doung (2021). Assessment of hydrology characteristic under land use change at Prek Thom catchment, Cambodia. Proceeding in the 10th Scientific Day of ITC, 190-194
3. Visal Rotha, Ratino Sith, & Sambo Lun (2021). Assessment of Hydraulic Performance of Water Supply System in Takhmao City, Using Modeling Approach. Proceeding in the 10th Scientific Day of ITC, 272-277
4. Visal Veng, Pinnara Ket, Rachana Thy, & Sovandara Saret (2021). Application of Storm and Sanitary Analysis model on hydraulic modeling for Storm Urban Drainage system in Siem Reap city, Cambodia. Proceeding in the 10th Scientific Day of ITC, 209-213
5. Vuthy Chork, Sreyleang Ya, Bunhuot Ruos, & Khy Eam Eang(2021). Well Water Quality Monitoring in the Northern Floodplain and the Upstream of the Tonle Sap lake. Proceeding in the 10th Scientific Day of ITC, 351-355
6. Yeng Sovann, & Chhuon Kong (2021). The review of urban drainage systems for urban flood analysis in Krong Battambang, Battambang province, Cambodia. Proceeding in the 10th Scientific Day of ITC, 230-236
7. Thaybona Or, Davin Sang, & Monychot Tepy Chanto (2021). Natural Organic Matter Removal in Drinking Water Treatment by Combination of Adsorption and Coagulation Processes: A Comprehensive Review. Proceeding in the 10th Scientific Day of ITC, 262-266
8. Theary Kuoch, & Kimleang Khoeurn (2021). Distribution and Ecological Risk of Heavy Metals from Mining Areas: A Case Study in Chong Phlah Village, Chong Phlah Commune, Kaev Seima District, Mondulhiri Province, Northeast of Cambodia. Proceeding in the 10th Scientific Day of ITC, 313-317

9. Romduol Khoeun, Kimsan Chann, Kimleang Chum, Ilan Ich, & Ty Sok (2021). Investigation of Riverine Sediment from the Tropical Transboundary Catchment in Srepok River Basin of the Lower Mekong Basin. Proceeding in the 10th Scientific Day of ITC, 323-327
10. Sakdanuphol Chan, & Ratino Sith (2021). Assessment of Hydrological Processes of the Tonle Sap Lake basin using SWAT model. Proceeding in the 10th Scientific Day of ITC, 199-203
11. Saret sovandara, Ket Pinnara, Thy Rachana, & Veng Visal (2021). Hydraulic Design of Urban Storm Drainage System Using Autodesk Storm and Sanitary Analysis (ASSA), Compared with Storm Water Management Model (SWMM). Proceeding in the 10th Scientific Day of ITC, 175-179
12. Socheata Mao, Luka Ly, Tetoutdam Kong, Sivchheng Phal, & Reasmey Tan (2021). Optimization of Solid-Phase Micro-Extraction for Volatile Compounds in Soy Sauce. Proceeding in the 10th Scientific Day of ITC, 78-82
13. Somalay KOH, Ritha NGETH, & Boreborey TY (2021). Evaluation on Wastewater Treatment System Using Sewage Treatment Operation and Analysis Over Time (STOAT). Proceeding in the 10th Scientific Day of ITC, 258-261
14. Sombath Keo, Melvin Frick, Nalin Hak, & Khy Eam Eang (2021). Analysis of Pesticide Residues Distribution in the Hydrological Compartments of an Irrigated System in Koh Thum District, Kandal Province. Proceeding in the 10th Scientific Day of ITC, 318-322
15. Sona Y, Sytharith PEN, & Sambo LUN (2021). 2D-Fluvial Hydraulic Characteristic Assessment at Chaktomuk Junction, Phnom Penh City. Proceeding in the 10th Scientific Day of ITC, 214-218
16. Sophearon Rann, & Chanvorleak Phat (2021). Status of Pesticide Contamination in Drinking Water Sources in Southeast Asia: A Review. Proceeding in the 10th Scientific Day of ITC, 308-312
17. Sopheavattey Moniroth, & Chanthol Peng (2021). Antimicrobial Resistance in Aquaculture, Health, and Environmental Risks: A Review. Proceeding in the 10th Scientific Day of ITC, 301-307
18. Sophorn Phoeuk, & Ratha Duong (2021). Urban Flood Modeling in Preah Sihanouk City using Storm Water Management Model (SWMM). Proceeding in the 10th Scientific Day of ITC, 180-184
19. Sreykeo Puok, & Kong Chhuon (2021). Steady flow analysis of a sluice gate structure in Prek System using HEC-RAS 1D modelling. Proceeding in the 10th Scientific Day of ITC, 282-287
20. Sreyleang Ya, Bunhuot Ruos, Vuthy Chork, & Khy Eam Eang (2021). Chemical Assessment of Groundwater Quality in the Floodplain Area along Tonle Sap Lake. Proceeding in the 10th Scientific Day of ITC, 342-345
21. Rany You, Sreyrorth Hok, Sreyvich Sieng, & Boreborey Ty (2021). The Preliminary of Arsenic Removal from Groundwater by utilizing Electro-Chemical Arsenic Remediation (ECAR). Proceeding in the 10th Scientific Day of ITC, 253-257
22. Phaya Seng, & Rathborey Chan (2021). Recent Research and Development of Anaerobic Baffled Reactor and Filter for Wastewater Treatment: A Review. Proceeding in the 10th Scientific Day of ITC, 242-246
23. Kimsan Chhan, Romduol Khoeun, Ilan Ich, Kimleang Chum, & Ty Sok (2021). Assessment of Nutrient and Ecological Function Indicators in Sesan River Basin by SWAT Modeling. Proceeding in the 10th Scientific Day of ITC, 328-332
24. Kosorl Phy, & Ratha Doung (2021). The Application of PCSWMM to Assess the Potential Impacts of Urbanization on Storm water Flood at Dangkor district, Phnom Penh, Cambodia. Proceeding in the 10th Scientific Day of ITC, 224-229
25. Eng Khun, Rathborey Chan, Rathboren Chan, & Chart Chiemchaisri (2021). Optimization of Hydraulic Retention Time (HRT) in High-Rate Aeration Tank for Maximum Nitrate Production from Aquaculture Wastewater. Proceeding in the 10th Scientific Day of ITC, 267-271
26. Chhenglang Heng, & Vannak Ann (2021). Effects of Land Use and Land Cover Changes on Total Suspended Sediment in Tonle Sap Lake. Proceeding in the 10th Scientific Day of ITC, 338-341

27. Chhordaneath Hen, Ilan Ich, Kimleang Chum, & Chantha Oeurng (2021). Hydrological Drought Responding to Meteorological Drought in Stung Prek Thnot River Basin. Proceeding in the 10th Scientific Day of ITC, 204-208
28. Chakriya Choun, & Saret Bun (2021). Review of Recent Development of Electrocoagulation-Flotation Process for Color, Turbidity, and Oil Removal from Slaughterhouse Wastewater. Proceeding in the 10th Scientific Day of ITC, 237-241
29. Borin Heang, Rathborey Chan, & Saret Bun (2021). Technical Review and Challenge of Various Decentralized Anaerobic Treatments for Domestic Wastewater. Proceeding in the 10th Scientific Day of ITC, 247-252
30. CHHUN Meng, Lun Sambo, Ratino Sith, & Davin Sang (2021). Formulizing the Design Criteria for the Piped Water Supply System in Urban Area of Cambodia. Proceeding in the 10th Scientific Day of ITC, 278-281
31. Kimsan Chann, Ty Sok, Romduol Khoeun, Vuthy Mèn, Supattra Visessri, Chantha Oeurng, Ratha Sor & Sarah E. Null (2023). Surface Runoff Alteration Leads to Frequent and Prolonged Drought in the most Dammed Rivers of the 3S River Basin. Sustainability MDPI, 2071-1050
32. HEN Chhordaneath, SOK Ty & OEURNG Chantha (2022). Hydrological Drought Responding to Meteorological Drought in Prek Thnot River Basin. IOP Publishing Morressier
33. Sombath KEO, Khy Eam EANG, Chanvorleak PHAT, Sereyvath YOEUN, Leakkhina MEAK, Kong CHHUON & Sylvain MASSUEL (2022). Detection of Pesticide Residues in The Canal Irrigation System of The Upper Mekong Delta, Cambodia. Indonesian Journal of Limnology, vol. 03 No. 01, 10-17, 2774-2571
34. Amret Chham & Ratha Doung (2022). Assessment of the Impact of Climate Change on Hydrological Components in Stung Sen Catchment of the Tonle Sap Lake Basin, Cambodia. Techno-Science Research Journal, vol. 10(2), 1-7

#### **Lists of Publications M-AIE**

1. Lisang Thourn, Chanvorleak Phat, & Malyna Suong (2021). Assessment of Extraction Techniques of Natural Compounds of Plant Origin for Nematicidal Properties: A Review. Proceeding in the 10th Scientific Day of ITC, 69-74
2. Lisang Thourn, Chanvorleak Phat, Malyna Suong, Sreyvich Sieng, Soukim Heng & Sereyvath Yoeun (2022). Identification of Pesticide Contamination in Water Sources Surrounding Agrochemical-Free Rice Farming in Battambang Province. Techno-Science Research Journal, vol. 10(2), 66-73
3. Phalla Chhay, Peany Houng & Sovannmony Lay (2022). Effect of Pretreatment on Extractions of Essential Oil from Kaffir Lime (Citrus Hysteric DC.) Leaves. Techno-Science Research Journal, vol. 10(2), 40-45
4. Sengnut Song, Peany Houng, Sovannmony Lay & Sokneang In (2022). Optimization of Extraction Conditions for Phenolic Compounds Extracted from Cassumunar Ginger (*Zingiber montanum*). Techno-Science Research Journal, vol. 10(2), 24-31
5. Sreypha Met, Peany Houng, Pichmony Ek, Pheakdey Yun & Sovannmony Lay (2022). Drying Kinetic and the Changes of Physicochemical Properties and Bioactive Contents of Dried Tomatoes during Hot Air Drying. Techno-Science Research Journal, vol. 10(1), 84-91

#### **Lists of Publications M-ECS**

1. Phearum Nop, Dona Valy, & Samedi Heng (2021). Digital Platform for Cambodian Agricultural Produce Based on Social and Human Values. Proceeding in the 10th Scientific Day of ITC, 116-120
2. LY Sivheng, TITH Dara, & LAY Heng (2021). Blockchain Application for Transparency, Traceability and Accessibility of The Donated Blood Information for Voluntary Blood Donors. Proceeding in the 10th Scientific Day of ITC, 121-125



3. Leangsros Lay, Dara Tith, & Heng Lay (2021). Designing Blockchain Application for Information Exchange of Blood Banks. Proceeding in the 10th Scientific Day of ITC, 107-111
4. BORN Seanghort, VALY Dona, & KONG Phutphalla (2021). Khmer Language Model for Handwritten Text Recognition on Historical Documents. Proceeding in the 10th Scientific Day of ITC, 112-115
5. Vanny Ratanak Chheang, Dona Valy & Dara Tith (2022). Distributed Authentication Infrastructure Using Public Key Infrastructure and Blockchain Platform. Techno Science-Research Journal, vol. 10, 10-27
6. Kokthay Poeng, Dara Tith & Phutphalla Kong (2022). Security Enhancement of Kubernetes Management in the Blockchain Platform for Building the Medical System for Information Exchange in Cambodia. Techno-Science Research Journal, vol. 10(2), 53-59

#### **Lists of Publications M-MIC**

1. Vanyi Chao, Sarot Srang, Morokot Sakal, & Chivorn Keo (2021). Landing Site Detection for Unmanned Aerial Vehicle based on YOLOv4-tiny Transfer Learning Model. Proceeding in the 10th Scientific Day of ITC, 92-97
2. Piseth Thok, Bunthern Kim, & Sokchea Am (2021). PMSM Sensorless Control for EVs Applications. Proceeding in the 10th Scientific Day of ITC, 83-87
3. Phayuth Yonrith, Sarot Srang, Morokot Sakal, & Boreth Sethy (2021). Indoor Localization for a Differential Drive Wheeled Mobile Robot using Sensor Fusion by Extended Kalman Filter. Proceeding in the 10th Scientific Day of ITC, 87-91
4. Hoksong Tim, Sarot Srang, & Morokot Sakal (2021). Numerical Design Approach of Gaseous Oxygen Injector for ABS/GOX Hybrid Rocket Motor. Proceeding in the 10th Scientific Day of ITC, 102-106
5. Sok An Siek, Sarot Srang, Hokly Sor & Dalin Soun (2021). Design and Prototyping of Solar Hybrid Switch Controller and Monitoring System. Techno Science-Research Journal, vol. 9(2), 44-52
6. Sotheara Oum, Sarot Srang & Phayuth Yonrith (2022). Integration of RRT\* Path Planning with Trajectory Tracking for Wheeled Mobile Robot. Techno Science-Research Journal, vol. 10(2), 60-65

#### **Lists of Publications M-TIE**

1. CHHIEV Vanda et al. A Study on Online Food Delivery Service Before And During Covid-19 Pandemic In Phnom Penh. International Journal of Social Science Research, [S.l.], v. 3, n. 4, p. 1-16, dec. 2021. ISSN 2710-6276
2. Ratha Chheng, Pharinet Pheng, Veng Kheang Phun, & Vanda Chhiev (2021). A Study on Improvement of Traffic Flow Along Russian Boulevard: Street 215 Case Study. Proceeding in the 10th Scientific Day of ITC, 42-47
3. Panha Yang, Veng Kheang Phun, & Hironori Kato (2021). Impact of Covid-19 on Paratransit Operate with Ride-Hailing Apps in Asian Developing Cities: The Phnom Penh Case. Proceeding in the 10th Scientific Day of ITC, 52-58
4. Udor Morm, Veng Kheang Phun, & Yat Yen (2021). Factors affecting the decision to change from Bajaj driver to other jobs, Phnom Penh Case. Proceeding in the 10th Scientific Day of ITC, 38-41
5. Chrinthony Soth, Veng Kheang Phun, & Sok Tetsya (2021). Evaluation of Structural Pavement by Using the Light Weight Deflectometer in Cambodia. Proceeding in the 10th Scientific Day of ITC, 166-169
6. Chrinthony Soth, Veng Kheang Phun, Sok Testya & Yit Bunna (2022). Evaluation of Structural Pavement (Foundation) by Using Light Weight Deflectometer in Cambodia. Techno-Science Research Journal, vol. 10(1), 16-25
7. Udor Morm, Veng Kheang Phun & Yat Yen (2022). FACTORS AFFECTING THE DECISION TO CHANGE FROM BAJAJ DRIVER TO OTHER JOBS, PHNOM PENH CASE. International Journal of Engineering Advanced Research, vol. 4 No. 3, 2710-7167

## Annex 8. List of Lecturers and Supervisors of GS for Doctoral Programs.

### List of Lecturers and Supervisors of D-WAE

No	Name of Lecturers/Supervisors	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	OEURNG Chantha	M	Doctorate	France	2010	Hydrology and Water Resources
2	HENG Sokchhay	M	Doctorate	Japan	2014	Water Resources
3	PICH Bunchoeun	M	Doctorate	Japan	2011	Geo-Environmental Engineering
4	PENG Chanthol	F	Doctorate	Japan	2019	Life Science and Technology
5	BUN Saret	M	Doctorate	Japan	2019	Environmental Engineering
6	ANN Vannak	M	Doctorate	Spain	2015	Water Science and Technology
7	CHHUON Kong	M	Doctorate	Philippines	2016	Environmental Engineering
8	TAN Reasmey	F	Doctorate	Japan	2011	Bioengineering
9	SENG Bunrith	M	Doctorate	Japan	2011	Integrated River Basin Management
10	DOUNG Ratha	M	Doctorate	Philippines	2015	Environmental Engineering
11	HENG Sokchhay	M	Doctorate	Japan	2014	Water Resources
12	TY Boreborey	F	Doctorate	Philippines	2016	Groundwater treatment process, Environmental Engineering
13	HAK Danet	F	Doctorate	Japan	2016	Mechanical and Environmental Informatics, Environmental Engineering
14	PHUN Veng Kheang	M	Doctorate	Japan	2013	Transport Engineering, Planning, Environment, and Policy

### List of Lecturers and Supervisors of D-ETM

No	Name of Lecturers/Supervisors	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	OR Chanmoly	M	Doctorate	Japan	2014	Petroleum Production Engineering
2	BUN Long	M	Doctorate	France	2011	Electrical Engineering
3	CHAN Sarin	M	Doctorate	Indonesia	2011	Refrigeration and Air Conditioning
4	VAI Vannak	M	Doctorate	France	2017	Electrical Engineering
5	CHRIN Phok	M	Doctorate	France	2016	Electrical Energy
6	AM Sokchea	M	Doctorate	France	2016	Electronics
7	KRET Kakada	M	Doctorate	Japan	2019	Exploration Geophysics

### List of Lecturers and Supervisors of D-FTN

No	Name of Lecturers/Supervisors	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	CHUNGHIEG Thavrith	M	Doctorate	France	2003	Food and Biotechnology
2	MITH Hasika	M	Doctorate	Belgium	2014	Food Science
3	TAN Reasmey	F	Doctorate	Japan	2011	Bio-engineering
4	IN Sokneang	F	Doctorate	France	2012	Science and processes of Food and bio-products, Agriculture Biology Environment Health
5	PHAT Chanvorleak	F	Doctorate	South Korea	2016	Food Chemistry
6	SOUNG Malyna	F	Doctorate	France	2017	Mécanismes des Interactions Parasitaires Pathogènes et Symbiotiques
7	VONGCHANH Kinnaeth	F	Doctorate	Indonesia	2010	Engineering in Mechanical Engineering

### List of Lecturers and Supervisors of D-MIT

No	Name of Lecturers/Supervisors	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	OM Romny	M	Doctorate	Japan	2002	System Engineering
2	SRANG Sarot	M	Doctorate	Japan	2014	Dynamical System Modeling, Estimation and Adaptive Control
3	SRENG Sokchenda	M	Doctorate	France	2012	Telecommunications and Network
4	LIN Mongkolsery	M	Doctorate	Thailand	2014	Applied Mathematics
5	PO Kimtho	M	Doctorate	Japan	2009	Communication Engineering
6	VALY Dona	M	Doctorate	Belgium	2020	Science de l'ingénieur et technologie
7	CHRIN Phok	M	Doctorate	France	2016	Electrical Energy
8	SIM Tepmony	M	Doctorate	France	2016	Applied Mathematics, Signal and Image Processing

### List of Lecturers and Supervisors of D-MSS

No	Name of Lecturers/Supervisors	Sex	Qualification			Specialization
			Latest degree	From	Year	
1	NGUON Kollika	M	Doctorate	Japan	2012	Water Hammer, Fluid-Structure Interaction
2	VONG Seng	M	Doctorate	Japan	2006	Civil Engineering
3	HAN Virak	M	Doctorate	Japan	2006	Construction Materials
4	BUN Kimngun	M	Doctorate	Malaysia	2013	Materials Engineering
5	YOS Phanny	M	Doctorate	Japan	2014	Materials Engineering
6	SEANG Chansopheak	M	Doctorate	France	2013	Civil and Mechanical Engineering
7	CHEA Savuth	M	Doctorate	France	2007	Highway Engineering and Design

8	LIM Sovanvichet	M	Doctorate	France	2012	Structural Engineering
9	KAING Saoserey	M	Doctorate	France	2008	Bridge Engineering
10	HENG Sokbil	M	Doctorate	Japan	2011	Geotechnical Engineering
11	HORNG Vuthy	M	Doctorate	Japan	2010	Civil Engineering
12	SENG Sokchan	M	Doctorate	Japan	2012	Civil Engineering
13	DOUNG Piseth	M	Doctorate	Japan	2020	Civil Engineering
14	ENG Chandoeun	M	Doctorate	Japan	2018	
15	HIN Raveth	M	Doctorate	France	2017	Mechanics
16	PROK Narith	M	Doctorate	Japan	2016	Civil Engineering
17	RATH Sovann Sathya	F	Doctorate	Japan	2016	Civil Engineering
18	OUCH Rithy	M	Doctorate	Thailand	2016	GeoEnvironment

## **Annex 9. List of PhD Thesis.**

(List arranged by degree, field/specialization, and chronological order)

### **List of PhD Theses D-WAE**

SOK Ty (2021). *Dynamic transport of the sediment and nutrient in the Mekong River Basin and the role of the Tonle Sap Lake: Assessment coupling data and modelling approaches*, [Doctoral Thesis, Water and Environment, Institute of Technology of Cambodia]

SONG Layheang (2021). *Land use, surface runoff, soil erosion: multi-scale impact assessment of teak tree plantation management in a tropical humid mountainous agro-ecosystem*, [Doctoral Thesis, Water and Environment, Institute of Technology of Cambodia]

MUON Ratha (2022). *Termite bioturbation in Cambodia – From characterization to application*, [Doctoral Thesis, Water and Environment, Institute of Technology of Cambodia]

SANG Davin (2023). *Influence of the coagulation-flocculation-sedimentation on the adsorption of micropollutants onto activated carbon*, [Doctoral Thesis, Water and Environment, Institute of Technology of Cambodia]

### **List of PhD Theses D-ETM**

KHON Kimsrornn (2022). *Planning of Rural LV AC/DC Microgrids with PV and Storage*, [Doctoral Thesis, Energy Technology and Management, Institute of Technology of Cambodia]

### **List of PhD Theses D-FTN**

SROY Sengly (2021). *Importance of Freshwater fish from Tonle Sap Lake for food and nutrition in Cambodia*, [Doctoral Thesis, Food Technology and Nutrition, Institute of Technology of Cambodia]

PHUONG Hengsim (2022). *Extrusion Coupled with Enzymatic Hydrolysis for the Extraction of Hydrosoluble Compounds of the Red Algae *Gracilaria gracilis**, [Doctoral Thesis, Food Technology and Nutrition, Institute of Technology of Cambodia]

YIN Molika (2022). *Study of Turmeric (*Curcuma longa* L.) Processes in Cambodia - Impact on Sensorial and Functional Quality*, [Doctoral Thesis, Food Technology and Nutrition, Institute of Technology of Cambodia]

### **List of PhD Theses D-MIT**

KONG Phutphalla (2022). *Visual Attention: Top-down and Bottom-up Information Relative Importance*, [Doctoral Thesis, Mechatronics and Information Technology, Institute of Technology of Cambodia]

### **List of PhD Theses D-MSS**

BUN Polyka (2022). *Development and Optimization of Ceramic Roof Tiles Incorporating with Industrial Waste*, [Doctoral Thesis, Materials Science and Structures, Institute of Technology of Cambodia]

HENG Sounean (2022). *The Study of the Cracking Sensitivity of Geopolymers*, [Doctoral Thesis, Materials Science and Structures, Institute of Technology of Cambodia]

MOM Sokvisal (2022). *Multi-scale modeling of thermal properties of cement-based materials*, [Doctoral Thesis, Materials Science and Structures, Institute of Technology of Cambodia]

## **Annex 10. List of Publications by PhD students.**

(List arranged by degree, field/specialization, and chronological order)

### **Lists of Publications of D-WAE**

1. Sok Ty & Oeurng Chantha & Ich Ilan & Sauvage Sabine & Sánchez Pérez José (2020). Assessment of Hydrology and Sediment Yield in the Mekong River Basin Using SWAT Model. *Water*. 12. 3503. 10.3390/w12123503.
2. Sok Ty & Oeurng Chantha & Kaing Vinhteang & Sauvage Sabine & Kondolf george 'mathias & Sánchez Pérez José (2021). Assessment of Suspended Sediment Load Variability in the Tonle Sap and Lower Mekong Rivers, Cambodia.
3. L. Song et al., "Understory Limits Surface Runoff and Soil Loss in Teak Tree Plantations of Northern Lao PDR," *Water*, vol. 12, no. 9, 2020, doi: 10.3390/w12092327.
4. Muon, R., Lai, C., Bureau-Point, E., Chassagne, F., Wieringa, F., Berger, J., ... & Jouquet, P. (2022, May). Termite mounds in Cambodian paddy fields. Are they always kept for improving soil quality? In EGU General
5. Muon, R., Lai, C., Hervé, V., Zaiss, R., Chassagne, F., Bureau-Point, E., ... & Jouquet, P. Abundance, perceptions and utilizations of termite mounds in Cambodia. *Soil Use and Management*.
6. L. Song et al., "Understory Limits Surface Runoff and Soil Loss in Teak Tree Plantations of Northern Lao PDR," *Water*, vol. 12, no. 9, 2020, doi: 10.3390/w12092327.
7. Muon, R., Lai, C., Bureau-Point, E., Chassagne, F., Wieringa, F., Berger, J., ... & Jouquet, P. (2022, May). Termite mounds in Cambodian paddy fields. Are they always kept for improving soil quality?. In EGU General Assembly Conference Abstracts (pp. EGU22-55).
8. Muon, R., Lai, C., Hervé, V., Zaiss, R., Chassagne, F., Bureau-Point, E., ... & Jouquet, P. Abundance, perceptions and utilizations of termite mounds in Cambodia. *Soil Use and Management*.
9. Sang, D., Cimetiere, N., Giraudet, S., Tan, R., Wolbert, D., & Le Cloirec, P. (2022). Online SPE-UPLC-MS/MS for herbicides and pharmaceuticals compounds' determination in water environment: A case study in France and Cambodia. *Environmental Advances*, 8, 100212.
10. Sang, D., Cimetiere, N., Giraudet, S., Tan, R., Wolbert, D., & Le Cloirec, P. (2022). Adsorption-desorption of organic micropollutants by powdered activated carbon and coagulant in drinking water treatment. *Journal of Water Process Engineering*, 49, 103190.
11. Sang, D., Chiemchaisri, C., & Chiemchaisri, W. (2022). Purification of polluted surface water by sponge moving bed membrane bioreactor with short hydraulic retention time operation. *Water and Environment Journal*, 36(4), 633-643.

### **Lists of Publications of D-ETM**

1. Kimsrornn Khon, Marie-Cécile Alvarez-Herault, Vannak Vai, Simon Fichtner, Long Bun, et al.. Optimal design of low voltage AC/DC microgrid. (SGE 2020, Nov 2020, Nantes, France. fhal-03324217f
2. Khon K, Chhlonh C, Vai V, Alvarez-Herault M-C, Raison B, Bun L. Comprehensive Low Voltage Microgrid Planning Methodology for Rural Electrification. *Sustainability*. 2023; 15(3):2841. <https://doi.org/10.3390/su15032841>
3. K. Khon, V. Vai, M. . -C. Alvarez-Herault, L. Bun and B. Raison, "planning of low voltage AC/DC microgrid for un-electrified areas," *CIREN 2021 - The 26th International Conference and Exhibition on Electricity Distribution*, Online Conference, 2021, pp. 2674-2678, doi: 10.1049/icp.2021.1518.

### **Lists of Publications of D-FTN**

1. Sroy, S., Arnaud, E., Servent, A., In, S., & Avallone, S. (2021). Nutritional benefits and heavy metal contents of freshwater fish species from Tonle Sap Lake with SAIN and LIM nutritional score. *Journal of Food Composition and Analysis*, 96, 103731.
2. Sroy, S., Servent, A., Sriwichai, W., In, S., & Avallone, S. (2021). Use of an experimental design to optimise the saponification reaction and the quantification of vitamins A1 and A2 in whole fish. *International Journal for Vitamin and Nutrition Research*.
3. Phuong, H., Massé, A., Dumay, J., Vandanjon, L., Mith, H., Legrand, J., & Arhaliass, A. (2022). Enhanced Liberation of Soluble Sugar, Protein, and R-Phycoerythrin Under Enzyme-Assisted Extraction on Dried and Fresh *Gracilaria gracilis* Biomass. *Frontiers in Chemical Engineering*, 4, 21
4. Yin, M., Bohuon, P., Avallone, S., In, S., & Weil, M. (2022). Postharvest treatments of turmeric (*Curcuma longa* L.) in Cambodia-Impact on quality. *Fruits*, 77 (6) : pp. 1-13
5. Yin, M., Weil, M., Avallone, S., Lebrun, M., Conejero, G., In, S., & Bohuon, P. (2022). Impact of cooking and drying operations on color, curcuminoids, and aroma of *Curcuma longa* L. *Journal of Food Processing and Preservation*, 46(5), e16643.
6. Yin, M., Weil, M., Avallone, S., Maraval, I., Forestier-Chiron, N., Servent, A., ... & Bohuon, P. (2023). Impact of cooking, drying and grinding operations on chemical content, functional and sensorial qualities of *Curcuma longa* L. *Journal of Food Measurement and Characterization*, 17(1), 998-1008.

