

## CS103 Syllabus

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This handout contains the tentative syllabus for CS103. Depending on how quickly we're able to cover various topics, we may proceed more quickly or more slowly than the syllabus indicates.

Date	Topics	Readings	Assignments
<b>Part One: Mathematical Formalisms</b>			
<b>M</b> April 2	Sets The Limits of Computing	Course Notes Ch. 1	
<b>W</b> April 4	Direct Proofs	Course Notes Ch. 2	
<b>F</b> April 6	Indirect Proofs	Course Notes Ch. 2	PS1 Out
<b>M</b> April 9	Mathematical Induction		PS1 Checkpoint Due
<b>W</b> April 11	Strong Induction		
<b>F</b> April 13	Graphs and Relations	Handouts	PS1 Due PS2 Out
<b>M</b> April 16	Functions		PS2 Checkpoint Due
<b>W</b> April 18	The Pigeonhole Principle		
<b>F</b> April 20	Propositional Logic	Rosen 1.1-1.2	PS2 Due PS3 Out
<b>M</b> April 23	First-Order Logic I	Rosen 1.3-1.5	PS3 Checkpoint Due
<b>W</b> April 25	First-Order Logic II	Rosen 1.3-1.5	
<b>Part Two: Computability Theory</b>			
<b>F</b> April 27	Introduction to Computability Theory DFAs	Sipser 1.1	PS3 Due, PS4 Out
<b>M</b> April 30	NFAs Equivalence of DFAs and NFAs	Sipser 1.2	
<b>W</b> May 2	Regular Expressions Equivalence of Regular Expressions and DFAs	Sipser 1.3	
<b>F</b> May 4	Closure Properties of Regular Languages		PS4 Due, PS5 Out
<b>M</b> May 7	Non-Regular Languages The Pumping Lemma for Regular Languages	Sipser 1.4	
<b>T</b> May 8	<b>Midterm Exam: 7PM – 10PM, Location TBA</b>		

<b>W</b> May 9	Context-Free Grammars Context-Free Languages	Sipser 2.1	
<b>F</b> May 11	Pushdown Automata Deterministic Context-Free Languages	Sipser 2.2	PS5 Due, PS6 Out
<b>M</b> May 14	The Pumping Lemma for Context-Free Languages Closure Properties of CFLs	Sipser 2.3	
<b>W</b> May 16	Turing Machines Programming Turing Machines	Sipser 3.1	
<b>F</b> May 18	The Universal Turing Machine The Church-Turing Thesis	Sipser 3.2–3.3	PS6 Due, PS7 Out
<b>M</b> May 21	An Unrecognizable Language An Undecidable Language	Sipser 4.2	
<b>W</b> May 23	More Undecidable and Unrecognizable Languages Reductions	Sipser 5.1	
<b>F</b> May 25	Mapping Reductions	Sipser 5.3	PS7 Due, PS8 Out
<b>M</b> May 28	<b>Memorial Day: No Class</b>		
<b>Part Three: Complexity Theory</b>			
<b>W</b> May 30	Introduction to Complexity Theory P	Sipser 7.1–7.3	
<b>F</b> June 1	Nondeterministic Turing Machines NP		PS8 Due, PS9 Out
<b>M</b> June 4	NP-Completeness I	Sipser 7.4	
<b>W</b> June 6	NP-Completeness II	Sipser 7.5	PS9 Due
<b>F</b> June 8	<b>Final Exam: 12:15 – 3:15, Location TBA</b>		