Arab Academy for Science and Technology & Maritime Transport

University/Academy: Arab Academy for Science and Technology & Maritime Transport
Faculty/Institute: College of Computing and Information Technology
Program: Computer Science

Form No. (12)
Course Specification

1- Course Data

Course Code:	Course Title:	Academic Year/Level:
CS403	Optimization Techniques	Year 4 / Semester 8
Specialization: Computer Science	**No. of Instructional Units:** 2 hrs lecture 2 hrs lab	**Lecture:**

2- Course Aim	Solution of Ordinary differential equations, Optimization Models in Operations Research Linear and Non-linear models, Simplex Search for Linear Programming, Duality and Sensitivity in Linear Programming, Multi-objective Optimization and Goal Programming, Unconstrained Nonlinear Programming, Selected Methods for Constrained Nonlinear Programming : Lagrange Multiplier Methods and Penalty and Barrier Methods.
3- Intended Learning Outcome:	
a- Knowledge and Understanding	**Students will be able to demonstrate knowledge of:** K16. Know and understand the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases and computer graphics. K19. Select advanced topics to provide a deeper understanding of some aspects of the subject, such as hardware systems design, object-oriented analysis and design, and artificial intelligence, and parallel and concurrent computing.
b- Intellectual Skills	**By the end of the course, the student acquires high skills and an ability to understand:** I10. Define traditional and nontraditional problems, set goals towards solving them, and. observe results. I11. Perform comparisons between (algorithms, methods, techniques...etc). I13. Identify attributes, components, relationships, patterns, main ideas, and errors. I19. Generate an innovative design to solve a problem containing a range of commercial and industrial constraints.

c- Professional Skills	**By the end of the course the student will have the ability to:** **. P11.** Perform independent information acquisition and management, using the scientific literature and Web sources. **P15.** Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem. **P19.** Deploy effectively the tools used for the construction and documentation of software, with particular emphasis on understanding the whole process involved in using computers to solve practical problems.
d- General Skills	**Students will be able to:** **G1.** Demonstrate the ability to make use of a range of learning resources and to manage one's own learning. G7. Show the use of general computing facilities.
4- Course Content	Introduction and Class Organization Concepts of Operations Research Modeling Concepts of Optimization Search Linear Programming Algorithms Modeling with Linear Programming **Linear Programming Duality and Output Analysis** Linear Programming Duality and Output Analysis Shortest Paths and Dynamic Programming Network Flows Discrete Optimization
5- Teaching and Learning Methods	Lectures, Labs, Projects, Individual study & self-learning.
6- Teaching and Learning Methods for Students with Special Needs	• Students with special needs are requested to contact the college representative for special needs (currently Dr Hoda Mamdouh in room C504) • Consulting with lecturer during office hours. • Consulting with teaching assistant during office hours. • Private Sessions for redelivering the lecture contents. • For handicapped accessibility, please refer to program specification.
7- Student Assessment:	
a- Procedures used:	Exams and Individual Projects
b- Schedule:	Week 7 exam Projects through the semester Week 16Final exam
c- Weighing of Assessment:	7th week exam 30% 12th week exam 20% Lab work 10% Final exam 40%

8- List of References:	
a- Course Notes	From the Moodle on www.aast.edu
b- Required Books (Textbooks)	Ronald L. Rardin, *Optimization in Operations Research*, Prentice Hall, 1998.
c- Recommended Books	
d- Periodicals, Web Sites, …, etc.	

Course Instructor: Head of Department:

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