### **Lists of Publications of D-MIT**

1. P. Kong, M. Mancas, B. Gosselin, and K. Po, "DeepRare: Generic Unsupervised Visual Attention Models," CoRR, vol. abs/2109.11439, 2021, [Online]. Available : <https://arxiv.org/abs/2109.11439>. (Conferences)
2. M. Matei, P. Kong, and B. Gosselin, "Visual Attention: Deep Rare Features," CoRR, vol. abs/2005.12073, 2020, [Online]. Available: <https://arxiv.org/abs/2005.12073>. (Conferences)
3. Kong Phutphalla & Mancas Matei & Back Mr & Kheang Seng & Gosselin Bernard (2018). Do Deep-Learning Saliency Models Really Model Saliency?. 2331-2335. 10.1109/ICIP.2018.8451809.
4. Kong Phutphalla & Mancas Matei & Kheang Seng & Gosselin Bernard (2018). Saliency and Object Detection.

### **Lists of Publications of D-MSS**

1. Sounean, H., Kinda, H., & Aveline, D. (2021, May). The Cracking Sensitivity of a Na-Geopolymer. In *International RILEM Conference on Early-Age and Long-Term Cracking in RC Structures: CRC 2021* (pp. 165-174). Cham: Springer International Publishing.
2. Mom, S., Hoeun, S., Bernard, F., Kamali-Bernard, S., & Han, V. (2022). The Effect of Thermal Contact Conductance (TCC) Between Aggregate Inclusion and Matrix on Thermal Conductivity of Cement-Based Material. *International Journal of Integrated Engineering*, 14(5), 99-106.
3. Bun, P., & Espion, B. (2011, September). Fatigue behavior of high performance concrete in compression. In *International RILEM Conference on Advances in Construction Materials Through Science and Engineering* (pp. 772-776). RILEM Publications SARL.

**Annex 11. ITC lecturers in overseas post-graduate program (2022-2023).**

<b>No</b>	<b>Nom et prénom</b>	<b>Sexe</b>	<b>Dépt.</b>	<b>Diplôme préparé</b>	<b>Université</b>	<b>Pays</b>	<b>Financement</b>
1	KETH Kannary	F	GAR	Doctorat	Université Libre de Bruxelles	Belgique	ARES
2	KETH Kannary	F	GAR	Doctorat	Université Libre de Bruxelles	Belgique	ARES
3	LONG Makara	M	GAR	Doctorat	Université de Liège	Belgique	ARES
4	TAING Kinmenh	F	GAR	Doctorat	Université de Liège	Belgique	ARES
5	BUN Menghorng	M	GEE	Doctorat	ITC-Toulouse INP	Cambodge + France	HEIP + ITC
6	CHHLONH Chhith	M	GEE	Doctorat	Grenoble INP	France	BGF
7	SOK Vattanak	M	GEE	Doctorat	Myongi University	Corée du sud	Laboratory
8	VANN Veasna	M	GEE	Master	National Chung Cheng University	Tawain	National Chung Cheng University Scholarship
9	CHHUN Chanmaly	F	GGG	Postdoctoral	Kyushu University	Japan	JICA
10	MAO Pisith	M	GGG	Postdoctoral	China University of Mining and Technology (CUMT)	China	CUMT
11	NGO Ichhuy	M	GGG	Postdoctoral	China University of Mining and Technology (CUMT)	China	CUMT
12	POENG Kokthay	M	GIC	Doctorat	Université de Namur	Belgique	ARES-CCD
13	SAM Ban	M	GIM	Doctorat	IMT Mines Albi	France	BGF
14	SENG Sunhor	M	GIM	Postdoctoral	Kanazawa University	Japon	University
15	CHIN Chan Daraly	M	GTR	Doctorat	Toulouse INP	France	BGF-MOYES
16	KEAN Jeudy	M	GTR	Doctorat	Toulouse INP	France	BGF-MOYES
17	TEP Sovichea	M	GTR	Doctorat	Toulouse INP	France	HEIP-ITC



**Annex 12. ITC students in overseas post-graduate program (2022-2023).**

No	Name	Sex	Dept.	Degree	Receiving University	Country	Financing
1	CHEA Rothvichea	M	GEE	Master	Mine Ales	France	Erasmus
2	EM Tithnorakneath	M	GEE	Master	Chulalongkorn University	Thailand	ASEAN/Non-ASEAN Scholarship
3	KHAN Sopanha	M	GEE	Master	Sepuluh Nopember Institute of Technology (ITS)	Indonesia	KNB-ANU Seed Net
4	LIM Vanthien	M	GEE	Master	KMUTT	Thailand	JGSEE scholarship
5	LORM Rathana	M	GEE	Master	Sirindhorn International Institute of Technology, Thammasart University	Thailand	EFS-Excellent Foreign Students
6	SENG Ou	M	GEE	Master	Sepuluh Nopember Institute of Technology (ITS)	Indonesia	KNB-ANU Seed Net
7	SOUN Dalin	F	GEE	Master	Mine Alès	France	EIFFEL
8	SUK Sievlong	M	GEE	Master	Sepuluh Nopember Institute of Technology (ITS)	Indonesia	KNB-ANU Seed Net
9	YOU Lyhour	M	GEE	Master	Chulalongkorn University	Thailand	ASEAN/Non-ASEAN Scholarship
10	BUTH Chitra	M	GGG	Master	Chularlongkorn University	Thailand	Asean and Non-Asean Scholarship
11	SYN Sak	M	GGG	Master	Curtin University	Australia	Curtin University + Own Financial
12	THARN Tina	M	GGG	Master	Chularlongkorn University	Thailand	Asean and Non-Asean Scholarship
13	CHOENG Veyseng	M	GIC	Master	Tokyo Institute of Technology	Japan	MEXT
14	HOUR Chan Pisey	M	GIC	Master	Chongqing University of Technology	China	Chongqing Automobile Company

15	KUOCH Naro	M	GIC	Master	Université Côte d'Azur	France	IDEX Scholarship
16	NART Somalika	F	GIC	Master	Chongqing University of Technology	China	Chongqing Automobile Company
17	NOUV Ratanakmuny	M	GIC	Engineering	ENSIIE	France	Eiffel Scholarship Program
18	ROS Sereiwathna	M	GIC	Doctorat	Chungbuk National University	South Korea	MSIS Lab
19	ROU Senghak	M	GIC	Diplôme d'ingénieur	ENSAE Paris	France	Eiffel Scholarship Program
20	TE Lyhourt	M	GIC	Master	University of Pécs	Hungary	Stipendium Hungaricum Scholarship
21	THO Tharath	M	GIC	Master	Chongqing University of Technology	China	Chongqing Automobile Company
22	TRY Sreyna	F	GIC	Master	Chongqing University of Technology	China	Chongqing Automobile Company
23	UN Lykong	F	GIC	Master	University Claude Bernard Lyon 1	France	Self Support
24	ANG Raksmeay	M	GRU	Doctorat	Tokyo Institute of Technology	Japon	MEXT scholarship
25	CHIEN Sothearath	M	GRU	Master	Hohai university	Chine	Mekong Lancang Cooperation
26	CHUY Voucheng	F	GRU	Master	Chulalongkorn Universtiy	Thaïlande	ASEAN countries program
27	HENG Seangmeng	F	GRU	Master	Hohai university	Chine	Mekong Lancang Cooperation
28	HUONG Oudom satia	M	GRU	Master	Kyungpook National University	Korea	BK21 Four Scholarship
29	Ich Ilan	M	GRU	Master	North west Agriculture and Forestry University	Chine	Chinese Government Scholarship
30	IT Soklin	F	GRU	Master	Chulalongkorn Unviversité	Thaïland	ASEAN countries program
31	KA Koemsreang	F	GRU	Master	Chulalongkorn Unviversité	Thaïland	ASEAN countries program
32	KAING Vinhtang	F	GRU	Doctorat	Tokyo Institute of Technology	Japon	MEXT scholarship
33	KET Dydarong	M	GRU	Master	Chulalongkorn Unviversité	Thaïland	ASEAN countries program
34	KHE Sotheanea	F	GRU	Master	Chulalongkorn Unviversité	Thaïland	ASEAN countries program
35	KHOEUN Chanseyma	F	GRU	Master	Chulalongkorn Unviversité	Thaïland	ASEAN countries program

36	KONG Phearun	M	GRU	Master	Hohai University	Chine	Mekong Lancang Cooperation
37	NAI Chhaiheang	M	GRU	Master	Hohai University	Chine	Mekong Lancang Cooperation
38	NY Sithy	M	GRU	Master	Chulalongkorn Universtiy	Thailande	ASEAN countries program
39	PANG Sreynich	F	GRU	Master	Chulalongkorn Universtiy	Thailande	ASEAN countries program
40	PECH Ponleu	M	GRU	Master	Chulalongkorn Universtiy	Thailande	ASEAN countries program
41	PHY Sophea rum	M	GRU	Master	Kyoto Univesity	Japon	MEXT
42	RY Nakrin	M	GRU	Master	Hohai University	Chine	Chinese Government Scholarship program
43	SAMRITH Chanponloeurothana	F	GRU	Master	Chulalongkorn Unviversité	Thailand	ASEAN countries program
44	TAING Eangthay	M	GRU	Master	Chulalongkorn Unviversité	Thailand	ASEAN countries program
45	TANG Eamlong	M	GRU	Master	Chulalongkorn Unviversité	Thailand	ASEAN countries program
46	TES Davin	M	GRU	Master	Tokyo Institute Of Technology	Japan	MEXT Scholarship
47	THA Theara	M	GRU	Doctorat	Chulalongkorn University	Thailande	Joint CU-SEI PhD program
48	THOY Sophon	M	GRU	Master	Hohai University	Chine	Mekong Lancang Cooperation
49	TRY Sophal	M	GRU	Post-Doctorat	Kyoto University	Japon	Japan Society for the Promotion of Science ( JSPS)
50	VET Sreyla	F	GRU	Master	Kanazawa Univesity	Japon	MEXT
51	YOS Chantharath	F	GRU	Master	Chulalongkorn Universtiy	Thailand	ASEAN countries program
52	CHEK Nita	F	GTR	Master	IMT Mines Alès	France	ERASMUS+

**Annex 13. Short-term overseas capacity building for lecturers (2022-2023).**

<b>No</b>	<b>Nom et prénom</b>	<b>Sexe</b>	<b>Dépt.</b>	<b>Université d'accueil</b>	<b>Titre</b>	<b>Date de mission</b>	<b>Financement</b>
1	LONG Sovann	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	03/04/2022-14/04/2022	Erasmus+
2	CHAU Sarwaddy	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	03/04/2022-14/04/2022	Erasmus+
3	HENG Theany	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	03/04/2022-14/04/2022	Erasmus+
4	SUN Sopheak	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	03/04/2022-14/04/2022	Erasmus+
5	MAO Chanrattanak	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	03/04/2022-14/04/2022	Erasmus+
6	MENG Chany	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	03/04/2022-14/04/2022	Erasmus+
7	LONG Sovann	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	06/05/2023-22/03/2023	Erasmus+
8	CHAU Sarwaddy	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	06/05/2023-22/03/2023	Erasmus+
9	HENG Theany	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	06/05/2023-22/03/2023	Erasmus+
10	SUN Sopheak	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	06/05/2023-22/03/2023	Erasmus+
11	MAO Chanrattanak	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	06/05/2023-22/03/2023	Erasmus+
12	MENG Chany	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	06/05/2023-22/03/2023	Erasmus+
13	CHEAM Ang	M	DTC	Universitaire Paris-Sclay	Physics Lab Training	06/05/2023-22/03/2023	Erasmus+
14	KAN Kuchvichea	M	GCI	Kyushu University	Urban Heritage Preservation	05/02/2023-18/02/2023	JST
15	CHOU Koksai	M	GEE	Bangkok	Management meeting and industry 4.0	13/01/2023 - 20/01/2023	Erasmus+ Factori 4.0 project
16	CHRIN Phok	M	GEE	Toulouse INP	Hydroponic Discussion	29/08/2023 - 10/09/2022	LBE-Jica
17	ENG Samphors	F	GEE	Bangkok	Management meeting and industry 4.0	13/01/2023 - 20/01/2023	Erasmus+ Factori 4.0 project

18	Kim Bunthern	M	GEE	TCTP Thailand	Training on Solar PV	15/05/2022 - 04/06/2023	Jica
19	Sorn Darong	M	GEE	TCTP Thailand	Training on Solar PV	15/05/2022 - 04/06/2023	Jica
20	VAIVannak	M	GEE	Grenoble INP	Visiting Researcher	12/09/2022 - 11/09/2023	Laboratory
21	Boeut Sophea	F	GGG	Hokkaido University	Laboratory testing and discussion geotechnical engineering	4 -17 December, 2022	LBE-JICA
22	Boeut Sophea	F	GGG	Chulalongkorn University	Training on improving Techno-Science Research Journal in preparation to apply for ASEAN Citataion Index (ACI)	6 -10 June, 2022	HEIP
23	Bun Kim Ngun	M	GGG	Chulalongkorn University	Training on Final curriculumn development and laboratory setup guidance for materials science and engineering program	18 -23 July 2022	HEIP
24	Eng Chandoeun	M	GGG	Kyushu University	Training on operation of X-Ray equipment (XRD and XRF)	28 Sept - 13 October 2022	LBE-JICA
25	Eng Chandoeun	M	GGG	University of Liege	Training on geophysical application in geotechnical engineering	31 Aug -15 September 2022	HEIP
26	Heng Muoy Yi	F	GGG	University of Liege	Training on geophysical application in geotechnical engineering	31 Aug -15 September 2022	HEIP
27	Heng Ratha	M	GGG	King Mongkut's University of Technology Thonburi (KMUTT), Thailand	Enhance production capacity and people's Livelihood by improving the Value chain for Cassava Cultivation and Application: Clean Cassava chips, Native starch, Modified Starch, Ethanol and Biogas Production	11 -17 December 2022	Lancang_Mekong Cooperation Special Fund

28	Heng Ratha	M	GGG	Kyushu University	Oral presentation in International Symposium on Earth Science and Technology 2022	29 November -03 December 2022	HEIP
29	Kret Kakda	M	GGG	Kyushu University	Economic Geology	25 September -03 October 2022	LBE-JICA
30	Pech Sopheap	F	GGG	Kyushu University	Oral presentation in International Symposium on Earth Science and Technology 2022	29 November -03 December 2022	HEIP
31	Seang Sirisokha	F	GGG	Kyushu University	Economic Geology	25 September -03 October 2022	LBE-JICA
32	Sio Sreymean	F	GGG	Kyushu University	Oral presentation in International Symposium on Earth Science and Technology 2022	29 November -03 December 2022	HEIP
33	Yos Phanny	M	GGG	Kyushu University	Training on operation of X-Ray equipment (XRD and XRF)	28 September - 13 October 2022	LBE-JICA
34	Yos Phanny	M	GGG	Chulalongkorn University	Training on finalization 5 course syllabi and preparation the teaching materials of 5 subjects for materials science and enigneering	11 -14 September, 2022	HEIP
35	Yos Phanny	M	GGG	Chulalongkorn University	Training on Final curriculum development and laboratory setup guidance for materials science and engineering program	17 -23 July 2022	HEIP
36	Yos Phanny	M	GGG	University of Sains Malaysia	Analysis of Fourier-transform infrared specstroscopy (FTIR), Rebound Resilience, and Abraisin Resistance of Rubber Composites, and Skills	19 June -02 July, 2022	HEIP

					Improvement on Rubber Latex Foam and Film Compounding		
37	Yos Phanny	M	GGG	MTEC, Thailand Science park	Training on advanced materials characterization techniques for young researchers from ASEAN member countries	27 -30 November, 2022	COSTI
38	BOU Channa	M	GIC	Institut de Médecine Tropicale, Belgique	Consortium Meeting of HITIHE Porject	04-07-2022→08-07-2022	Erasmus+ KA2
39	BOU Channa	M	GIC	Bangkok, Thaïlande	Forum régional de l'enseignement supérieur	09-05-2023→13-05-2023	ADB
40	CHHEANG Vanny Ratanak	M	GIC	Université de Namur, Belgique	Internship on Research Project	15-05-2022→13-08-2022	Erasmus+
41	CHHEANG Vanny Ratanak	M	GIC	Vietnam National University, Vietnam	MONTUS project meeting	07-11-2022→11-11-2022	Erasmus+ KA2
42	CHOM Sreylam	F	GIC	Institut de Médecine Tropicale, Belgique	Consortium Meeting of HITIHE Porject	04-07-2022→08-07-2022	Erasmus+ KA2
43	CHOM Sreylam	F	GIC	University of Gadjah Mada, Indonesia	HITIHE Porject Meeting	28-11-2022→02-12-2022	Erasmus+ KA2
44	HENG Rathpisey	M	GIC	University of Ferrara, Italy	MONTUS project meeting	05-09-2022→07-09-2022	Erasmus+ KA2
45	HENG Rathpisey	M	GIC	Vietnam National University, Vietnam	MONTUS project meeting	07-11-2022→11-11-2022	Erasmus+ KA2
46	HOK Tin	M	GIC	Université de Namur, Belgique	Recherche sur le thème Cryptographie	21-03-2023→12-04-2023	Erasmus+
47	LAY Heng	M	GIC	Curtin University, Malaysia	Meeting and Discussion new IT International Program	07-06-2022→11-06-2022	World Bank

48	LAY Heng	M	GIC	Seoul, Korea	Korean Startup Eco-system	19-06-2022→01-07-2022	KOICA
49	LAY Heng	M	GIC	University of Danang, Vietnam	MONTUS project meeting	04-07-2022→08-07-2022	Erasmus+ KA2
50	LAY Heng	M	GIC	University of Ferrara, Italy	MONTUS project meeting	05-09-2022→07-09-2022	Erasmus+ KA2
51	LAY Heng	M	GIC	Vietnam National University, Vietnam	MONTUS project meeting	07-11-2022→11-11-2022	Erasmus+ KA2
52	LAY Heng	M	GIC	University of Gadjah Mada, Indonesia	HITIHE Porject Meeting	28-11-2022→02-12-2022	Erasmus+ KA2
53	LAY Heng	M	GIC	Kuala Lumpur, Malaisie	Réunion du projet DX.SEA	21-05-2023→27-05-2023	Erasmust+ KA2 DX.SEA
54	POENG Kokthay	M	GIC	Université de Namur, Belgique	Internship on Research Project	15-05-2022→13-08-2022	Erasmus+
55	SREY Sokhom	F	GIC	Seoul, Korea	Korean Startup Eco-system	19-06-2022→01-07-2022	KOICA
56	VALY Dona	M	GIC	Kuala Lumpur, Malaisie	Réunion du projet DX.SEA	21-05-2023→27-05-2023	Erasmust+ KA2 DX.SEA
57	Vongchanh Kinnalesh (speaker)	F	GIM	Department of Mechanical engineering, faculty of engineering, National University of Laos	Introduction to Thermal Lab and the implementation of research and projects and sources of funding	2-4 May 2023	Financement personnel
58	Vongchanh Kinnalesh (speaker)	F	GIM	Department of Mechanical engineering, faculty of engineering, National University of Laos	Thermal comfort and Energy audit procedure Example of EA results in school	2-4 May 2024	Financement personnel
59	ANN Vannak	M	GRU	Universita de Lorraine (France), Universita Libre de Bruxelles (Belgique)	Strategie, Pilotage, Formation, Recherche, Doctorat et Internationale.	26-30 September 2022	PURSEA -ERASMUS+ programme



60	ANN Vannak	M	GRU	Can Tho Univeristy, Hanoi University, Viet Nam	Development of innovative multilevel formation programs for the new water leading professionals in South-East Asia	30 October 2022 - 06 November 2022	INOWAsia - ERASMUS + Program
61	BUN Saret	M	GRU	ENSGTI-UPPA	Training on Sludge Management and Treatment Process and consultation meeting with partner universities on improving Engineering and Master Program	18 June 2022 - 01 July 2022	EU/AFD
62	CHHUON Kong	M	GRU	ENSGTI-UPPA	Training on Sludge Management and Treatment Process and consultation meeting with partner universities on improving Engineering and Master Program	18 June 2022 - 01 July 2022	EU/AFD
63	CHHUON Kong	M	GRU	Chulalongkorn University	Curriculum finalization for Master of Water and Environmental Engineering (MWEE) and preparation of master program towards AUN-QA	21-27 August 2022	HEIP
64	CHHUON Kong	M	GRU	Can Tho and Ha Noi (Vietnam)	Biannual Steering Committee of the INOWASIA project	30 October 2022 - 06 November 2022	INOWAsia - ERASMUS + Program
65	CHHUON Kong	M	GRU	Mahidol University	Final Workshop of LandSAGE 4 project	23-24 Febraury 2023	LANDSAGE 4-EU
66	EANG Khyeam	M	GRU	Can Tho and Ha Noi (Vietnam)	Biannual Steering Committee of the INOWASIA project	30 October 2022 - 06 November 2022	INOWAsia - ERASMUS + Program
67	HANG Leakhena	F	GRU	University Technology Malaysia	2nd Regional Congress on Membrane Technology 2022 (RCOM 2022) & 16th	21-22 September 2022	AUN/SEED-Net

					AUN/SEED-Net Regional Conference on Environmental Engineering 2022 (RCEnvE 2022)		
68	HANG Leakhena	F	GRU	Kanazawa University, Japan	Training on optimization of air sampling procedure and air pollutants analysis	01-10 October 2022	HEIP
69	HEU Rina	F	GRU	Brunel University London	Join Conference of Sustainable Energy and Environmental Protection (SEEP 2022)	12-15 September 2022	HEIP
70	HEU Rina	F	GRU	ENSGTI-UPPA	Consultation meeting and Training	18 June 2022 - 01 July 2022	EU/AFD
71	KET Pinnara	F	GRU	ENSGTI-UPPA	Training on Sludge Management and Treatment Process and consultation meeting with partner universities on improving Engineering and Master Program	18 June 2022 - 01 July 2022	EU/AFD
72	LUN Sambo	M	GRU	Mahidol University	Final Workshop of LandSAGE 4 project	23-24 February 2023	LANDSAGE 4-EU
73	SOK Ty	M	GRU	Aalto University, Finland	Training	19-28 August 2022	HEIP
74	SOK Ty	M	GRU	Institute of Natural Products Chemistry	International Conference on Surface water quality in Asia MEga City: Monitoring and Management	12-14 January 2023	APN grant
75	SOK Ty	M	GRU	SUMERNET Programme	SUMERNET Annual Meeting	09 November 2022 - 12 February 2023	SUMERNET
76	SONG Layheang	M	GRU	Aalto University	Training on Flood and Drought Risk forecasting and Early Warning System using Real-Time Data from Automatic Telemetry Water level and Rain gauge	19-28 August 2022	HEIP
77	CHHORN Sopheaktra	M	GTR	IMT Mines Alès	Electronique Embarqué pour Mécatronique	11 - 21 July 2022	HEIP-ITC

78	CHHORN Sopheaktra	M	GTR	IEEE Japan office	The IEEE 8th World Forum on Internet of things	29-Oct to 6-Nov-2022	HEIP-ITC-SGA#02
79	KEAN Jeudy	M	GTR	Toulouse INP	EMC Experiment and Data Collection	26 Nov - 11 Dec 2022	HEIP-ITC-SGA#03
80	NGETH Rithea	M	GTR	Tokyo Tech	Short Training	12-25 Feb. 2023	JICA LBE project
81	PEC Rothna	M	GTR	IMT Mines Alès	Développement des Curriculum et Syllabus pour le program Master MIC	11 - 21 July 2022	HEIP-ITC
82	PEC Rothna	M	GTR	IMT Mines Alès	System engineering architecture, Project design	16 - 27 January 2023	ERASMUS+
83	PEC Rothna	M	GTR	APAN55 Conference, Nepal	Asi@Connect IBN@TEIN project meeting	12 - 17 March 2023	Asi@Connect IBN@TEIN project
84	PEC Rothna	M	GTR	Huawei Headquarter, China	Huawei ICT Competition 2022-2023 Global Final	24 - 27 Mai 2023	Huawei
85	SRENG Sokchenda	M	GTR	IMT Mines Alès	Intelligence Artificiel pour Mécatronique	11 - 21 July 2022	HEIP-ITC
86	SRENG Sokchenda	M	GTR	Toulouse INP	Reverberation Chamber contruction and validation	26 Nov - 11 Dec 2022	HEIP-ITC-SGA#03
87	SRENG Sokchenda	M	GTR	IMT Mines Alès	System engineering requirement, Project design	16 - 27 January 2023	ERASMUS+
88	SRENG Sokchenda	M	GTR	APAN55 Conference, Nepal	Asi@Connect IBN@TEIN project meeting	12 - 17 March 2023	Asi@Connect IBN@TEIN project
89	SRENG Sokchenda	M	GTR	Toulouse INP	Formation de formateur	24 Avril 2023 - 17 Mai 2023	ERASMUS+
90	THOURN Kosorl	M	GTR	Singapore	- Consortium Meeting of ASEAN Factori 4.0 Project - Industrial Transformation ASIA Pacific 2022	10-20 Oct. 2022	ASEAN Factori 4.0 Erasmus+ Project
91	THOURN Kosorl	M	GTR	Chulalongkorn University and Kasetsat University	- Consortium Meeting of ASEAN Factori 4.0 Project - ICA-SYM 2023	13-19 Jan. 2023	ASEAN Factori 4.0 Erasmus+ Project
92	THOURN Kosorl	M	GTR	Huawei Asia Pacific ICT Competition 2022–2023	Ministry of Education, Culture, Research, and Technology, Jakarta, Indonesia	15-19 Mar. 2023	Huawei Cambodia

**Annex 14. Short-term overseas capacity building for students (2022-2023).**

<b>No</b>	<b>Nom et prénom</b>	<b>Sexe</b>	<b>Dépt.</b>	<b>Université d'accueil</b>	<b>Titre</b>	<b>Date de mission</b>	<b>Financement</b>
1	VONG Pichvimean	F	GAR	Kyushu University	Winter School	13-11-22 ® 22-11-22	JASSO 80,000JPY Scholarship
2	VONG Pichvimean	F	GAR	Kyushu University	Sakura Science	04-2-23 ® 18-2-23	Airfare and Accommodation by Kyushu University
3	SUON Kosal	M	GAR	Univeristy of Yamanashi	Language and Culture Program	10-2-23 ® 24-2-23	80,000 JPY Scholarship
4	Tharn Tina	M	GGG	Kyushu University	Join international conference and laboratory training	30-11-22 ® 9-12-22	JASSO
5	Syn Sak	M	GGG	Kyushu University	Join international conference and laboratory training	30-11-22 ® 9-12-22	JASSO
6	Ly Panhavong	M	GGG	Kyushu University	Join international conference and laboratory training	30-11-22 ® 9-12-22	JASSO
7	Kim Chheng	M	GGG	Kyushu University	Join international conference and laboratory training	30-11-22 ® 9-12-22	JASSO
8	Chheuy Pothsma	M	GGG	Kyushu University	Join international conference and laboratory training	30-11-22 ® 9-12-22	JASSO
9	Boeurn Chanmakara	M	GGG	Kyushu University	Join international conference and laboratory training	30-11-22 ® 9-12-22	JASSO

10	Chhorn Tola	F	GGG	Prony Resources, New Caledonia	Summer internship on X-Ray Disfraction	25-7-22 @ 27-9-22	Prony Resources
11	Seng bunleang	M	GGG	Hokkaido University	Summer internship on Mineral Processing	1-9-22 @ 1-11-22	JASSO
12	Keo Tithya	M	GGG	Nakazawa University	Exchange Program	23-9-22 @ 23-3-23	JASSO
13	Heng Hongchhay	M	GGG	Nakazawa University	Exchange Program	23-9-22 @ 23-3-23	JASSO
14	Run Sreypich	F	GGG	Nakazawa University	Exchange Program	23-9-22 @ 23-3-23	JASSO
15	KHUN Dararith	M	GIC	Université de Namur, Belgique	Internship Research on topic: Reputation model for trust-based policy in Self-Sovereign Identity system	03-03-2023→30-06-2023	Erasmus+
16	CHHOEM Sothy	M	GIC	Université de Namur, Belgique	Internship Research on topic: The Trust Model in the SSI System	03-03-2023→30-06-2023	Erasmus+
17	LIV Bunthorn	M	GIC	Université de Namur, Belgique	Internship Research on topic: Designing Digital Wallet for Blockchain-Based Self-Soveriegn Identity	03-03-2023→30-06-2023	Erasmus+
18	EM Hengly	M	GIC	National Chung Cheng University, Taiwan	Internship Research on topic: Computer vision applications based on deep learning techniques	01-03-2023→20-06-2023	CCU Internship program
19	YANN Sovanvichea	M	GIC	National Chung Cheng University, Taiwan	Internship Research on topic: 6DoF object pose estimation from a single RGB image	01-03-2023→20-06-2023	CCU Internship program
20	LY Pechvathana	M	GIM	ECAM LaSalle	Student exchange	Jan-June 2023	ECAM LaSalle
21	HAV Seng Houy	F	GIM	ECAM LaSalle	Student exchange	Jan-June 2023	ECAM LaSalle
22	CHHEANG Nguonheak	M	GIM	ECAM LaSalle	Student exchange	Jan-June 2023	ECAM LaSalle
23	MINH Meng Hour	M	GIM	ECAM LaSalle	Student exchange	Jan-June 2023	ECAM LaSalle

