Industrial Engineering Program

1. COURSE NUMBER AND NAME	**IE 445 – Industrial Simulation**
2. CREDITS AND CONTACT HOURS	3 Credits. 4 Contact Hours
3. COURSE INSTRUCTOR	Golgen Bengu
4. TEXT BOOK	Kelton, W. D., Sadowski, R. P., Sadowski, D. A., Simulation with Arena, 1st Ed., 1998
4A. OTHER MATERIAL	
5A. CATALOG DESCRIPTION	Introduction to the application of simulation modeling for the analysis of complex industrial and manufacturing service systems. Examples are chosen from real-life situations such as warehousing, material handling, robotics, transportation, and hospital emergency rooms. Verification/validation as well as statistical analysis of both input/output data are introduced.
5B. PREREQUISITES	CS 101, IE 331 or equivalent.
5C. REQUIRED, ELECTIVE OR SELECTED ELECTIVE	Required
6A. SPECIFIC OUTCOMES OF INSTRUCTION	The students will: 1 Learn to build discrete event simulation models (e, k). 2 Be able to use statistics to experiment with alternative models for the analysis and solution of real-life problems (a, b and c). 3 Work in teams to execute a project and present their results (c, d, g).
6B. CRITERION 3 OUTCOMES ADDRESSED	The mapping of the three (3) outcomes of instruction of item 6A to the Criterion 3 outcomes (a-k) is as follows: 1. Satisfies Criterion 3 outcomes e and k. 2. Satisfies Criterion 3 outcomes a, b and c. 3. Satisfies Criterion 3 outcomes c, d and g.
7. TOPICS COVERED	1. Verification and validation, calibration of models, face validity 2. Validity of assumptions, Turing/Delphi test 3. Comparison and evaluation of alternative systems 4. Simulation examples, queueing systems, inventory systems 5. Programming languages 6. High level simulation languages. 7. Object oriented programming 8. Arena simulation software 9. Random number generation 10. Input modeling

	11. Output analysis, confidence intervals, variance reduction