Industrial Engineering Program

1. COURSE NUMBER AND NAME	**IE 440 – Stochastic Models in Operations Research**
2. CREDITS AND CONTACT HOURS	3 Credits. 3 Contact Hours
3. COURSE INSTRUCTOR	Layek Abdel-Malek
4. TEXT BOOK	Winston, W. L., Operations Research: Applications and Algorithms, 4th Ed., Thomson Learning, 2004
4A. OTHER MATERIAL	
5A. CATALOG DESCRIPTION	Probabilistic techniques of operations research. Topics include the applications of Markov chains, queueing and inventory control models to analyze and evaluate systems performance.
5B. PREREQUISITES	IE 331, Math 222 or equivalent.
5C. REQUIRED, ELECTIVE OR SELECTED ELECTIVE	Required
6A. SPECIFIC OUTCOMES OF INSTRUCTION	The students will: 1 Be able to identify and include randomness in system design (a) 2 Be able to solve Markov chain problems (k). 3 Be able to solve queueing problems (k). 4 Be able to solve inventory problems (k). 5 Be able to incorporate economic aspects in queueing and inventory problems (c). 6 Be able to incorporate variability in the decision making process (a, k).
6B. CRITERION 3 OUTCOMES ADDRESSED	The mapping of the six (6) outcomes of instruction of item 6A to the Criterion 3 outcomes (a-k) is as follows: 1. Satisfies Criterion 3 outcome a. 2. Satisfies Criterion 3 outcome k. 3. Satisfies Criterion 3 outcome k. 4. Satisfies Criterion 3 outcome k. 5. Satisfies Criterion 3 outcome c. 6. Satisfies Criterion 3 outcomes a and k,
7. TOPICS COVERED	1. Introduction to stochastic processes, review of probability 2. Markov chains and classification of their states

	3. Long-run Markov chains and applications
	4. Introduction to queueing theory, birth and death process
	5. M/M/1/∞ system, M/M/C systaems
	6. Applications of queueing theory
	7. Introduction to inventory theory,components of inventory models
	8. Deterministic inventory models
	9. Stochastic inventory models
	10. Introduction to forecasting