Operations Research

OPRE 6000 Professional Development (0 semester credit hours) This course is designed to enhance the students' experience such as building networking skills, verbal and written communication skills, business etiquette and learning how to increase their human capital. The goal of this course is to make students more marketable and valuable professionals to the global economy. (1-0) S

OPRE 6008 Quantitative Foundations Primer (0 semester credit hours) This online course covers college algebra, linear algebra, and the basic calculus necessary for the MBA Program. Department consent required. Prerequisite: MBA majors only. (0-0) Y

OPRE 6009 Supply Chain Management Internship (0 semester credit 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. Pass/Fail only. Prerequisites: (MAS 6102 or MBA major) and department consent required. (0-0) S

OPRE 6250 Global Supply Chain Management (2 semester credit 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. (2-0) Y

OPRE 6271 Project Overview, Strategic and Process Management (2 semester credit hours) Executive Education Course. 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 professional credentialing of project managers. (2-0) R

OPRE 6274 Project Execution Planning (2 semester credit hours) Executive Education Course. Concludes the introduction of project planning techniques started in OPRE 6373. Topics include negotiation, project time, resource, cost, and risk management. Prerequisite: OPRE 6373. (2-0) S

OPRE 6275 Project Execution, Control and Closeout (2 semester credit hours) Executive Education Course. Introduces project execution, control and closeout techniques. Topics include project execution and control including earned value management, lean and six sigma methodologies, procurement management and project closeout. Prerequisite: OPRE 6274. (2-0) S

OPRE 6301 (SYSM 6303) Statistics and Data Analysis (3 semester credit 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. Credit cannot be received for both: OPRE 6301 and (OPRE 6359 or BUAN 6359). (Some sections of this class may require a laptop computer). (3-0) S

OPRE 6302 (SYSM 6334) Operations Management (3 semester credit 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 or Corequisite: OPRE 6301 or BUAN 6359 or OPRE 6359. (3-0) S

OPRE 6303 Quantitative Foundations of Business (3 semester credit 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. Department consent required. (3-0) S

OPRE 6304 Operations Analytics (3 semester credit hours) All businesses face operational and pricing challenges including: how to configure and operate their supply chain, what kind of contracts to set with suppliers, what inventory levels to carry at various points in the supply chain, how to allocate products to sales channels and outlets, and how to price their products over time to different market segments. These challenges are often addressed individually and in isolation but, in reality, all of these decisions interact with each other at a fundamental level. This course examines the operations management challenges faced by companies in various industries through business cases and analytics exercises. The course particularly emphasizes on incorporating data-driven decision making into companies' complex processes and the challenges involved in coordinating different decision areas across the firm. (3-0) Y

OPRE 6305 (BUAN 6356 and MIS 6356) Business Analytics With R (3 semester credit hours) This course covers theories and applications of business analytics. The focus is on extracting business intelligence from firms' business data for various applications, including (but not limited to) customer segmentation, customer relationship management (CRM), personalization, online recommendation systems, web mining, and product assortment. The emphasis is placed on the 'know-how' -- knowing how to extract and apply business analytics to improve business decision-making. Students will also acquire hands-on experience with business analytics software in the form of R. Credit cannot be received for both courses, BUAN 6324 and BUAN 6356. Prerequisite or Corequisite: BUAN 6359 or OPRE 6359. (3-0) Y

OPRE 6325 (HMGT 6325) Healthcare Operations Management (3 semester credit hours) This course explores the Healthcare Supply Chain, in terms of its strategic management, operations, challenges, and overall costs. Topics include importance of delivery of care, Healthcare supply chain management processes, sourcing relationships, inventory, delivery, and cost management. Relevant case studies will be used throughout the course providing additional insights. (3-0) Y

OPRE 6332 (HMGT 6335) Spreadsheet Modeling and Analytics (3 semester credit 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 6334 (MIS 6334) Advanced Business Analytics With SAS (3 semester credit hours) This course is SAS based and is part of the 4-course curriculum for the SAS data mining certificate program. It will cover the topics as required by the SAS certificate program including data manipulation, imputation, variable selection, SAS/STA, SAS/ETS, SAS/QC (DOE), and various SAS stat modules. Students will also learn various advanced business intelligence topics including business data analytics, model analytics, customer analytics, web intelligence analytics, business performance analytics, and decision-making analytics. Tool to be used includes SAS. Credit cannot be received for more than one of the following courses: MIS 6334 or OPRE 6334 or BUAN 6357 or MIS 6357. Prerequisites: (OPRE 6301 or OPRE 6359 or BUAN 6359) and (BUAN 6324 or MIS 6324 or BUAN 6356 or MIS 6356 or OPRE 6305). (3-0) Y