24	DOS Chanheng	F	GRU	MRC	Pitching Workshop on the MRC River Monitoring Technology Competition, Bangkok	31-1-23 @ 2-2-23	MRC Secretariat
25	PAO Laiheng	M	GRU	CAN THO University	International Internahip under InowAsia Project	22-4-23 @ 22-07-23	INOWASIA
26	NENG Layheng	F	GRU	CAN THO University	International Internahip under InowAsia Project	22-4-23 @ 22-07-23	INOWASIA
27	DOS Chanheng	F	GRU	MRC	Final Demonstration and Award Ceremony for MRC River Monitoring Technology Competition and International Conference	30-3-23 @ 4-4-23	MRC
28	LY Vannmei	F	GRU	Chulalongkorn University	Internship Abroad under EU-AFD	1-6-23 @ 31-8-23	EU-AFD
29	SAN Sokmean	M	GRU	Chulalongkorn University	Internship Abroad under EU-AFD	1-6-23 @ 31-8-23	EU-AFD
30	KOY Makaravoan	M	GRU	IRD-ESPACE-DEV-Monperllier	Internship Abroad under EU-AFD	1-6-23 @ 31-8-23	EU-AFD
31	PHANN Sothea	F	GTR	Toulouse INP	Stage de fin d'étude	9-3-23 @ 31-7-23	ERASMUS+

**Annex 15. Local capacity building for lecturers and students in form of seminar (2022-2023).**

<b>No</b>	<b>Titre du séminaire</b>	<b>Objectif du séminaire</b>	<b>En coopération avec</b>	<b>Nombre de participants</b>	<b>Date</b>	<b>Résultats attendus</b>
1	e-Learning Content Development Training	Build capacity of HEIs (RUPP, RUA, NUBB, SRU, UHST) on e-learning content development	DGHE/MoEYS	40+	30-05-23 till 02-06-23	RUPP, RUA, NUBB, SRU, UHST, DGHE/MoEYS
2	Orientation of Techno Innovation Challenges Cambodia (TICC) 2023	Promote the TICC 2023	KE, Smart Axiata, FTB Bank	60+	09-05-2023	Public (students)
3	Seminar on Introduction to Aviation Acoustic and Future Air-Traffic Noise	Sharing knowledge about aviation technology	Munich Aeroacoustics, Germany	~ 100	ITC Conference Hall-Building A	Awareness and aviation transport technology
4	Seminar on Precast Concrete	Sharing knowledge about precast concrete element in construction	Phnom Penh Precast Construction (V-Con), Thailand	~ 300	ITC Conference Hall- Building G	1-Awareness of precast concrete technology 2-Cooperation between ITC and Phnom Penh Precast Construction. 3- Internship and working opportunity for students.
5	The Sharing Seminar BIM Technology in Construction	Introduce BIM technology in construction	Shanghai Baoye Group, China	~ 200	ITC Conference Hall-Building A	1-Awareness of BIM technology 2- Cooperation between ITC and Shanghai Baoye Group. 3-Internship and working opportunity for students.
6	The Exhibition of Architecture from Japan	Sharing on Japanese Architecture and Future of Architecture in Cambodia	SAKO Architects, Japan	~ 200	ITC Conference Hall-Building A	Awareness of both japanses and cambodians' architecture
7	CALOHEA	Student Mobility and dissemination of CALOHEA results	University of GRONINGEN, AUN, SRU	249	ITC conference room in a hybrid way, Room A109 and A113 (2 day workshop)	1- Awareness of Results of CALOHEA about curriculum methodology 2- Share indeas and concerns of improvement in CALOHEA

8	Aggregate Production Plant at Chip Mong Industries	<ul style="list-style-type: none"> <li>- To understand the blasting techniques</li> <li>- To understand the aggregate production plant</li> </ul>	Chip Mong industries	42	Chip Mong industries	<ul style="list-style-type: none"> <li>- Student understood the blasting techniques</li> <li>- Students understood the aggregate production plant</li> </ul>
9	The 2nd Foundation Seminar on Pile Foundation in Cambodia	<ul style="list-style-type: none"> <li>- To enhance education and build up the capabilities in the field of Geotechnical Engineering</li> <li>- To extend and strengthen collaboration network among industries, community, and academic institution</li> </ul>	Partner Industries (RDE, GEO Pro and Engineering., Co., Ltd, UY Sing Investment Co., Ltd, First Build Engineering Co., Ltd, 7 FTD Co., Ltd, Dynamic Growth E&C Co., Ltd)	1000 (Lecturers, Engineers, Representative of company, Representative of local university, Norton, NTTI, NPIC, UI, Students)	GGG, ITC	<ul style="list-style-type: none"> <li>- Successfully organized the seminar and the 3rd Seminar already proposed for January 2024.</li> <li>- Participants have learned the new experience from expertise</li> <li>- Extended the collaboration between ITC and private industries</li> </ul>
10	Korean EMCAST Training Center	To introduce students to EMCAST company and to show students what EMCAST is doing and their vision. The presenter also shared the internship and job opportunities at EMCAST	EMCAST	40	25-01-2023	Students get to know the latest technology provided by the Korean training center. Students were also very interested in applying for internships and job opportunities at EMCAST.
11	Unlocking the Potential of AI	To introduce students to the potential of AI technology, and how to apply them in real practice	ZTOA	50	18-01-2023	Students get to know the advance of using AI technology and develop a roadmap to use AI technology
12	Deep Learning, internships, and scholarship opportunities	To introduce students to Deep Learning method. The presenter also shared experiences on how to apply for internships and scholarship opportunities at CCU	National Chung Cheng University, Taiwan	90	17-01-2023	Students have learned a lot in the field of Deep Learning from this workshop. They were also very interested in applying for internships and scholarships to do a Master's Degree at CCU.
13	ICT Competition Road Show	To introduce students to online training and competitions that include Cloud and Network topics.	Huawei	80	7-12-2022	Students could join the free training related to Cloud and Network topics. After the training, they can join the ICT



						competitions conducted by Huawei Cambodia.
14	IP PBX Fundamental	To introduce students to the IP PBX Fundamental and to provide internship opportunities	KHCOLO	200	23-11-2022	Students get up to date on IP PBX and learn how to install IP PBX phone system
15	How to Grow Your Career	To introduce students to HR First Consulting company and to teach students how to set the career path. The presenter also shared experiences with time management	HR First Consulting	200	23-11-2022	Students get to know about the company, and what they have done so far about their activities and build closed relationships together.
16	Legrand Academic Program	Electrical solutions, Power Distribution Panel & Power Protection Devices, CRT & Busbar system	Legrand	80		The training offers hands-on possibilities for designers, installers, and DIYers to learn about new products and the most efficient ways to install them
17	Electronic And IoT System	Introduction to Electronic and Service, Fintech and Banking	IG Tech	60		Students understand new technology, opportunity to join company, collaboration with GEE
18	Young Engineer Program	Introduction to Young Talent Program, SMT Technology	SVI (AEC) Cambodia	103		Students understand SMT technology, internship and job opportunity, working environment
19	Energy Efficiency	Introduction to Sustainable Energy, Energy Efficiency, and SWITCH Garment	GERES Cambodia	120		Students understand the application of energy management in Garment industries, Future training and collaboration with GEE
20	Sustainable development	Research cooperations	ITC, Norton, Paragon, Stuttgart	250	18-08-2022	
21	Join workshop for Build4People	Research cooperations	Technische Hochschule Lübeck, Lübeck, Germany	100	10-08-2022	

22	Workshop for Sustainable Technologies for A reasonable Growth	Research cooperations	SIIT	250	21-12-2022	
23	SCG Concrete Youth Camp 2022	Share about Ready-Mix Concrete (RMC) knowledge and expertise to students	SCG	200	14-12-2022	<ul style="list-style-type: none"> <li>- Participants can learn about the lessons of cement and concrete mixed design.</li> <li>- Understand what cause concrete bugholes and concrete honeycomb and how to repair them.</li> <li>- Have competition to win a reward</li> </ul>
24	Webinar on TYFO® FIBRWRAP® SYSTEMS	- Introduce latest technology for structural strengthening system of buildings and infrastructures	Fyfe Asia Pte Ltd, Singapore	150	16-11-2022	<ul style="list-style-type: none"> <li>- Participants gain more knowledge on structural strengthening technology used in developed countries as well as in Cambodia.</li> <li>- Participants have learnt about recent research topic related to TYFO® FIBRWRAP® SYSTEMS conducted in civil engineering department, ITC.</li> </ul>
25	2st Heat Stress Workshop	<ul style="list-style-type: none"> <li>• Sharing knowledge on heat stress to the public through special lectures from the National University of Singapore (NUS), the Hong Kong Polytechnic University (PolyU);</li> <li>• Providing the initial finding on the impact of heat stress on garment and education sectors by ITC;</li> <li>• Sharing the achievement of the HSC projects.</li> </ul>	National University of Singapore; The Hong Kong Polytechnic University, Cambodia Climate Change Alliance	56	Ministries, schools, universities private sectors	<ul style="list-style-type: none"> <li>• Increase knowledge on heat stress</li> <li>• Raising the awareness on heat stress</li> <li>• Increase the collaboration between the stakeholders</li> </ul>

26	Hosting seminar on Asean Energy Outlook 7 (AEO7)		Asean Center of Energy (ACE)	50	Lecturers, Researcher, students	Energy situation of ASEAN
27	Introduction to Thermal Lab and the implementation of research and projects and sources of funding	To share the research finding, to have a discussion for future research collaboration, and to introduce the “Heat Stress and Thermal Comfort”.	Department of Mechanical engineering, faculty of engineering, National University of Laos	40	to NUOL	
28	Thermal comfort and Energy audit procedure Example of EA results in school		Department of Mechanical engineering, faculty of engineering, National University of Laos	40	to NUOL	

**Annex 16. Dispatch Professor at ITC (2022-2023).**

<b>No</b>	<b>Nom et prénom</b>	<b>Université d'origine</b>	<b>Matière enseignée</b>	<b>Date</b>	<b>Départ. d'accueil</b>
1	M.VERNIER Nicolas	IUT d'Orsay, Paris Saclay University	Physics lab	05-06-23 ® 13-06-23	DTC
2	Mme YAM Navy	IUT d'Orsay, Paris Saclay University	Physics lab	05-06-23 ® 13-06-23	DTC
3	M. LECOEUR Philippe	Faculté de Sciences d'Orsay, Paris Saclay University	Physics lab	12-06-23 ® 16-06-23	DTC
4	M.VERNIER Nicolas	IUT d'Orsay, Paris Saclay University	Physics lab	16-05-22 ® 20-05-22	DTC
5	Mme YAM Navy	IUT d'Orsay, Paris Saclay University	Physics lab	16-05-22 ® 20-05-22	DTC
6	Mme AURELIE Carnins	IUT d'Orsay, Paris Saclay University	Physics lab	20-02-23 ® 24-02-23	DTC
7	Mme ANNE Migan	IUT d'Orsay, Paris Saclay University	Physics lab	20-02-23 ® 24-02-23	DTC
8	M. BRUNO Darracq	IUT d'Orsay, Paris Saclay University	Physics lab	20-02-23 ® 24-02-23	DTC
9	M. PASCAL Aubert	IUT d'Orsay, Paris Saclay University	Physics lab	20-02-23 ® 24-02-23	DTC
10	M. BASTIEN Vincke	IUT d'Orsay, Paris Saclay University	Physics lab	20-02-23 ® 24-02-23	DTC
11	Prof. Maurice Fadel	Toulouse INP	Electric Drive	1-6-22 ® 10-6-22	EEEE-N7
12	Prof. Pascal Maussion	Toulouse INP	Control System	16-6-22 ® 18-6-22	EEEE-N7
13	Prof. CHARLES Yann	Université Paris 13	Elément finis	12-17 juin 2023	GIM
14	Dr. Marine Hermann	LEGOS, IRD	Marine science	15-05-2023	GRU
15	Dr. Sylvain OUILLON	LEGOS, IRD	Water Resources	15-05-2023	GRU
16	Dr. NGO Duc Thanh	University of Science and Technology Hanoi	Water Resources	15-05-2023	GRU
17	Prof. Jacques Mercaddier	Université de Pau et des Pays de l'Adour	Chemical Thermodynamics for Waste Water Treatment	15-11-22 ® 24-11-22	GRU

18	Dr. Guillaume Lacombe	CIRAD (G-eau)	Hydrologist	25-05-2023	GRU
19	Dr. HUBert Loisel	Université du Littoral Côte d'Opale (ULCO)	Fluid Dynamics, Oceanography	27-04-2023	GRU
20	Dr. Charles VERPOORTER	from Université du Littoral Côte d'Opale (ULCO), Laboratory of Oceanology and Geosciences (LOG) UMR CNRS	Remote Sensing, Environmental Management	27-04-2023	GRU
21	Prof. Ignasi Rodriguez-Roda Layret	Universitat de Girona (UdG)	Problem-Based Learning methodology (PBL)	27-8-22 ® 3-9-22	GRU
22	Dr. Gaetan Blandin,	Universitat de Girona (UdG)	Membrane technology for water reuse	27-8-22 ® 3-9-22	GRU
23	Prof. Aurore Degré	University of Liege	The capacity building of Ph.D. students in soil science and agronomy	3-3-23 ® 6-3-23	GRU
24	Dr. Antonina Torrens Armengol	FUNDACIO SOLIDARITAT UB (FSUB)	Nature Based Solution	4-1-23 ® 5-1-23	GRU
25	Prof. Ignasi Rodriguez-Roda Layret	Universitat de Girona (UdG)	Resources Recovery	4-1-23 ® 5-1-23	GRU
26	Associate Professor Sunil Herat	Griffith University	Waste Management and Circular Economy	7-2-23 ® 11-2-23	GRU
27	Professor Melissa E. Lenczewski	Northern Illinois University	hydrogeochemistry	7-2-23 ® 7-4-23	GRU
28	Prof. Riadh DHAOU	Toulouse INP	Non-Terrestrial Network	19-12-22 ® 23-12-22	GTR
29	Prof. Nathalie RAVEU	Toulouse INP	Antenna Design	20-2-23 ® 03-3-23	GTR
30	Prof. Gregory ZACHAREWICZ	IMT Mines Alès	System Modeling	20-3-23 ® 24-3-23	GTR
31	Prof. Vincent CHAPURLAT	IMT Mines Alès	System Engineering	21-11-22 ® 25-11-22	GTR
32	Prof. Sebastien HARISPE	IMT Mines Alès	Introduction to Machine Learning	21-11-22 ® 25-11-22	GTR

**Annex 17. Research Topics in 2022-2023 of ETM Unit.**

No.	Project/Research Topic	Name of Researcher	Funding sources	Period (2020-2023)	Objectives	Outputs
1	Applied geophysics for investigating hydrocarbon potential and depositional environment of sediments at onshore prospect, southern Cambodia	Dr. Or Chamoly Dr. Eng Chandoeun Dr. Kret Kakda Mrs. Sio Sreymean Mr. Kan Rithy Ms. Heng Mouy Yi	HEIP	2021-2023	Intergrade geophysics and geological data for investigating the geological structures, the hydrocarbon system and depositional environment of sediments in Southern Cambodia	2 PhDs candidate, facility building-resistivity and extend collaboration with petroleum company
2	Development of a Virtual Cambodian Power System-Towards an Innovation Micro-Grid in Cambodia	Dr. Vai Vannak Ms. Eng Samphors Dr. Bun Long Mr. Eth Oudaya Mr. Khon Kimsrornn Mr. Chhith Chhlonh	HEIP	2020-2024	1) To develop tools for distribution system architectures 2) To develop tools for microgrid architectures 3) To develop tools for self-healing operation of distribution systems and microgrids 4) To set-up a testbed for distribution system and microgrid	1) Upgrade three ITC staffs from master to Ph.D., 2) At least four master students will graduate 3) At least five international peer-reviewed journals will be published 4) At least ten international peer-reviewed conferences will be published 5) A testbed platform at ITC
3	Integration of Landsat-8, ASTER, and Sentinel-2 for mapping of mineral prospective, hydrothermal alteration and geological structures for porphyry copper and epithermal gold deposits in the north Cambodia.	Dr. Kret Kakda Dr. Seang Sirisokha Dr. Kong Sitha Dr. ENG Chandeoun Dr. Boeut Sophea Dr. Boeut Sophea	JICA-LBE	2021-2023	1. To analyze band ratios and Principal Component Analysis (PCA) using Sentinel-2, Landsat-8, and ASTER datasets for delineating of hydrothermal alteration mineral 2. To delineate mineral prospective zones using weight of evidence method 3. To verify remote sensing results by laboratory analysis and field observation	- Exploration of potential mineral deposits in Cambodia using remote-sensing datasets - Journal publications, research cooperation with local and international companies and Universities - Capacity building for students and researchers  mining company and train students to work and do research
4	Investigation the production potential of the Cambodian offshore reservoir considering	Dr. Ngo Ichhuy Dr. Or Chamoly Dr. Eng Chandoeun	HEIP	2021-2023	Integrate phase behavior, rock-fluid interaction and numerical simulation to	Facility building-PVT equipment, extend collaboration with ministry and private company

	effects of phase behavior and rock-fluid interaction	Dr. Boeut Sophea -Dr. Mao Pisith -Ms. Pech Sopheap			determine the production potential of Cambodian offshore reservoir	
5	Planning and Operation of Active Distribution Systems	Dr. Vai Vannak Ms. Eng Samphors Mr. Chhith Chhlonh Dr. Bun Long	JICA-LBE	2021-2023	1) To improve the algorithms of optimal phase connection, reconfiguration, and restoration 2) To develop algorithms for improving the unbalanced system 3) To develop algorithms for the quality and reliability of services through fault location and isolation 4) To develop a small scale prototype	1) Four undergraduate students will graduate under this project 2) Three international peer-reviewed journal will be published 3) Seven international peer-reviewed conferences will be published 4) GUI of an active distribution system will be developed 5) Small scale prototype of the active distribution system
6	Quality Assurance of Concrete Pile Integrity Soil Properties Investigation in Phnom Penh City using Seismic and Electrical Resistivity Tomography Approaches	Dr. Eng Chandoeun Dr. Ngo Ichhuy Dr. Kret Kakda Dr. Boeut Sophea Dr. Mao Pisith Ms. Heng Muoy Yi	HEIP	2021-2023	Integrate seismic and electrical resistivity methods to qualify concrete pile integrity Progress/status: Start in 01/2021	Facility building-seismic and resistivity equipment, extend collaboration and private company
7	Study on impact of heat stress to human productivity and economic in Cambodia	Dr. Kinnaeth Vongchanh Dr. Sarin Chan Mr. Latin Heang	CCCA3	2020-2023	1. Build human resources in the heat stress field 2. Investigate the impacts of heat stress on productivity 3. Develop an economic model on the impact of heat stress 4. Build evidence on the impacts of heat stress on productivity in three selected sectors including the construction, garment, and education sectors. 5. Identify the work rest schedule for the construction worker.	1. Min. 2 international journal 2. 2 Ph.D. candidates, 1 master student 3. Establish the measurement tools/devices in Cambodia for investigation of heat stress 4. Create local experts on economic forecasting for heat stress 5. Introduce research area on heat stress to Cambodia. 6. Enhance and strengthen activities between ITC and MoE. 7. Expand the research and academic collaboration with research partners 8. Publications 9. Collaboration with Local and international institution 10. Collaboration with garment, construction, and education sectors

8	Optimal Fault location Isolation, and restoration procedure for LV microgrids.	Mr. Chhloh Chhith Dr. VAI Vannak Prof. RAISON Bertrand Assoc. Prof. ALVAREZ-HERAULT Marie-Cécile	French Government Scholarship (BGF)	2021-2024	<ul style="list-style-type: none"> <li>To develop an algorithm for microgrid topologies planning with various options (i.e. AC, AC/DC, and DC).</li> <li>To develop an algorithm to make the system self-healing operation include fault location, insolation, and restoration (FLIR) integrate with PV.</li> </ul>	<ul style="list-style-type: none"> <li>2 international journals</li> <li>3 international conferences (1 published, 2 writing)</li> </ul>
9	Accelerating Digital Transformation for Higher Education Institutions in Southeast Asia (DX.SEA)	Dr. OR Chanmoly Mr. LAY Heng Dr. VALY Dona	Erasmus+	2023-2025	<ul style="list-style-type: none"> <li>developing digital campus blueprint</li> <li>enhance digital leadership competencies</li> <li>improve the quality of online learning and teaching</li> <li>improve methodologies and pedagogical approaches for digital learning</li> </ul>	<ul style="list-style-type: none"> <li>The primary deliverables of this project are a digital transformation blueprint, training materials, and Train for Trainers (ToT) for developing campus ICT infrastructure and a digital learning management system, designing digital content for digital education, and implementing effective digital teaching, evaluation, and quality assurance</li> </ul>
10	Optimal energy-management system in smart-building	Dr. KHON Kimsornn Mr. SORN Darong Mrs. ENG Samphors Ms. MIN Taingliv Mr. LIM Phing	JICA-LBE	2023-2024	<ul style="list-style-type: none"> <li>TO develop an algorithm for the energy efficiency in the smart building</li> <li>To develop a prototype of the energy management</li> </ul>	<ul style="list-style-type: none"> <li>1) Two undergraduate students will graduate under this project</li> <li>2) Three international peer-</li> </ul>



					in the smart building tools	reviewed conferences will be published
11	The Optimization of Algae Cultivation for Biofuel Production in Cambodia	Dr. OR Chanmoly Mr. HENG Ratha Dr. ENG Chandoeun Dr. YOEU Sereyvath Ms. PECH Sopheap Ms. SIO Sreymean Mr. KONG Sela	JICA-LBE	2023-2024	- To identify the ultimate conditions suitable for Cambodia and types for cultivating algae toward the biofuel production. To extract the biofuel from the cultivated algae	1) Two bachelor students are graduated 2) Two conference papers are submitted 3) One article journals submission/publication 4) Three students (4th -years students) will use the project data to write the internship report

**Annex 18. Research Topics in 2022-2023 of FTN Unit.**

No.	Project/Research Topic	Name of Researchers	Fund	Period (2016-2023)	Objectives	Outputs
1	Biotechnology for Integrated Pest Management towards pesticide reduction in Cambodia	Dr. SUONG Malyna Ms. HENG Soukim Ms. SIENG Sreyvich	Government of Cambodia (HEIP)	2019-2023	To rescue all Cambodian crops from pest and diseases by integrating biotechnology into IPM approach	<ul style="list-style-type: none"> <li>- Lab equipment</li> <li>- Graduation of undergraduate and graduate students</li> <li>- Staff capacity building</li> <li>- Publications</li> <li>- Abstract and/or extended abstract to international conference/symposium</li> </ul>
2	Valorization of high-value dry food products (agricultural products including herbal and spices) and other by-products in Cambodia	Dr. IN Sokneang Dr. PHAT Chanvorleak Ms. Heng Soukim Dr. KHOEURN Kimleang	Government of Cambodia (HEIP)	2019-2023	To set up the drying excellence center (the pilot scale of drying processing center) of agricultural products, by-products, to develop the capacity building of human resource on drying technology (including technology transfer and industrial collaboration) for agricultural products in Cambodia	<ul style="list-style-type: none"> <li>- Drying excellence center</li> <li>- Lab equipment</li> <li>- Graduation of undergraduate and graduate students</li> <li>- Staff capacity building</li> <li>- Publications</li> <li>- Abstract and/or extended abstract to international conference/symposium</li> </ul>
3	Improvement and development of rice-based products toward the growth of SMEs/Industries in Cambodia	Dr. MITH Hasika Ms. MOM Vattana Ms. CHIN Lyda	Government of Cambodia (HEIP)	2019-2023	To set up a rice-based product development platform, improving the quality of rice-based products locally produced and available in markets and to diversify rice-based products, human resource development, and enhancing collaborative research between university and SMEs	<ul style="list-style-type: none"> <li>- Center for training of rice-based products</li> <li>- Lab equipment</li> <li>- Graduation of undergraduate and graduate students</li> <li>- Staff capacity building</li> <li>- Publications</li> <li>- Abstract and/or extended abstract to international conference/symposium</li> </ul>
4	Development of Cambodian Soy Sauce by Fermentation Method	Dr. TAN Reasmey Mr. LY Luka	Government of Cambodia (HEIP)	2019-2023	To produce Cambodian soy sauce by fermentation method with good quality and transfer the developed technology of soy sauce to the private sector	<ul style="list-style-type: none"> <li>- Lab equipment</li> <li>- Graduation of undergraduate and graduate students</li> <li>- Staff capacity building</li> <li>- Publications</li> <li>- Abstract and/or extended abstract to international conference/symposiums</li> </ul>
5	Development of Cooking Oil Processes for Commercialization	Mr. KONG Sela Ms. NAT Yukleav	Government of Cambodia (HEIP)	2021-2023	To develop cooking oil processes in order to produce cooking oils with good quality, to transfer the technology to private sectors for commercialization, to develop cooking	<ul style="list-style-type: none"> <li>- Graduation of undergraduate and graduate students</li> <li>- One manual of cooking oil research will be done including hierarchy diagram</li> </ul>

					oil research platform and to develop human resource in cooking oil processing	<ul style="list-style-type: none"> <li>- Staff capacity building</li> <li>- Oil processing Research platform at ITC</li> <li>- Collaboration with university partner</li> <li>- Publications</li> <li>- National and international conferences</li> </ul>
6	Improvement and development of fish and meat products for better preservation using innovative technology	Dr. PENG Chanthol Dr. SROY Sengly Dr. MITH Hasika Ms. THANH Channmuny Mr. NGET Sovanmony	Government of Cambodia (HEIP)	2021-2023	To improve the quality, and add-value to the existing fish and meat products which are available on Cambodian market by applying different preservation technique	<ul style="list-style-type: none"> <li>- At least one international peer reviewed paper is expected by the end of the project</li> <li>- Two peer reviewed papers published at local journal are expected</li> <li>- 10 local SMEs and local producer will be informed the research finding</li> <li>- Fish and meat processing lab will be established</li> <li>- Graduated students</li> <li>- Human resources capacity building</li> </ul>
7	Valorization of agricultural by-products in Cambodia through extractions and formulations of essential oils and bioactive compounds	Dr. HOUNG Peany Mr. LAY Sovanmony	Government of Cambodia (HEIP)	2021-2023	To identify and screen essential oils/bioactive compounds in extracts obtained from varieties of Cambodia agricultural food products and wastes; then evaluate its applicability to be used as aromatherapy, food preservatives and active ingredients and to promote institutional Chemical Engineering Field, through university-SME technology transfers and strengthen university-university research collaborations	<ul style="list-style-type: none"> <li>- Database of essential oils/bioactive compounds in agricultural by-products</li> <li>- Lab equipment</li> <li>- Graduation of undergraduate and graduate students</li> <li>- Staff capacity building</li> <li>- Publications</li> <li>- Abstract and/or extended abstract to international conference/symposiums</li> </ul>
8	HEALTHYRICE	Dr. SUONG Malyna Ms. SIENG Sreyvich	IRD	2019-2022	To identify diversified agricultural rice systems allowing an increase in soil and plant health, and a decrease in pesticide use and their occurrence as residues in consumption products	<ul style="list-style-type: none"> <li>- Lab equipment and Lab set up</li> <li>- Graduation of undergraduate and graduate students</li> <li>- Staff capacity building</li> <li>- Publications</li> <li>- Abstract and/or extended abstract to international conference/symposiums</li> </ul>
9	FOODI (MSc course in Food Processing and Innovation)	Dr. TY Boreborey Dr. TAN Reasmey Dr. MITH Hasika	Erasmus+ KA2	2019-2021	To educate aspiring food entrepreneurs, healthcare professionals, government officials, and food industry professionals in the end-to-end value chain of food processing: from understanding the elements of food, to starting a new venture	<ul style="list-style-type: none"> <li>- E-learning courses for master degree are developed</li> <li>- Mobility of staff</li> <li>- Strengthening network/collaboration</li> </ul>

					for disrupting and enriching the food processing industry in Asia	
10	Training a new generation of entrepreneurs in sustainable agriculture and food engineering (FoodSTEM)	Dr. IN Sokneang Dr. HOR Sivmey	Erasmus+	2019-2022	To build the partnership between Cambodian and European universities, and to create a favourable condition in the 4 partners universities for the emergence of student entrepreneurship and micro or small enterprises	<ul style="list-style-type: none"> <li>- Setting up of food safety lab</li> <li>- E-learning classroom is set up</li> <li>- E-learning courses are developed</li> <li>- Innovation challenge program for students</li> <li>- Strengthening network/collaboration</li> </ul>
11	Agroecology and Safe Food System Transitions (ASSET)	Dr. HOUNG Peany Dr. SOUNG Malyna	EU/AFD and GRET	2020-2025	To make food and agricultural systems in Southeast Asia more sustainable, safer and inclusive, through harnessing the potential of agroecology to transform them	<ul style="list-style-type: none"> <li>- Training/staff capacity building</li> <li>- Staff mobility</li> <li>- Strengthening network/collaboration</li> </ul>
12	Reducing Foodborne Pathogen Contamination of Vegetables in Cambodia: Innovative Research, Targeted Interventions, and Impactful, Cambodian-Led Engagement	Dr. PENG Chanthol Mrs. CHANTO Monychot Tepy Mr. HENG Oudam	USAID	2020-2024	To reduce the prevalence and incidence of foodborne pathogen contamination of vegetables produced and sold in Cambodia	<ul style="list-style-type: none"> <li>- Strengthen collaboration with local and international research institute</li> <li>- Capacity building of researcher</li> <li>- Human resource development through involvement of Engineering and Master students in the project</li> </ul>
13	Development of Cambodian Fermented Cucumbers by using Freeze-Dried Lactic Acid Bacteria with their Potential Use as Aromatic and Bacteriocin-producing Starters	Dr. TAN Reasmey Ms. MOA Socheata	LBE/JIC A	2021-2023	To develop fermented cucumbers by using freeze-dried LAB that are useful for taste and preservation	<ul style="list-style-type: none"> <li>- Graduation of undergraduate and graduate students</li> <li>- Publications</li> <li>- Abstract and extended abstract to international conference/symposium</li> </ul>
14	ASEAN Network for Green Entrepreneurship and Leadership/ ANGEL	Dr. YOEUN Sereyvath Mr. KONG Sela	Eramus +	2021-2024	Green entrepreneurship and leadership	<ul style="list-style-type: none"> <li>- IT equipment</li> <li>- Training/staff capacity building</li> <li>- Staff mobility</li> <li>- Strengthening network/collaboration</li> </ul>
15	Removal of diclofenac and caffeine from different water sources using activated carbons made from different wastes	Dr. TAN Reasmey Ms. PHAL Sivchheng	EU/AFD	2022-2023	To remove the diclofenac and caffeine as micropollutants from different water sources using activated carbons made from different wastes	<ul style="list-style-type: none"> <li>- Graduation of undergraduate and graduate students</li> <li>- Publications</li> <li>- Abstract and extended abstract to international conference/symposium</li> <li>- Lab equipment</li> </ul>

