Birla Institute of Technology and Science, Pilani, Hyderabad Campus
Instruction Division
First Semester 2013-14
Course Handout (Part-II)

Date: 27.07.2013

In addition to Part – I (General handout for all courses appended to the timetable) this portion further specific information regarding the course.

Course No.	**:**	**CS F351**
Course Title	**:**	**Theory of Computation**
Instructor-In-Charge	**:**	**R.Gururaj**
Instructors	**:**	**CR Prasanna, K Kavitha**

1. Course Description

Finite automata and regular languages- Regular Expressions, Deterministic and Non-deterministic FA, Conversion from NDFA to DFA, Pumping theorem; Context free languages and CFGs- Push down automata, concepts in parsing, parse trees, Top-down and Bottom-up parsing; Turing machines; Universal Turing Machines; Computability - decidability and semi-decidability, recursive languages, Church-Turing hypothesis; Undecidable problems – the halting problem.

2. Objective

To provide a theoretical foundation for the process of computation and to impart an understanding of the notions of automata, formal languages, Grammars, parsing, computability and complexity classes.

3. Scope

This course covers basic concepts of formal models of computation and computability. It introduces a hierarchy of machines and languages to capture classes of computable sets. It concludes with a generic notion of computability, and complexity classes of computable functions.

4. Textbook

1. Elements of Theory of Computation, Harry Lewis and Christos Papadimitriou, Second Edition, PHI, Asia 1998

5. Reference Books

2. Introduction to Automata Theory, Languages and Computation, John Hopcroft, Rajeev Motwani and Jeffrey Ullman, Second Edition, Pearson, Asia 2001

1. **Lecture Schedule:**

Lect.	Topics	Readings
1	Introduction	-
2-4	Sets, Finite Sets	T1 Ch.1
5-6	Alphabets and languages	T1 Ch. 1
7	Finite representation of languages	T1 Ch. 1
8	Finite automata	T1 Ch. 2
9-10	Deterministic & Non-deterministic finite automata	T1 Ch. 2
11-12	Finite automata & regular expressions	T1 Ch. 2
13-14	State minimization	T1 Ch. 2
15-16	Context-free grammars	T1 Ch. 3
17-19	Parse trees	T1 Ch. 3
20-23	Pushdown automata	T1 Ch. 3
23-25	Turing machines	T1 Ch. 4
26-29	Non-deterministic turing machines	T1 Ch. 4
30-33	Undecidability, halting problem,	T1 Ch. 5
34-35	Unsolvable problems	T1 Ch. 5
36-37	Computational complexity	T1 Ch. 6
38-39	N-P Completeness	T1. Ch.7
40	Course Summary	-

2. **Evaluation:**

Component	Duration	Date & Time	Weightage	Remarks
Test-1	**1 Hr**	**01-10-13; 5-6PM**	**20%**	**Closed Book**
Test-2	**1 Hr**	**08-11-13; 5-6PM**	**20%**	**open**
Comprehensive	**3 Hrs**	**12-12-13 AN**	**60%**	**Close Book**

3. **Make-up-Policy:**
   Make-up will be strictly granted on prior permissions and on justifiable grounds only. Students applying for make-up on medical grounds need to submit confirmation letter from the concerned warden.
4. **Course Notices:**
   All notices pertaining to this course will be displayed on the LTC Notice Board and Course webpage.
5. **Chamber Consultation:**
   To be announced in the Classroom.

Instructor-In-Charge
CS F351