Operations Research

OPRE 6250 Global Supply Chain Management (2 semester hours) Executive Education Course. This course addresses the design and management of global supply chain including international sourcing, integration of suppliers and distribution channels. Prerequisite: OPRE 6201 or OPRE 6302 or consent of instructor. (2-0) Y

OPRE 6271 Project Overview, Strategic and Process Management (2 semester hours) Introduces the project lifecycle, typical project management processes, leadership and teaming in project management, the relevance of business process analysis, strategic alignment of projects, and financial considerations in project selection. (2-0) R

OPRE 6301 (SYSM 6303) Quantitative Introduction to Risk and Uncertainty in Business (3 semester hours) Introduction to statistical and probabilistic methods and theory applicable to situations faced by managers. Topics include: data presentation and summarization, regression analysis, fundamental probability theory and random variables, introductory decision analysis, estimation, confidence intervals, hypothesis testing, and One Way ANOVA (Some sections of this class may require a laptop computer). (3-0) S

OPRE 6302 Operations Management (3 semester hours) Operations Management integrates all of the activities and processes that are necessary to provide products and services. This course overviews methods and models that help managers make better operating decisions over time. How these methods will allow firms to operate both manufacturing and service facilities in order to compete in a global environment will also be discussed. Prerequisite: OPRE 6301 (3-0) S

OPRE 6303 Quantitative Foundations of Business (3 semester hours) This course discusses the applications of some basic mathematical concepts necessary for the business environment. Students are introduced to selected topics, including those in college algebra, matrix algebra, calculus, and optimization, and their usage in the context of managerial decision-making. MS Excel is used to illustrate and understand the core concepts. (3-0) S

OPRE 6311 Game Theory (3 semester hours) Two person zero-sum and nonzero-sum games; Nash equilibrium; use of LP and Complementarity, N-person games; core, nucleolus, stable sets, etc. Applications to market equilibrium problems. (3-0) R

OPRE 6325 (HMGT 6325) Healthcare Operations Management (3 semester hours) Explores how effectively managing and continuously improving the end-to-end health care supply chain provides a competitive advantage. Topics include supply chain fundamentals, key players in the health care supply chain and their challenges, how the health care supply chain works, impact of technology on supply chain performance, and lean six sigma methodology. Simulations and case studies will reinforce the learning. (3-0) T

OPRE 6332 Spreadsheet Modeling and Analytics (3 semester hours) This course explains the concepts of effective spreadsheet design and model building utilizing the electronic spreadsheet as the principal device. The course helps students to take an analytic view and acquire knowledge about specific decision making techniques for business, such as optimization and simulation, building spreadsheet models to identify choices, formalize trade-offs, specify constraints, perform sensitivity analyses, and analyze the
impact of uncertainty. The course also examines the applications in finance, economics, marketing, and operations. (3-0) S

**OPRE 6335 (SYSM 6304)** Risk and Decision Analysis (3 semester hours) This course provides an overview of the main concepts and methods of risk assessment, risk management, and decision analysis. The methods used in industry, such as probabilistic risk assessment, six sigma, and reliability, are discussed. Advanced methods from economics and finance (decision optimization and portfolio analysis) are presented. Prerequisite: **SYSM 6303** or **OPRE 6301**. (3-0) T

**OPRE 6340 (MECH 6335)** Flexible Manufacturing Strategies (3 semester hours) The use of automation in manufacturing is continuously increasing. This course covers the variety of types of flexible automation, including flexible manufacturing systems, integrated circuit fabrication and assembly, and robotics. Examples of international systems are discussed to show the wide variety of systems designs and problems. Strategic as well as economic justification issues are covered. (3-0) R

**OPRE 6360** Operations Strategy (3 semester hours) This course provides an overview of the key concepts that comprise manufacturing and service strategy. It assumes, in broad terms, overall corporate or business unit strategy as an input and focuses on building distinctive competencies within manufacturing and services. It deals specifically with resource allocation and reallocation - relating and combining corporate strategy, manufacturing strategy and service strategy. (3-0) T