						<ul style="list-style-type: none"> <li>- Kinds of activated carbons are made by using locally available Nam Wa banana peels, coffee waste and pineapple peels</li> <li>- One activated carbon selected can be used to remove micropollutants present in real waters and wastewater</li> </ul>
16	Assessment on nutritional profiles, storage stability and sensory evaluation of dried fish powder made by low-value small fish species	Dr. SROY Sengly Dr. IN Sokneang Dr. MORM Elen Dr. MITH Hasika	LBE- JICA	2022- 2023	To assess the nutritional profile of low-value small fish species and develop low-cost nutrient fish powder by following the sensory and nutritional profile along storage	<ul style="list-style-type: none"> <li>- Graduation of undergraduate students</li> <li>- An article to submit in regional or international journal/ a communication in one conference</li> <li>- Improve fish powder shelf-life for Vissot Enterprise</li> </ul>
17	Impact of initial composition and processing techniques on aromatic quality of mango	Ms. CHIN Lyda Dr. MITH Hasika Dr. HOR Sivmey	BGF & MoEYS	2021- 2024	To identify the biochemical composition (volatile compounds and aroma precursors) of three contrasted cultivars at three ripening stages before and after each processing (drying, puree, and vacuum frying)	<ul style="list-style-type: none"> <li>- Staff capacity upgrade</li> <li>- Journal publications</li> </ul>
18	Development of alternative salt process to manufacture refined table salt from coarse salt	Ms. SIENG Sreyvich Mr. KON Sela Dr. IN Sokneang Dr. PHAT Chanvorleak Dr. KHOEURN Kimleang Dr. HOUNG Peany	AFD	2022- 2023	To develop an alternative coarse salt refining process with affordable cost of production and acceptable quality on physical and chemical criteria in term of maintaining the original characteristics of salt for GI application	<ul style="list-style-type: none"> <li>- Graduation of undergraduate students</li> <li>- Staff capacity building</li> <li>- Provide actual practical works on salt processing and technology design for salt processing plants in Kampot and Kep province</li> </ul>
19	Development of high nutritional value farmed fish and safe processed products (smoked and fermented fish) in Cambodia	Dr. MITH Hasika Dr. PHAT Chanvorleak Dr. KHOEUN Kimleang Dr. SROY Sengly Ms. MOM Vattana Mr. LAY Sovannmony	ARES	2022- 2027	Contribute to the development of sustainable aquaculture value chains in Cambodia and to improve food safety and nutritional quality of marketed farmed and caught fish products in Cambodia	<ul style="list-style-type: none"> <li>- a strategy to empower a Cambodian sustainable agroindustrial value chain has been implemented and tested at a pilot-scale on fish value chain through the creation of a network of scientists and stakeholders working together with relevant technologies and approaches</li> <li>- Graduation of undergraduate and graduate students (2 Ph.D students)</li> <li>- Staff capacity building</li> </ul>
20	HEALTH OF PLANTS IN THEIR SOCIO-ECOLOGICAL	Dr. SUONG Malyna	GDA (MAFF)	2022- 2024	To explore the root microbiome of rice in Cambodia and exploit root-associated bacteria as biofertilizers for rice plant	<ul style="list-style-type: none"> <li>- Joint indexed publications</li> <li>- Human resources</li> </ul>

	ECOSYSTEM (Plant Health)					
21	Deciphering the function of the plant parasitic nematode microbiome in suppressive soils (DEPPAS)	Dr. SUONG Malyna		2022-2024	The overall objective is to decipher the plurality of interactions between a soil pathogen, the plant and soil microorganisms in different ecosystems with the aim of searching for microorganisms that may play a role in biocontrol	<ul style="list-style-type: none"> <li>- Joint Indexed publications with ITC affiliation</li> <li>- Consumables and lab supports</li> <li>- Networking for further research proposals</li> </ul>
22	Improving fresh-water fish powder production for versatile use in Cambodian diets	Dr. IN Sokneang Dr. SROY Sengly	CAPFish-UNIDO-EU	2022-2023	The development of fish processing solutions with the aim to improve the nutritional performance and efficiency of fish processing technologies, including relevant food safety aspects. This project will therefore contribute to the further development of a sustainable freshwater fish-based food system in Cambodia	<ul style="list-style-type: none"> <li>- Graduation of undergraduate students</li> <li>- Lab equipment</li> <li>- Staff capacity building</li> <li>- SME collaboration</li> <li>- International conference</li> </ul>
23	Improvement of Dried Fish Quality through Drying Technology Development	Dr. HOUNG Peany Dr. EK Pichmony	CAPFish-UNIDO-EU	2022-2023	To compare different drying technologies and identify the one which is suitable for obtaining good quality of dried fish products with an acceptable production cost in Cambodia context	<ul style="list-style-type: none"> <li>- Graduation of undergraduate students</li> <li>- Lab equipment</li> <li>- Staff capacity building</li> <li>- SME collaboration</li> </ul>
24	Development of Instant Fish Soups for Commercialization	Mr. KONG Sela Dr. TAN Reasmey	CAPFish-UNIDO-EU	2022-2023	To innovate 3 different instant fish soup products that will be formulated from our Khmer traditional dishes, such as Somlor Broheu Trey, instant Ngam Ngov Trey, and Khor Trey	<ul style="list-style-type: none"> <li>- Graduation of undergraduate students</li> <li>- Lab equipment</li> <li>- Staff capacity building</li> <li>- SME collaboration</li> <li>- Internation conference</li> </ul>
25	Development of nutrient-dense waffle rolls for children by incorporating Cambodian freshwater fish powder	Dr. EK Pichmony Dr. SROY Sengly	CAPFish-UNIDO-EU	2022-2023	To focus on the development of the waffle rolls containing fish powders from two fish species	<ul style="list-style-type: none"> <li>- Graduation of undergraduate and graduate students</li> <li>- Lab equipment</li> <li>- Staff capacity building</li> <li>- SME collaboration</li> </ul>
26	Shelf life improvement and development of fish Jerky products	Dr. MORM Elen Dr. SROY Sengly Dr. MITH Hasika	CAPFish-UNIDO-EU	2022-2023	To improve the shelf life of dry fish Jerky and to develop a ready-to-eat fish Jerky product	<ul style="list-style-type: none"> <li>- Graduation of undergraduate students</li> <li>- Staff capacity building</li> <li>- SME collaboration</li> </ul>

**Annex 19. Research Topics in 2022-2023 of MIT Unit.**

No.	Project/Research Topic	Name of Researcher	Fund	Period	Objectives	Outputs
1	Ancient Manuscript Digitization and Indexation	Dr. VALY Dona	HEIP	2020-2023	To preserve cultural heritage embedded in Cambodian historical documents specifically the palm leaf manuscripts (Sleuk Rith)	A centralized system to store digitized palm leaf manuscripts with text search capability and publicly accessible
2	Plagiarism Detection System for Khmer Language	Dr. VALY Dona	LBE JICA	2022-2023	To develop a plagiarism detection framework to find duplicated texts and similarities of an input text in a document (document to be analyzed) compared to existing referenced documents	(1) Prototyped plagiarism detection system (2) Publications and student thesis
3	Toward Product Innovation via FabLab-ITC	Dr. PEC Rothna Mr. HEL Chanthan Mr. CHHORN Sopheaktra Mr. TEP Sovichea	HEIP	2020-2024	(1) Electronic product development hub in Cambodia (2) Establishment of Digital-Control Fabrication Lab (FABLAB) at ITC and Research on smart farm to improve the productivity and management	Fablab at ITC, IoT devices, papers
4	Prototyping of Low-cost and Smart In-vessel Composter	Dr. KET Pinnara Mr. HEL Chanthan	LBE JICA	2021-2023	Prototyping of Low-cost and Smart In-vessel Composter	(1) Process for fast composting of mushroom substrate (2) Prototype of composter bin
5	Integrated approach of precise irrigation and sustainable soil management to improve crop water productivity in Cambodia through ITC soil laboratory development: the focus on rice farming	Dr. KET Pinnara Mr. HEL Chanthan	HEIP	2021-2024	(1) To evaluate the soil quality of various paddy fields in Taing Krosaing Irrigation Scheme (TKIS). (2) To optimize irrigation water productivity in rice farming using different water saving methods using both experimental and modeling approach. (3) To develop mobile application to assist smart irrigation scheduling for rice farming.	(1) 2 researchers and 2 PhD students gained oversea training (2) Proper place of soil laboratory for research is set up and laboratory quality control and safety and health are established. (3) 6-8 undergraduate students, 4 Master students, 2 PhD students graduated
6	DNS Tunneling Detection Based on DNS over HTTPS Data Analysis	Mr. PICH Reatrey	ARES	2021-2025	Using DNS traffic features to detect if the income and outcome traffic is the DNS Tunneling by providing the	DNS Security analysis and Propose Solution for Some Parameters setting

					classification system Using Machine learning algorithm	
7	Controller system for smart greenhouse	Mr. CHHORN Sopheaktra	HEIP + YG	2022-2023	Development of controller system for smart greenhouse application	A prototype of smart greenhouse controller (IoT control panel and Agrinode)
8	SOLAGEO's Internet of Energy	Mr. CHHORN Sopheaktra	HEIP + Trade without Border	2022-2023	Implement PayGo system for Energizer system	One prototype of hardware (Motherboard and daughterboard) that support PAYGO system
9	Development of omnidirectional semi-autonomous mobile robots for robot competition	Ms. OUM Sotheara	AI Farm	2022-2023	Producing omnidirectional mobile robots with (semi-) autonomous capabilities for educational purposes as well as joining ABU Robocon 2023.	Two semi-autonomous mobile robots will be developed
10	Development of Dual Axes Solar Tracker for a use on a UAV	Mr. KEO Chivorn	AOARD US Airforce	2022-2023	(1) Implement State Estimation on Pixhawk controller by using UKF algorithm. (2) Evaluating performance of estimation. (3) Design and build the prototype of the 2-axes solar tracker which is mounted on movable support (Assume that the support is a multi-copter that has 3 rotational axes). (4) Experiment for model simulation validation. (5) Examine the net energy gain from the solar tracker	This project provides an experimental technique for a tracking system with movable support before a prototype of UAV with solar tracker will be built.
11	Design a boat for SUV car	Mr. LY Leangcheng		2022-2023	Design a boat for SUV car with the motion of the boat is generated by the car engine, and all the control motions of the boat is converted from the act of driving the car to driving the boat such as steering and speed control.	A design of a boat which is able to handle the SUV car that has 4000kg of weight
12	Design and Implementation of Health Data Collection Communication Protocol Using Physical-Layer Network Coding	Dr. NGET Rithea	LBE JICA	2022-2023	Design a health data collection protocol based on physical-layer network coding and integrate the protocol on software defined radio	An international conference



13	Initiative towards electrical and electronic product testing and certification by EMC Laboratory	Dr. THOURN Kosorl Dr. SRENG Sokchenda Mr. KEAN Jeudy	HEIP	2019-2024	(1) To set up an anechoic chamber at ITC. This chamber will be used for conducting research and development (R&D) on related EMC issues. (2) To analyze and design electromagnetic wave absorber using time domain techniques. (3) To study a new topology of reverberation chamber by using meta-material to improve spectral richness, reduce size and control direction of arrival.	(1) Chamber for EMC measurement at ITC (2) PhD and Master student thesis (3) Conference papers and Journal
14	Investigation of configuration issues related to SDN/NFV deployments	Mr. KUY Movsun	ARES	2020-2024	(1) Experiment with NFV deployment on resource constrained datacenter. (2) Experiment with NFV deployment across federated networks.	Proposed solution to NFV deployment
15	Contribution to the optimal design, control and diagnostic of an e-tuk-tuk	Dr. KIM Bunthern Mr. BUN Menghorng	HEIP	2021-2024	(1) To retrofiting LPG tuk tuk to Solar electrical tuk tuk (2) To Select the best solutions that is less impact to the environment (air pollution, land pollution, etc.) (3) To Control speed and Torque AC machine with very cheap components. (4) To study the health of the battery and AC machine.	(1) PhD Student thesis (2) Conference paper and journal (3) Reused Solar Electric tuk tuk
16	The vehicle as an intelligent thing	Mr. CHIN Chan Daraly		2022-2025	Transforming the role of the vehicle into an active and intelligent actor on the road by exploiting these sensing, computing and communication capabilities for making the transportation people and goods safer, more efficient, greener and more entertaining.	A prototype system as tomorrow's vehicle system to perceive the accidents and to assist to avoid the accidents.
17	Smart farming for qualified vegetable using mechatronics techniques	Dr. CHRIN Phok Dr. PEC Rothna Dr. SRANG Sarot Dr. THOURN Kosorl Dr. VALY Dona Dr. KIM Bunthern	LBE JICA	2022-2023	The first objective of this project is to do comprehensive literature review as well as to perform site surveys in order to collect necessary information and data related to Cambodia vegetable farming style and behavior and the necessity for technological adoption.	Conference and Student Thesis

					The second objective is to conceptualize and perform the detailed analysis of an appropriate automation system integrated with a smart system. The third objective is to develop and design a prototyping system which will be later installed for testing and validation. The prototype work involves farm-field construction, system setup, mechatronics design and development, and information processing.	
18	Smart Mushroom Control System Development	Mr. TEP Sovichea Mr. CHHORN Sopheaktra Mr. PROEUNG Bunrong	iDE	2023-2024	- Setup mushroom houses at ITC for straw and oyster mushroom growing process - Set up a controlled environment for growing mushroom - Develop mushroom control system - Estimate the final specifications of sensing and control system including costs, capacity of control (i.e. ratio of # of system/ m <sup>3</sup> or m <sup>2</sup> )	
19	Integrated Decision Support System for Non-Communicable Ocular Diseases using Machine Intelligence	Dr. Wan Mimi Diyana Wan Zaki (UKM) Dr. VALY Dona	ASEAN IVO	2023-2024	1. Development of the Decision Support System to screen anterior segment-related NCODs using ASPIs captured using smartphone cameras. 2. Development of machine intelligence models with the best classifier that provides the highest classification and prediction accuracies to detect identified anterior segment NCOD 3. Societal, health and well-being impact analysis with the underprivileged old folks and rural communities	

**Annex 20. Research Topics in 2022-2023 of MSS Unit.**

<b>No.</b>	<b>Project/Research Topic</b>	<b>Name of Researchers</b>	<b>Fund</b>	<b>Period</b>	<b>Objectives</b>	<b>Outputs</b>
1	Cambodian natural rubber/different minerals composites for floor mat shock absorbing application	Dr. YOS Phanny Dr. SEANG Sirisokha Dr. RATH Sovannasathya	HEIP	2020-2023	To optimize mechanical and physical properties of Cambodian natural rubber composites by varying common clay mineral and limestone fillers content for shock absorbing applications such as floor tile.	- Rubber will be convert into value-added products
2	Initiative on the development of wind load for design of building structures in Cambodia	Dr. DOUNG Piseth Dr. HAN Virak	HEIP	2021-2023	1. Develop a reference wind speed map for the calculation of wind pressure on buildings and other low-rise structures via statistical wind analysis 2. Develop a calculation procedure for wind load. The development of a calculation procedure of wind load firstly aims for the application of the reference wind speed using the developed map along with an existing international calculation procedure (ASCE) for low-rise and regular building structures. 3. Establish the load combination for the structural analysis and design by providing reliable load combinations based on the developed calculation procedure for the wind load.	- Bachelor students graduated - Master student graduated - Conference and journal publications - Technical guidelines on wind load development in Cambodia
3	Energy-based design for buildings and Steel ring damper for seismic application	Dr. DOUNG Piseth	KMUTT	2020-2024	To develop a new steel damper To assess the cumulative seismic energy in buildings To develop an energy-based seismic design method for buildings	- Conference and journal publications - New seismic steel dampers are developed - New seismic-based design is developed
4	Evaluation of Mechanical Behavior of Post-Installed Bundled Reinforcement Used for Concrete Connections	Dr. DOUNG Piseth Dr. HENG Sounean	LBE/JICA	2022-2023	To assess the bond strength and failure modes of the post-installed reinforcement To investigate the fundamental pull-out strength and failure modes of post-installed bundled reinforcement To evaluate the effects of embedded length and concrete cover on the mechanical behavior of the post-installed bundled reinforcement using a pull-out test	1) Lab equipment improvement. 2) Bachelor and master students graduated. 3) Publications. 4) Transfer knowledge

					To establish the conformity to the existing design codes in order to use in practices	
5	Geological, Geochemical Characteristics and Genesis of Gold Mineralization, Gemstone and Rare Earth Element in Ratanakiri, Kampot, and Pailin province, Cambodia	Dr. SEANG Sirisokha	LBE/JICA	2022-2023	<p>1. To provide the geological background, hydrothermal alteration, mineralization, and geological characteristics for porphyry copper-molybdenum, and gold-copper exploration, in Koh Sla prospect and Canada Wall prospect.</p> <p>2. To investigate physicochemical processes related to the evolution of the gossan cover and the supergene gold enrichment</p> <p>3. To identification of mineralogical and textural and geochemical characteristics of rare earth elements along with the gossan profile</p>	<ul style="list-style-type: none"> <li>- To make geological map and alteration map in Koh Sla, Kampot</li> <li>- To confirm the deposit type in Canada Wall, Andoung Meas Ratanakiri</li> <li>- To identify the deposit type in Koh Sla, Kampot</li> <li>- Undergraduate Thesis</li> <li>- Proceeding paper</li> <li>- International journals and conference publication</li> </ul>
6	Development and optimization of ceramic tile using Cambodian clays incorporating with industrial wastes	Dr. BUN Kimngun Ms. BUN Polyka	HEIP	2019-2023	To develop high quality clay roof tile using local raw materials such as clay, alternative feldspar (waste rock) and silica sand and fired in different firing temperatures and to produce scientific manual for ceramic production technology and plus organizing dissemination workshop to share the research findings and technology to the private and public sectors.	<ul style="list-style-type: none"> <li>- Raw samples for ceramic roof tile body formation are collected,</li> <li>- Mixture design formulation for optimizing formulation of ceramic roof tiles is being done,</li> <li>- Firing shrinkage, water absorption and bending strength of the ceramics are determined.</li> </ul>
7	Chemical Strengthening of Large-scale glass Pieces for Construction and Other Engineering Applications	Dr. HIN Raveth Dr. SEANG Chansopheak	HEIP	2020-2024	To study on a glass strengthening process, which is chemical tempering, and its applications.	<ul style="list-style-type: none"> <li>- Working on tempering optimization, preparing a publication</li> <li>- Submitting for bidding,</li> <li>- Designing 1 of them,</li> <li>- Waiting until next 2 years to be started.</li> </ul> <p>1 master and 1 phd students are registered at GS of ITC</p>

8	Green BIM - Analysis of BIM approach for designing a bioclimatic building	Ms. TAING Kimnenh	ARES	2020-2024	<ul style="list-style-type: none"> <li>- Find bioclimatic design to achieve thermal comfort in building specific in tropical region by using BIM as instrument</li> <li>- BIM to facilitate at the early stage of this design process to avoid certain conflicts between architect and engineer</li> <li>- Perspective of application of BIM and Bioclimatic design in AEC sector in Cambodia</li> </ul>	<ul style="list-style-type: none"> <li>- PhD Thesis</li> <li>- Conferences</li> </ul> <p>Journal papers</p>
9	Managing the collaboration between architect, structure, and MEP in service of construction 4.0: ITC's workshop case	Ms. KETH Kannary	ARES	2020-2024	<p>The objective of this research:</p> <ul style="list-style-type: none"> <li>-To understand the multi-disciplines collaboration (architecture, structural, and MEP) in Cambodia's current construction stage.</li> <li>-To identify the difference of the guideline/protocol BIM in the European context.</li> <li>-To propose the guideline/protocol BIM aligned with the Cambodian context.</li> <li>-To propose the integration of BIM training in Architectural engineering students in Cambodia.</li> </ul>	<ul style="list-style-type: none"> <li>- PhD Thesis</li> <li>- Conferences</li> </ul> <p>Journal papers</p>
10	Sustainable building designs integrated life-cycle assessment (LCA), for best strategies to design the green residential building in Phnom Penh, Cambodia	Mr. LONG Makara	ARES – COMBO IA Project	2021-2025	Analyze building LCA towards green residential building design by integrating the sustainability aspect to propose design strategy and guidelines to reduce the carbon footprint and overall environmental impact of building	<ul style="list-style-type: none"> <li>- PhD Thesis</li> <li>- Conferences</li> </ul> <p>Journal papers</p>
11	Physical Properties and Mineralogy of Ancient Brick from Temples at Sambor Prei Kuk area, Kampong Thom, Cambodia	Dr. YOS Phanny	LBE/JICA	2022-2023	<p>The research objective tends to characterize and determine the physical and chemical properties of ancient brick, sandstone, laterite rocks from the Sambo Prei Kuk area. In order to reproduce the material with similar properties to rehabilitate and conserve the ancient temple. There is two sub following objectives such as:</p> <ul style="list-style-type: none"> <li>- To characterize physical properties (texture, color, size) of brick from each temple.</li> <li>- To identify chemical properties (XRD, XRF, MP-AES) of brick from each temple</li> </ul>	<ol style="list-style-type: none"> <li>1) Collaboration with National Authority of Sambor Prei Kuk (NASPK),</li> <li>(2) Capacity building of ITC and NASPK staff,</li> <li>(3) Sstudents research knowledge.</li> <li>(4) Documentation of ancient brick for Cambodian</li> </ol>
12	Polyethylene (PE) Waste Recycling for Asphalt	Dr. YOS Phanny	MOE	2021-2022	In this research, one type of plastic wastes called Polyethylene (PE) will be added into asphalt concrete with varying PE percentage for such	N/A

	Concrete Pavement Application				applications. Furthermore, its physical and mechanical properties will be characterized.	
13	Air pollution monitoring in Phnom Penh	Ms. AUN Srean	ITC-KU	2019-2023	<ul style="list-style-type: none"> <li>- To monitor the air pollutants in Phnom Penh</li> <li>- The requirement from KU is to monitor air pollution in ITC campus (On the Top of Building H) for 10 years or more (3 days/month).</li> <li>- Send samples to KU and they send the filter back</li> </ul>	<ul style="list-style-type: none"> <li>- ITC will be a good partner with KU.</li> <li>- ITC Engineering students graduate under the project work.</li> <li>- Enhance the quality of air laboratory by usable of KU air equipment</li> </ul>
14	Designing and Implementing a Pilot to Promote Waste Circularity in Phnom Penh	Dr. YOS Phanny Dr. KAN Kuchvichea Dr. POV KeangSe Dr. HENG Sonean	UNDP	2022-2023	<p>The goal of this assignment is to design and pilot a voluntary EPR scheme to promote circularity mainly targeted at non-recyclable plastic items. Its specific aim is to test an approach that can achieve higher collection rates for less valued plastic waste items, enabling alternative treatment and reduce waste leakage into the environment and waste disposal at landfill.</p> <p>There are the four objectives:</p> <ol style="list-style-type: none"> <li>1) Increased awareness and engagement of targeted stakeholders for the collection and treatment of non-recyclable plastic waste;</li> <li>2) Increased collection rates of non-recyclable plastic waste on land and from water</li> <li>3) Improved urban waste management system capacity to collect, sort and treat non-recyclable plastic</li> <li>4) Increased amount of recyclable plastic waste sorted and channeled to recycling businesses</li> </ol>	<ul style="list-style-type: none"> <li>- Pilot implementation at ITC</li> <li>- Conference</li> <li>-</li> </ul>
15	Development of Starch Based Film for Biodegradable Packaging Using Cambodian Cassava as Starch Source	Mrs. AUN Srean Mrs. Nat Yukliv	Takahashi	2023-2024	The purpose of this research study is to develop cassava starch-based film. Three different types of cassava starch based-film will be studied and compared its properties, which are native cassava starch film, acid hydrolysis of cassava starch film, and cassava starch/Poly Lactic Acid (PLA) film	<ul style="list-style-type: none"> <li>- Publications</li> </ul> <p>Students will graduate</p>

16	Effect of The Addition of Natural Fibers on Shrinkage, Cracking Risk and Healing Capacity of Cementitious Materials	Mr. SOM Chansamnang	BGF-ITC	2023-2026	<ul style="list-style-type: none"> <li>- Valorize natural, local and renewable products and reduce the CO<sub>2</sub> emissions comparing to the production of classic fibers</li> <li>- Produce self-healing capacity in cementitious materials by natural fibers as a reservoir</li> <li>- Limit crack and improve mechanical properties of cementitious materials</li> <li>- Reduce construction cost and building maintenance</li> <li>- Increase lifespan of structures</li> </ul>	<ul style="list-style-type: none"> <li>- PhD thesis</li> </ul> Publications
17	Performance of FRP Anchor Embedded into Concrete Cylinder	Dr. PROK Narith Dr. RATH Sovann Sathya	Fyfe Asia	2022-2023	<ul style="list-style-type: none"> <li>- To investigate the pull-out behavior of FRP Anchor using experiment</li> </ul> To investigate the pull-out behavior of FRP Anchor using simulation	<ul style="list-style-type: none"> <li>- Publications</li> <li>- Students will graduate</li> </ul> Knowledge transfer
18	ERASMUS KA-171 (French Partners): Capacity building on Materials Engineering	Yos Phanny	Erasmus	2023-2025	Capacity building of ITC staff in Materials engineering field	
19	ERASMUS KA-171 (Turkish Partner): Capacity building on Materials and Civil Engineering	Yos Phanny	Erasmus	2023-2024	Capacity building of ITC staff in civil engineering and Materials engineering field	
20	FSIP-R: Capacity building on metal materials	Yos Phanny	French Embassy	2023-2025	Capacity building on metal materials	

