East West Institute of Technology

(Affiliated to Visvesvaraya Technological University, Belagavi)

**Bengaluru-91**

Department of Computer Science & Engineering

**(2023-24 Even Semester)**

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| **CourseName:AUTOMATATHEORYANDCOMPILERDESIGN** | | **Semester : V AI & ML** |
| **Course Code: BSC21CS51** | | **Assignment: 2** |
| Course Outcomes:After studying this course, students will be able to: | | |
| BSC21CS51.1 | Acquire fundamental understanding of the core concepts in automata theory and Theory ofComputation | |
| BSC21CS51.3 | Designanddeveloplexicalanalyzers,parsersandcodegenerators | |
| BSC21CS51.3 | Design Grammars and Automata (recognizers) for different language classes and becomeknowledgeableaboutrestrictedmodelsofComputation(Regular,ContextFree)andtheirrelativepowers. | |
| BSC21CS51.4 | Acquire fundamental understanding of the structure of a Compiler and Apply conceptsautomatatheoryand TheoryofComputation todesignCompilers | |
| BSC21CS51.5 | Design computations models for problems in Automata theory and adaptation of such modelinthefieldofcompilers | |

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| **Sl.No** | **Questions** | **CO** | **Bloom’s**  **Level** |
| 1. | List the application of Regular Expression . | CO3 | L2 |
| 2. | Build an R E from the following Finite State Machine  1)    2)    3) | CO3 | L5 |
| 3. | 8Construct FSM for the following RE   1. (b(a U b)b)\* 2. ab(a+b) \* 3. (b U ab )\*. | CO3 | L3 |
| 4 | Apply the concept of pumping lemma for regular language and prove the language is irregular | CO3 | L3 |
| 5 | Show that the following language is not regular  1)L={WWR| W ∈(0 ,1)\* }  2)L={an bn |n>=0}  3)L={aibj|i ≠j}  4)L= {0n|n is prime }  5)L={an bl cn+l |n,l>=0} | CO3 | L3 |
| 6 | Construct the language for the following grammar   1. S → aCa   C → aCa|b   1. S →0A|ε   A→1 | CO3 | L3 |
| 7 | Obtain the grammar for the following language  1)L={an+2bm |n ≥ 0 &m>n}  2)L={0i1j| i ≠j ,i≥ 0 & j≥ 0}  3)L={W|na(w)= nb(w)}  4)Set of all palindromes over Σ=(a,b)  5)L={W| na(w) > nb(w)}  6)L={ anbmck|n+2m=k for n≥0, m≥0}  7)Set of all strings with no more than 3 a’s  8) Set of 0’s and 1’s having substring 000  9)L=(W: |W| mod3 ≠ |W| mod2} on Σ=(a,b) | CO3 | L3 |
| 8 | Define a Parse Tree . Explain the types of parse tree with example | CO4 | L1 |
| 9. | What is context free grammar ?list the 4 tuples of the below grammar  A → aA, A → abc.  S → aSa, S → bSb, S → ε  S → 00S | 11F, F → 00F | ε | CO3 | L1 |
| 10. | Consider the production X → X+X | X\*X |X| aover an alphabet {a}.Obtain leftmost derivation and rightmost derivation for the string **"a+a\*a"** and construct the parse tree for the same | CO3 | L3 |
| 11. | Demonstrate kleen’s theorem with an example | CO3 | L2 |
| 12. | Examine and Eliminate the left recursion for the following  1) A → ABd / Aa / a  B → Be / b  2) E → E + E / E x E / a  3)E→E+T|E-T|T  T→T\*F|T/F|F  F→id  4)S →Aa|b  A→ Ac| Aad| bd| ε  5) S → (L) / a  L → L , S / S | CO3 | L4 |
| 13. | Examine and Eliminate the left factoring in the following  1)S→iEtS|iEtSes|a  E→b  2)S→aSSbS|aSaSb|abb|b  3)S→bSSaas|bSSaSb|bSb|a  4)A→Aab|Aa  B→b B|b | CO3 | L4 |
| 14. | What is ambiguous grammar? Demonstrate with an example | CO3 | L2 |
| 15. | List and explain theRoleoftheLexicalAnalyzer and the need for differentiating lexical analysis and parser | CO4 | L4 |
| 16. | Define the following with an example  1)Lexeme  2)Token  3)Pattern  4)yield of parse tree | CO4 | L1 |
| 17. | Explain the concept of input buffering | CO4 |  |
| 18. | Construct a transition diagram for the following  1)Relational Operator  2)Unsigned Number | CO4 | L3 |

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| **Faculty Incharge** | **Course Coordinator** | **Head of the Department** |
| Prof. Nalini B M  Prof. Shashikala A B | Prof. Shashikala A B | Dr. Achyutha Prasad N |