**OPRE 6361** Production Planning and Control (3 semester hours) Analysis of the production system of a manufacturing organization. Classical modeling and decision methods including simulation methods for stochastic models and exact and heuristic solutions of deterministic models. Material Requirement Planning systems and Flexible Manufacturing systems. Prerequisite: **OPRE 6302** or consent of the instructor. (3-0) R

**OPRE 6362 (SYSM 6311)** Project Management in Engineering and Operations (3 semester hours) Project management is the discipline of planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives. The course will cover various aspects of managing projects in engineering and operations environments including the critical path methods for planning and controlling projects, time and cost tradeoffs, resource utilization, organizational design, conflict resolution and stochastic considerations. (3-0) S

**OPRE 6363** Inventory Control (3 semester hours) Analysis of deterministic and simple stochastic inventory models. Stochastic periodic reorder models with simple deterministic and simulation solutions. Lot size models and their extensions, reorder point determination, price break, Wagner-Whitin, Modigliani-Holn models. Prerequisite: **OPRE 6302** or consent of the instructor. (3-0) R

**OPRE 6364** Quality Control (Lean Six Sigma) (3 semester hours) Concepts and theory of quality control in manufacturing and service operations. Analysis of product design, process capability studies, statistical process control, and acceptance sampling. (3-0) S

**OPRE 6365** Managing Inventory (3 semester hours) This course teaches students to view inventory control as a competitive strategy. The emphasis is on analysis and application of deterministic and simple stochastic inventory models. Students learn concepts through a combination of theory, problem solving, and case discussion. Prerequisite: **OPRE 6302** or consent of instructor. (3-0) R

**OPRE 6366** Global Supply Chain Management (3 semester hours) Key issues associated with the design and management of industrial supply chains. The efficient integration of suppliers, factories, warehouses,
and stores so that products are distributed to global customers in the right quantity and at the right time. Prerequisite: **OPRE 6302** or consent of the instructor. (3-0) S

**OPRE 6367** Capstone Projects in Supply Chain Management (3 semester hours) Capstone projects are sponsored by local industries and provide the students an opportunity to apply the skills and knowledge gained to solve real world challenging problems in the area of supply chain management. Students work in a team environment, interact with industry leaders and gain some industry specific knowledge. Prerequisite: **OPRE 6366** and consent of the instructor. (3-0) Y

**OPRE 6368** Industrial Applications in Supply Chains (3 semester hours) The course discusses and reviews major supply chain challenges and relevant decision making tools used in the industry. The course proceeds with the analysis of real-life cases during which the students obtain industry specific knowledge. Some of the industries of interest are Telecommunications, High-tech Electronics, Semiconductors, Consumer Goods and Retail. Topics may vary. Prerequisite: **OPRE 6366** or consent of the instructor. (3-0) R

**OPRE 6369 (MIS 6369)** Supply Chain Software (3 semester hours) The course teaches planning and execution of supply chains with software such as SAP's ERP (R3) and Advanced Planning & Optimization (APO). This software is used in lab exercises that provide students with hands-on, experimental learning. The focus is on the supply planning function of supply chain management. Topics include: fundamentals of ERP and SAP, master and transaction data, MRP, forecasting, supply and demand matching, and integration of ERP and APO modules. This course is intended for graduate students with interests in software-based supply chain management. No SAP experience is required. (3-0) S

**OPRE 6370** Logistics, Distribution and Warehousing (3 semester hours) This course focuses on the design and analysis of transportation and supply chain systems including the components such as suppliers, warehouse, packaging and material handling, customers, production, inventory, orders, transportation, and information systems. The course also discusses the interactions between these components; models and techniques for the analysis of logistics systems as well as the strategic financial outcomes influenced by the logistics decisions. Prerequisites: **OPRE 6302** or consent of the instructor. (3-0) S

**OPRE 6371** Purchasing, Sourcing and Contract Management (3 semester hours) Basic concepts and processes in purchasing, sourcing and contract management are introduced in this course. It teaches global sourcing techniques and the application of various management tools and quality tools in purchasing. Focus is on the proactive and planned analysis of supply markets and the selection of suppliers, with the objective of delivering solutions to meet pre-determined and agreed organizational needs. (3-0) S

