COURSE NUMBER: IE 3012	COURSE TITLE: Optimization II
TERMS OFFERED: Spring	**PREREQUISITES:**
TEXTBOOKS/REQUIRED MATERIAL: Rangarajan K. Sundaram, *A First Course in Optimization Theory*, Cambridge University Press, 1996.	**PREPARED BY:** Shuzhong Zhang **DATE OF PREPARATION:** October 21, 2011
COURSE LEADER(S):	**CLASS/LABORATORY SCHEDULE:** **CONTRIBUTION OF COURSE TO MEETING PROFESSIONAL OBJECTIVES:**
CATALOG DESCRIPTION: Nonlinear programming, convexity, gradient method, constrained optimization, Lagrangian function, the KKT condition, duality theory, dynamic optimization.	**COURSE TOPICS:** 1. Optimality conditions for unconstrained optimization; 2. Gradient method; 3. The KKT optimality condition for constrained optimization; 4. Concept of dynamic optimization; 5. Applications of nonlinear optimization.
COURSE OBJECTIVES	1. To help students understand the optimality conditions for an optimization model; 2. To train students to use Excel and Matlab to solve linear and quadratic optimization models; 3. To introduce students basic solution methods, such as the gradient method for nonlinear optimization, and the dynamic optimization principle; 4. To get students acquainted with the modeling power of nonlinear programming to solve practical problems.

COURSE OUTCOMES	1. Students learn to solve engineering design problems by optimization models. 2. Students learn the basic solution techniques, such as the gradient method, the KKT optimality conditions, and the dynamic programming principle; 3. Students learn to use Excel and Matlab to solve optimization models. 4. Students learn to interpret the solutions, and communicate their findings in a scientific manner.
ASSESSMENT TOOLS:	1. 1 midterm examination and a final examination. 2. Biweekly assignments.