**Annex 21. Research Topics in 2022-2023 of WAE Unit.**

No.	Project/Research Topic	Name of Researchers	Source of Funding	Period (2016-2023)	Objectives	Outputs
1	SATREPS: Establishment of Risk Management Platform for Air Pollution in Cambodia	Dr. OR Chanmoly Dr. PENG Chanthol Dr. KHOEURN Kimleang Ma. HANG Leakhena	JST/JICA	2022-2027	To contribute to the creation and establishment of a safe and comfortable living environment from the viewpoint of air pollution, essential for the sustainable development of tourism, which leads to economic benefits to the Cambodian people and to creation of a far better and comfortable environment for residents and tourists from all over the world.	<ul style="list-style-type: none"> <li>- Kickoff meeting and JCC conducted on September, 2022</li> <li>- Sampling training was conducted by KU postdoctoral research to students at ITC</li> <li>- Weekly, and monthly meeting have been conducting to update each group progress, discussion, and planning</li> <li>- Several abstract presented and going to present in International Conference.</li> </ul>
2	Water Evolution and Vulnerability Under Global Changes in Coastal Catchments of Cambodia	Dr. DOUNG Ratha Dr. PEN Sytharith	IRD	2019-2022	<p>To assess surface water resource and groundwater resource in the coastal area;</p> <p>Groundwater salinity monitoring and mapping</p>	<ul style="list-style-type: none"> <li>- Field investigation and analysis</li> <li>- Installation of water level monitoring</li> <li>- Salinity contour map of the region</li> </ul> <p>Ground water assessment</p>
3	Occurrence and Distribution Analysis of Microplastics in Different Environmental Mediums of Cambodia	Dr. BUN Saret Mr. HAM Phally	AFD/EU	2022-2023	To assess the presence of microplastic in different water sources	<ul style="list-style-type: none"> <li>- Field investigation and analysis</li> </ul>
4	Investigation of the Effects of Algal Bloom in TSL Source Water on Water Supply Treatment Efficiency	Dr. HEU Rina Mr. Maypheu Wai	AFD/EU	2022-2023	To analyze the algal concentration in TSL water source	<ul style="list-style-type: none"> <li>- Field investigation and analysis</li> </ul>
5	Air pollution in Phnom Penh/East Asia-Nanoparticle monitoring network (EA-Nanonet)	Ms. AUN Srean	Kanazawa University HEIP	2011-Present	Through monitoring of ambient aerosol nanoparticles at more than 20 sites in 10 countries in East Asia, 1) Evaluation of status and characteristics of	<ul style="list-style-type: none"> <li>- Monthly sampling, monitoring source of air pollution in Phnom Penh area</li> </ul>



					ambient nanoparticles in East Asian area, 2) Discussion on contribution of emission sources and possible trans-boundary transportation	
6	Development of a bio-filter system model to control air pollution toward industrial application	Ms. Hang Leakhena		2021-2023	<ul style="list-style-type: none"> <li>- Characterization of air pollutant</li> <li>- Development of biofiltration system</li> <li>- Efficiency testing</li> <li>- Technology transferring to industries/SMEs</li> </ul>	<ul style="list-style-type: none"> <li>- Two conference proceeding</li> <li>- Two peer reviewed paper</li> <li>- Two undergraduate students involved and graduated from this project</li> <li>- One master student involved and graduated from this project</li> <li>- To host one dissemination seminar on air pollution control and technology transfer with participation of local industries and SMEs by the end of the project</li> <li>- To demonstrate testing of a biofiltration system at ITC to industries</li> <li>- Air pollution lab equipment will be installed at ITC</li> </ul>
7	Improving Sustainable Water Supply and Sanitation in Cambodia: Case of Tonle Sap Lake's Floating Villages	Dr. Heu Rina		2021-2023	The objective of this research to provide a sustainable water supply and sanitation that are adapted to the socio-economic and environmental contexts of TSL by using pilot scale of advanced water treatment technologies.	<ul style="list-style-type: none"> <li>- Revising proposal, budget and procurement plan.</li> <li>- Submitted and gave presentation in AUN/SEED-Net conference: Ma L., Heu R.*, Meas M., Eang K, and Siev S. Occurrence, Transportation, Regulation and Treatment Methods of Heavy Metals in Groundwater: A Review on Case of Well Water around Tonle Sap Lake.</li> </ul>
8	Integrated approach of precise irrigation and sustainable soil management to improve crop water productivity in Cambodia through ITC soil laboratory development: the focus on rice farming	Dr. Ket Pinnara Ms.Pheoun Chanarun Dr. TY Boreborey	EU/AFD ITC, BGF, and IRD	2021-2023	Develop advanced technology on irrigation system for rice farming	<ul style="list-style-type: none"> <li>- The experiment at CARDI is almost done</li> <li>- 2 PhD students have done exchanged in Belgium November</li> <li>- 2 manuscripts are being drafts</li> <li>- International conference</li> <li>- App development is for demo</li> </ul>
9	Development of Eco-Friendly and Low-Cost Wastewater Treatment	Dr. Chan Rathborey, Dr Bun Saret, Mr Sok Ty,		2021-2023	To compare removal efficiencies of varies anaerobic reactors, optimize operation	<ul style="list-style-type: none"> <li>- Submitted revised proposal to HEIP coordinator</li> <li>- Learned about the processes for preparing procurement of HEIP project in joint meeting</li> </ul>

	System as an On-Site Product	Mr. Hong Penghour, Mr Heng Borin, Ms Seng Phaya,		condition and observed removal efficient of pilot-scale anaerobic reactor	<ul style="list-style-type: none"> <li>- Re-prepared budget plan and submitted specification of all lab equipment.</li> <li>- Signed contract</li> <li>- Assigned master and bachelor students to conduct experiment</li> </ul>	
10	Development of Climate Data Information System for Cambodia	Dr. SONG Layheang Dr. CHHIN Rattana Dr. Chhuon Kong Mr. Song Layheang		2021-2023	<ul style="list-style-type: none"> <li>- To construct gridded climate data from the historical point observation data over Cambodia.</li> <li>- To provide reliable climate data and downscaling climate data in Cambodia to users by using bias-correction method and climate downscaling method, respectively.</li> <li>- To share climate data and software developed in the sub-project with relevant governmental agencies and partner institutions by launching training workshops and supporting on utilizing the output herein for policy</li> </ul>	<ul style="list-style-type: none"> <li>- Prepare procurement document to purchase the equipment of the project.</li> <li>- Recruit research assistant and engineering students work in and support the project.</li> <li>- Review necessary literature of the interpolation methods, bias-correction methods, climate downscaling methods.</li> <li>- Climate data collection for both observation and climate model data.</li> </ul>
11	Strengthening Flood and Drought Risk Management and Early Warning System in Lower Mekong Basin of Cambodia	Dr. Oeung Chantha Mr. Sok Ty Mr. Song Layheang Mr. Chhin Ratana		2021-2023	The main goal of the project is to improve flood risk management through integration of technical and institutional linkage into policy, and reducing vulnerability of local community livelihoods.	<ul style="list-style-type: none"> <li>- The study will be delivered as below: Flood risk assessment improved through integrating modelling and social approaches, and Capacity built on flood risk management and adaptation to climate change provided to local government and communities</li> </ul>

12	Dynamic Transport of the Sediment and Nutrient in the Mekong River Basin and the Role of the Tonle Sap: Assessment Coupling Data and Modelling Approaches (PhD project)	Mr. Sok Ty		2019-2022	Present a quantification of annual, seasonal and monthly nitrate the sediment and nutrient transport exchange between Tonle Sap Lake and the mainstem Mekong River and sediment study of Mekong River basin	<ul style="list-style-type: none"> <li>- Paper accepted: Sok, T.; Oeurng, C.; Ich, I.; Sauvage, S.; Sánchez-Pérez, J.M. <i>Assessment of Hydrology and Sediment Yield in the Mekong River Basin Using SWAT Model. Water</i> 2020, 12, 3503.</li> <li>- Two paper is under reviewed in Catena and Ecological Engineering</li> <li>- One presentation in international conference.</li> <li>- One paper is drafting for Science of Total Environment.</li> <li>- PhD completion</li> </ul>
13	Development of Electrocoagulation Reactor Integrated Sedimentation for Turbidity and Color Removal from Industrial Wastewater	Dr. Chan Rothborey, Dr. Bun Saret, Mr Hong Penghour, and Mr. Chan Ratboren	LBE/JICA	2021-2023	To develop and evaluate the hybrid Electrocoagulation Reactor (ECR) combining both EC and sedimentation units in terms of design criteria and operation condition in both batch and continue mode for decolorization and turbidity removal	Proposal accepted
14	Preventing zoonotic diseases emergenc	Dr. THENG Voulay Dr. PENG Chanthol Mr. MA Chiva Dr. Ann Vannak		2022-2027	To study risks of emergence of zoonotic diseases impacted by the hydrological dynamics, climate, and environment in diversified ecosystems in Cambodia	<ul style="list-style-type: none"> <li>- Preliminary workshop has been done for activities planning</li> </ul>
15	Antimicrobial Resistance Circulation along the Mekong and its Delta (ARCIMED)	Ms. DOEURN Seyha Mr. MA Chiva Dr. PENG Chanthol		2021-2023	To study antibiotic-resistant bacteria profile, bacterial community, and antibiotic residues in Mekong River	Two sampling conducted and analysing the antibiotic resistant bacterial
16	Ecosystem-base Adaptations for Sustainable Groundwater Resources Management in the Transboundary Cambodia-Vietnam Mekong Delta Aquifer,	Dr. PEN Sytharith		2022-2023	Proposal accepted	-

	Lower Mekong Region (GEBA)					
17	Development of Electrocoagulation-Flootation (ECF) Reactor for Removal Turbidity, Color, and Oil & Grease from Slaughterhouse Wastewater	Dr. SANG Davin	LBE/JICA	2023-2024	Proposal accepted	
18	Development of locally-produced ceramic pot filter for household groundwater purification in rural Cambodia	Dr. HEU Rina	LBE/JICA	2023-2024	Proposal accepted	
19	Development of monitoring and controlling of IoT based aquaponics system using green energy (Acronym: smart aquaponics projec	Dr. TY Boreborey	LBE/JICA	2023-22024	Proposal accepted	

**Annex 22. List of publications in Techno-Science Research Journal in Volume 10 (2022).**

No.	Title of papers published in volume 10 (2022)	Research Unit
<b>Volume 10 and Issue 1</b>		
1	Analytical Assessment of Earthquake Energy Demand in Single Degree of Freedom Systems (Kimheng Oeung, Piseth Doung, Sutata Leelataviwat, Viral Han)	MSS
2	Direct Seismic Design Methods for Buckling-Retrained Knee-Braced Frames with Single Plate Shear Connections (Piseth Doung, Sutata Leelataviwat)	MSS
3	Evaluation of Structural Pavement (Foundation) by Using Light Weight Deflectometer in Cambodia (Chrinthony Soth, Veng Kheang Phun, Sok Testya, Yit Bunna)	Other
4	The Bi-Directional Static Load Test for Bored Pile (Drilled Shaft) for Koh Norea Bridge, Bassac River, Phnom Penh, Cambodia (Rithikun Mean, Zhengzheng Wang)	MSS
5	Impact of Climate Change on Sediment and Nitrate Loads in Prek Thnot River Basin of the Lower Mekong River (Chantharath Yos, Ilan Ich, Ty Sok, Ratboren Chan, Vinhteang Kaing, Chanlyda Khen, Chathan Oeurng)	WAE
6	Trend and Stationarity Analysis of Streamflow in Prek Thnot River Basin (Oudomsatia Huong, Chponleourothana Samrith, Ty Sok, Ilan Ich, Sophal Try, Ratboren Chan, Chantha Oeurng)	WAE
7	Flow Alteration under Land use Impact in Sen River Basin of the Tonle Sap Lake Basin (Dydarong Ket, Ty Sok, Ilan Ich, Kimleang Chum, Sovatey Lim, Ratboren Chan, Ponleu Pech, Chantha Oeurng)	WAE
8	Formulizing the Design Criteria for Piped Water System in Cambodia: A Case Study in Anlong Romiet Water Supply (Davin Sang, Meng Chhun, Sambo Lun)	WAE
9	Sensorless Control of PMSM using Sliding Mode Observer in Solar Electric Tuktuk Application (Piseth Thok, Bunthern Kim, Sokchea Am)	MIT
10	Drying Kinetic and the Changes of Physicochemical Properties and Bioactive Contents of Dried Tomatoes during Hot Air Drying (Sreyphhea Met, Peany Houng, Pichmony Ek, Pheakdey Yun, Sovannmony Lay)	FTN

**Volume 10 and Issue 2**

11	Assessment of the Impact of Climate Change on Hydrological Components in Stung Sen Catchment of the Tonle Sap Lake Basin, Cambodia (Amret Chham, Ratha Doung)	WAE
12	Lithofacies and Petrology of Sandstones from Outcrops at Kulen Area, Siem Reap Province, Cambodia (Pidao Choon, Chandoeun Eng, Sopheap Pech, Muoy Yi Heng, Meta Chorn, Chitra Buth, Ratha Heng)	WAE
13	Twin Bridge Hydraulics Analysis using HEC-RAS Model (Norak Harn, Sytharith Pen, Sokchhay Heng)	WAE
14	Optimization of Extraction Conditions for Phenolic Compounds Extracted from Cassumunar Ginger ( <i>Zingiber montanum</i> ) (Sengnut Song, Peany Houng, Sovannmony Lay, Sokneang In)	FTN
15	Feasibility Study of Recycled Waste Plastic Application in Bituminous Concrete (Sotheany Seang, Kuchvichea Kan, Masaaki Okamoto)	MSS
16	Effect of Pretreatment on Extractions of Essential Oils from Kaffir Lime ( <i>Citrus Hysteric DC.</i> ) Leaves (Phalla Chhay, Peany Houng, Sovannmony Lay)	FTN
17	Improving Urban Traffic Low at Congested Signalized Intersections in Phnom Penh, Case Study of Neakvaon Intersection (Visal Chheng, Pharinet Pheng, Veng Kheang Phun)	Other
18	Security Enhancement of Kubernetes Management in the Blockchain Platform for Building the Medical System for Information Exchange in Cambodia (Kothay Poeng, Dara Tith, Phutphalla Kong)	ETM
19	Integration of RRT* Path Planning with Trajectory Tracking for Wheeled Mobile Robot (Sotheara Oum, Sarot Srang, Phayuth Yonrith)	ETM
20	Identification of Pesticide Contamination in Water Sources Surrounding Agrochemical-Free Rice Farming in Battambang Province (Lisang Thourn, Chanvorleak Phat, Malyna Suong, Sreyvich Sieng, Soukim Heng, Sereyvath Yoeun)	FTN

## Annex 23. List of publication from ETM Research Unit.

### List of Index publications from 2018

1. Kimsrornn KHON, Vannak VAI, Marie-Cecile ALVAREZ-HERAULT, Long BUN, Bertrand RAISON. 2021., Planning Of Low Voltage Ac/Dc Microgrid For Un-Electrified Areas. <https://ieeexplore.ieee.org/abstract/document/9692581>
2. Kanika Yon, Marie-Cécile Alvarez-Hérault, Bertrand Raison, Kimsrornn Khon, Vannak Vai, Long Bun., 2021. Microgrids planning for rural electrification. <https://ieeexplore.ieee.org/abstract/document/9494966>
3. V. Vai, « Design of AC Microgrid Topology with Photovoltaic Uncertainties in a Rural Village, » Makara Journal of Technology, 2021, <https://doi.org/10.7454/mst.v25i1.3759>
4. S. Suk, V. Vai, R. Lorm, C. Chhlonh, S. Eng and L. Bun, « Modifying Switch Opening and Exchange Method for Distribution Network Reconfiguration with Distributed Generations, » 2021 9th International Electrical Engineering Congress (iEECON), 2021, pp. 85-88, doi: 10.1109/iEECON51072.2021.9440343. (International peer review).
5. S. Suk, V. Vai, R. Lorm, C. Chhlonh, S. Eng and L. Bun, « Network Reconfiguration in Distribution Systems Based on Modified Sequential Switch Opening Method, » 2021 11th International Conference on Power, Energy and Electrical Engineering (CPEEE), 2021, pp. 143-146, doi : 10.1109/CPEEE51686.2021.9383247. (International peer review)
6. V. Vai et al., « Optimal Design of LVAC Distribution System Topology for a Rural Village, » 2021 9th International Electrical Engineering Congress (iEECON), 2021, pp. 93-96, doi : 10.1109/iEECON51072.2021.9440289. (International peer review)
7. V. Vai, S. Suk, R. Lorm, C. Chhlonh, S. Eng, and L. Bun. « Optimal Reconfiguration in Distribution Systems with Distributed Generations Based on Modified Sequential Switch Opening and Exchange » Applied Sciences, 2021, 11, no. 5 : 2146. <https://doi.org/10.3390/app11052146>. IF:2.679
8. R. Lorm, V. Vai, S. Suk, C. Chhlonh, S. Eng, L. Bun, « Service Restoration in Distribution Systems under Different Load Levels, » 2021 11th International Conference on Power, Energy and Electrical Engineering (CPEEE), 2021, pp. 122-126, doi : 10.1109/CPEEE51686.2021.9383358. (International peer review)
9. VAI Vannak, BUN Long, KHON Kimsrornn, Marie-Cécile Alvarez-Hérault, Bertrand Raison. 2020. Integrated PV and Battery Energy Storage in LVAC for a Rural Village: A Case Study of Cambodia. <https://ieeexplore.ieee.org/abstract/document/9255336>
10. R. Lorm, S. Eng, S. Suk, C. Chhlonh, L. Bun and V. Vai, « Service Restoration in Distribution System Using Modified Sequential Opening Branches, » 2021 9th International Electrical Engineering Congress (iEECON), 2021, pp. 69-72, doi : 10.1109/iEECON51072.2021.9440266. (International peer review)
11. C. Chhlonh, D. C. Riawan and H. Suryoatmojo, "Modeling and Simulation of Independent Speed Steering Control for Front In-wheel in EV Using BLDC Motor in MATLAB GUI," 2019 International Seminar on Intelligent Technology and Its Applications (ISITIA), Surabaya, Indonesia, 2019, pp. 270-275, doi: 10.1109/ISITIA.2019.8937199.
12. C. Chhlonh, D. C. Riawan and H. Suryoatmojo, "Independent Speed Steering Control of Rear In-wheel BLDC Motor in EV Based on Fuzzy Logic Controller in GUI," 2019 5th International Conference on Science and Technology (ICST), Yogyakarta, Indonesia, 2019, pp. 1-6, doi: 10.1109/ICST47872.2019.9166418.
13. Chhlonh, C., Riawan, D. C., & Suryoatmojo, H. (2019, April). Simulation of independent speed steering control of four in-wheel BLDC motors direct drive for electric vehicle using hybrid fuzzy-PI controller in Matlab GUI. In *Proceedings of the 2019 2nd International Conference on Electronics, Communications and Control Engineering* (pp. 67-71).
14. C. Chhlonh, B. Kim, P. Chrin, S. Am and T. Seng, "Four In-Wheel BLDC Motors Speed Control in EV Based on Hybrid Fuzzy-PI Controller Visual on GUI," 2021 International Symposium on Electrical and

- Electronics Engineering (ISEE), Ho Chi Minh, Vietnam, 2021, pp. 166-171, doi: 10.1109/ISEE51682.2021.9418790.
15. T. Nozaki, T. Nagase, Y. Takaya, et al., « Subseafloor sulphide deposit formed by pumice replacement mineralisation, » *Scientific Report* 11, 8809 (2021). <https://doi.org/10.1038/s41598-021-87050-z>. IF: 5.134
  16. Kimsrornn KHON, Vannak VAI, Marie-Cecile ALVAREZ-HERAULT, Long BUN, Bertrand RAISON., 2021. Factors affecting the breakdown voltage along the insulator surface of a busbar for power modules
  17. K. KHON, S. FICHTNER, M. ALVAREZ-HERAULT, V. VAI, L. BUN, B. RAISON, ‘Optimal design of low voltage AC/DC microgrid’ SYMPOSIUM DE GENIE ELECTRIQUE (SGE 2020), 30 JUIN – 2 JUILLET 2020, NANTES, France
  18. B. Kim, E. Boulaud, E. Boisaubert, S. Am, P. Chrin, “Study of the control of an AC voltage stabilizer using lqr and anti-windup”. 22<sup>nd</sup> European Conference on Power Electronics and Applications 7-11 September 2020, Lyon (France). Doi:10.3390/en13102410
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  21. M. Pietrzak-David, B. Kim, P. Maussion, C. Phok “Frugal Innovation for Sustainable Rural Electrification.” 22<sup>nd</sup> European Conference on Power Electronics and Applications 7-11 September 2020, Lyon (France). (Accepted)
  22. Sok Chea AM, Phok CHRIN, Bunthern KIM, Menghorng BUN, Phing LIM, “High Isolated Transformer for a Serie Connected IGBTs Power Supply”.iEECON 2020, The international Electrical Engineering Congress, Thailand. (Accepted)
  23. Vannak Vai and Long Bun, “Study on the Impact of Integrated PV Uncertainties into an Optimal LVAC Topology in a Rural Village”, *ASEAN Engineering Journal*, Vol. 10, No. 1, pp.79-92, March 2020
  24. Vannak Vai, Long Bun and Hideaki Ohgaki, “Integrated Battery Energy Storage into an Optimal Low Voltage Distribution System with PV Production for an Urban Village”, *International Journal on Advanced Science, Engineering and Information Technology*, Vol. 10, No. 6, pp.2458-2464, December 2020
  25. Vannak Vai, Marie-Cécile Alvarez-Hérault, Bertrand Raison and Long Bun, “Optimal Low-Voltage Distribution Topology with Integration of PV and Storage for Rural Electrification in Developing Countries: A Case Study of Cambodia”, *Journal of Modern Power Systems and Clean Energy*, Vol. 8, No. 3, pp.531-539, May 2020
  26. Tongsa Lan, Chandoeun Eng, and Vuthy Horng., 2019. Design of 293ontiguous pile wall and lateral support system for deep excavation at Chroy Changva, Phnom Penh, Cambodia. *International Symposium on Earth Science and Technology*, pp. 413-418
  27. B. Kim, M. Pietrzak-David and P. Maussion, “Novel Configuration of a Three-phase Induction Generator for Single-phase Load: Simulations and Experimentations,” *IECON 2019 – 45<sup>TH</sup> ANNUAL CONFERENCE OF THE IEEE INDUSTRIAL ELECTRONICS SOCIETY*, Lisbon, Portugal, 2019, pp. 5807-5813.
  28. B. Kim, M. Pietrzak-David and P. Maussion, “Novel Configuration of an Inverter-based Three-phase Induction Generator for Single-phase Load: Comparison to TSCAOI Setup,” *2019 INTERNATIONAL SYMPOSIUM ON ELECTRICAL AND ELECTRONICS ENGINEERING (ISEE)*, Ho Chi Minh, Vietnam, 2019, pp. 318-322.
  29. Chantra Chhorn and Chandoeun Eng., 2019. Geological mapping and interpretation of Wild Boar prospect area in Ratanakiri province, Cambodia. *International Symposium on Earth Science and Technology*, pp. 531-536.



30. K. Vongchanch, S. Chan (2019) Preliminary study on investigation of the heat stress affecting the labor productivity, A Case Study: garment factory Phnom Penh, Icorer conference
31. Kakda Kret, Tatsunori Ikeda, Takeshi Tsuji (2019) Grid-search inversion based on rock physics model for estimation of pore geometry and grain elastic moduli: Application to hydrothermal ore deposits and basalt, *Exploration Geophysics*, 50, 1-11
32. Porchaing CHOENG, Lan HEANG, K. Vongchanch, S. Chan (2019) Investigation on Application of Fish Oil as Binding Material in Biomass Briquetting Process, The 10<sup>th</sup> RC MEManuE 2019
33. Vannak Vai, Long Bun, Marie-Cécile Alvarez-Hérault, and Bertrand Raison (2019) Design of LVAC distribution system with PV and centralized battery energy storage integration-A case study of Cambodia, *ASEAN Engineering Journal*, Vol 9, No 2, 1-16
34. Inthavideth X., Vongchanh, K., and Trichanh P. (2018) Testing and Investigation of Properties of Composite Biomass Briquettes, the 10<sup>th</sup> RCEnE
35. Porchaing CHOENG, Kinnaeth VONGCHANH, Chanmoly OR, Latin HEANG, and Sarin CHAN, (2018) Investigate Briquette's Properties of Biomass having Fish Residue as a Binder, TSME-IcoME2018
36. V. Vai, L. Bun, M.-C. Alvarez-Hérault, B. Raison, "LVAC Distribution System Design with PV and Centralized Battery Energy Storage Integration", in Proc. RCEEE 2018
37. V. Vai, L. Bun, M.-C. Alvarez-Hérault, B. Raison, "Optimal Design of LVAC Topology Considering Load Demand Uncertainties", in Proc. RCEnE 2018
38. Vongchanh K., Chan S., Sok P. (2018) A survey on energy consumption and appliances of households in urban and sub-urban Cambodia, RCEnE2018
39. Vongchanh K., Chan S., Sok P., A survey on energy consumption and appliances of households in urban and sub-urban Cambodia, 11<sup>th</sup> AUN/SEED-net regional conference on Energy Engineering, September 27-28, 2018, Manila, Philippines

#### **List of Non-index publications from 2018**

1. Latin Heang, Porchaing Choeng, Kinnaeth Vongchanh, Sarin Chan. Experimental Investigation on Sawdust and Tree Leaf Briquette Using Fish Residues Oil as a Binder. *Techno-Science Research Journal* 8 (2020)
2. Porchaing Choeng, Latin Heang, Kinnaeth Vongchanh, Sarin Chan. Experimental Investigation on Rice Husk and Bagasse Briquette Using Fish Oil as Binder. *Techno-Science Research Journal* 8 (2020)
3. Kinnaeth Vongchanh, Sarin Chan, Heat Stress Effect on Labour Construction Productivity, policy brief, 2019.

