Indian Institute of Information Technology, Design and Manufacturing Kancheepuram

<table>
<tr><td>Course Title</td><td>Discrete Structures for Computer Science</td><td>Course No</td><td colspan="4"></td></tr>
<tr><td rowspan="2">Department/ Specialization</td><td rowspan="2">Computer Science</td><td rowspan="2">Credits</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>3</td><td>1</td><td>0</td><td>4</td></tr>
<tr><td>Faculty proposing the course</td><td>Faculty, Department of CSE</td><td>Status</td><td colspan="2">Core ■</td><td colspan="2">Elective □</td></tr>
<tr><td>Offered for</td><td>B.Tech CSE</td><td>Type</td><td colspan="2">New ■</td><td colspan="2">Revision □</td></tr>
<tr><td>To take effect from</td><td>March 2021</td><td rowspan="2">Submitted for approval</td><td colspan="4" rowspan="2">____ Senate</td></tr>
<tr><td>Prerequisite</td><td>Nil</td></tr>
<tr><td>Learning Objectives</td><td colspan="6">This course introduces logical reasoning, inferences, and proof techniques. Relations, Functions, Counting principles are also discussed. Graph theory and various properties of graphs are also taught as part of this course.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="6">The learner would appreciate the importance of combinatorics and the various proof techniques, and in particular, in proving the correctness of algorithms. Counting principles learnt as part of the course will help the learner in counting various combinatorial objects</td></tr>
<tr><td>Course Contents (with approximate breakup of hours for lecture/ tutorial/practice)</td><td colspan="6">Mathematical Reasoning – Propositions – Predicates –First order logic – Nested quantifier – logical puzzles
(9L,3T)
Set theory – Relations between sets – Operation on sets –Inductive definition of sets - Proof techniques – Direct proof , proof by contradiction, mathematical induction(8L,3T)
Binary relation and digraphs – Special properties of relations – Composition of relations – Closure operations on relations – counting special relations (7L,3T)
Basic properties of functions – Special classes of functions – counting functions (5L,1T)
Pigenhole principle – onto functions – derangements (5L,1T)
Basic counting techniques – Finite and Infinite sets –Countable and uncountable sets–Cardinal numbers (6L,1T)
Graph Theory –Graphs – Sub graphs – Isomorphic and Homeomorphic graphs – Paths – Connectivity Bridges of Konigsberg – Labeled and Weighted Graphs – Complete, Regular and Bipartite Graphs –Planar Graphs – Coloring (5L,1T)</td></tr>
<tr><td>Essential Reading</td><td colspan="6">1. K. H. Rosen, “Discrete Mathematics and its Applications,” McGraw Hill, 6 th Edition, 2007.</td></tr>
<tr><td>Supplementary Reading</td><td colspan="6">1. D. F. Stanat and D. F. McAllister, “Discrete Mathematics in Computer Science,” Prentice Hall, 1977.
2. R. L. Graham, D. E. Knuth, and O. Patashnik, “Concrete Mathematics,” Addison Wesley, 2nd edition, 1994.
3. Busby, Kolman, and Ross, “Discrete Mathematical Structures,” PHI, 6 th Edition, 2008.
4. C. L. Liu, “Elements of Discrete Mathematics,” Tata McGraw Hill, 2nd edition, 1995.</td></tr>
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