

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

Course name	Operational Research (1)
Course number	ITIS3304
Faculty	
Department	
Course type	Major Needs
Course level	3
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

1 - Providing balanced coverage of the theory, applications, and computations of operations research
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Intended Learning Outcomes

Knowledge and Understanding	<ul style="list-style-type: none"> <li>* a1- Knowledge of informal and formal modeling skills</li> <li>* a2- Knowledge of the different models and algorithms used in operations research</li> <li>* a3- Understand and appreciate the capabilities and limitations of deterministic models in operations research</li> </ul>
Intellectual Skills	<ul style="list-style-type: none"> <li>* b1- Build, analyze, and reason logically with mathematical models</li> <li>* b2- Propose and integrate with large-scale models</li> <li>* b3- Integrate skills to design and analyze algorithms, and to distinguish good algorithms from not-so good ones</li> </ul>
Professional Skills	<ul style="list-style-type: none"> <li>* c1- Inject knowledge of the varied applications of operations research</li> <li>* c2- Problem solving skills using appropriate modeling techniques</li> </ul>
General Skill	<ul style="list-style-type: none"> <li>* d1- Presenting knowledge of various modeling methods in different settings and applications and present them</li> </ul>

Course Contents

<ol style="list-style-type: none"> <li>1 - Linear programming, deals with problems of minimizing or maximizing a linear function in the presence of linear equality and/or inequality constraints</li> <li>2 - Transportation problem, were the cost of transporting goods from one place to another is minimized</li> <li>3 - Assignment problem, were a number of jobs are assigned to a number of machines to minimize the cost and maximizing the benefits</li> <li>4 - Theory of decision making, a decision is made under different state of natures</li> <li>5 - Queuing theory, were the queue is analyzed to maximize the benefits</li> <li>6 - Game theory, were the best strategy is found between 2 players in a zero sum game</li> <li>7 - Network flow analysis, were the cost is minimized</li> </ol>
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## Teaching and Learning Methods

- 1 - Lectures
- 2 - Practical Exercises
- 3 - Projects

## Students Assessment

<u>Assessment Method</u>	<u>TIME</u>	<u>MARKS</u>
Mid-term exam I	6th week	20
Mid-term exam II	12th week	20
Projects	During the 16 weeks	10
Final Exam	16th week	50

## Books and References

Course note	Lectures Notes
Essential books	: Taha, H. A., Operations Research: An Introduction, 9/E. University of Arkansas. Prentice Hall, 2007.

## Knowledge and Skills Matrix

Main Course Contents	Study Week	Knowledge and Understanding	Intellectual Skills	Professional Skills	General Skill
Linear programming, deals with problems of minimizing or maximizing a linear function in the presence of linear equality and/or inequality constraints	1-3	a1,a2	b1	c1	d1
Transportation problem, were the cost of transporting goods from one place to another is minimized	4-5	a2,a3	b2	c2	d1
Assignment problem, were a number of jobs are assigned to a number of machines to minimize the cost and maximizing the benefits	6-7	a3	b1,b3	c2	d1
Theory of decision making, a decision is made under different state of natures	8-9	a1	b3	c2	d1
Queuing theory, were the queue is analyzed to maximize the benefits	10-11	a2	b1-b3	c1	d1
Game theory, were the best strategy is found between 2 players in a zero sum game	12-13	a2	b2-b3	c2	d1
Network flow analysis, were the cost is minimized	14-15	a1-a3	b1-b2	c1-c2	d1