#### **List of Conferences from 2018**

1. Pheakdey Choun, Viza Heang, Sarin Chan, Kinnaeth Vongchanh, Simulation of Energy consumption for Flat using EnergyPlus, the 11th scientific day of ITC, 5-6 May 2022, Phnom Penh, Cambodia.
2. V. Chea, L. Heang, K. Vongchanh, S. Chan, A Descriptive Results on Environment Affecting Pupils in Cambodia – Case Study Primary Schools in Phnom Penh, 2nd ASEAN International Conference on Energy and Environment, 14-15 September 2022, Phnom Penh, Cambodia.
3. Morn Mengly, Kinnaeth VONGCHANH, CHAN Sarin, Latin HEANG, A Descriptive Results on Environment Affecting Pupils in Cambodia – Case Study Primary Schools in Phnom Penh, 2nd ASEAN International Conference on Energy and Environment, 14-15 September 2022, Phnom Penh, Cambodia.
4. Samoeurn Cheng, Kinnaeth Vongchanh, Sarin Chan, Latin Heang, Pisal Ken, Exergy Analysis of Biomass Briquette System, The 15th Regional Conference on Energy Engineering And The 13th International Conference on Thermofluids 2022, 25-26, October, 2022, Yogyakarta, Indonesia.
5. Pisal Ken, Kinnaeth Vongchanh, Sarin Chan, Latin Heang, Samoeurn Cheng, Thermal Properties of Biomass Briquettes made from Waste Materials. (2022). The 15th Regional Conference on Energy

- Engineering and The 13th International Conference on Thermofluids 2022, 25-26, October, 2022, Yogyakarta, Indonesia.
6. Kinnaleth Vongchanh, Sarin Chan, Testing the hydraulic press machine for densification of biomass briquettes for household use, The International postgraduate conference for energy research 2022, 19 December 2022, Kuala Lumpur, Malaysia.
  7. Ly, P., Seang, S., Kret, K., Oy, K., Yonezu, K., Watanabe, K., Sreu, T. (2022) Lithology, hydrothermal alteration, and ore characteristics of Area-1 in Koh Sla, Chhouk district, Kampot Province, southern Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan.
  8. Chheuy, P., Kret, K., Seang, S., Or, C., Kong, S., Kry, R., Oy, K., Chan, C., Sreu, T., Hoeun, S., Hoeun, S., Chhun, C., Neak, K. (2022) Hydrothermal Alteration Mineral Mapping by Integrating of ASTER and Landsat-8: A case study in Phnom Peam Louk, Kompong Chhang Province, Southwest Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022.
  9. Neak, K., Kret, K., Sreu, T., Or, C., Seang, S. (2022). Petrophysical and Petrographical Studies for Characterization of Reservoir Quality of Cambodian Offshore: A Case Study on the Khmer Basin in the Gulf of Thailand. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022.
  10. Boeurn, C., Seang, S., Kret, K., Yonezu, K., Watanabe, Zaw, K. (2022) Geology and Hydrothermal Alteration of Skarn Deposit in Area 4, Phnom So Ngam Tenement, Chhouk District, Kampot Province, Cambodia. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022.
  11. Kim, C., Kret, K., Seang, S., Kong, K., Or, C., Oy, K., Ammuguan, J., Heoun, S., Chhun, C., and Neak, K. (2022) Lithological Analysis of Koh Nheak, Mondoukiri Province Using Landsat-8 OLI and ASTER. Proceedings of the International Symposium on Earth Science and Technology, Japan 2022.
  12. M. Morn, K. Vongchanh, S. Chan, L. Heang (2022), A Descriptive Results on Environmental Affecting Pupils in Cambodia – Case Study Primary Schools in Phnom Penh, The 2nd ASEAN International Conference on Energy and Environment.
  13. V. Chea, L. Heang, K. Vongchanh, S. Chan (2022), Workers' Perceptions of Occupational Heat Stress- a survey among garment workers in Phnom Penh, The 2nd ASEAN International Conference on Energy and Environment.
  14. P. Ken, K. Vongchanh, S. Chan, L. Heang, S. Cheng (2022), Investigation of Briquette Thermophysical Properties and Gas Emissions, Seminar Thermofluid UGM
  15. S. Cheng, S. Chan, K. Vongchanh, L. Heang, P. Ken (2022), Investigation of Briquette Thermophysical Properties and Gas Emissions, The 11<sup>th</sup> Scientific Day
  16. P. Ken, K. Vongchanh, S. Chan, L. Heang, S. Cheng (2022), Exergy Analysis of Biomass Briquette System, The 11<sup>th</sup> Scientific Day.
  17. Muoy Y. H., Chungyeun L., Saranyu H., Chandoeun E., Frederic N., 2022. Quality assurance of Concrete pile using Cross-hole Sonic Logging and Soil Profile. International Symposium on Earth Science and Technology 2022.
  18. KEO T., HENG. M. Y., CHORK S., LANG R., HENG H., 2022., The Primary Geochemistry Evaluation on the Geothermal source in Te Teuk Pus Hot Spring in Oral district, Kompong Speu province, Cambodia., International Symposium On Earth Resources And Geo-Environmental Technology 2022.
  19. Chungyeun L., Chandoeun E., Muoy Y. H., Phanny Y., 2022., Concrete Pile Defect Identification: Insights from Cross-Hole Sonic Logging and High Strain Dynamic Pile Test., The 4th ICCEE Proceedings.
  20. Chungyeun L., Chandoeun E., Muoy Y. H., Phanny Y., 2022., Cross-Hole Sonic Logging and Dynamic Load Test for Concrete Pile Integrity Analysis., THE 11TH SCIENTIFIC DAY, Phnom Penh.
  21. Sreymean Sio, Chandoeun Eng, Chanmoly Or. (2022). Seismic Interpretation and Tectonic Evolution of Tonle Sap Basin, Onshore Cambodia, the 11<sup>th</sup> Scientific Day of ITC
  22. Sreymean Sio Chanmoly Or, Chandoeun Eng (2022). Review of Sedimentary Basin Formation and Petroleum System of Khmer Basin, Offshore Cambodia, the International Symposium on Earth Science and Technology 2022.
  23. Sopheap PECH, Chandoeun ENG, Chanmoly OR, Sreymean SIO, Ratha HENG, Chitra BUTH (2022). Geochemistry of Shales and Limestones in Battambang Province: Implications for Depositional Environment, the 1<sup>st</sup> International Conference on Earth Resources and Geo-Environment Technology 2022,

24. Sreyleap Koem, Chandoeun Eng, Sopheap Pech, Kimhouy Oy, Sreymean Sio (2022). Sedimentary Facies and Sandstone Characteristics of Outcrop at Phnom Thippadei, Battambang Province, Cambodia, the 1<sup>st</sup> International Conference on Earth Resources and Geo-Environment Technology 2022.
25. They Chhun, Chandoeun Eng, Kimhouy Oy, Sopheap Pech, Sreymean Sio, Chaimongkhon Proeung. (2022). Petrography and geochemistry properties of limestone at Sampov Mountain in Battambang province, Cambodia, the 1<sup>st</sup> International Conference on Earth Resources and Geo-Environment Technology 2022.
26. Vechheka OEUR, Chandoeun ENG, Sopheap PECH, Kimhouy OY, Sreymean SIO. (2022). Lithofacies identification of outcrop in Takream mountain at Pouy Svay village, Takream Commune, Banan District, Battambang Province, Western Tonle Sap Basin, Onshore Cambodia, he 1<sup>st</sup> International Conference on Earth Resources and Geo-Environment Technology 2022
27. Sreymean Sio, Chanmoly Or, Chandoeun Eng. (2021). Review of Petroleum Systems Around Cambodia, the 10<sup>th</sup> Scientific Day of ITC.
28. Reach S. L., Muoy. Y. H. (2021). Preliminary Investigation of Geothermal Reservoir in Oral District Kampong Speu Province, Cambodia. Virtual GEOSEA 2021
29. Sokheng C., Muoy Y. H., Ichhuy N., and Phanny Y. (2021). The Preliminary Investigation on Geothermal Hot Spring, Te Tek Pus in Oral District, Kampong Speu Province, Cambodia., International Symposium on Earth Science and Technology 2021., p172-176., ( best paper award )
30. Menghor LEAP., Muoyyi HENG., Nallis KRY., Ichhuy NGO. (2020). Investigation on lithology and mineral alteration of geothermal resources in Te Teuk Pus hot spring, Kampong Speu province, Cambodia., 12th AUN/SEED-Net Regional Conference on Geological and Geo-Resources Engineering.
31. Menghor LEAP., Muoyyi HENG., Nallis KRY., Ichhuy NGO. 2020. Primary Investigation on Lithology and Alteration for Geothermal Resource in Te Tekpos, Oral District, Kompong Speu Province, Cambodia., Proceedings of International Symposium on Earth Science and Technology, 2020.p 450-456.
32. Sokvireak Say., Chanmoly Or., Muoyyi Heng. (2020). Hydrocarbon Reservoir Characterization Using Well Logs Data Analysis, Offshore Cambodia. Proceedings of International Symposium on Earth Science and Technology, 2020, p216-221.
33. K. Vongchanh (2021), Alternative of biomass waste to energy sources as biomass briquettes in Cambodia, 11th Annual International Conference on Industrial Engineering and Operations Management.
34. K. Vongchanh (2021), Development of home solar dryer for drying of fish in Cambodia, International Symposium on Environment/Eco-technology and Policy (EETP) in East Asian
35. L. Heang, K. Vongchanh, S. Chan. (2020). Investigation on Application of Fish Oil as Binding Material in Biomass Briquetting Process, The 10th RC MEManuE 2020
36. K. VITHEAN, K. Vongchanch, S. Chan. (2019). Study on heat stress impacting to Labor productivity in Phnom Penh: Case study on Rebar workers, 9th Scientific day
37. Chan Oussa SUNG, Or Sopheap, Kinnalesh VONGCHANH. (2018). Improve Solar Hybrid Dryer System and investigation of moisture content of dried fish, The 8th Scientific day
38. Kinnalesh VONGCHANH (2018) The need of Energy Saving in Cambodia, The 8th Scientific day.
39. Sam BAN, Kinnalesh VONGCHANH, Sarin CHAN. (2018). Household survey energy consumption in Cambodia, The 8th Scientific day.
40. Sokhim KEO, Chanlin PHANG, Kinnalesh VONGCHANH, Sarin CHAN. (2018). 3D design of biomass briquetting machine, the 8th Scientific day.
41. Oudaya Eth, Long Bun. (2017). Economic Viability of Building Integrated Photovoltaic System Connected to the Grid In Phnom Penh, Cambodia. The 10th AUN-Seed Net Regional Conference on Energy Engineering. Yangon, Myanmar.
42. Borann Ing, Vattanak Sok, Oudaya Eth. (2018). Study on Regulation for Connecting Solar Projects to National Grid in Cambodia and Vietnam to Complement Each Other with a Specific Goal for Developing Sophisticated Solar Project in Cambodia” The 11th AUN-Seed Net Regional Conference on Energy Engineering (RCEnE) 2018, Manila, Philippines.

## Annex 24. List of publication from FTN Research Unit.

### List of Index publications from 2018

1. Ek, P., Gu, B.-J., Saunders, S. R., Huber, K., & Ganjyal, G. M. (2021). Exploration of physicochemical properties and molecular interactions between cellulose and high-amylose cornstarch during extrusion processing. *Current Research in Food Science*. 4(June), 588–597. <https://doi.org/10.1016/j.crfs.2021.07.001>
2. Ek P., Gu, B.-J., & Ganjyal, G. M. (2021). Whole seed lentil flours from different varieties (Brewer, Crimson, and Richlea) demonstrated significant variation in their expansion characteristics during extrusion. *Journal of Food Science*. 86(3), 942-951. <https://doi.org/10.1111/1750-3841.15623>
3. Dey, D., Gu, B.-J., Ek, P., Rangira, I., Saunders, S. R., Kiszonas, A. M., & Ganjyal, G. M. (2021). Apple pomace pretreated with hydrochloric acid exhibited better adherence with the corn starch during extrusion expansion. *Carbohydrate Polymer Technologies and Applications*. 2, 100089. <https://doi.org/10.1016/j.carpta.2021.100089>
4. Yusoff, A. H., Roslan, N. N., Chang, C. S., Lazim, A. M., Nadzir, M. S. M., Oslan, S. N. H., ... & Tan, R. (2021). Heavy Metals in Marsh Clam (*Polymesoda expansa*) as Bioindicators for Pollution in Industrial and Sand Mining Area of Kelantan River Basin, Malaysia. *Trends in Sciences*, 18(20), 10-10. (IF:0.146)  
DOI: <https://doi.org/10.48048/tis.2021.10>
5. Lorn, D., Ho, P. H., Tan, R., Licandro, H., & Waché, Y. (2021). Screening of lactic acid bacteria for their potential use as aromatic starters in fermented vegetables. *International Journal of Food Microbiology*, 350, 109242.
6. Rodriguez, C., Mith, H., Taminiau, B., Bouchafa, L., Van Broeck, J., Soumillion, K., ... & Daube, G. (2021). First isolation of *Clostridioides difficile* from smoked and dried freshwater fish in Cambodia. *Food Control*, 124, 107895.
7. Sroy, S., Arnaud, E., Servent, A., In, S., & Avallone, S. (2021). Nutritional benefits and heavy metal contents of freshwater fish species from Tonle Sap Lake with SAIN and LIM nutritional score. *Journal of Food Composition and Analysis*, 96, 103731.
8. Sroy, S., Arnaud, E., Servent, A., In, S., & Avallone, S. (2021). Nutritional benefits and heavy metal contents of freshwater fish species from Tonle Sap Lake with SAIN and LIM nutritional score. *Journal of Food Composition and Analysis*, 96, 103731.
9. Dey, D., Richter, J.K., Ek, P., Gu, B.-J., & Ganjyal, G.M. (2020). A review of food processing by-products utilization in extrusion processing. *Frontiers (Sustainable Food Systems)*. Vol. 4. Article: 603751. <https://doi.org/10.3389/fsufs.2020.603751>
10. Rangira, I., Gu B.-J., Ek P., & Ganjyal, G.M. (2020). Pea starch exhibits excellent expansion characteristics under relatively lower temperatures during extrusion cooking. *Journal of Food Science*. 85(10), 3333-3344. <https://doi.org/10.1111/1750-3841.15450>
11. Chin, L., N. Therdthai and W. Ratphitagsanti. (2020). Effect of microwave cooking on quality of Thai Riceberry rice (*Oryza sativa* L.). *Journal of Food Quality*. Article ID 4350274. <https://doi.org/10.1155/2020/4350274>
12. Anal, A. K., Perpetuini, G., Petchkongkaew, A., Tan, R., Avallone, S., Tofalo, R., ... & Waché, Y. (2020). Food safety risks in traditional fermented food from South-East Asia. *Food Control*, 109, 106922.
13. Hor, S., Léchaudel, M., Mith, H., & Bugaud, C. (2020). Fruit density: A reliable indicator of sensory quality for mango. *Scientia Horticulturae*, 272, 109548.
14. Morm, E., Ma, K., Horn, S., Debaste, F., Haut, B., & In, S. (2020). Experimental Characterization of the Drying of Kampot Red Pepper (*Piper nigrum* L.). *Foods*, 9(11), 1532.

15. Anal, A. K., Waché, Y., Louzier, V., Laurent, R., Mens, F., Avallone, S., ... & Guidi, A. (2020). AsiFood and its output and prospects: An Erasmus+ project on capacity building in food safety and quality for South-East Asia. *Food Control*, *109*, 106913.
16. Song, M., Chapuis, E., Leng, V., Tivet, F., De Waele, D., Thi, H. N., & Bellafiore, S. (2019). Impact of a conservation agriculture system on soil characteristics, rice yield, and root-parasitic nematodes in a Cambodian lowland rice field. *Journal of Nematology*, *51*.
17. Ly, S., Bajoul Kakahi, F., Mith, H., Phat, C., Fifani, B., Kenne, T., ... & Delvigne, F. (2019). Engineering synthetic microbial communities through a selective biofilm cultivation device for the production of fermented beverages. *Microorganisms*, *7*(7), 206.
18. Peng, C., Hanawa, T., Azam, A. H., LeBlanc, C., Ung, P., Matsuda, T., ... & Tanji, Y. (2019). Silviavirus phage  $\phi$ MR003 displays a broad host range against methicillin-resistant *Staphylococcus aureus* of human origin. *Applied microbiology and biotechnology*, *103*(18), 7751-7765.
19. Khoeurn, K., Sakaguchi, A., Tomiyama, S., & Igarashi, T. (2019). Distribution of Zinc, Copper, and Iron in the Tailings Dam of an Abandoned Mine in Shimokawa, Hokkaido, Japan. *Mine Water and Environment*, *38*(1), 119-129.
20. Khoeurn, K., Sakaguchi, A., Tomiyama, S., & Igarashi, T. (2019). Long-term acid generation and heavy metal leaching from the tailings of Shimokawa mine, Hokkaido, Japan: Column study under natural condition. *Journal of Geochemical Exploration*, *201*, 1-12.
21. Bajoul Kakahi, F., Ly, S., Tarayre, C., Deschaume, O., Bartic, C., Wagner, P., ... & Delvigne, F. (2019). Modulation of fungal biofilm physiology and secondary product formation based on physico-chemical surface properties. *Bioprocess and biosystems engineering*, *42*(12), 1935-1946.
22. Try, S., Voilley, A., Chunhieng, T., De-Coninck, J., & Waché, Y. (2018). Aroma compounds production by solid state fermentation, importance of in situ gas-phase recovery systems. *Applied microbiology and biotechnology*, *102*(17), 7239-7255.
23. Try, S., De-Coninck, J., Voilley, A., Chunhieng, T., & Waché, Y. (2018). Solid state fermentation for the production of  $\gamma$ -decalactones by *Yarrowia lipolytica*. *Process Biochemistry*, *64*, 9-15.
24. Waché, Y., Do, T. L., Do, T. B. H., Do, T. Y., Haure, M., Ho, P. H., ... & Chu-Ky, S. (2018). Prospects for food fermentation in South-East Asia, topics from the tropical fermentation and biotechnology network at the end of the AsiFood Erasmus+ Project. *Frontiers in Microbiology*, *2278*.
25. Ly, S., Mith, H., Tarayre, C., Taminiau, B., Daube, G., Fauconnier, M. L., & Delvigne, F. (2018). Impact of microbial composition of Cambodian traditional dried starters (Dombea) on flavor compounds of rice wine: combining amplicon sequencing with HP-SPME-GCMS. *Frontiers in Microbiology*, *9*, 894.
26. Yoeun, S., Cho, K., & Han, O. (2018). Structural evidence for the substrate channeling of rice allene oxide cyclase in biologically analogous Nazarov reaction. *Frontiers in chemistry*, *6*, 500.
27. Ung, P., Peng, C., Yuk, S., Ann, V., Mith, H., Tan, R., ... & Tanji, Y. (2018). Fate of *Escherichia coli* in dialysis device exposed into sewage influent and activated sludge. *Journal of Water and Health*, *16*(3), 380-390.

#### **List of Non-index publications from 2018**

1. Y. Nat, P. Houng, S. Lay, 2021. Effect of Ultrasound-Assisted Extraction Condition on Extraction of Bioactive Compounds from Khmer White Turmeric (*Curcuma Zedoaria*). The Bulletin of Cambodian Chemical Society 12.
2. S. Yoeun, S. Ly, F. Kuok, 2021. Alcohol-Based Hand Rub Analysis by High Performance Liquid Chromatography. The Bulletin of Cambodian Chemical Society 12.
3. S. Hoeun, S. Lay, P. Houng, S. In, 2021. Impact of Blanching and Drying on Bioactive Compounds of Black Turmeric. The Bulletin of Cambodian Chemical Society 12.
4. S. Lay, P. Houng, S. In, 2021. Effects of Solvent and Time on Extraction of Bioactive Compounds from Cambodia Black Turmeric Using Ultrasound-Assisted Extraction. Techno-Science Research Journal 9.

5. M. Yin, S. Heng, S. Rem, L. Chin, 2021. Development of Spicy Sweet Chili Sauce. *Techno-Science Research Journal* 9.
6. M. Yin, W. Ratphitagsanti, N. Therdthai, 2021. Changes on Qualities of Gluten-free Chalky Rice Breadstick during Storage. *Techno-Science Research Journal* 9.
7. S. Chuon, M. T. Chanto, R. Tan, C. Peng, 2021. Isolation and Characterization of Lactic Acid Bacteria from Soy-based Products. *Techno-Science Research Journal* 9.
8. Ek, P. & Ganjyal, G.M. (2020). Basics of extrusion processing. In *Extrusion Cooking: Cereal Grains Processing*. Wood Publishing, an imprint of Elsevier, Inc. and Cereals and Grains Association.
9. Ek, P., Kowalski, R.J., & Ganjyal, G.M. (2020). Raw materials behaviors in extrusion processing I. In *Extrusion Cooking: Cereal Grains Processing*. Wood Publishing, an imprint of Elsevier, Inc. and Cereals and Grains Association.
10. Ek, P., Baner, J.M., & Ganjyal, G.M. (2020). Extrusion processing of cereal grains and seeds. In *Extrusion Cooking: Cereal grains processing*, an imprint of Elsevier, Inc. and Cereal and Grains Association.
11. Morantes, G., Ek, P., & Ganjyal, G.M. (2020). Food safety in extrusion processing. In *Extrusion Cooking: Cereal grains processing*, edited by Ganjyal GM, an imprint of Elsevier, Inc. and Cereal and Grains Association.
12. L. Ly, M. T. Chanto, C. Peng, R. Tan, 2020. Market study of soy sauces in Cambodia. *Techno-Science Research Journal*, 2020, Volume 8, 64–68.
13. S. Kai, S. Yeoun, C. Phat, 2020. Analysis of pesticide residues in sediment from Chhnok Tru, Kampong Chhnang using different extraction methods. *Techno-Science Research Journal* 8.
14. D. Vantha, C. Peng, H. Mith, 2020. Detection and susceptibility of antibiotic-resistant *Enterococcus* spp. in fermented and pickled vegetables. *Techno-Science Research Journal* 8.
15. C. Phat, S. Rann, P. Teav, S. Soeung, F. Kuok, E. G. Mariquit, W. Kuriniawan, H. Hinode, 2020. Assessment of pesticide residues in surface water, sediment, and fish from Chhnok Tru, Kampong Chhnang. *Techno-Science Research Journal* 8.
16. S. Hoeun, E. Mom, S. In, 2020. Optimization of white pepper (*Piper nigrum* L.) processing by enzymatic activity. *Techno-Science Research Journal* 8.
17. Kuoch, Th., Khoeur, K., (2020). Distribution and Ecological Risk of Heavy Metals from Mining Areas: A Case Study in Chong Phlah Village, Chong Phlah Commune, Kaev Seima District, Mondulkiri Province, Northeast of Cambodia. *Techno-Science Research Journal* 8.
18. V. Phoem, S. Ly, H. Mith, 2020. Cambodian Rice Liquor Development using *Rhizopus oryzae*, *Saccharomyces cerevisiae* and alpha-amylase. *Techno-Science Research Journal* 8.
19. S. Yoeun, 2020. High Performance Liquid Chromatography: Principle and Basic Application. *The Bulletin of Cambodian Chemical Society* 11.
20. P. Ek, F. Kuok, W. Kuriniawan, E. G. Mariquit, H. Hinode, C. Phat, 2020. Preliminary study on chemical pollutants in Tonie Sap Lake, Cambodia. *The Bulletin of Cambodian Chemical Society* 11.
21. R. Kong, S. Lun, P. Kang, C. Soeng, L. Blanchot, S. Kim, M. Leti, B. Fabre, H. Mith, 2020. Optimization of extraction and analysis of physico-chemical properties and chemical compositions of fatty oils extracted from kernel seed of different mango (*Mangifera indica* L.) varieties. *The Bulletin of Cambodian Chemical Society* 11.
22. K. Saing, S. HUL, 2019. Behavioural Study of People toward Plastic Bag Generation and Characteristics of Plastic Waste Composition in Phnom Penh Municipality, Cambodia. *Techno-Science Research Journal* 7.
23. Y. Nat, S. Hor, C. Taing, R. Kan, F. Kuok, C. Or, S. Hul, M. Hata, M. Furuuchi, 2018. Size distribution of particulate matters surrounding the burning zones of medical wastes in the remote area of Cambodia. *Techno-Science Research Journal* 6.

## List of Conferences

1. L. Thourn, C. Phat., M. Suong (2021). Assessment of Extraction Technique of Natural Compounds of Plant Origin for Nematicidal Properties: A Review. The 10th Scientific Day of ITC, Institute of Technology of Cambodia, Phnom Penh, Cambodia.
2. Yusoff, A. H., Azmi, M. S. W., Chang, C. S., Sulaiman, A. F., Nor, A. N. M., Tan, R., & Ahmed, M. F. (2021, August). Vertical distribution of heavy metals in core sediments from Kelantan River off Tanah Merah, Kelantan, Malaysia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 842, No. 1, p. 012037). IOP Publishing.
3. S. Lay, P. Houng, 2021. Optimization of Ultrasound-Assisted Extraction of Phenolic Compounds from Cambodia Black Turmeric. *14<sup>th</sup> AUN/SEED-Net Regional Conference on Chemical Engineering 2021 (RCChE2021), In Conjunction with 1<sup>st</sup> International Conference on Innovation in Chemical Engineering & Technology (ICICET 2021)*, Selangor, Malaysia.
4. S. Sieng, L. Thourn, S. Sorn, T. Va, K. Tho, S. Bellafiore, M. SUONG, 2021. Current status of the Rice Root-Knot Nematode in Cambodian rice fields and management approaches. *The 3<sup>rd</sup> National Research Forum*, Phnom Penh, Cambodia.
5. T. Or, M. Lim, D. Sang, M. T. Chanto, R. Tan, 2021. Improving Removal Efficiency of Natural Organic Matter from Drinking Water Treatment Plant by Powder Activated Carbon Injection in Coagulation Process. *The 6th International Symposium on Conservation and Management of Tropical Lakes, In Conjunction with The 3rd International Conference on Tropical Limnology (TROPLIMNO III)*, Phnom Penh, Cambodia.
6. L. Meak, S. Khoun, T. Mao, C. Phat, 2021. Assessment of Pesticides Residue in Groundwater in Kampong Thom, Cambodia. *The 6th International Symposium on Conservation and Management of Tropical Lakes, In Conjunction with The 3rd International Conference on Tropical Limnology (TROPLIMNO III)*, Phnom Penh, Cambodia.
7. S. Yoeurm, S. Khuon, C. Phat, S. Yeoun, 2021. Assessment of Pesticides Residues in the Farm Soils and Sediment from Chhnok Tru, Kampong Chhnang. *The 6th International Symposium on Conservation and Management of Tropical Lakes, In Conjunction with The 3rd International Conference on Tropical Limnology (TROPLIMNO III)*, Phnom Penh, Cambodia.
8. V-D. Pham, S. In, S. Sroy, M. Soeung, M. Nishiyama, S. Heng, H. Mith, S. Nget, T. Watanabe, 2021. Assessment of Heavy Metal(loid) Accumulation and Sources in Six Edible Fish Species of Tonle Sap Lake, Cambodia. *The 6th International Symposium on Conservation and Management of Tropical Lakes, In Conjunction with The 3rd International Conference on Tropical Limnology (TROPLIMNO III)*, Phnom Penh, Cambodia.
9. C. Phat, S. Yoeun, M. Ouk, K. Kun, F. Kuok, B. Ty, W. Kurniawan, E. G. Mariquit, H. Hinode, 2021. Assessment of pesticide contamination in vegetable and water from Chhnok Tru floating communities of Tonle Sap Lake. *The 35th Congress of the International Society of Limnology (SIL2021)*, Gwangju, Republic of Korea.
10. R. Tan, C. Be, C. Peng, P. Ung, K. Miyana, Y. Tanji, 2021. Investigation of Multidrug-Resistant Bacteria in Tonle Sap Lake, Tonle Sap River, Mekong River, and Wastewater. *The 35th Congress of the International Society of Limnology (SIL2021)*, Gwangju, Republic of Korea.
11. P. Ung, K. Seang, S. Keo, R. Tan, K. Miyana, Y. Tanji, 2021. Assessment of Microbiological Water Quality in Tonle Sap River and Kob Srov Lake in Phnom Penh, Cambodia. *The 35th Congress of the International Society of Limnology (SIL2021)*, Gwangju, Republic of Korea.
12. S. Sok, P. Thach, K. Miyana, R. Tan, 2020. Development of a Package Containing PAC and Ca(OCl)<sub>2</sub> for Drinking Water Treatment of Lake Water. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.

13. S. In, S. Nget, S. Heng, D. V. Pham, M. Nishiyama, H. Mith, T. Watanabe, 2020. Bioaccumulation of heavy metals and trace elements in six fish species from Tonle Sap Lake, Cambodia. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
14. T. Yann, K. Miyanaga, R. Tan, 2020. The effectiveness of different types of polyaluminum chloride (PAC) and aluminum sulfate (alum) with Ca(OCl)<sub>2</sub> dosing for treatment surface water of Tonle Sap River. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
15. C. Phat, K. Kun, V. Pheap, S. Yoeun, E. G. Mariquit, W. Kuriniawan, H. Hinode, 2020. Assessment of Pesticide Residues in Surface Water and Fish from Chhnok Tru, Kampong Chhnang. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
16. K. Ngoun, G. Chhun, R. Tan, 2020. Optimization of Young Mango Fermentation and Effect of Different Preservation Methods on its Shelf-life. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
17. C. Nong and S. In, 2020. The effect of blanching on curcumin content and chemical composition of essential oils of dried Turmeric (*Curcuma longa*). *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
18. S. Hoeun, S. Meas, E. Morm, S. In, 2020. Production of White Pepper from Ripe Pepper Berries (*Piper nigrum* L.). *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
19. M. Net, D. Dim, R. Tan, 2020. Development of Fermented Small Cucumbers with Different Tastes Using Isolated Lactic Acid Bacteria. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
20. T. Kong, S. Hean, R. Tan, 2020. Development of Fermented Young Melon using Isolated Lactic Acid Bacteria. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
21. C. Sam, S. Nget, S. Heng, S. In, M. Nishiyama, T. Watanabe, H. Mith, 2020. Determination of Antibiotic Resistance of Enterococcus spp. Isolated from Drinking Water Collected from Stoung District. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
22. B. Bun, S. Nget, S. Heng, S. In, N. Maseteru, T. Watanabe, H. MitH, 2020. Investigation on Antibiotic Resistance of Escherichia coli Isolated from Drinking Water Collected in Stoung District. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
23. S. Sat, S. Nget, S. Heng, S. In, M. Nishiyama, T. Watanabe, H. Mith, 2020. Study on Antibiotic Resistance of Pseudomonas aeruginosa Isolated from Drinking Water Collected from Three communes in Kampong Thom Province. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering*



- 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes, Phnom Penh, Cambodia.
24. S. Phuong, M. T. Chanto, C. Peng, K. Miyanaga, R. Tan, 2020. Detection of Antibiotic-Resistant Bacteria in Water Environment of Tonle Sap Area and Wastewater. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  25. L. Ly, M. T. Chanto, C. Peng, R. Tan, 2020. Price Evaluation and Quality Control of Different Soy Sauces Sold in the Markets. *The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2020 (RCChE-2020), Jointly held with The 5th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  26. C. Heang, S. Keo, C. Hok, K. Kong, C. Phat, F. Kuok, E.G. Mariquit, W. Kuriniawan, H. Hinode, 2019. Analysis of pesticide residues in surface water in Chhnok Tru community of Tonle Sap Lake. *The 4th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  27. K. Kong, C. Hok, C. Heang, S. Keo, C. Phat, F. Kuok, E.G. Mariquit, W. Kuriniawan, H. Hinode, 2019. Assessment of pesticide residues in surface water of Tonle Sap Lake, Cambodia during rainy season. *The 4th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  28. I. Yoneda, S. Ang, M. Nishiyama, H. Mith, R. Khanal, S. In, T. Watanabe, 2019. Spatial distribution of E. coli concentration in the Tonle Sap Lake during low water level season. *The 4th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  29. M. Nishiyama, H. Mith, S. Nget, S. Say, S. In, J. Pu, T. Watanabe, 2019. Investigation of antimicrobial resistance of Enterococci collected from drinking water in Tonle Sap Lake, Cambodia. *The 4th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  30. S. Keo, M. Svay, P. Ung, 2019. Characterization of Tonle Sap River water quality as influent by untreated domestic wastewater. *The 4th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  31. E.S. Leaksmy and T. Reasmey, 2019. Study the Effectiveness of Different Natural Coagulants for Turbidity Removal from Tonle Sap River Water. *The 4th International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  32. C. Phat, F. Kouk, E.G. Mariquit, W. Kuriniawan, H. Hinode, 2019. Analysis of Pesticide Residues in Surface Water in Chnok Tru Floating Community of Tonle Sap Lake during Low Water Season. *The 12th Regional Conference on Chemical Engineering (RCChE 2019)*, Ho Chi Minh City, Vietnam.
  33. Chin, L., & Therdthai, N. (2018). Effect of ripening stage of banana and drying methods on properties of flour for mixed banana powder drink. *Food and Applied Bioscience Journal*, 6(Special), 262 – 277. <https://li01.tci-thaijo.org/index.php/fabjournal/article/view/121406>
  34. K. Hin, L. Thourn, V. Leng, S. Chheong, F. Tivet, F. Kuok, 2018. Effect of Conventional plough-based Tillage (CT) and Direct Seeding Mulchbased Cropping Systems (DMC) on Soil Chemical and Mineralogical Properties in Kampong Thom. *The 11th Regional Conference on Environmental Engineering 2018 (RCEnvE-2018), Jointly held with The 3rd International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  35. O. Heng, F. Kuok, V. Hul, L. Khun, S. Ol, L. Kong, T. Hoem, J. Cappelle, P. Dussart, V. Duong, 2018. Identification of bat species and astrovirus contained in samples from bat in Cambodia. *The 11th Regional Conference on Environmental Engineering 2018 (RCEnvE-2018), Jointly held with The 3rd International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
  36. C. Peng, P. Ung, K. Miyanaga, R. Tan and Y. Tanji, 2018. Response of Bacterial Community in Sewage Influent to Antibiotic Treatment. *The 11th Regional Conference on Environmental Engineering 2018 (RCEnvE-2018), Jointly held with The 3rd International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.