**OPRE 6372** Project Initiation (3 semester hours) Explores project manager credentialing, professional ethics, and project management in a global environment; then bridges from strategy to project definition with a discussion of project selection and a focus on determining project requirements and managing changes. Course delivery is integrated with relevant modules from **OB 6301** Organizational Behavior. Prerequisite: **OPRE 6271**. (3-0) R

**OPRE 6373** Project Planning (3 semester hours) Continues from project initiation and covers the initial stages of planning a project, including scope management, quality planning, project team building, dealing with conflict, and negotiation. Course delivery is integrated with relevant modules from **OB 6301** Organizational Behavior. Prerequisite: **OPRE 6372**. (3-0) R

**OPRE 6374** Project Planning and Execution (3 semester hours) Continues the discussion of planning
techniques from OPRE6373 and introduces execution phase processes. Topics include scheduling, resource planning, budgeting, negotiation skills development, and risk management. Prerequisite: OPRE 6 373. (3-0) R

**OPRE 6375** Project Execution and Closeout (3 semester hours) Continues the discussion of planning and execution techniques from OPRE 6374 and discusses project closeout. Topics include project procurement management, earned value management, lean and six sigma methodologies, and project execution and control. Prerequisite: OPRE 6374. (3-0) R

**OPRE 6376** Advanced Project Management and Simulation (3 semester hours) Explores project organizational competence, maturity models, project portfolio management, program management, PM offices, alternate project management methodologies including Agile and simulates a project lifecycle. Prerequisite: OPRE 6375. (3-0) R

**OPRE 6377** Demand and Revenue Management (3 semester hours) This course focuses on the expense involved in managing conventional and idiosyncratic demand through the supply process. Demand for a single unit or an assembly (network) of units requires forecasting that incorporates prices and macroeconomic factors. Perishable supplies are optimally priced by considering their amount (inflated in overbooking), location, vintage, and customer classes. This approach is relevant for airlines, hotels, parks, rental cars, broadcasters, art/sport events, and retailers. (3-0) Y

**OPRE 6378** Supply Chain Strategy (3 semester hours) The success of a product in today's global marketplace depends, to a large extent, on activities of firms in the product's supply chain and their processing of information. This course will focus on the value of information and technology, and effective ways to use that information in optimizing global operations and information. The course will cover some analytical methods to quantify the costs and benefits of information and the technology used to obtain information in supply chain improvement initiatives or supply-chain restructuring opportunities. Case studies will be used to discuss the role of information technology (e.g. RFID) and innovative process, (e.g. CPFR), in functional areas such as new product development, manufacturing outsourcing, and distribution operations. Prerequisite: OPRE 6301 or equivalent or consent of the instructor. (3-0) Y

**OPRE 6379** Product Lifecycle Management (3 semester hours) This course provides a management approach to new product development, product lifecycle management and its impact on supply chain management. Topics include the management of product portfolio transitions, resources, schema and modeling for bills of materials, change management, and product cost management. (3-0) R

**OPRE 6385** Scheduling (3 semester hours) Concepts and theory of scheduling problems with business applications. Combinatorial approaches for simple systems, and queuing/simulation methods for large and/or complex systems. Prerequisite: 6302 or consent of the instructor. (3-0) T

**OPRE 6386** Applied Programming Languages (3 semester hours) An introduction to various mathematical, simulation and statistical software such as Mathematica, Gauss, SAS, and CPLEX. Students will use these package programs to solve problems in various business disciplines. Prerequisites: OPRE 6302, STAT 5352, or consent of instructor. Topics may vary. (3-0) Y

**OPRE 6388** Engineering Packaged Goods Distribution (3 semester hours) This course covers both warehouse and DSD models of distribution common in CPG industry, in which network engineering design, distribution & replenishment planning and transportation planning / execution are performed. Students will also learn about unique distribution engineering aspects of returns, recycling, variety and display
products and push/pull/hybrid delivery. In addition, this class focuses heavily on the practical operational aspects of distribution management through discussion and case studies. (3-0) Y

**OPRE 6389** Managing Energy: Risk, Investment, Technology (MERIT) (3 semester hours) MERIT is designed for students or professionals interested in the energy sector. Energy sector houses applications from several academic disciplines: Operations Management, Engineering and Technology, Risk Management, Economics and Finance. Students currently involved in these and similar academic programs can take MERIT to learn the fundamentals of the energy sector. MERIT prepares such students and professionals for entry- to mid-level management careers in the energy sector. (3-0) R

