

University: Alexandria
Faculty: Science
Program: Computer Science

**Form no. (12)
Course Specification**

1- Course Data

Course Code: CS 307	Course Title: <i>Data and Algorithms Analysis</i>	Academic Year/Level: Third level (First semester)
Specialization: Computer Science	No. of Instructional Units: Lecture <input type="text" value="2"/> Lab <input type="text" value="1"/>	

2- Course Aim	<ul style="list-style-type: none"> • This course is designed to encourage in students a sense of interest for Data and Algorithms Analysis concept and the applications in different contexts • Provide a solid foundation in the major areas of Data and Algorithms Analysis • Provide education and training of high quality in Algorithm design
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3- Intended Learning Outcome

a- Knowledge and Understanding	<p>a1. Describe the main concepts, definitions of algorithms</p> <p>a2. Review theories and concepts used in Data and Algorithms Analysis</p> <p>a3. Identify an understanding of the contribution and impacts of Data and Algorithms Analysis in scientific, social, economic, environmental, political and cultural terms.</p> <p>a4. modeling techniques and algorithm design methods</p> <p>a5. Evaluating and designing of algorithms</p>
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b- Intellectual Skills	<p>b1. Manipulate and apply appropriate theories, principles and concepts relevant to Data and Algorithms Analysis</p> <p>b2. Critically assess and evaluate the literature within the field of Data and Algorithms Analysis</p> <p>b3 Deduce and interpret information from a variety of sources relevant Data and Algorithms Analysis</p>
c- Professional Skills	<p>c1. Plan, design and execute practical activities using techniques and procedures Appropriate to Data and Algorithms Analysis</p> <p>c2. Execute a piece of independent research using Data and Algorithms Analysis and techniques;</p>
d- General Skills	<p>d1. Develop appropriate effective written and oral communication skills relevant to the specific course of Data and Algorithms Analysis</p> <p>d2. Demonstrate the ability to work effectively as part of a group</p> <p>d3. Solve problems relevant to Data and Algorithms Analysis using ideas and techniques some of which are at the forefront of the discipline.</p> <p>d4. Solve problems relevant to applications in real life in computer science using old and new algorithms some of which are at the forefront of the discipline;</p>
4- Course Content	<ul style="list-style-type: none"> • Problems, Complexity, Analysis; • Asymptotics, Recurrences; • The master method, Hashing, • Dynamic programming, • Greedy algorithms, • Depth-1st search; • Strongly, Connected components, • Minimum spanning trees, • Prim's and kruskal's algorithms, • Single-source shortest paths; • Bellman-ford, Dijkstra, • All-pairs shortest paths; • Floyd-warshall, • Polynomial time and NP-completeness, • Proving problems NP-complete, • Approximation algorithms, String matching

5- Teaching and Learning Methods	Lecturers – Home works - Oral discussion - Quizzes
6- Teaching and Learning Methods for Students with Special Needs	NONE
7- Student Assessment:	
a- Procedures used:	Lecturers – tutorials- homework – oral discussion - Quizzes
b- Schedule:	Mid-Term exam... Week 10 Final exam Week 17
c- Weighing of Assessment:	Term work (exam + home works) 20% Oral exam 10% Final exam 70%
8- List of References:	An Introduction to the Analysis of Algorithms [Paperback] Robert Sedgewick , Philippe Flajolet
a- Course Notes	Course notes provided by the Faculty member of Computer Science Division, Math department, to be handled at the beginning of the semester.

b- Required Books (Textbooks)	Algorithms, Robert Sedgewick, Kevin Wayne
c- Recommended Books	Analysis of Algorithms, Jeffrey McConnell
d- Periodicals, Web Sites, ..., etc.	

Course Instructor: Dr. Yasser Fouad

Head of Department: Prof. Dr. Mahmoud El-Alem.

Date: 1/9/2012