COURSE PLAN

Bakhtiyarpur College of Engineering Bakhtiyarpur

Academic Session : 2020-2021(Odd Semester) **Semester** : 5th
Branch : CS **Name of Subject** : Formal Language and Automata Theory
Course : B.Tech. **Subject Code** : 051611
Groups : CS-51 **Name of Faculty Member** : Ajeet Kumar

Lecture No.	Topics to be covered	Planned Date of Completion	Book and page no.
Module 1 Introduction, Regular languages and finite automata			
1	Terminology: Alphabet, languages and grammars		T1: 17-20
2	productions and derivation		T1: 21-24
3	Chomsky hierarchy of languages.		T1:305-307
4	Deterministic Finite Automata (DFA)		T1:37-41
5	Nondeterministic finite automata (NFA) and equivalence with DFA,		T1:46-58
6	Minimization of finite automata.		T1:66-68
7	Regular expressions and languages		T1: 74-81
8	Deterministic Finite Automata (DFA) and equivalence with regular expressions		T1: 82-88
9	regular grammars and equivalence with finite automata		T1: 89-97

10	properties of regular languages		T1: 101-105
11	pumping lemma for regular languages		T1: 117-119
12	Moore and Mealy Machine		T1:377-392
Module 2 Context-free languages and pushdown automata			
13	Context-free grammars (CFG)		T1: 129-131
14	Context-free languages (CFL)		T1:131-134
15	parse trees		T1:134-137
16	Ambiguity in CFG		T1:140-145
17	Simplification of CFG		T1:155-164
18	Chomsky and Greibach normal forms		T1:171-174
19	Deterministic pushdown automata		T1:203-206
20	Nondeterministic pushdown automata (PDA) and equivalence with CFG		T1:191-202
21	pumping lemma for context-free languages		T1:214-219
22	closure properties of CFLs.		T1:220-227
Module 3 Context-sensitive languages:			
23	Context-sensitive grammars (CSG) and Context-sensitive languages		T1:299-300
24	linear bounded automata and equivalence with CSG		T1:300-304
Module 4 Turing machines:			
25	The basic model for Turing machines (TM)		T1:231-232
26	Turing recognizable (Recursively enumerable)		T1:285-286

27	Turing-decidable (recursive) languages		T1:287-288
28	closure properties of RE and REC Language		T1:289-291
29	variants of Turing machines		T1:259-271
30	Deterministic TMs		T1:271-273
31	Nondeterministic TMs and equivalence with deterministic TMs		T1:273-275
32	Unrestricted grammars and equivalence with Turing machines		T1:291-298
33	TMs as enumerators		T1:335-339
Module 5 Undecidability			
34	Church-Turing thesis		T1:335-337
35	universal Turing machine		T1:276-280
36	the universal and diagonalization languages		T1:289-291
37	Rice's theorem		T1:320-321
38	reduction between languages and Rice's theorem		T1:310-318
39	undecidable problems about languages.		T1:329-332
40	NP Completeness		T1:355-373

No. of Proposed Lectures: 40

Teacher's Assessment:

Name of the Activity:	Marks Allotted to Each Activity:	Date of Completion:
1. Special Quiz	05	19th September 2020
2. Assignment	10	10th October 2020
3. Class Notes	05	11st November 2020

Text Books :

T1. An Introduction to FORMAL LANGUAGES and AUTOMATA(sixth Edition), PETER LINZ

T2. Introduction to Automata Theory, Languages, and Computation, 2e by John E, Hopcroft, Rajeev Motwani, Jeffery D. Ullman , Pearson Education.

T3. Theory of Computer Science (Automata, Languages and Computation), 2e by K. L. P. Mishra and N. Chandrasekharan, PHI

Reference Books :

R1. A. M. Padma Reddy, Finite Automata and Formal Languages: A Simple Approach, Pearson Education India

R2. Harry R. Lewis and Christos H. Papadimitriou, Elements of the Theory of Computation, Pearson Education Asia.

R3. Dexter C. Kozen, Automata and Computability, Undergraduate Texts in Computer Science, Springer.

R4. Michael Sipser, Introduction to the Theory of Computation, PWS Publishing.

R5. John Martin, Introduction to Languages and the Theory of Computation, Tata McGraw Hill.

Evaluation Scheme:

- **Mid-Sem Test:**
  - **No. Test** - 1
  - **Marks** - 20 marks
  - **Type of Question Paper** - Subjective and Objective Question
  - **Guidelines** - General University Test Guidelines
- **Teacher Assessment**
  - **No. of Teacher Assessment** - **3**
  - **1. Special Quiz (5 marks)** - 5 Objective Type Questions of 1 marks each and will be conducted in class.
  - **2. Assignment (10 marks)** - At least 10 Questions out of 20 of 1 mark each should be solved by students.
  - **3. Class Notes (5 marks)** - Class Notes of Student will be submitted till 14th week of the semester and checked (parameter Content & clearness etc.) by subject teacher.

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