**OPRE 6390 (MIS 6319)** Enterprise Resource Planning (3 semester hours) Examines the role of enterprise systems in organizations. It will focus on business processes, business process integration, and information technology for enabling the integration. The course also covers selection and implementation of ERP systems. A part of the course will be set aside for demonstration and 'hands on' exercises with one of the available ERP software. (3-0) Y

**OPRE 6391 (ACCT 6309, MIS 6309)** Business Data Warehousing (3 semester hours) This course provides the student with in depth knowledge of data warehousing principles, data warehouse techniques, and business intelligence systems. The course introduces the topics of data warehouse design, Extract-Transform-Load (ETL), data cubes, and data marts. Students will create business intelligence using data warehouses with several OLAP and analytical tools. The course currently uses SAP BW, SAP BEx, SAP Data Mining Workbench, and SAP Business Objects as tools to illustrate these concepts. (3-0) Y

**OPRE 6392 (MIS 6372)** IT Services Management (3 semester hours) The purpose of this course is to examine and explain how organizations engage and manage their IT services throughout the IT services lifecycle. The course covers topics related to service strategy, service design, service transition, service operation and continuous improvement. It also includes managing outsourced IT services and the organizational, technological and economical aspects associated with the outsourcing of IT services and functions. The course uses ITIL framework to illustrate various concepts. (3-0) Y

**OPRE 6393 (MIS 6320, ACCT 6320)** Database Foundations (3 semester hours) The course is designed to provide database knowledge for non-MIS business students to function effectively in their functional area. The course covers fundamentals of relational databases, relational database structure, database queries, and reports. Structured Query Language will be used extensively. Applications of databases for accounting, finance, marketing, and other areas of business will be emphasized. Cannot be used to satisfy the requirements of MS ITM degree. **MIS 6320** and **MIS 6326** cannot both be used to satisfy degree requirements. (3-0) Y

**OPRE 6394 (SYSM 6332, ENTP 6375)** Technology and New Product Development (3 semester hours) This course addresses the strategic and organizational issues confronted by firms in technology-intensive environments. The course reflects six broad themes: (1) managing firms in technology-intensive industries; (2) forecasting key industry and technology trends; (3) linking technology and business strategies; (4) using technology as a source of competitive advantage; (5) organizing firms to achieve these goals; and (6) implementing new technologies in organizations. Students will analyze actual situations in organizations and summarize their findings and recommendations in an in-depth term paper. Case studies and class participation are stressed. (3-0) Y

**OPRE 6395 (SYSM 6317)** The Management of High Tech Products (3 semester hours) Building on the premise that successful product management involves getting the right product to the right customer at
the right time, the course will teach techniques in product identification and requirements; product development; management of internal resources, including manufacturing, sales and management; costing and pricing decisions; product planning and winning the right design win. (3-0) Y

**OPRE 6396 (OB 6332, HMG 6324, SYM 6313)** Negotiation and Dispute Resolution (3 semester hours) This course explores the theories, processes, and practical techniques of negotiation so that students can successfully negotiate and resolve disputes in a variety of situations including interpersonal, group, and international settings. Emphasis is placed on understanding influence and conflict resolution strategies; identifying interests, issues, and positions of the parties involved; analyzing co-negotiators, their negotiation styles, and the negotiation situations; and managing the dynamics associated with most negotiations. Practical skills are developed through the use of simulations and exercises. (3-0) Y

**OPRE 6397 (IMS 6365)** Cross-Culture Communication and Management (3 semester hours) This course focuses on understanding national culture and cultural issues in international business. It emphasizes the importance of managing cultural differences to enhance communication, negotiation, leadership, and group dynamics in an international work environment. Further, the course describes methods to develop effective selection and training programs for international assignments. (3-0) Y

**OPRE 6v98** Supply Chain Management Internship (1-3 semester hours) Student gains experience and improves skills through appropriate developmental work assignments in a real business environment. Student must identify and submit specific business learning objectives at the beginning of the semester. The student must demonstrate exposure to the managerial perspective via involvement or observation. At semester end, student prepares an oral or poster presentation, or a written paper reflecting on the work experience. Student performance is evaluated by the work supervisor. Consent of the School of Management's Internship Coordinator is required. ([1-3]-0) S

