

**Jerash University**

**Faculty of Computer Science and Information Technology**

**Computer Sciences Department**

**Semester**: Fall Semester 2018/2019

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| **Course symbol and number: 1001223** | **Course Name: تحليل وتصميم الخوارزميات** |
| **Teaching Language:** English | **Prerequisites:** 1001220 |
| **Credits:** 3 hours**.** | **Course Level:** 100 |

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| **Course Description** |
| This course is an introductory undergraduate course on the design and analysis of algorithms. The goal is to introduce a number of important algorithm design techniques as well as basic algorithms that are interesting both from a theoretical and also practical point of view. We will cover basic algorithm design techniques such as divide-and-conquer, dynamic programming, and greedy techniques for optimization. We will cover asymptotic analysis of algorithm time bounds by the solution of recurrence equations. We will apply these design and analysis techniques to derived algorithms for a variety of tasks such as sorting, searching, and graph problems. |

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| **Course Objectives** |
| · Students will know the meaning of algorithms and their different applications in computers.  · He can know time complexity of algorithms and the difference from space complexity.  · Measure the efficiency of different algorithms.  · Being able to distinguish between different algorithms using Big-O, Omega, and Theta notations.  · Design and analyze various sorting algorithms: insertion, merges, quick, and heap sort.  · Design and analyze two graph searching algorithms: breadth-first and depth-first search. |

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| **Learning Outcomes** |
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|  | **Text Book(s)** |
| **Title** | Introduction to Algorithms |
| **Author(s)** | Thmas H.Cormen |
| **Publisher** |  |
| **Year** | 2002 |
| **Edition** |  |

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|  | **References** |
| **Books** |  |
| **Internet links** | http://www.jpu.edu.jo/lms |
| **Course link** | [Click here](http://www.jpu.edu.jo/lms) |

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|  | **Instructors** |
| **Instructor** |  |
| **Office Location** |  |
| **Office Phone** |  |
| **E-mail** |  |

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| **Topics Covered** | | | |
| Topics | **Chapters in Text** | **Week number** | **Teaching hours** |
| Introduction | Chp.1 | 1 |  |
| Basic Concepts in Algorithmic Analysis | Chp.1 | 2,3 |  |
| Recurrences | Chp. 2 | 4 |  |
| Sorting | Chp.3 | 5,6 |  |
| Divide and Conquer | Chp.4 | 7,8,9 |  |
| Graph Traversals and Application | Chp.5 | 10,11 |  |
| Dynamic Programming | Chp.6 | 12 |  |
| Greedy Algorithms | Chp.7 | 13, 14 |  |
| File Compression | Chp.7 | 15,16 | 2 |

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|  | **Evaluation** |  |
| **Assessment Tool** | **Expected Due Date** | **Weight** |
| Programming assignments and LMS |  | 20 % |
| First Exam |  | 20 % |
| Second Exam |  | 20 % |
| Final Exam | According to the University final examination schedule | 40 % |

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|  | **Policy** |
| **Attendance** | Attendance is very important for the course. In accordance with university policy, students missing more than the allowed absence rate of total classes are subject to failure. Penalties may be assessed without regard to the student's performance. Attendance will be recorded at the beginning or end of each class. |
| **Exams** | All exams will be CLOSE-BOOK; necessary algorithms/equations/relations will be supplied as convenient. |

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| **Class Schedule & Room** |

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| **Office Hours** | | |
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|  | \* Or by an appointment through email |  |

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|  | **Teaching Assistant** |
| To announced later on. |  |

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|  | **Prerequisites** |
| **Prerequisites by course** | 1001220 |