37. S. Chheun, C. Peng, R. Tan, C. Vann, S. Un, S. Aun, S. Penh, P. Ung, K. Miyanaga, Y. Tanji, 2018. Monitoring of Antibiotic-Resistant Bacteria in Tonle Sap River, Mekong River, and Wastewater in Dry Season. *The 11th Regional Conference on Environmental Engineering 2018 (RCEnvE-2018), Jointly held with The 3rd International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
38. S. Penh, K. Miyanaga, P. Ung, R. Tan, S. Un, S. Aun, S. Chheun, Y. Tanji, 2018. Study the Effects of PAC Coagulant and  $\text{Ca}(\text{OCl})_2$  on *Escherichia fergusonii* and T4 Phage. *The 11th Regional Conference on Environmental Engineering 2018 (RCEnvE-2018), Jointly held with The 3rd International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
39. C. Phat, F. Kuok, E. G. Mariquit, W. Kuriniawan, H. Hinode, 2018. Pesticide Residues in Sediment and Fish from Chnok Tru Floating Community of Tonle Sap Lake. *The 11th Regional Conference on Environmental Engineering 2018 (RCEnvE-2018), Jointly held with The 3rd International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
40. P. Ung, S. Un, S. Chheun, S. Aun, S. Penh, S. Sann, R. Tan, K. Miyanaga, Y. Tanji, 2018. Analysis of Total Bacterial Concentration and Microbial Community in Waters Used by Floating Villagers, Tonle Sap Lake. *The 11th Regional Conference on Environmental Engineering 2018 (RCEnvE-2018), Jointly held with The 3rd International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
41. S. Aun, R. Tan, S. Un, S. Chheun, S. Penh, C. Peng, P. Ung, K. Miyanaga, Y. Tanji, 2018. Monitoring the Pathogenic Bacteria in Mekong River and Tonle Sap River. *The 11th Regional Conference on Environmental Engineering 2018 (RCEnvE-2018), Jointly held with The 3rd International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
42. S. Rann, C. Phat, F. Kuok, E. G. Mariquit, W. Kuriniawan, H. Hinode, 2018. Assessment of Pesticide Residues in Surface Water at Chhnok Trou Floating Community, Tonle Sap Lake. *The 11th Regional Conference on Environmental Engineering 2018 (RCEnvE-2018), Jointly held with The 3rd International Symposium on Conservation and Management of Tropical Lakes*, Phnom Penh, Cambodia.
43. Khoeurn, K., Asuka, S., Shingo, T., Toshifumi, I., 2018. Comparison of sequential extraction methods and leaching characteristics of heavy metals in the tailings of a closed mine (Oral Presentation). *17<sup>th</sup> Global Joint Seminar on Geo-Environmental Engineering, May 25-26, 2018: Session-III Remediation of contaminated soils and groundwater (4) and abandoned mine management*, Fukuoka University, Japan, 357–362.
44. Khoeurn, K., Asuka, S., Shingo, T., Toshifumi, I., 2018. Comparison of heavy metals leaching between laboratory experiment and field observation (Oral Presentation). *Geo-Environment and Recycling, China*, 219-229.

## Annex 25. List of publication from MIT Research Unit.

### List of Index publications from 2018

1. J. Kean, N. Raveu, H. Kaouach, K. Thourn and S. Sreng, "Analysis of Metamaterial Walls Reverberation Chamber by Using Modal Expansion Theory," 2021 Asia-Pacific International Symposium on Electromagnetic Compatibility (APEMC), 2021, pp. 1-4,
2. Chan Daraly Chin, Chanthan Hel, Rothna Pec, "Fab Lab Initiative in Higher Education: Digital Solutions Diverted to Traditional Farming in Cambodia Context," 2021 6th International STEM Education Conference (iSTEM-Ed), IEEE, 2021
3. Thura Peuo, Sopeak Yean, Boreth Sethy and Sarot Srang, "PD Controller and Dynamic Compensation Design for a DC Motor based on Estimated Parameters," 2021 International Conference on Advanced Mechatronics, Intelligent Manufacture and Industrial Automation (ICAMIA). Indonesia.
4. Sophyn Srey, Vongchivorn Chhour and Sarot Srang, "Lumped Parameter Estimation of a Low-Cost DC Motor for Position Controller Design," 2021 International Conference on Advanced Mechatronics, Intelligent Manufacture and Industrial Automation (ICAMIA). Indonesia.
5. Sam Ban, Andreea Dan, Félix Guinet, Julien Portanguen, Sarot Srang and Matthieu Luras "Assessing the potentialities of Physical Internet for Developing Countries Last-Mile Deliveries," IPIC 2021, 8th International Physical Internet Conference. 2021, Germany.
6. Sai Thavath, Bunrong Proeung, Sovichea Tep, Sopheaktra Chhorn, Rothna Pec, Vichhey Nall, Pinnara Ket, Chantha Oeurng, and Chanthan Hel. "Prototyping of Smart Irrigation System Using IoT Technology." In 2021 7th International Conference on Electrical, Electronics and Information Engineering (ICEEIE), pp. 1-5. IEEE, 2021.
7. M. Mancas, P. Kong and B. Gosselin, "Visual Attention: Deep Rare Features," 2020 Joint 9th International Conference on Informatics, Electronics & Vision (ICIEV) and 2020 4th International Conference on Imaging, Vision & Pattern Recognition
8. Sam Ban, Matthieu Luras, and Sarot Srang, "Toward Physical Internet-enabled Supply Chain and Logistics Networks in Developing Countries, " PRO-VE - 21st IFIP / SOCOLNET Working Conference on Virtual Enterprises, 2020, Spain.
9. Maximilien Berthet et al. , " Student-Led Policy and Technical Capacity Building Program: The Road to Cambodia's First CubeSat ," 71st International Astronautical Congress (IAC) , 2020.
10. Sarot Srang, Sopagna Ath, and Masaki Yamkita, "Newton-Euler Based Dynamic Modeling and Control Simulation for Dual-Axis Parallel Mechanism Solar Tracker" Advances in Science, Technology and Engineering Systems Journal. Vol. 5, No. 5, 709-716, 2020.
11. Vannak VAI., Sopheaktra CHHORN, Roza CHHIM, TEP Sovichea, and BUN Long. "Modeling and Simulation of PV Module for Estimating Energy Production under Uncertainties." In 2020 8th International Electrical Engineering Congress (iEECON), pp. 1-4. IEEE, 2020
12. Valy, Dona, Michel Verleysen, and Sophea Chhun. "Data Augmentation and Text Recognition on Khmer Historical Manuscripts." In 2020 17th International Conference on Frontiers in Handwriting Recognition (ICFHR), pp. 73-78. IEEE, 2020.
13. Sarot Srang and Sopagna Ath, "Dynamic Modelling and Simulation for 2DOF Parallel Mechanism Solar Tracker," IEEE/ASME International Conference on Advanced Intelligent Mechatronics, 2019. Hong Kong
14. M. Asim, R. Pec, T. H. Im, Y. S. Cho, "Cell Search Techniques for Underwater Acoustic Cellular Systems." IEEE Access, vol. 7, pp. 106019-106033, 2019.
15. Valy, Dona, Michel Verleysen, and Sophea Chhun. "Text Recognition on Khmer Historical Documents using Glyph Class Map Generation with Encoder-Decoder Model." In ICPRAM, pp. 749-756. 2019.

16. Phutphalla Kong, Matei Mancas, Nimol Thuon, Seng Kheang, and Bernard Gosselin. "Do deep-learning saliency models really model saliency?". In 2018 25th IEEE International Conference on Image Processing (ICIP), pages 2331-2335. IEEE, 2018.
17. Phutphalla Kong, Matei Mancas, Seng Kheang, and Bernard Gosselin. "Saliency and object detection". In 2018 International Conference on Pattern Recognition and Artificial Intelligence (ICPRAI), pages 523-528. CENPARMI, 2018.
18. Chhorn Sopheaktra, and Arporn Teeramongkonrasmee. "A portable USB-controlled potentiostat for paper-based electrochemical applications." In 2018 15th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON), pp. 321-324. IEEE, 2018.
19. M. S. Khan, R. Pec, C. H. Park, and Y. S. Cho "Random Access Preamble Design for High-Velocity User in Millimeter-Wave Cellular Networks," IEEE Access, vol. 6, pp. 66047-66054, 2018.
20. R. Pec, M. S. Khan, M. Asim, and Y. S. Cho, "Random Access for Underwater Acoustic Cellular Systems," Sensors Journal, 18 (2): 432, 2018.
21. M.A. Jasper, R. Pec, Y.S. Cho, "An efficient handover measurement technique for millimeter-wave cellular communications," IEICE Transaction on Communication, vol. 101-B (2), pp. 592-602, 2018.
22. Kesiman, Made Windu Antara, Dona Valy, Jean-Christophe Burie, Erick Paulus, Mira Suryani, Setiawan Hadi, Michel Verleysen, Sophea Chhun, and Jean-Marc Ogier. "Benchmarking of document image analysis tasks for palm leaf manuscripts from southeast asia." Journal of Imaging 4, no. 2 (2018): 43.
23. Kesiman, Made Windu Antara, Dona Valy, Jean Christophe Burie, Erick Paulus, Mira Suryani, Setiawan Hadi, Michel Verleysen, Sophea Chhun, and Jean-Marc Ogier. "ICFHR 2018 competition on document image analysis tasks for southeast asian palm leaf manuscripts." In 2018 16th International Conference on Frontiers in Handwriting Recognition (ICFHR), pp. 483-488. IEEE, 2018.
24. Valy, Dona, Michel Verleysen, Sophea Chhun, and Jean-Christophe Burie. "Character and text recognition of khmer historical palm leaf manuscripts." In 2018 16th International Conference on Frontiers in Handwriting Recognition (ICFHR), pp. 13-18. IEEE, 2018.
25. Kimheng SOK, Jean Noël COLIN, Kimtho PO. 2018. Blockchain and Internet of Things Opportunities and Challenges. In The Ninth International Symposium on Information and Communication Technology (SoICT2018), December 6-7, 2018, Danang City, Vietnam. ACM. <https://doi.org/10.1145/3287921.3287933>

#### **List of Non-index publications from 2018**

1. Sok An Siek and Sarot Srang, "Design and Prototyping of Solar Hybrid Switch Controller and Monitoring System," Techno-Science Research Journal, 2021.
2. Phayuth Yonrith, Sarot Srang, Morokot Sakal, Boreth Sethy, "Mobile Robot Localization using Extended Kalman Filter with Kinematic Model" Techno-Science Research Journal, 2021.
3. Hoksong Tim, Sarot Srang, Morokot Sakal, "Simulation and Numerical Characterization of Gaseous Oxygen Injector for ABS/GOX Hybrid Rocket Motor" Techno-Science Research Journal, 2021.
4. Vanyi Chao, Sarot Srang, Morokot Sakal, Chivorn Keo, "Helipad Detection for UAV based on YOLOv4 Transfer Learning Model" Techno-Science Research Journal, 2021.
5. Sarot Srang, Nguonly Taing, Fidero Kuok, "Policy Brief: Minimum Pre-Requisite for Creating High-tech and Deep-tech Startup Ecosystem in Cambodia", Asian Vision Institute, 2021.
6. Dalin Soun, Morokot Sakal, Hokly Sor and Sarot Srang, "Design and Implementation of the Commercial-Off-The-Shelf Electrical Power System for the Satellite Training Kit – DemoSat," Techno-Science Research Journal, 2021, Cambodia.
7. Chivorn Keo, Sarot Srang, and Daro Van, "Modeling and Simulation at the Equilibrium of Fixed-Wing Unmanned Aerial Vehicle," Techno-Science Research Journal, 2020, Cambodia.

8. Boreth Sethy, Sarot Srang, and Daro Van, "Pose Estimation for Differential Drive Mobile Robot using Multi-Sensor Data Fusion," *Techno-Science Research Journal*, 2020.
9. Tongly Mork, Sarot Srang, and Daro Van, "Simultaneous Localization and Mapping using Intel RealSense Camera," *Techno-Science Research Journal*, 2020.
10. Leangchheng Ly, Sarot Srang, and Daro Van, "Modeling, Control, and Simulation on 3DOF Robot Manipulator," *Techno-Science Research Journal*, 2020.
11. Bunvireak Lim, Sarot Srang, and Daro Van, "Development of IoT Smart Controller: Case Study for the Gravity Irrigation System," *Techno-Science Research Journal*, 2020.
12. Lyhor Tem, and Sarot Srang, "CNC-Mill Construction and Automatic Control to Shape the Specimen by CAD/CAM," *Techno-Science Research Journal*, 2020.
13. Sarot Srang, "Dynamic Modeling for Multi Rigid Body UAV," *Techno-Science Research Journal*, 2019, Cambodia.
14. Rethy Chhem et al., "Industry 4.0: Prospects and Challenges for Cambodia's Manufacturing Sector", Cambodia Development Resource Institute, 2018.
15. Kosorl Thourn, Takahiro Aoyagi, and Jun-ichi Takada, "Development of Broadband Parametric Permittivity Model of Dielectric Absorbing Material for Time-domain Electromagnetic Wave Simulation", *IEEJ Transactions on Fundamentals and Materials*, Vol. 138, No. 6, June 2018, pp. 302-308

#### **List of Conferences from 2018**

1. Sopheaktra Chhorn, Sovichea Tep, Chanthan Hel, Rothna Pec, "Development of ESP32-Based Smart Greenhouse Controller", *IEEE IoT World Forum*, 2022
2. Sotheara Oum, Sarot Srang, Phayuth Yonrith, "Integration of RRT\* Path Planning with Trajectory Tracking for Wheeled Mobile Robot", *2022 Annual Conference on Electronics, Information and Systems*, 2022, Japan
3. Sophy Huon, Dona Valy, "Handwritten Khmer Digit Recognition using Artificial Neural Network", *The 11th Scientific Day of ITC*, 2022, Cambodia
4. Seanghort Born, Dona Valy, Phutphalla Kong, "Encoder-Decoder Language Model for Khmer Handwritten Text Recognition on Historical Documents (Sleuk-Rith)", *The 11th Scientific Day of ITC*, 2022, Cambodia
5. Vanny Ratanak Chheang, Dara Tith, Dona Valy, "Distributed Authentication Infrastructure using Public Key Infrastructure and Blockchain", *The 11th Scientific Day of ITC*, 2022, Cambodia
6. Sotheara Oum, Sarot Srang, Phayuth Yonrith, "Integration of RRT\* Path Planning with Trajectory Tracking for Wheeled Mobile Robot", *The 11th Scientific Day of ITC*, 2022, Cambodia.
7. Povnemol Gnhiok, Sarot Srang, Phayuth Yonrith, "PI Controller for Velocity Controller Design based on Lumped Parameter Estimation of a Low-Cost PMDC Motor", *The 11th Scientific Day of ITC*, 2022, Cambodia.
8. Chanvireak Samrit, Sarot Srang, Phayuth Yonrith, "Design Structure for Plug and Play Wheel Mobile Robot", *The 11th Scientific Day of ITC*, 2022, Cambodia.
9. Vichetra Yi, Sarot Srang, Chivorn Keo, "Roll and Pitch angle Estimation by using Unscented Kalman filter", *The 11th Scientific Day of ITC*, 2022, Cambodia.
10. Rattana Seng, Sarot Srang, Chivorn Keo, "Flight Transition State Machine Design for Vertical Takeoff Landing for Fixed-Wing Unmanned Aerial Vehicle", *The 11th Scientific Day of ITC*, 2022, Cambodia.
11. Sothea Oeun, Sokheng Meng, Chanreng Sey Nhim, Sopheaktra Chhorn, Sovichea Tep, Chanthan Hel, Pinnara Ket, "The Prototype of Smart Compost Bin (S-Mush Bin)", *The 11th Scientific Day of ITC*, 2022, Cambodia.
12. Sereiwathna Ros, Dona Valy, "Face Mask Recognition using ResNet and DenseNet", *The 11th Scientific Day of ITC*, 2022, Cambodia

13. Hutmonineat Sea, Dona Valy, Phutphalla Kong, "Insects and Abnormalities Detection using Convolutional Neural Network", The 11th Scientific Day of ITC, 2022, Cambodia
14. Sochetra Than, Dona Valy, Phutphalla Kong, "Crop Disease Data & Detection using Convolutional Neural Network", The 11th Scientific Day of ITC, 2022, Cambodia
15. Seangly Ny, Dona Valy, Phutphalla Kong, "Lock and Unlock Door with Face Detection using OpenCV, Python and Arduino Board", The 11th Scientific Day of ITC, 2022, Cambodia
16. Lykong Un, Dona Valy, "Isolated Khmer Character Recognition", The 11th Scientific Day of ITC, 2022, Cambodia
17. Rasin Koun, Pocvenh Ly, Tithtola Vong, Sopheapanha Bun, Hoksong Tim, Chivorn Keo, " Concept Study of Dual Axes Camera Tracker and Rocket Detection by Using Color Based Detection", The 11th Scientific Day of ITC, 2022, Cambodia.
18. Chan Daraly Chin, Chanthan Hel, Rothna Pec, "Initiation of the Creation of Fab Lab for Advanced Studies: Digital Solutions Focusing on Traditional Agriculture in the Context of Cambodia" 2021 3rd National Research Forum, 2021
19. S. Tep and R. Pec, "Design of Sensor Node System for Low-Cost and Customizable Applications," 12th Regional Conference on Computer Information and Engineering, 2019, Laos.
20. Chhorn Sopheaktra, and Arporn Teeramongkonrasmee. "A Low-Cost USB-Controlled Potentiostat for Educational and Electrochemical Applications." In 2018 33rd The International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC), 2018. Thailand
21. Hen, Sodem, Dona Valy, Sophea Chhun, and Ratha Siv. "An Initial Study on Synthetic Data for Khmer Ancient Document Analysis." In 11th AUN/SEED-Net Regional Conference on Computer and Information Engineering 2018 (AUN-RC CIE 2018), 2018.

## **Annex 26. List of publication from MSS Research Unit.**

### **List of Index publications from 2018**

1. Leelataviwat, S., Doung, P., Naiyana, N. (2021) A review on performance-based plastic design method: concept and recent developments. 155. [https://doi.org/10.1007/978-3-030-73932-4\\_8](https://doi.org/10.1007/978-3-030-73932-4_8) (Book chapter)
2. Piseth, D., Sutath, L., Eiichi, S. (2021) Tensile strength and failure mechanism of internal diaphragms in wide flange beam-to-box column connections with concrete filling. Elsevier, <https://doi.org/10.1016/j.jobbe.2020.102037> (IF: 5.138)
3. Sophea, B., Yohaiki, F., Jun-ichi, K., Daisuke, F., Anjula, D., A.K.M. Badrul A. (2020) Laboratory Investigation on the Permeability Variation of Fractured Inada Granite by Multiple Transient Axial Stress Disturbances. *Pure and Applied Geophysics*. 177(11). 5385-5396 (2020). DOI: 10.1007/s00024-020-02565-2
4. Amirthan, T., Lahiru, D., Tharaka, D., Anjula, D., Chulantha, J., Maheshwari, W., Yoshiaki, F., Sophea, B. (2020) Stability Analysis of Slopes in Aruwakkalu Limestone Mine During Rain: A Finite Element Approach. *IEEE*. DOI: 10.1109/MERCon50084.2020.9185268
5. Takashi, S., Pisith, M., Hideki, S., Akihiro, H., and Jiro, O. (2020) Numerical Analysis of Longwall Gate-Entry Stability under Weak Geological Condition: A Case Study of an Indonesian Coal Mine. *Energies* 13, no. 18: 4710
6. Kafi, M.A., Aktar, M.K., Phanny, Y., Todo, M. (2019) Adhesion, proliferation and differentiation of human mesenchymal stem cell on chitosan/collagen composite scaffold. *Journal of Materials science*, 131. <https://doi.org/10.1007/s10856-019-6341-8>
7. Seang, S., Kotaro, Y., Thomas, T., Tetsuya, N., Koichiro, W., Jocelyn, P. (2019) Litho geochemistry of Intrusive Rocks in the Halo Porphyry Copper-Molybdenum Prospect, Northeast Cambodia. *Open Journal of Geology*. 7 (342). <https://doi.org/10.4236/ojg.2019.97023>
8. Todo M, Yos P, Arahira T, Myoui A (2018) Development and characterization of porous hydroxyapatite scaffolds reinforced with polymeric secondary phase for bone tissue engineering. *In vivo*, 11 (12)
9. Yonghuort, L., Mohd R. I. (2018). Efficacy of Double Skin Façade on Energy Consumption in Office Buildings in Phnom Penh City. *International Transaction Journal of Engineering, Management, & Applied Science & Technologies*. 9,119-132.

### **List of Non-index publications from 2018**

1. Sreng, L., Azura, A. R., Yos, P. (2021) Effects of Cambodian Clay on the Physical and Mechanical Properties of Natural Rubber Latex Foams. *Techno Science Research Journal*, In Press
2. Chea, L., Prok, N., Rath, S.S. (2020) Effect on Capacity of RC Beam and Column Strengthened with Fibrwrap® System by Cyclic Exposure to Water and Salt Water *Techno Science Research Journal*, Vol. 9.
3. Chab, H., Rath, S.S., Prok, N. (2020). "Mechanical Properties of Reinforced Concrete Beam and Column Strengthened by Fibrwrap® System after being Submerged to Different Exposure Solutions". *Techno Science Research Journal*, Vol. 9.
4. Cheng, K., Hin, R., Han, V., Bernard, F. (2019) Development of Connection of Glass Beam: A Numerical Study. *Techno Science Research Journal* V6, pp. 35-43.

### **List of Conferences from 2018**

1. Sreng, L., Seang, S., Azura, A.R., Yos, P. (2021) Characterization of Cambodian Natural Rubber/Common Clay Composites. *Proceeding of the 14th AUN/SEED-Net Regional Conference on Materials 2021 & 4th International Postgraduate Conference on Materials*
2. Seang, S., Kakda, K., Jaydee, A., Kov, R., Hang, B., Ly, S. C. S., Chan, C., Oy, K., Sitha, K. (2021) Initial Study on Lithological, Hydrothermal Alteration, and Geochemistry for Mineral Exploration in

- Chhouk District, Kampot Province, Southwest Cambodia. Regional Conference on Natural Disaster, Yangon University Research Center, Yangon, Myanmar
3. Kret, K., Chan, C., Seang, S., Kuoch, T., Kong, S., Kry, R., Boeut, S., Hoeun, S. (2021) Hydrothermal alteration mineral mapping by integrating ASTER and Landsat-8 OLI: A case study in Ratanakiri province, northeast Cambodia. Regional Conference on Natural Disaster, Yangon University Research Center, Yangon, Myanmar
  4. Kret, K., Chan, C., Seang, S., Kuoch, T., Kong, S., Kry, R., Boeut, S., Hoeun, S. (2021) Hydrothermal alteration mineral mapping by integrating ASTER and Landsat-8 OLI: A case study in Ratanakiri province, northeast Cambodia. Regional Conference on Natural Disaster, Yangon University Research Center, Yangon, Myanmar
  5. Ly, S., Sirisokha, S., Oy, K., Kakda, K., Kov, R., Hang, B., Chorn, S., Jaydee, A., Kong, S., Sitha, K., Kotaro, Y., Koichiro, W., Sophea, B., Tola, S., Seangleng, H. (2021) Preliminary study on lithology, hydrothermal alteration, and soil and rock geochemistry for gold and copper at Area 6, Phnom Sro Ngam Tenement, Chhouk District, Kampot Province, Cambodia. International Symposium on Earth Science and Technology, Japan
  6. Chhayo, C., Kakda, K.t, Sirisokha, S., Chanmoly, O., Sitha, K., Reaksmey, K., Sophea, B., Kimhouy, O., Seangleng, H., Jaydee, A., Kong, S. (2021) Hydrothermal alteration mapping from ASTER and Landsat-8 in Kampot Fold Belt, southwest Cambodia. International Symposium on Earth Science and Technology, Japan
  7. Leakhena, H., Phalla, T., Srean, A., Dalin, U., Taing, C. (2021) Air Emission Inventory of Factory Boiler and impact to human health. Case Study in Phnom Penh, Cambodia The 6th International Symposium on Conservation and Management of Tropical Lakes” In Conjunction with
  8. Leakhena, H., Phalla, T., Srean, A., Dalin, U., Taing, C. (2021-A) Assessment of human health impact of particulate matter formation from industry textile boiler in Cambodia. 15th Regional Conference in Environmental Engineering
  9. Leakhena, H., Phalla, T., Srean, A., Dalin, U., Taing, C. (2021-B) Feasibility of air quality standard compliance link with perception of people : case study Phnom Penh Cambodia. Asean young scientist conference
  10. Menghor, L., Mouyyi, H., Nallis, K., Sirisokha, S., and Ichhuy, N. (2020) Primary Investigation on lithology and alteration minerals for geothermal resource in Te Teuk Pus, Oral district Kampot Speu province, Cambodia. International of Symposium on Earth Science and Technology. 420-425.
  11. Hin, R., Cheng, K., Han, V., Bernard, F., Seang, C., Keryvin, V., Sangleboeuf, J.-C. Flexural strength improvement for structural glass: a numerical study. IOP Conf. Series: Materials Science and Engineering, 849 (2020) 012083. doi:10.1088/1757-899X/849/1/012083
  12. Seang, S., Kotaro, Y., Koichiro, W., Thomas, T. (2019) Litho-geochemistry, Alteration, and Mineralization in the Halo Porphyry Copper-Molybdenum Prospect, Northeast Cambodia. Regional Conference on Geological and Geo-Resources Engineering, University of the Philippines Diliman, Philippines.
  13. BUN, P., IDIR, R., BUN, K., CYR, M. (2018) Concrete made of 100% recycled materials\_Feasibility study. WasteEng 7th International Concrete on Engineering for waste and Biomass Valorisation, Prague, Czech Republic
  14. Narith, P. and Sinnara, L. (2018). Critical Area of Ground Motion Amplification in Phnom Penh City, Regional Conference in Civil Engineering (RCCE2018), Yogyakarta, Indonesia.
  15. Sovann Sathya, R., Narith, P., Sithpisey, S., and Phearin, C. (2018) Strengthening Reinforced Concrete Beam Sample Using Fiber Reinforcing Polymer Materials, Regional Conference in Civil Engineering RCCE2018 and The 4th International Conference on Sustainable Civil Engineering Structures and Construction Materials (SCESCM), Yogyakarta, Indonesia



