FUTURE UNIVERSITY IN EGYPT
جامعة المستقبل

Faculty of Computers and Information Technology

Operations Research

Information :

Course Code :	IS333	**Level :**	Undergraduate	**Course Hours :**	3.00- Hours

Department : Department of Information Systems

Instructor Information :

Title	Name	Office hours
Lecturer	Samah Ahmed Zaki Hassan	1
Teaching Assistant	Salma Essam Eldin Ali Mohamed Mohamed Yassin	

Area Of Study :

Apply the basic concepts and theories of deterministic models in operations research
Use basic mathematics to solve mathematical models that represent real-world problems such as transportation, network, integer, and non-linear models.
Analyze the requirements of deterministic models and design a solution for these requirements
Compare, evaluate and select methodologies to optimize the objective functions using linear programming by learning the simplex algorithm
Use effectively communication skills.

Description :

Operations Research (also called Management Science) is the study of scientific approaches to decision-making. Through mathematical modeling, it seeks to design, improve and operate complex systems in the best possible way. The mathematical tools used for the solution of such models are either deterministic or stochastic, depending on the nature of the system modeled. The course focuses on basic deterministic models and methods in Operations Research as well as stochastic models. In addition, the course will learn very powerful modeling and solution techniques for decision-making problems that are used today by many successful companies to help them save/earn millions of dollars. The module covers topics that include: linear programming, transportation, assignment, game theory, dynamic programming and integer programming, and CPM/ MSPT techniques. Analytic techniques and computer packages will be used to solve problems facing business managers in decision environments

Course outcomes :

a.Knowledge and Understanding: :	
1 -	Define fundamental concepts and theories related to operations research
2 -	Identify the fundamental mathematics required to solve deterministic models
3 -	Discuss the fundamental topics of formulating and solving common optimization problems
b.Intellectual Skills: :	
1 -	Analyze the theoretical workings of the simplex method for linear programming and perform iterations of it by hand
2 -	. Propose a set of alternative solutions for linear programming problems
3 -	Evaluate and verify different applications and challenges in integer programming, single- and multiple-variable unconstrained and constrained non-linear optimization problems

c.Professional and Practical Skills: :	
1 -	Run LINDO package/an appropriate programming language for operation research models.
2 -	Use different computing technologies to simple practical cases such as Win QSB, TORA, and spreadsheets software
3 -	. Illustrate systems in terms of general quality attributes and possible tradeoffs presented within the given problem
d.General and Transferable Skills: :	
1 -	Work on a team for the development of a requirements document
2 -	Apply communications skills in presentation and report writing of requirements engineering deliverables

ABET Course outcomes :	
1 -	Demonstrate adequate understanding of the basic concepts and theories of deterministic models in operations research
2 -	Use basic mathematics to solve mathematical models that represent real-world problems such as transportation, network, integer, and non-linear models
3 -	Analyze the requirements of deterministic models and design a solution for these requirements
4 -	Compare, evaluate, and select methodologies to optimize the objective functions using linear programming by learning the simplex algorithm

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Linear programming: Formulations and graphical solution (P1)	4	2	2
Linear programming: Formulations and graphical solution (P2)	4	2	2
Algebraic solution: the simplex method (P1)	4	2	2
Algebraic solution: the simplex method (P2)	4	2	2
Duel- simplex method	4	2	2
Sensitivity analysis, transporting and assignment problems.	4	2	2
Integer linear programming: Cutting-plan algorithms	4	2	2
Branch and bound method.	4	2	2
Mid-Term Exam	2		
Dynamic programming: Models and computations,	4	2	2
Solution of Linear programs by dynamic programs (P1)	4	2	2
Solution of Linear programs by dynamic programs (P2)	4	2	2
Project scheduling by PERT-CPM	4	2	2
Final Exam	2		

Teaching And Learning Methodologies :
Interactive Lectures including Discussions
Practical Lab Sessions
Self-Study (Project / Reading Materials / Online Material / Presentations)
Case Studies

Problem Solving

Course Assessment :

Methods of assessment	Relative weight %	Week No	Assess What
Assignments	5.00	4	
Final Exam	40.00	14	
Midterm Exam(s)	30.00	9	
Practical Exam	10.00	12	
Quizzes	5.00	5	
Team Work Projects	5.00	11	

Course Notes :

An Electronic form of the Course Notes and all the slides of the Lectures is available on the Students Learning Management System (Moodle)

Web Sites :

LINDO Systems, Inc.
www.lindo.com
European Journal of Operational Research - Elsevier
https://www.journals.elsevier.com/european-journal-of-operational-research/