		PESIT, Dept of CSE	Jan-May 2012			Dr. Kavi Mahesh		
		Textbook: Theory of Computation: A Problem-Solving Approach, Kavi Mahesh, Wiley India, 2012						
10CS 255		**Theory of Computation (Finite Automata and Formal Languages)**	**(3-0-0-3)**					
Lesson	**Unit**	**Topic**	**Chapter & Section(s)**	**% Coverage**		**Learning Objectives**	**Examples (choose from)**	**Assignments**
				Unit	**Total**			
1	1	Introduction: What is a computer	1.1, 1.2			L1.1, L1.2		
2	1	Computing machines and languages	1.3 - 1.5			L1.3		
3	1	Science of computing	1.6 - 1.8			L1.4 - L1.8		Watch "What is Computer Science" video
4	1	Finite automata	2.1 - 2.3			L2.1	2.1	Watch "HowToUseJFLAP" video
5	1	Constructing automata	2.4 - 2.6			L2.2 - L2.4	2.2 - 2.6	Watch videos 2.6, 2.10, 2.30, 2.35
6	1	Constructing automata	2.7 - 2.11			L2.5 - L2.7	2.7 - 2.13	Ch. 2 Exercises
7	1	Non-deterministic finite automata	2.12, 3.1 - 3.2			L3.1 - L3.2	2.14, 3.1 - 3.5	Watch videos 3.2, 3.4, 3.7
8	1	Converting NFA to DFA and lambda transitions	3.3 - 3.4			L3.3 - L3.4	3.6 - 3.9	Ch. 3 Exercises (1 - 18)
9	1	Minimizing automata	3.5	22.50	22.50	L3.5	3.10 - 3.11	Study Theorems 1 and 2 in Appendix B
10	2	Regular languages and RegEx	4.1 - 4.3			L4.1		
11	2	Constructing RegEx	4.4, 4.8			L4.2	4.1 - 4.10, 4.15	Watch videos 4.2, 4.6, 4.14
12	2	Converting between RegEx and NFA	4.5 - 4.6			L4.3 - L4.4	4.11 - 4.13	Watch video 4.35 and Study Theorems 3 and 4
13	2	Equivalence and RegEx in practice	4.7, 4.9			L4.5 - L4.6	4.14, 4.16-4.19	Ch. 4 Exercises
14	2	Grammars	5.1 - 5.3			L5.1 - L5.2	5.1 - 5.2	

15	2	Constructing regular grammars	5.4, 5.7			L5.3	5.3 - 5.6	Watch videos 5.7, 5.14
16	2	Converting grammars to automata	5.5 - 5.6			L5.4 - L5.5	5.7 - 5.10	Watch video 5.20, Study Theorems 5 and 6, and Ch. 5 Exercises
17	2	Closure properties and questions	6.1 - 6.2			L6.1 - L6.2	6.1	Watch videos 6.4, 6.6, 6.10
18	2	Pumping lemma	6.3 - 6.4			L6.3 - L6.4		Ch. 6 Exercises (1-13)
19	2	Using pumping lemma	6.5	25.00	47.50	L6.5	6.2 - 6.5	Ch. 6 Exercises (14-20) and Study Theorems 7-10
20	3	Context-free behavior	7.1 - 7.2			L7.1	7.1	
21	3	Construcing CFGs	7.3 - 7.4			L7.2 - L7.3	7.2 - 7.15	
22	3	Constructing CFGs and Parsing	7.5 - 7.6			L7.4 - L7.5		Watch videos 7.6, 7.11, 7.23, 7.67
23	3	Ambiguity	7.7 - 7.8			L7.6 - L7.7	7.16 - 7.17	Ch. 7 Exercises (1-42)
24	3	Chomsky Normal Form	7.9 - 7.10			L7.8, L7.10	7.18 - 7.22	
25	3	CYK, Greibach Normal Form and simple grammars	7.11 - 7.12	15.00	62.50	L7.9	7.23 - 7.24	Ch. 7 Exercises (43-63) and Study Theorems 11-14
26	4	Pushdown automata	8.1 - 8.2			L8.1 - L8.2		
27	4	Constructing PDAs	8.3 - 8.4			L8.3	8.1 - 8.3	Watch videos 8.2, 8.4, 8.10
28	4	CFG to PDA	8.5			L8.4	8.4	Watch video 8.19
29	4	PDA to CFG and non-determinism	8.6 - 8.8			L8.5 - L8.6	8.5 - 8.6	Ch. 8 Exercises and Study Theorem 15
30	4	Closure properties and questions	9.1 - 9.3			L9.1 - L9.4		Watch videos 9.3 and 9.5
31	4	Pumping lemma	9.4 - 9.6	15.00	77.50	L9.5 - L9.6	9.1 - 9.3	Ch. 9 Exercises and Study Theorems 16-19

32	5	Turing machine demonstration	10.1 - 10.3			L10.1	10.1 - 10.2	
33	5	Constructing Turing machines	10.4 - 10.5			L10.2 - L10.3	10.3 - 10.5	Watch videos 10.1, 10.4, 10.13, 10.23
34	5	Turing thesis and variations	10.6 - 10.8			L10.4		Study Theorem 20
35	5	Universal Turing machine	10.9 - 10.10			L10.5 - L10.6		Ch. 10 Exercises
36	5	Recursively enumerable languages	11.1 - 11.8			L11.1 - L11.6		Study Theorems 21-24
37	5	Context-sensitive and other classes	11.9 - 11.13			L11.7 - L11.11	11.1 - 11.2	Ch. 11 Exercises and Study Theorems 25-32
38	5	Post Correspondence Problem	12.1 - 12.2			L12.1 - L12.2	12.1 - 12.4	
39	5	Halting problem and undecidability	12.3 - 12.7			L12.3 - L12.6		Study Theorems 33-36
40	5	Introduction to complexity theory	12.8 - 12.10	22.50	100.00	L12.7		Ch. 12 Exercises
								Answer the quiz in Appendix A
								Answer the two model question papers given in the DVD