PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY KANURU, VIJAYAWADA

Department of Computer Science and Engineering

II B.Tech – I Semester

**20BS1303**  **Discrete Mathematical Structures**

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| --- | --- | --- | --- | --- |
| **CO** | **Statement** | **Skill** | **Blooms** | **Units** |
| **CO1** | **Understand** the fundamental concepts of Discrete Mathematical Structures | Understand | **L2** | 1,2,3,4,5 |
| **CO2** | Apply Normal forms/ Rules of Inference for solving suitable problems. | Apply | **L3** | 2 |
| **CO3** | Apply the method of Characteristic roots for solving different recurrence relations | Apply | **L3** | 3 |
| **CO4** | Analyze various graph techniques to construct a tree. | Analyze,  Individual Performance, Communication | **L4** | 4,5 |

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| **Discrete Mathematical Structures** | | |
| **Unit No.** | **Contents** | **Mapped CO** |
| I | **Mathematical Logic:** Introduction**-**Statements and Notations-Connectives(Negation,Conjunction,Disjunction)-Statement formulas and Truth Tables, Conditional and Bi-conditional, Well-Formed Formulas, Tautologies, Equivalence of Formulas, Duality Law, Tautological Implication, Functionally Complete Sets of Connectives, Other Connectives.  **Normal Forms:** Disjunctive Normal Forms (DNF), Conjunctive Normal Forms (CNF), Principal of Disjunctive Normal Forms (PDNF), Principal of Conjunctive Normal Forms (PCNF). | **CO1, CO2** |
| II | **Theory of Inference for Statement Calculus:** Validity using Truth Tables-Rules of Inference – Consistency of Premises and Indirect Method Proof.  **Predicate calculus:** Introduction to Predicates - Statement functions, Variable and Quantifiers- Predicate Formulas-Free and Bound Variables-Universe of Discourse. | **CO1, CO2** |
| III | **Recurrence Relations**-The Method of Characteristic Roots-Solutions in Inhomogeneous Recurrence Relation. | **CO1, CO3** |
| IV | **Relations and Directed Graphs**-Special Properties of Binary Relations- Equivalence Relations- Ordering Relations, Lattices, and Enumerations- Operations on Relations- Paths and Closures-Directed Graphs and Adjacency Matrices | **CO1,CO4** |
| V | **Graphs-** Basic Concepts- Isomorphism’s and Sub graphs-Trees and Their Properties - Spanning Trees-Planar Graphs-Euler's Formula- Multi-graphs and Euler Circuits-Hamiltonian Graphs- Chromatic Numbers. | **CO1, CO4** |

**CO-PO Mapping**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Contribution of Course Outcomes towards achievement of Program Outcomes** | | | | | | | | | | | | | | |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| **CO1** | √ |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO2** | √ |  |  |  |  |  |  |  |  | √ |  |  |  |  |
| **CO3** |  |  |  |  |  |  |  |  |  | √ |  |  | √ |  |
| **CO4** |  | √ |  |  |  |  |  |  | √ | √ |  |  |  |  |

**Strength of Correlation**

Distribution of marks weightage to PO’s through CO’s.

* The strength of correlation levels is based on percentage of marks distribution towards PO.

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| --- | --- | --- | --- |
| CIE | **Test** | **Test Number** | **Marks** |
| Objective Exam (10) | Objective Exam -1 | 10 |
| Objective Exam -2 | 10 |
| Assignment (5) | Assignment -1 | 5 |
| Assignment - 2 | 5 |
| Descriptive Exam (15) | Descriptive Exam - 1 | 15 |
| Descriptive Exam - 2 | 15 |

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| **CO** | **Skill** | **Blooms** | **Units** | **Assessing Tools can be used to measure CO (CIE)**  **Marks** | **Assessing Tools can be used to measure CO (SEE)**  **Marks** |
| CO1 | Understand | L2 | 1,2,3,4,5 | Objective Exam –10  Descriptive Exam-2.5 | 21 |
| CO2 | Apply, Communication | L3 | 2 | Descriptive Exam -4  Assignment – 2(1.5+0.5) | 14 |
| CO3 | Apply, Communication | L3 | 3 | Descriptive Exam –2.5  Assignment -1(0.5+0.5) | 14 |
| CO4 | Analyze,  Individual Performance, Communication | L4 | 4,5 | Descriptive Exam –6  Assignment – 2(1+0.5+0.5) | 21 |

**Strength of Correlation**

|  |  |
| --- | --- |
| **% of questions towards PO** | **Level (Weight)** |
| >=20% of total marks | 3 |
| >=10% and <20% of total marks | 2 |
| < 10% of total marks | 1 |

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| **CO** | **Skill** | **Bloom's** | **Units** | **Assessing tools can be used to measure CO (CIE) Marks** | **CIE Total** | **Assessing tools can be used to measure CO (SEE) Marks** | **Total (CIE+SEE)** | **Percentage (%)** | **Strength of Correlation** | **PO** |
| **CO1** | Understand | L2 | 1,2,3,4,5 | Objective Exam –10  Descriptive Exam-2.5 | 12.5 | 21 | 33.5 | 33.5% | 3 | PO1 |
| **CO2** | Apply,  Communication | L3 | 2 | Descriptive Exam -4  Assignment – 2(1.5+0.5) | 5.5  0.5 | 14 | 19.5  0.5 | 19.5%  0.5% | 2  1 | PO1  PO10 |
| **CO3** | Apply,  Communication | L3 | 3 | Descriptive Exam –2.5  Assignment -1(0.5+0.5) | 3  0.5 | 14 | 17  0.5 | 17.5%  0.5% | 2  1 | PSO1PO10 |
| **CO4** | Analyze,  Individual Performance, Communication | L4 | 4,5 | Descriptive Exam –6  Assignment – 2(1+0.5+0.5) | 7  0.5  0.5 | 14 | 21  0.5  0.5 | 21%  0.5%  0.5% | 3  1  1 | PO2  PO9  PO10 |

**Course Articulation Matrix:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)** | | | | | | | | | | | | | | |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| **CO1** | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **CO2** | 2 |  |  |  |  |  |  |  |  | 1 |  |  |  |  |
| **CO3** |  |  |  |  |  |  |  |  |  | 1 |  |  | 2 |  |
| **CO4** |  | 3 |  |  |  |  |  |  | 1 | 1 |  |  |  |  |
| **Average** | **2.5** | **3** |  |  |  |  |  |  | **1** | **1** |  |  | **2** |  |