OPRE 6335 (SYSM 6304) Risk and Decision Analysis (3 semester credit 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: OPRE 6301 or OPRE 6359 or BUAN 6359 or SYSM 6303. (3-0) T

OPRE 6340 (MECH 6335) Flexible Manufacturing Strategies (3 semester credit 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 6341 Retail Operations (3 semester credit hours) This course will examine retail operations and the application of operations management principles to this industry. Topics include inventory management, assortment planning, responsive supply chains, store execution, online retailing, omni-channel retailing, technology and innovation, pricing and revenue management, impact on financial performance and sustainability. (3-0) Y

OPRE 6342 Special Topics in Product Lifecycle and Supply Chain Management (3 semester credit hours) Executive Education Course. This course introduces selected topics in product lifecycle and supply chain management. Students will be exposed to technology solutions, value management and business simulations to learn the interactions and challenges in decision making in a real world supply chain environment. Additional prerequisites may be required depending on the specific course topic. Instructor consent required. (3-0) Y

OPRE 6343 (BUAN 6341 and MIS 6341) Applied Machine Learning (3 semester credit hours) This course covers machine learning models for business data including text mining, natural language processing, non-linear regression models, resampling methods and advanced neural networks and

artificial intelligence-based models for data-driven analytics. The course will be taught using either R or Python language. Prerequisites: (BUAN 6356 or BUAN 6324 or MIS 6324 or OPRE 6399) and (OPRE 6359 or BUAN 6359). (3-0) Y

OPRE 6351 Applied Supply Chain Management for New Products (3 semester credit hours) Executive Education Only. This course introduces global supply chain from the perspective for a new product or service entering a new market. Key areas of discussion are strategy, planning and operations. Students will establish a fundamental understanding of supply chains, how value is added to the product and/or service during the progress through the chain, and the processes and practices involved in effective and efficient management of the supply chain. We will also discuss product / service design and development as an integral component. (3-0) Y

OPRE 6352 (MIS 6332) Intelligent Enterprise Systems Configurations and Implementation with SAP (3 semester credit hours) The course focuses on Intelligent Enterprise System business processes and configuring an Intelligent Enterprise System from start up with hands-on experience with configuring Sales, Material Management, Production, Financial Accounting, and Management Accounting Modules on the S/4HANA platform. Several case studies are provided by which students can configure the Intelligent Enterprise System to meet the requirements so that products can be produced, purchased, sold, and generate reports - analytics. Prerequisite or Corequisite: MIS 6319 or OPRE 6390. (3-0) Y

OPRE 6353 Managing Strategy Execution (3 semester credit hours) Executive Education Course. The objective of this course is to introduce students to the discipline of managing strategy execution. Execution in this context is broadly defined as "Getting Things Done." The discipline will be explored from strategic, tactical, organizational, people, and other perspectives. The intent is to raise awareness on how execution is vitally applicable to every function in every organization, how improved execution management can lead to creating a competitive advantage for the organization, how to establish a culture of execution, and how to apply execution management discipline to achieve goals and objectives. (3-0) Y

OPRE 6354 (HMGT 6332) Quality Improvement in Healthcare: Six Sigma and Beyond (3 semester credit hours) The course will explore applications of quality improvement measures to the healthcare environment. Applications including the Demming method, QI, and CQI will be studied. Application of other industrial quality improvement methodology including Six Sigma and Toyota Lean will be covered. (3-0) Y

OPRE 6355 (MECO 6355) Deal Making Strategies (3 semester credit hours) This course uses experiential hands-on learning to develop students' skills in effectively managing competitive and collaborative business situations. Students will learn: (1) Behavioral principles for effective bargaining. (2) The principles for designing, conducting, and participating in procurement auctions. (3) Methods for increasing cooperation and trust in competitive and collaborative settings. (4) Behavioral principles for designing trading. Each topic in the course will be centered around a set of hands-on business simulations and case studies, in which students will take on the role of market participants working through a business problem. (3-0) R

OPRE 6359 (BUAN 6359) Advanced Statistics for Data Science (3 semester credit hours) This course

uses statistical methods to analyze data from observational studies and experimental designs to communicate results to a business audience. The course mandates prior knowledge of fundamental statistical concepts such as measures of central location, standard deviations, histograms, the normal and t-distributions (knowledge of calculus is not required). The course also emphasizes interpretation and inference, as well as computation using a statistical software package such as R or STATA. Credit cannot be received for both: OPRE 6301 and (OPRE 6359 or BUAN 6359). (3-0) S

OPRE 6362 (ENGY 6362 and IMS 6362 and SYSM 6311) Project Management in Engineering and Operations (3 semester credit 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 credit 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. (3-0) R

