Course material for the exam in DM553
The material students are responsible for in connection with the exam is:

1. Finite automata and regular languages — Chapter 1 in Sipser

2. Pushdown automata and context-free languages — Sections 2.1–2.3 in Chapter 2 in Sipser

3. Turing machines — Chapter 3 in Sipser

4. Decidability — Chapter 4 in Sipser

5. Reducibility — Chapter 5 in Sipser, except not the part in section 5.1 about "reductions via computation histories"

6. Definitions concerning P, NP, NP-Completeness are relevant for both of the next two topics: The definition of time complexity classes is on page 279 in Sipser's textbook, and the definition of P is on page 286. The definitions of NP and NP-Complete are in sections 7.3 and 7.4 of Sipser's textbook.

7. NP-completeness proofs — Corollary 7.4.2 in Sipser and Chapter 34 in CLRS

8. Proof that CNF-SAT is NP-complete — This is the Cook-Levin Theorem in section 7.4 in Sipser, plus part of Corollary 7.42 in Sipser.

9. Information-theoretic lower bounds (lower bounds proven by counting leaves in decision trees), especially the average case bounds for sorting by comparisons — From the extra notes, up to and including section 2.4

10. Adversary arguments — From the extra notes, chapter 3

11. Median problem – worst case linear time algorithm and lower bound – section 9.3 in CLRS and section 3.5 in the extra notes.

12. Approximation algorithms — Chapter 35 in CLRS

13. All problems (for discussion sections) on the lecture notes.

Note that students from DM508 are not responsible for the first five points, except for enough of the definition of Turing machines (pages 168–169 in Sipser) to handle NP-Completeness. Come ask Joan if you have any questions.