

Industrial Engineering Program

1. COURSE NUMBER AND NAME	IE 439 – Deterministic Models in Operations Research
2. CREDITS AND CONTACT HOURS	3 Credits. 3 Contact Hours
3. COURSE INSTRUCTOR	Wengbo (Selina) Cai
4. TEXT BOOK	Hillier & Liebermann, Introduction to Operations Research, 8 th Ed. McGraw-Hill
4A. OTHER MATERIAL	
5A. CATALOG DESCRIPTION	The deterministic techniques of operations research. Topics include the applications of linear, nonlinear, integer, and dynamic programming methods and network flows analysis to solve industrial and systems engineering problems.
5B. PREREQUISITES	Math 222 or equivalent.
5C. REQUIRED, ELECTIVE OR SELECTED ELECTIVE	Required
6A. SPECIFIC OUTCOMES OF INSTRUCTION	The students will: 1 Identify the appropriate analytical tool to solve a real world optimization problem (a). 2 Solve LP, IP, DP and network problems (k). 3 Learn the difficulties associated with large scale optimization (i, j)
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 outcome a. 2. Satisfies Criterion 3 outcome k. 3. Satisfies Criterion 3 outcomes i and j.
7. TOPICS COVERED	1. Introduction and overview of deterministic models 2. Preliminaries of linear programming and its formulation 3. Graphical solution of LP and introduction to simplex method 4. The big M method. The dual problem. 5. Sensitivity analysis, marginal utility 6. Computer applications and LP packages 7. Transportation and assignment problems

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| | <ol style="list-style-type: none">8. Network and graph theory introduction, spanning trees9. Shortest route algorithm, Kijkstra's algorithm10. Formulation of shortest path as LP11. Maximum flow algorithms12. Nonlinear programming, classical optimization13. Integer programming introduction14. Gomory's cutting plane15. Branch and bound method. Complete methods16. Dynamic programming, recursive relationship of DP |
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