What is examinable?

The online notes contain all the definitions and theorems in the course and more.

All the definitions are examinable, this means that you may be asked to state or use any of the definition in the exam.

As a general rule, you need to know the statements of all the theorems (including lemmas, propositions and corollaries) that were stated in the lectures, you have to be able to apply them in the appropriate situations and you have to be able to prove the theorems that were proved in the lectures. (This includes Turán's Theorem (Theorem 3.2), where the notes only contain a link to the Wikipedia article containing the proof.)

You are expected to know the geometric, binomial and exponential series, if a question requires anything more complicated, it will be given to you.

Here is the list of things which will *not* be asked in the exam. If only the proof of a theorem is on the list, then it means that you still have to know the statement of the theorem and you have to be able to apply it.

Graph Theory:

- the proof of Proposition 0.3,
- the proof of Theorems 1.2 and 1.3,
- Section 1.2 on squared squares and rectangles,
- the first part of the proof of Theorem 2.2 dealing with the existence of the maximal flow, the rest of the proof *is* examinable,
- the proof of the vertex version in Theorem 2.5,
- Theorems 2.7 and 2.8,
- the second half of the proof of Theorem 3.1.

Generating functions:

- the proof of Theorem 4.3.

The following are the main problem types that you have to be able to solve:

- calculating the currents in an electrical network by using the method of spanning trees,
- finding the maximal flow and the minimal cut in a flow network,
- calculating the ordinary power series generating function, the exponential generating function or the Dirichlet series of a sequence given by an explicit formula,
- finding an explicit formula for a sequence given by a recurrence relation by using ordinary power series generating functions or exponential generating functions,
- applications of the Sieve Formula (including finding the model for the problem in which the Sieve Formula can be applied),
- writing down the hand enumerator function for problems that can be interpreted in terms of cards, decks, hands, but you are not expected to calculate concrete coefficients,
- proving simple identities by the Snake Oil Method.

There are plenty of examples of each type on the problem sheets and past exam papers.

There will be questions on electrical networks, flow networks and the Ford-Fulkerson algorithm, ordinary power series generating functions and exponential generating functions. The first two questions can include other topics from graph theory and the last two questions can include other topics from the theory of generating functions.

As a rough guide, definitions count for about 15% of the total mark on the exam, theorems for about 35% and problem solving for about 50%, but there can be big differences between questions. Knowing the proofs is where students tend to do worse, many of them not even attempting to answer the questions, even though these should be easy marks.