DEPARTMENT OF INDUSTRIAL ENGINEERING
COURSE SYLLABUS

COURSE TITLE	*ENGLISH CODE/NO*	*ARABIC CODE/NO.*	*CREDITS*			
			Th.	*Pr.*	*Tr.*	*Total*
Operations Research II	**IE 411**	هـ ص ٤١١	3	2	-	3
Pre-requisites:	IE 311, IE 332					
Course Role in Curriculum	*Required or Elective:*		Required Core Course			
Catalogue Description: Non-linear programming. Dynamic programming. Inventory models. Waiting line models. Markov analysis. Introduction to Game theory. Applications in industrial, service and public systems.						

***Textbooks*:**
Quantitative Analysis for Management, Barry Render, Ralph M. Stair (Jr) and Michael Henna, Prentice Hall International Inc., 10th Edition (2006)

***Supplemental Materials*:**

1. Operations Research: Hamdy A. Taha., John Wiley & Sons, Inc., 7th Edition, 2002
2. Introduction to Operations Research, Hillier, F.S., and Lieberman, G.J., McGraw Hill Company, 8th Edition, 2004

***Course Learning Outcomes*:**
By the completion of the course the student should be able to:

1. List the knowledge of analytical techniques of OR-II
2. Explain the basic principles and techniques of OR-II
3. Formulate, solve, analyze and evaluate the NLP problems, their applications
4. Formulate, solve, analyze and evaluate the waiting line model & its problems
5. Formulate, solve, analyze and evaluate the dynamic programming and its applications
6. Formulate, solve, analyze & evaluate Inventory models and their problems
7. Formulate, solve, analyze and evaluate Markov Series and their applications
8. Formulate, solve, analyze, Game theory problems
9. Select formulate analyze, & solve real life problems for Term project within team
10. Realize the computer software applications and solve different OR-II problems

	Topics to be Covered:	***Duration in Weeks***
1	Non-linear Programming; graphical illustration, concave and convex functions, unconstraint optimization	2
2	Waiting Lines and Queuing Theory Models: characteristics of models. single, multi-channel models, constant service time model, finite population model	3
3	Dynamic Programming; shortest route problem by DP, terminology, notations, knapsack problem, air transportation service problem, resource allocation problems, distribution of effort problem	3
4	Inventory models, elements of inventory control, inventory control systems, economic order quantity models, quantity discounts, reorder point, order quantity for a periodic inventory system	3
5	Markov Analysis: introduction, states & state probabilities, transition matrix, predicting future market share, equilibrium conditions, absorbing states & the fundamental matrix	2
6	Game theory: language of games, the minimax criterion, pure strategy games, mixed strategy games, dominance.	3

Student Outcomes addressed by the course: (Put a √ sign)

(a)	an ability to apply knowledge of mathematics, science, and engineering	√
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	√
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	√

Key Student Outcomes assessed in the course: (a) (e) and (k)

Instructor or course coordinator: Dr. Osman Taylan
Last updated: February 2015