DEPARTMENT OF COMPUTER SCIENCE
COURSE DESCRIPTION FORM

Title/Code: (COMP 302) – Algorithm Analysis

<table>
<tr><td>Course Aim and/or Objective</td><td>This course is designed to help the learner
Build up on the knowledge gained in data structures
Introduce additional types of algorithm for computer related problem solving
gain skills on how to analyze an algorithm
gain skills on how to make algorithms more time and space efficient</td></tr>
<tr><td>Course Description</td><td>Developing the skills of analysing the behaviour of algorithms. Detailed study of the basic notions of the design of algorithms and the underlying data structures. Major topics: the analysis with respect to average and worst case behaviour and correctness of algorithms for internal sorting, pattern matching on strings, graph algorithms and methods such as recursive elimination, dynamic programming and program profiling. It will also cover Complexity problem, Structure, complexity and efficiency of algorithms. Examples are taken from numerical computations.</td></tr>
<tr><td>Learning Outcomes</td><td>The learner shall be able to read and write algorithm that are space and time efficient. The learner shall be able to understand and decide appropriate algorithm for various programming problems that will be space and time efficient.</td></tr>
<tr><td>Pre-requisites:</td><td>COMP 102, MATH 211</td></tr>
<tr><td>General Description of Teaching/Learning Methods and Modes of Assessment</td><td>Lectures, Presentations by members of the class, Tutorials, Assignments, Continuous assessment tests, Lab Practical, Library, appropriate software, manual/notes

Course Assessment:
Continuous Assessment Tests:(CATs) 20%
Assignments 10%
End-of-semester examination 70%
Total 100%</td></tr>
<tr><td>Teaching facilities/Instructional materials/Equipment needed:</td><td>Computer Lab installed with necessary software
Internet Connection
Lecture Material – Whiteboard and Markers, Projector and software</td></tr>
<tr><td>Course Outline</td><td><table>
<tr><td>Week 1,2</td><td>• Introduction</td></tr>
<tr><td></td><td>• Fundamentals of Algorithmic Problem solving</td></tr>
<tr><td></td><td>• Important Problem Types</td></tr>
<tr><td>Week 3,4</td><td>• Fundamentals of the Analysis of Algorithm Efficiency</td></tr>
<tr><td>Week 5,6,7,8,9, 10</td><td>• Types of Sorting Algorithms</td></tr>
<tr><td>Week 11,12</td><td>• Greedy Technique</td></tr>
<tr><td>Week 13,14</td><td>• Dynamic Programming</td></tr>
<tr><td>Week 15</td><td>• Limitations of algorithm Power</td></tr>
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<tr><td>Main references:

Other references:</td><td>Levitin, A.(2004). Introduction to The Design and Analysis of Algorithms. Pearson Education, Inc. India.

Michael T. Goodrich and Roberto Tamassia(2010). Data Structures and Algorithm in Java. John Wiley and Sons. 1st Ed. ISBN:0-470-38326-7
Mount, D.M. (2003). Design and Analysis of Computer Algorithms.
Any Algorithm analysis text book</td></tr>
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