The University of Jordan
Faculty of Engineering and Technology
1ST Semester 2014/2015

Course Title:	Operations Research- II (OR2)
Learning/Teaching Methods:	Lecture/Problem solving sessions.
	Case studies.
	Homeworks
	Reading assignments.
Assessment Methods:	Quizzes, Home works, and Short project : 20%
	Midterm Exam : 30%
	Final exam : 50%
Providing Department:	Industrial Engineering
Instructor:	Prof. Dr. Mohammad D. AL-Tahat
Phone:	22930
Email:	altahat@ju.edu.jo
Class time:	Mo., We. : 11:00-12:30
Cl ss Place:	IE. 101
Office Hours:	Mo., We. :12:30 – 02:30 pm

Course Description:
Probabilistic and stochastic models used in industrial engineering systems: Markov processes, stochastic processes, queuing and their applications. Discrete and continuous processes. (As per 2005-2006 plan catalog description).

Course Prerequisite: Operations Research- I (OR 1) (0906353)

Course Objectives/ Student Learning Outcomes:
1. Identify and classify general operations research models [SLO10]
2. Formulate operations research models [SLO5]
3. Recognize terminology that is often used to describe queues as well as stochastic process. [SLO10]
4. Classify different types of queues [SLO5]
5. Realize mathematics of solving and analyzing queues [SLO1, SLO5, IE2, IE3]
6. Establish measures of performance for queuing models [SLO2, SLO5]
7. Recognize what is stochastic model, what is Continuous Time Markov Chains (CTMCs) and what is Discrete Time Markov Chains (DTMCs) [SLO5]
8. Become conscious with mathematics of analyzing Continuous Time Markov Chains (CTMCs) as well as Discrete Time Markov Chains (DTMCs): [SLO1]
9. Adopt engineering Knowledge gained from this course to solve real life problems. [IE2, IE3]

Text Books and References:
1. Instructor's notes
2. Paul A. Jenson and Jonathan F. Bard. Operations Research Models and Methods. John Wiley & Sons. ISBN 0-471- 38004-0.
3. Hamdy A. Taha. Operations Research: An introduction. Prentice hall, 9th edition..

General Class Policies:

Grading:

		Percentage
1	Quizzes, Home works, and Short project	20%
2	Midterm Exam	30%
3	Final Examination, Comprehensive	50%
	Total	100%

Tentative course outline

Chapter/Part	Topics
1	General and brief introduction to model and methods of operations research.
2	Models and methods of Integer programming: applications, models, methods, Traveling Salesperson TSP Problem, Nearest-Neighbor Heuristic, Sub-tour Reversal Heuristic, Branch and Bound algorithm, Cutting plane algorithm.
3	Queuing Theory: Why queues form, elements of queue, role of exponential and Poisson distributions, generalized queuing model. Specialized Poisson queues: steady state measures of performance, single and multiple servers' models, limited and unlimited queuing models. Applications
4	Stochastic process: Definitions, Components and mathematics.
5	Continuous Time Markov Chains (CTMCs): examples, Poisson process, rate network and rate matrix R, transition probability state vector, transient and steady state solutions, analysis of CTMCs based on DTMC S approximation
6	Discrete Time Markov Chains (DTMCs): examples, Transition network and transition matrix P, Absorbing and transient states and probabilities, Multi step transition probabilities, transition probabilities vectors, first passage probabilities

Important Notes:
   a. Do not hesitate to ask questions on any material you do not fully understand
   b. Students are required to bring a notebook and take notes in all classes.
   c. Students are expected to attend every class session and they are responsible for all material, announcements, schedule changes, etc., discussed in class.
   d. Discuss the assignments among yourselves. This is helpful to the learning process.
   e. Don't Cheat; direct copying of others work will NOT be allowed or tolerated and will result in a reduction of grade. If you are found to be cheating in any way, on an exam or assignment, even signing the roll sheet for another student, you will be given an "F" for the course. There will be no exceptions.
   f. All cases of academic dishonesty will be handled in accordance with university policies and regulations. JU policy requires the faculty member to assign ZERO grade (F) if a student misses 15% of the classes that are not excused, and 20% of the classes that are excused
   g. There will be a number of homeworks and unannounced quizzes during the semester. Students are expected to be ready to take a quiz any time they have a class. There will be no make-up quizzes or home works.
   h. Any students with disabilities who need accommodations in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements for these accommodations.