**OPRE 6v99** Special Topics in Operations Research (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

**OPRE 7309** Behavioral Operations Management (3 semester hours) This course covers various topics in behavioral operations management including introduction to using laboratory experiments in operations, individual decisions, supply chain contracts and behavioral marked design in a seminar format. The main goal of the course is to expose students to behavioral research and gain deeper understanding of the limitations of the standard operations management paradigm. The main deliverable in the course will be a proposal for a laboratory study, including hypotheses, treatments and factors. Those who wish to pursue this research further will have an opportunity to conduct their studies with human subjects. (3-0) R

**OPRE 7310** Probability and Stochastic Processes (3 semester hours) Basic concepts and methods from probability theory that are useful in the modeling of complex systems. Topics include Poisson and renewal processes, discrete and continuous-time Markov chains, semi-Markov processes, and various concepts of stochastic ordering. Permission of instructor required. (3-0) Y

**OPRE 7311** Stochastic Models in Operations Research (3 semester hours) This course is a systematic study of important classes of stochastic models in operation research. Topics include renewal theory, Markov chains, semi-Markov processes, queuing models, stochastic ordering concepts, and Brownian motion. Permission of instructor required. (3-0) R

**OPRE 7313** Network Flow (3 semester hours) Network flow models and solution algorithms. Matrix representations and properties, max-flow algorithms, min-cost flow algorithms, circulation and feasibility
theorems, sensitivity analysis, integrality property of solutions, shortest route methods. Problems with special structure. CPT-PERT, multicommodity flows, matching, traveling salesperson problem. (3-0) T

**OPRE 7315** Dynamic Programming (3 semester hours) This course is an introduction to both deterministic and stochastic dynamic programming. The basic ideas of recursion and functional equation will be introduced. A wide variety of applications will be used to illustrate these concepts. Specific topics include: Markov and Semi-Markov decision processes, principle of optimality, structure of optimal policies under various cost criteria, LP formulations, and policy-improvement techniques. Prerequisites: OPRE 6331 or consent of instructor. (3-0) R

**OPRE 7320** Optimal Control Theory and Applications (3 semester hours) This course is an introduction to Optimal Control Theory and a survey of its selected applications in finance, production, marketing and economics. Relationships to dynamic programming and Kuhn-Tucker conditions are also pointed out. Emphasis is on modeling and not on mathematical rigor. Students should have two semesters of calculus including some knowledge of differential equations and linear algebra or consent of instructor. (3-0) Y

**OPRE 7330** Deterministic Models in Operations Research. (3 semester hours) Deterministic models in operations research. Topics include linear programming, sensitivity analysis and duality, assignment problems, network models, integer programming, nonlinear programming, sequencing and scheduling models. (3-0) Y

**OPRE 7346** Differential Games and Applications (3 semester hours) Concepts and methods of game theory and differential games are presented, including both deterministic and stochastic models. The theory of necessary conditions, dynamic programming, and Nash equilibrium are discussed. Applications to economics and management are presented. Prerequisite: OPRE 7320 or consent of instructor. (3-0) T

**OPRE 7351** Seminar in Operations Management (3 semester hours) This seminar covers topics of current research in the area of operations management. Research papers are presented on a variety of topics including: supply chain management, inventory models, production planning and control, design and scheduling of cellular manufacturing systems, and decision and risk analysis. (3-0) Y

**OPRE 7352** Teaching Practicum in Operations Management (3 semester hours) Under the supervision of a faculty member, student assumes all instructional responsibilities for a course, including: developing the syllabus, delivering the lectures, and grading. Pass/Fail only. (3-0) Y

**OPRE 7372** Advanced Topics in Supply Networks - Advanced Risk Analysis (3 semester hours) This course will focus on probabilistic, statistical and optimization techniques needed in risk analysis and decision-making. The domain is in full development and appropriate for active research. The methods are generic and applicable in finance as well as in operations management. Prerequisites: OPRE 6302, OPRE 6330 and OPRE 6366 or consent of the instructor. (3-0) R