



# 15-453 Formal Languages, Automata and Computation

Spring 2014, TTH 12-1:20, GHC 4215

[[Schedule/Assignments](#) | [Project Info](#) | [What's New?](#)]

This Schedule is tentative, but the topics we'll cover should not deviate too much from it.

DATE	LECTURE ( <a href="#">Handouts</a> )	READING	ASSIGNMENT
Tue Jan 14	Overview Deterministic Finite Automata and Regular Languages (1 <a href="#">pdf</a> )	Chapters 0, 1.1	<a href="#">Homework 1</a> <a href="#">Sol1</a>
Thu Jan 16	Non-Determinism and Regular Operations (2 <a href="#">pdf</a> )	Chapter 1.2	
Tue Jan 21	Regular Expressions and the Pumping Lemma for Regular Languages (3 <a href="#">pdf</a> )	Chapter 1.3, 1.4	<a href="#">Homework 2</a> <a href="#">Sol2</a>
Thu Jan 23	Minimizing DFAs (4 <a href="#">pdf</a> )	Finish Chapter 1	
Tue Jan 28	Push-Down Automata and Context-Free Grammars; Pumping Lemma for CFLs (5 <a href="#">pdf</a> )	Chapter 2.1, 2.2, 2.3	<a href="#">Homework 3</a> <a href="#">Sol3</a>
Thu Jan 30	Equivalence of PDAs and CFGs, (6 <a href="#">pdf</a> )		
Tue Feb 5	Chomsky Normal Form, Turing Machines (7 <a href="#">pdf</a> )	Chapter 2, Chapter 3	<a href="#">Review1 Homework</a>
<b>Thu Feb 6</b>	<b>Review</b> (8 <a href="#">pdf</a> )		<b>*Project Report 1 due</b> (Topic, Main Contact)
<b>Tue Feb 11</b>	<b>Midterm Exam 1</b>		<a href="#">Homework 4</a> <a href="#">Sol4</a>
Thu Feb 13	Undecidability (9 <a href="#">pdf</a> )	Chapter 3, Chapter 4	
Tue Feb 18	Undecidability II: Reductions (10 <a href="#">pdf</a> )	Chapter 5.1	<a href="#">Homework 5</a> <a href="#">Sol5</a>
Thu Feb 20	More Mapping Reducibilities	Chapter 5.3	
Tue Feb 25	Post Correspondence Problem (11 <a href="#">pdf</a> )	Chapter 5.2	<a href="#">Homework 6</a> <a href="#">Sol6</a>
Thu Feb 27	Rice's Theorem; The Recursion Theorem; The Fixed-Point Theorem (12 <a href="#">pdf</a> )	Chapter 6	
Tue Mar 4	Oracle Turing Machines and Turing Reducibility (13 <a href="#">pdf</a> )	Chapter 6	<a href="#">Homework 7</a> <a href="#">Sol7</a>
Thu Mar 6	The Arithmetic Hierarchy (14 <a href="#">pdf</a> )	Chapter 6	
Tue Mar 11	<b>No class. SPRING BREAK!</b>		
Thur Mar 13	<b>No class. SPRING BREAK!</b>		
Tue Mar 18	Kolmogorov-Chaitin Complexity (15. <a href="#">pdf</a> )	Chapter 6	
<b>Thu Mar 22</b>	<b>Review</b> (16 <a href="#">pdf</a> )		<b>**Project Report 2 due</b>
<b>Tue Mar 25</b>	<b>Midterm Exam 2</b>		<a href="#">Homework 8</a> <a href="#">Sol8</a>

Thu Mar 27	Time Complexity and Polynomial Time; Non-Deterministic Turing Machines and NP (17 <a href="#">pdf</a> )	Chapters 7.1-7.4	
Tue Apr 1	NP-Completeness: The Cook-Levin Theorem(18 <a href="#">pdf</a> )	Chapter 7.5	<a href="#">Homework 9</a> <a href="#">Sol9</a>
Thu Apr 3	SAT Solvers; Midterm Review		
Tue Apr 8	NP: Completeness: Karp (19 <a href="#">pdf</a> )	Chapter 8	<a href="#">Homework 10</a> <a href="#">Sol10</a>
Thu Apr 10	<b>No Class, SPRING CARNIVAL!</b>		
Tue Apr 15	Space Complexity I: Savitch's Theorem and PSPACE-Completeness (20 <a href="#">pdf</a> )		
Thu Apr 17	Space Complexity II. (21 <a href="#">pdf</a> )	Chapter 10.2	<a href="#">Homework 11</a> <a href="#">Sol11</a>
Tue Apr 22	Randomized Complexity: BPP, RP, etc., co-Classes (22 <a href="#">pdf</a> )		
<b>Thu Apr 24</b>	<b><a href="#">Project Presentations I</a></b>		
<b>Tue Apr 29</b>	<b><a href="#">Project Presentations II</a></b>		
<b>Thur May 1</b>	<b><a href="#">Review</a> and <a href="#">Presentations III</a></b>		<b>***Final Project Report due</b>

**FINAL EXAM**  
**Good luck!!!**