

Birla Institute of Technology and Science, Pilani, Hyderabad Campus
First Semester 2019-20
Course Handout (Part-II)

01.08.2019

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	:	Dr.R. Gururaj
Instructors	:	Dr. Manjanna, Mr. Rajesh Srivastava

1. Scope of the Course:

The scope of this course includes- Languages; 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. Course Objectives:

- To provide a theoretical foundation for the process of computations performed by computers by studying Automata concepts.
- To impart an understanding of the notions of automata, formal languages, Grammars, and parsing.
- To understand the practical applications of automata in various applications like Compilers etc.
- To understand the capabilities and limitations of computing machines.

3. Textbook:

T1. Elements of Theory of Computation, Harry Lewis and Christos Papadimitriou, Second Edition, PHI, Asia 1998

4. Reference Books:

R1. Introduction to Automata Theory, Languages and Computation, John Hopcroft, Rajeev Motwani and Jeffrey Ullman, Second Edition, Pearson, Asia 2001

5. Detailed Lecture Schedule:

Lect. No.	Learning Objective	Topics to be covered	Chapter in the Text Book
1	To provide an overview of the course and its importance	Introduction to Theory of Computations	-
2-3	To have a recap of concepts of Set theory related to Automata Theory	Set theory	T1 Ch. 1
4-5	To understand the concepts in Language representation	Alphabets and languages	T1 Ch. 1
6		Finite representation of languages	T1 Ch. 1
7-9	To provide a comprehensive understanding about the theory and working of Finite automata and its applications	Finite automata	T1 Ch. 2
10-12		Deterministic & Non-deterministic finite automata	T1 Ch. 2
13-14		Finite automata & regular expressions	T1 Ch. 2
15-17		State minimization	T1 Ch. 2
18-20	To learn the theory behind the Context-free languages, Context – free Grammars and related automata and their applications in compilation	Context-free grammars	T1 Ch. 3
21-24		Parse trees	T1 Ch. 3
25-29		Pushdown automata	T1 Ch. 3
30-33	To understand the theory and working of Turing Machines	Turing machines	T1 Ch. 4
34-35		Non-deterministic Turing machines	T1 Ch. 4
36-38		Undecidability, Universal TMs	T1 Ch. 5
39	To provide an overview of classes of computational problems	Unsolvable problems	T1 Ch. 5
40		Computational complexity	T1 Ch. 6
41		N-P Completeness	T1. Ch.7
42		Course Summary	-

6. Evaluation:

Component	Duration	Date & Time	Weightage	Nature of Component
Mid-semester Exam	90 Mins.	28/9, 11.00 -- 12.30 PM	35%	Partly Open (20%) Book
Quiz-1	30 Mins.	2 nd week, Sept 2019	10%	Close Book
Quiz-2	30 Mins.	1 st week, Nov 2019	10%	Close Book
Comprehensive Exam	3 Hrs.	02-12-2019 AN	45%	Close Book

7. Make-up-Policy:

For genuine reasons other than medical, prior approval from the IC is mandatory. Requests coming after the test will not be honored. For make-up on medical grounds, first inform the warden about the illness and take his help for consulting the doctor, and finally Chief Hostel Warden's recommendation/certificate is a must and such students should not leave the campus during Test dates (please refer to the guidelines by Timetable & Exams in this regard). No make-up will be given by just producing some medical prescription. The above mentioned rules will be followed very strictly.

8. Course Notices:

All notices pertaining to this course will be displayed on the CSIS Notice Board and CMS Course webpage.

9. **Chamber Consultation:** To be announced.
10. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor In-charge
CS F351