## Annex 27. List of publication from WAE Research Unit.

### List of Index publications from 2018

1. Chhin, R., Siev, S., & Yoden, S. (2021). Time-lagged correlations of pre-monsoon precipitation in the Indochina Peninsula confirmed in a large ensemble simulation dataset. *International Journal of Climatology*, 1–18. Doi: 10.1002/joc.7292. (IF:4)
2. Chan, R., Chan, R., Chiemchaisri, W., & Chiemchaisri, C. (2021). Treatment of aquaculture farm effluent containing antibiotics in high-rate membrane bioreactor. *Desalination and water treatment*, 221, 56-63. (IF:1.2)
3. Charlotte, J.H., Mauricio, E.A., Zhewen Y., Ty, S., & Michael, C. W. (2021). Plastic transport in a complex confluence of the Mekong River in Cambodia. *Environmental Research Letter*. (IF:6.7)
4. Chan, R., Chiemchaisri, C., & Chiemchaisri, W. (2021). Application of Membrane Bioreactor with Sponge Media in Aquaculture Wastewater Treatment. *Journal of Fisheries and Environment*, 45(2), 106-118. (IF:0.42)
5. Dai, J., Rad, S., Xu, J., Pen, S., Gan, L., Chen, X., Yu, C., & Zhang, S. (2021). Impacts of climate change versus land use change on recent Lijiang River flood regime, South China. <https://doi.org/10.24850/j-tyca-2021-03-07>. (IF:0.29)
6. Rajendra, K., Uk, S. Dilini, K., Siev, S., & Chihiro, Y. (2021). Impact of Water Level Fluctuation on Sediment and Phosphorous Dynamics in Tonle Sap Lake, Cambodia. *Water Air Soil Pollut* 232, 139 (2021). <https://doi.org/10.1007/s11270-021-05084-5>. (IF:2.5)
7. Bun, S., Sek, S., Oeurng, C., Manabu, F., Ham, P., & Pisut, P. (2021). A Survey of Household Water Use and Groundwater Quality Index Assessment in a Rural Community of Cambodia. *Sustainability* 13(18), 10071; <https://doi.org/10.3390/su131810071>. (IF:3.2)
8. Jain, S., Chhin, R., Ruth, M. D., Saroj K. M., & Shigeo, Y. (2021). A New Graphical Method to Diagnose the Impacts of Model Changes on Climate Sensitivity. *Journal of the Meteorological Society of Japan*. Ser. II. (IF:2.2)
9. Sok, T., Oeurng, C., Kaing, V., Sabine, S., Mathias, G. K., & José, M. S. P. (2021). Assessment of Suspended Sediment Load Variability in The Tonle Sap and Lower Mekong Rivers, Cambodia. *Catena*. (IF:5.1)
10. Wandee, S., Chan, R., Chiemchaisri, W., & Chiemchaisri, C. (2021). Alteration of antibiotic-resistant phenotypes and minimal inhibitory concentration of *Escherichia coli* in pig farming: Comparison between closed and open farming systems. *Science of The Total Environment*, 781, 146743. (IF:7.9)
11. Try, S., Tanaka, S., Kenji, T., Sayama, T., Oeurng, C., Uk, S., Takara, K., Hu, M., & Han, D. (2020). Comparison of Gridded Precipitation Datasets for Rainfall-runoff and Inundation Modeling in the Mekong River Basins. *Plos one* 15, no. 1, e0226814; doi.org/10.1371/journal.pone.0226814.
12. Sophal Try, Shigenobu Tanaka, Kenji Tanaka, Takahiro Sayama, Giha Lee, and Chantha Oeurng. (2020). Assessing the Effects of Climate Change on Flood Inundation in the Lower Mekong Basin Using High-Resolution AGCM Outputs. *Progress in Earth and Planetary Science*, 7, 1-16; doi.org/10.1186/s40645-020-00353-z.
13. Sophal Try, Shigenobu Tanaka, Kenji Tanaka, Takahiro Sayama, Maochuan Hu, Ty Sok, and Chantha Oeurng. (2020). Projection of extreme flood inundation in the Mekong River basin under 4K increasing scenario using large ensemble climate data." *Hydrological Processes* 34, no. 22: 4350-4364.
14. Ty Sok, Chantha Oeurng, Ilan Ich, Sabine Sauvage, and José Miguel Sánchez-Pérez. (2020). Assessment of Hydrology and Sediment Yield in the Mekong River Basin Using SWAT Model. *Water* 12, no. 12: 3503.
15. Tharo Touch, Chantha Oeurng, Yanan Jiang, Ali Mokhtar. (2020). Integrated Modeling of Water Supply and Demand Under Climate Change Impacts and Management Options in Tributary Basin of Tonle Sap Lake, Cambodia. *Water*, 12, 2462; doi:10.3390/w12092462.
16. Hoang Quoc Anh, Thi Phuong Quynh Le, Nhu Da Le, Xi Xi Lu, Thi Thuy Duong, Josette Garnier, Emma Rochelle-Newall, Shurong Zhang, Neung-Hwan Oh, Chantha Oeurng, Chaiwat Ekkawatpanit, Tien Dat Nguyen, Quang Trung Nguyen, Tran Dung Nguyen, Trong Nghia Nguyen, Thi Lieu Tran, Tatsuya Kunisue, Rumi Tanoue, Shin Takahashi, Tu Binh Minh, Huu Tuyen Le, Thi Ngoc Mai Pham, Thi Anh Huong Nguyen. (2020). Antibiotics in Surface Water of East and Southeast Asian Countries: A Focused Review on Contamination Status, Pollution Sources, Potential Risks, and Future Perspectives. *Science of the Total Environment*, 142865; doi.org/10.1016/j.scitotenv.2020.142865.

17. Rathborey Chan, Sirinthrar Wandee, Manna Wang, Wilai Chiemchaisri, Chart Chiemchaisri, Chihiro Yoshimura. (2020). Fate, transport and ecological risk of antibiotics from pig farms along the Bang Pakong River, Thailand. *Journal of Agriculture, Ecosystem & Environment*. 304:107173.
18. Rathborey Chan, Chart Chiemchaisri, Wilai Chiemchaisri. (2020) The effect of sludge recirculation on antibiotic removals in Two-stage membrane bioreactor (MBR) treating livestock wastewater. *Journal of Environmental Health Science and Engineering*. 18: 1541-1553.
19. Heu, R.; Ateia, M.; Yoshimura, C. (2020). Photocatalytic Nanofiltration Membrane Using Zr-MOF/GO Nanocomposite with High-Flux and Anti-Fouling Properties. *Catalysts*, 10, 711.
20. Heu, R.; Ateia, M.; Awfa, D.; Punyapalukul, P.; Yoshimura, C. (2020). Photocatalytic Degradation of Organic Micropollutants in Water by Zr-MOF/GO Composites. *J. Compos. Sci.*, 4, 54. *Journal of Composite Science*.
21. Chhin, R., C. Oeurng, and S. Yoden, (2020). Drought Projection in the Indochina Region Based on the Optimal Ensemble Subset of CMIP5 Models. *Climatic Change*, 162, 687–705.
22. S. Tweed, S. Massuel, J.L. Seidel, K. Chhuon, S. Lun, K.E. Eang, J.P. Venot, G. Belaud, M. Babic, M. Leblanc (2020). Seasonal influences on groundwater arsenic concentrations in the irrigated region of the Cambodian Mekong Delta, *Journal of Science of the Total Environment*, Vol. 728.
23. Chantha Oeurng and Ty Sok. (2020). Assessing changes in flow and water quality emerging from hydropower development and operation in the Sesan River Basin of the Lower Mekong Region. *Sustainable Water Resources Management* 6, no. 2: 1-12.
24. Layheang, Song; Boithias, Laurie; Sengtaheuanghoung, Oloth; Oeurng, Chantha; Valentin, Christian; Souksavath, Bounthan; Sounyafong, Phabvilay; de Rouw, Anneke; Soulleuth, Bounsamay; Silvera, Norbert; Lattanavongkhot, Bounchanh; Pierret, Alain; Ribolzi, Olivier (2020). Understorey Limits Surface Runoff and Soil Loss in Teak Tree Plantations of Northern Lao PDR. *Water*, 12, 2327.
25. Li, S., Heng, S., Siev, S., Yoshimura, C., Saavedra, O., Ly, S. (2019). Multivariate interpolation and information entropy for optimizing rain gauge network in the Mekong River Basin. *Hydrological Sciences Journal*. 1–14.
26. Siev, S., Paringit, E., Yoshimura, C., & Hul, S. (2019). Modeling Inundation Patterns and Sediment Dynamics in the Extensive Floodplain along the Tonle Sap River. *River Research and Applications*. 1–15.
27. Hoshikawa, K., Fujihara, Y., Siev, S., Arai, S., Nakamura, T., Fujii, H., Sok, T., & Yoshimura, C. (2019). Characterization of total suspended solid dynamics in a large shallow lake using long-term daily satellite images. *Hydrological Processes*. 1–14.
28. Tanaka, T., Yoshioka, H., Siev, S., Fujii, H., Ly, S., & Yoshimura, C. (2019). A consistent finite difference local inertial model for shallow water simulation. *Hydrological Research Letters*, 13 (2), 28–33.
29. Ung, P., C. Peng, S. Yuk, R. Tan, V. Ann, K. Miyanaga, Y. Tanji, (2019). Dynamics of Bacterial Community in Tonle Sap Lake, a Large Tropical Flood-pulse System in Southeast Asia. *Science of the Total Environment*. Vol. 664, 414-423.
30. Try S., Lee, G., Yu, W., Oeurng C. (2019). Delineation of flood-prone areas using geomorphological approach in the Mekong River Basin, *Quaternary international* 503, 79-86.
31. Chantha Oeurng, Thomas A. Cochrane, Sarit Chung, Mathias G. Kondolf, Thanapon Piman, Mauricio E. Arias. (2019). Assessing Climate Change Impacts on River Flows in the Tonle Sap Lake Basin, Cambodia. *Water*, 11, 618; doi:10.3390/w11030618.
32. Sok K., Supattra V., Heng S. (2019). A Comparative Assessment of Meteorological Drought Indices for the Baribo Basin (Cambodia) In H. I. Chaminé, B. Maurizio, K. Ozgur, C. Mingjie, B. J. Merkel (Ed.) *Advances in Sustainable and Environmental Hydrology, Hydrogeology, Hydrochemistry and Water Resources*, Springer International Publishing
33. Ann, V., A. Freixa, A. Butturini, A. M. Romani. (2019). Interplay between sediment properties and stream flow conditions influences surface sediment organic matter and microbial biomass in a Mediterranean river. *Hydrobiologia* 828(1):199-212.
34. Siev Sokly, YangHeejun, Sok Ty, Uk Sovannara, Song Layheang, Kodikara Dilini, Oeurng Chantha, Hul Seingheng, Yoshimura Chihiro. (2018). Sediment dynamics in a large shallow lake characterized by seasonal flood pulse in Southeast Asia, *Science of The Total Environment*, Vol. 631-631, 597-607.
35. Eang K.E., Igarashi T., Kondo M., Nakatani T., Tabelin C.B., Fujinaga R. (2018). Groundwater Monitoring of an Open-Pit Limestone Quarry: Water-Rock Interaction and Mixing Estimation within

the Rock Layers by Geochemical and Statistical Analyses. *International Journal of Mining Science and Technology*, 28(6), 849-857.

36. Eang K.E., Igarashi T., Fujinaga R., Kondo M., Tabelin C.B. (2018). Groundwater Monitoring of an Open-Pit Limestone Quarry: Groundwater Characteristics, Evolution and Their Connections to Rock Slopes. *Environmental Monitoring and Assessment*, 190(193), 1-15.
37. Sophal Try, Giha Lee, Wansik Yu, Chantha Oeurng. (2018). Large-Scale Flood-Inundation Modeling in the Mekong River Basin, Case Studies, *Journal of Hydrologic Engineering* 23(7).
38. Sovannara Uk, Chihiro Yoshimura, Sokly Siev, Sophal Try, Heejun Yang, Chantha Oeurng, Shangshang Li, Seingheng Hul. (2018). Tonle Sap Lake: Current status and important research directions for environmental management, *Lakes & Reservoirs Research & Management* 23(3): 177-189.
39. G. Mathias Kondolf, Rafael J.P. Schmitt, Paul Carling, Steve Darby, Mauricio Arias, Simone Bizzi, Andrea Castelletti, Thomas A. Cochrane, Stanford Gibson, Matti Kummu, Chantha Oeurng, Zan Rubin, Thomas Wild. (2018). Changing sediment budget of the Mekong: Cumulative threats and management strategies for a large river basin, *Science of The Total Environment* 625(7), 114-134.
40. Pinnara Ket, Sarah Garré, Chantha Oeurng, Lyda Hok and Aurore Degré. (2018). Simulation of Crop Growth and Water-Saving Irrigation Scenarios for Lettuce: A Monsoon-Climate Case Study in Kampong Chhnang, Cambodia, *Water* 10(5): 666.
41. Pinnara Ket, Chantha Oeurng and Aurore Degré. (2018). Estimating Soil Water Retention Curve by Inverse Modelling from Combination of In Situ Dynamic Soil Water Content and Soil Potential Data, *Soil system* 2(4).
42. Sith. R, et al. (2018). Assessment of water quality and evaluation of best management practices in a small agricultural watershed adjacent to Coral Reef area in Japan, *Joural Agricultural Water Management*
43. Tom Murphy, Kongkea Phan, Emmanuel Yumvihoze, Kim Irvine, Ken Wilson, David Lean, Borey Ty, Alexander Poulain, Brian Laird, Laurie Hing Man Chan. (2018). Groundwater irrigation and arsenic speciation in rice". *Journal of health and Pollution* 8(19).
44. Luke Makarichi, Rithy Kan, Warangkana Jutidamrongphan, Kua-anan Techato. (2018) Suitability of municipal solid waste in African cities for thermochemical waste-to-energy conversion: The case of Harare Metropolitan City, Zimbabwe, *Waste Management and Research*, 1-12.
45. Raksmeay Ang, Chantha Oeurng. (2018). Simulating streamflow in an ungauged catchment of Tonlesap Lake Basin in Cambodia using Soil and Water Assessment Tool (SWAT) model, *Water Science* 32(1): 89-101.
46. T. Seng, S. Ly, S. Heng. (2018). Feasible study of a micro-hydropower project based on economic analysis: a case study of a remote area in Cambodia, *Water Security in Asia: Opportunities and Challenges in the Context of Climate Change*. California, Springer.
47. Kan, R., Kaosol, T., Tekasakul, P., and Tekasakul, S. (2018). Risk assessment of particle-bound polycyclic aromatic hydrocarbons derived from combustion of lignite and rubber sawdust pellets: size distribution and human health effects. *Walailak Journal of Science and Technology*. 16 (10).
48. Ly, S., Kim, L., Demerre, S., Heng, S. (2018). Flood mapping along the Lower Mekong River in Cambodia. *Engineering Journal* 22 (1).
49. Valois, R., Vouillamoz, J.M., Lun, S. and Arnout, L. (2018). Mapping groundwater reserves in northwestern Cambodia with the combined use of data from lithologs and time-domain-electromagnetic and magnetic-resonance soundings. *Hydrogeology Journal*, 1-14.
50. Zuliziana Suif, Chihiro Yoshimura, Nordila Ahmad and Seingheng Hul. (2018). Distributed model of hydrological and sediment transport process in Mekong River Basin, *International Journal of GEOMATE*, 14(42), 134-139.

#### **List of Non-index publications from 2018**

1. Khen, C., Ich, I., Sok, T., Try, S., & Oeurng, C. (2021). Hydrological Components and Catchment Scale Sediment Delivery in Prek Thnot River Basin, Cambodia. *Techno Science Journal*.
2. Heng, D., Ty, B., Hul, S. (2021). Study on Nutrients and Heavy Metals in Bottom Sediment of Tonle Sap Lake. *Techno Science Journal*.
3. Heng, S., Kheav, K., Hok, P., Chhuon, K., Ly, S., Kinouchi, T. (2021). Urban Flood Modeling in Phnom Penh Using Flo-2D: Consideration of Climate Change Effect. *Techno Science Journal*.
4. Kol, P., & Doung, R. (2021). Application of SWMM to Explore Possible Climate Change Impact on Urban Stormwater Drainage. *Techno Science Journal*.

5. Lai, C., Vorn, T., Eang, K.E., Ty, B. (2021). Evaluation of Wastewater Treatment Efficiency Utilizing Coconut Fiber as Filter Media. *Techno Science Journal*
6. Neang, P., Hul, S.H., Endo, G., Miyauchi, K. (2021). Groundwater Arsenic Contamination and Social Needs of Economical Arsenic Removal Technology in Rural Areas of Cambodian Mekong Delta. *Techno Science Journal*

#### **List of Conferences from 2018**

1. Khoeun, C., Sok, T., Try, S., Chan, R., Ich, I., Chan, K., Oeurng, C. (2021). Assessing Flood Hazard Index using Analytical Hierarchy Process (AHP) and Geographical Information System (GIS) in Stung Sen River Basin, the 9th AUN/SEED-Net Regional Conference on natural Disaster (RCND), December 2021.
2. Khun, E., Chan, R., Chan, R., Bun, S., & Chart, C. (2021). Optimization of hydraulic retention time (HRT) in high-rate aeration tank for maximum nitrate production from aquaculture wastewater. The 10th Scientific Day of ITC, May 2021.
3. Chan, R., Chan, R., Wandee, S., Manna, W., Wilai, C., Chart, C., & Chihiro, Y. (2021). Fate and transport of antibiotics from pig farm along the Bang Pakong River, Thailand. The 13th AUN/SEED-Net Regional Conference on Chemical Engineering (RCChE-2020), 04- 05 February 2021.
4. Kaing, V., Ilan, I., Lieng, T., Yos, C., Chan, R., Chan, R., Song, L., Mong, M., Oeurng, C., & Sok, T. (2021). Application of Multivariate Techniques in the Evaluation of Spatial Surface Water Quality in an Urbanized Floodplain Area in Cambodia. The 13th AUN/SEED-Net Regional Conference on Chemical Engineering (RCChE-2020), Phnom Penh, Cambodia.
5. Heang, B., Chan, R., Chuy, V., & Bun, S. (2021). Technical Review and Challenge of Various Decentralized Anaerobic Treatments for Domestic Wastewater. The 10th Scientific Day of ITC.
6. Seng, P., Chan, R., & Bun, S. (2021). Recent Research and Development of Anaerobic Baffled Reactor and Filter for Wastewater Treatment: A Review. The 10th Scientific Day of ITC.
7. Ka, K., Khe, S., Chan, R., Chan, R., Tes, D., Kaing, V., Oeurng, C., & Ty, S. (2021). Seasonal Dynamic on Occurrence and Distribution of Pollutants from Urban Canal and Aquaculture Farm to Tamouk Lake, a Floodplain Urbanized Area in Phnom Penh. The 10th Scientific Day of ITC, May 2021.
8. You, R., Hok, S., Sieng, S., Ty, B. (2021). The Preliminary of Arsenic Removal from Groundwater by utilizing Electro-Chemical Arsenic Remediation (ECAR). The 10th Scientific Day of ITC, May 2021.
9. Nhem, V., Siev, S., Chhin, R., Ung, P., Fuji, H., & Chihiro, Y. (2021). Water Quality Mapping Using High Resolution Satellite Image Sentinel-2. The 13th AUN/SEED-Net Regional Conference on Chemical Engineering 2021
10. Thoeurn, T., Tri, W. H., & Chhin, R. (2021). Application of Statistical Downscaling for Seasonal Rainfall Forecasts in Cambodia: A Comparison between Constructed Analogue and Bias Correction Methods. The 13th AUN/SEED-Net Regional Conference on Chemical Engineering
11. Sang, D., Tan, R., & Pierre, L. C. (2021). Kinetic and Equilibrium Studies of Caffeine Adsorption on Different Type of Activated Carbons. The 10th Scientific Day of ITC, May 2021.
12. Or, T., Sang, D., Chanto, M.T., Tan, R. (2021). Natural Organic Matter Removal in Drinking Water Treatment by Combination of Adsorption and Coagulation Processes: A Comprehensive Review. The 10th Scientific Day of ITC, May 2021.
13. Meng, C., Lun, S., Sith, R., & Sang, D. (2021). Formulizing the Design Criteria for the Piped Water Supply in Urban Area of Cambodia. The 10th Scientific Day of ITC, May 2021.
14. Visal, R., Sith, R., & Lun, S. (2021). Assessment of Hydraulic Performance of Water Supply System in Takhmao City, Using Modeling Approach, Proceedings of the 10th Scientific Day of ITC, May 6, 2021, Phnom Penh.
15. Sona, Y., Pen, S., & Lun, S. (2021). 2D-Fluvial Hydraulic Characteristic Assessment at Chaktomuk Junction, Phnom Penh City, Proceedings of the 10th Scientific Day of ITC, May 6, 2021, Phnom Penh.

**Annex 28. List of Foreign Students at ITC.**

No	Civilité	Nom et prénom	Départ.	Date d'arrivée	Date de départ	Université d'origine	Pays	Thème	Financement
1	M.	Bacqué Matéo	GRU	25 février 2022	8 mai 2023	Université de Liege	Belgium	Flood vulnerability of informal settlements in Phnom Penh	ARES
2	Mlle	BAUER Mariane	ECAM	22 septembre 2022	février 2022	ECAM LaSalle	France	Semester exchange	
3	M.	BENOIT Valentin	GCI	4 octobre 2022	10 février 2023	INSA RENNES	France	Semester exchange	Pas de financement
4	M.	BERGER Lucas	ECAM	03 septembre 2022	11 janvier 2023	ECAM LaSalle	France	Semester exchange	
5	Mlle	BOUCHER Louis-Marie	ECAM	29 janvier 2023		ECAM LaSalle	France	Semester exchange	
6	M.	CARRAZ-BILLAT Armand	GIC	14 février 2023	18 juillet 2023	INSA Toulouse	France	Semester exchange	INSA Toulouse
7	M.	CARTIER Alexandre	ECAM	18 janvier 2022	juillet 2022	ECAM LaSalle	France	Semester exchange	
8	M.	CARVALHO Jules	GIM	15 février 2023	18 juillet 2023	INSA Toulouse	France	Semester exchange	INSA Toulouse
9	M.	CLAUSER Thomas	ECAM	28 janvier 2023		ECAM LaSalle	France	Semester exchange	
10	M.	COLINEAU Lilian	DTC	7 novembre 2022	20 janvier 2023	IUT d'Orsay	France	Optics and Thermodynamics Lab	IUT d'Orsay
11	Mlle	DALLEINNE Eve	ECAM	08 février 2022	juillet 2022	ECAM LaSalle	France	Semester exchange	
12	M.	DAMON Jules	ECAM	28 janvier 2023		ECAM LaSalle	France	Semester exchange	
13	M.	DAVAL POMMIER Lucas	ECAM	04 février 2022	juillet 2022	ECAM LaSalle	France	Semester exchange	
14	Mlle	DE RIVAZ Pauline	ECAM	04 septembre 2022	07 janvier 2023	ECAM LaSalle	France	Semester exchange	
15	M.	DE SAINT-EXUPERY Alix	ECAM	03 septembre 2022	11 janvier 2023	ECAM LaSalle	France	Semester exchange	

16	Mlle	DECHAMPS Anaëlle	GRU	15 mai 2022	7 juillet 2023	University of Paris-Saclay	France	Groundwater Quality Assessment at rural areas of Cambodia	University of Paris-Saclay
17	M.	DEVICTOR Margot	ECAM	28 janvier 2023		ECAM LaSalle	France	Semester exchange	
18	M.	ELMASRY Ahmed	ECAM	22 septembre 2022	février 2022	ECAM LaSalle	Égyptien	Semester exchange	
19	Mlle	Ferrouillat Charlotte	GCI	5 octobre 2022	10 février 2023	INSA RENNES	France	Semester exchange	Pas de financement
20	Mlle	FRANCOIS Jeanne	ECAM	28 janvier 2023		ECAM LaSalle	France	Semester exchange	
21	Mlle	GAUGE Coline	ECAM	22 septembre 2022	février 2022	ECAM LaSalle	France	Semester exchange	
22	M.	GONIN Maeva	ECAM	03 février 2022	juillet 2022	ECAM LaSalle	France	Semester exchange	
23	M.	Guilhem SOULAN	GIC	27 septembre 2022	28 février 2023	Le Mans Université	France	Exchange Program Scheme	Le Mans Université
24	Mlle	HUONG Luong Thi Thu	GRU	15 mai 2022	10 août 2023	Hanoi University of Science	Vietnam	Microplastic in Deifferent Environmental Mediums of Cambodia	INOWASIA
25	M.	JACQUEY Cristal	ECAM	11 septembre 2022	07 janvier 2023	ECAM LaSalle	France	Semester exchange	
26	Mlle	Lamarche Audrey	GCI	4 octobre 2022	10 février 2023	INSA RENNES	France	Semester exchange	Pas de financement
27	Mlle	LAO Chanrithy	WAE	13 mars 2023	12 septembre 2023	Caen Université	France	M2	IRD (UMR iEEs Paris)
28	Mlle	LASSERRE Adrien	ECAM	22 janvier 2022	juillet 2022	ECAM LaSalle	France	Semester exchange	
29	Mlle	Latsamee KINGLATTANA	GRU	15 mai 2022	10 août 2023	National University of Laos	Laos PDR	Water and Health Risk in Cambodia project	INOWASIA
30	M.	LAURENT Eliott	ECAM	08 septembre 2022	07 janvier 2023	ECAM LaSalle	France	Semester exchange	
31	M.	LEFRANCQ Lou	ECAM	28 janvier 2023		ECAM LaSalle	France	Semester exchange	
32	M.	MAETZ Malo	ECAM	22 septembre 2022	février 2022	ECAM LaSalle	France	Semester exchange	

33	M.	MARGARON Maud	ECAM	03 septembre 2022	07 janvier 2023	ECAM LaSalle	France	Semester exchange	
34	Mlle	MARTIN Arun	WAE	4 mars 2023	4 septembre 2023	MNHN, Paris	France	M2	Sindora Pepper Garden IRD
35	Mlle	MARTIN Louise	WAE	9 mai 2023	14-Jul-23	Institut Agro Montpellier	France	Engineer school	Financement Gustave Muller
36	M.	Matéo Bacqué	GRU	24 février 2023	8 juin 2023	ULG université de liege	Belgium	M2	ARES
37	M.	MICHEL Louis	ECAM	03 septembre 2022	11 janvier 2023	ECAM LaSalle	France	Semester exchange	
38	M.	Nathan MAURY	GIC	3 octobre 2022	12 février 2023	INSA de RENNES	France	Exchange Program Scheme	INSA de RENNES
39	M.	ODDOU Louison	DTC	7 novembre 2022	20 janvier 2023	IUT d'Orsay	France	Optics and Thermodynamics Lab	IUT d'Orsay
40	M.	PÉRIN Thomas	ECAM	03 septembre 2022	07 janvier 2023	ECAM LaSalle	France	Semester exchange	
41	Mlle	POUDEVINGE Louis	ECAM	03 septembre 2022	11 janvier 2023	ECAM LaSalle	France	Semester exchange	
42	Mlle	ROUCHOU Maxence	ECAM	08 février 2022	juillet 2022	ECAM LaSalle	France	Semester exchange	
43	M.	SABY Lalou	ECAM	28 janvier 2023		ECAM LaSalle	France	Semester exchange	
44	Mlle	Sarah OURY	GIC	3 octobre 2022	12 février 2023	INSA de RENNES	France	Exchange Program Scheme	INSA de RENNES
45	Mlle	Sreypich Sinh	WAE	1 avril 2023	30 septembre 2023	University Paris Créteil France	France	PhD	BGF / IRD
46	M.	Tangi Floch	AMS	1 juin 2023	28 juillet 2023	Engineer school CY Tech (EISTI),	France	Statistical and Machine Learning Techniques for Credit Scoring Modeling on Cambodian Credit Datasets	EISTI
47	M.	THOMAS Maxime	GCI	4 octobre 2022	10-Feb-23	INSA RENNES	France	Semester exchange	Pas de financement
48	M.	Yugo CARTRON	GIC	3 octobre 2022	16 février 2023	INSA de RENNES	France	Exchange Program Scheme	INSA de RENNES