OPRE 6364 Lean Six Sigma (3 semester credit hours) This course discusses the Lean and Six Sigma quality framework as it applies to manufacturing, service operations, re-engineering the design of products and processes to reduce waste and variability, use of Define-Measure-Improve-Control (DMAIC) methodology, and application of Lean for continuous improvement. (3-0) S

OPRE 6366 Global Supply Chain Management (3 semester credit 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. (3-0) S

OPRE 6367 Capstone Projects in Supply Chain Management (3 semester credit 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. Prerequisites: OPRE 6366 and OPRE 6370 and (MAS 6102 or MBA major) and instructor consent required. (3-0) Y

OPRE 6368 Industrial Applications in Supply Chains (3 semester credit hours) Executive Education Course. 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. Prerequisite: OPRE 6366 or instructor consent required. (3-0) R

OPRE 6369 (MIS 6369) Supply Chain Software with SAP (3 semester credit hours) The course

introduces planning and execution of supply chains with software such as SAP's S/4 HANA and Advanced Planning and Optimization (APO) with case discussions and lab exercises. Students also get exposure to the new GUI SAP Fiori. This software is used in lab exercises that provide students with hands-on, experiential 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 or digital supply chains. No SAP experience is required. (3-0) S

OPRE 6370 Global Logistics and Transportation (3 semester credit hours) This course focuses on the design and analysis of global logistics, 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. Prerequisite: OPRE 6302. (3-0) S

OPRE 6371 Purchasing, Sourcing and Contract Management (3 semester credit 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 credit hours) Executive Education Course. Explores project management in a global environment, bridges from strategy to project definition with discussions of project selection, creating value from project investments, determining and managing project requirements, and legal considerations in project management. Course delivery is integrated with relevant modules from OB 6301 Organizational Behavior. (3-0) R

OPRE 6373 Project Planning (3 semester credit hours) Executive Education Course. Continues from project initiation and covers the initial stages of planning a project, including scope management, quality planning, project team building, dealing with conflict, negotiation, and additional legal considerations. 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 credit hours) Executive Education Course. Continues the discussion of planning techniques from OPRE 6373 and introduces execution phase processes. Topics include scheduling, resource planning, budgeting, negotiation skills development, and risk management. Prerequisite: OPRE 6373. (3-0) R

OPRE 6375 Project Execution and Closeout (3 semester credit hours) Executive Education Course. 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 credit hours) Executive Education Course. 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 6275. (3-0) R

OPRE 6377 Demand and Revenue Analytics (3 semester credit 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 credit hours) The success of a product (and a firm) in today's global marketplace depends on activities of firms in the product's supply chain. Students will learn how to develop strategies to create value through supply chain design, how to better structure a company's global operations strategy, how to develop guidelines for making strategic sourcing and make-buy decisions, how to deploy operations for successful turnarounds, and how to effectively use information technology to synchronize and manage global supply chains. Case studies will cover recent trends in supply chain strategy and key competencies required to be successful in a global marketplace. (3-0) Y

OPRE 6379 Product Lifecycle Management (3 semester credit 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 6382 Supply Chain Trade Compliance (3 semester credit hours) This course explores the key issues associated with the application of international trade laws and regulations in the context of global supply chains through the examination of the international and national institutions, rules, and mechanisms used to govern and regulate international trade activities. The course also discusses global import/export compliance, regulations, requirements, fines and penalties, savings opportunities, audits, and tools. Students learn the important aspects of international trade regulations and how it impacts global supply chain operations. (3-0) S

OPRE 6384 Global Project Management Functions and Performance Measurement (3 semester credit hours) Executive Education Course. This course bridges the traditional project management methods of scope, time, and cost with the next generation of project management techniques for project controls, quantitative methods, and performance measurement. This course walks through the project management framework that is set forth by the Project Management Institute (PMI). In addition, it will also teach the advanced techniques of project management, e.g., Quantitative Methods, Statistical Analysis, Risk Management, Conflict Resolution, Capital Budgeting, Break-even Analysis, and the Earned Value method. Prerequisites: FIN 6301 and OPRE 6301. (3-0) Y

OPRE 6388 Engineering Packaged Goods Distribution (3 semester credit hours) This course covers both warehouse and DSD models of distribution common in CPG industry, in which network

engineering design, distribution and 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 credit 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. (3-0) R

OPRE 6390 (MIS 6319) Intelligent Enterprise Systems with SAP (3 semester credit hours) This course provides students with an understanding of intelligent enterprise systems using the SAP S/4 HANA platform. The course focuses on managing enterprise-wide business processes such as Design to Operate, Record to Report (Core Finance), Lead to Cash, Source to Pay, and Hire to Retire, and integrations among them in large organizations. The course also introduces enterprise-wide analytics, enterprise system development methodologies, project management, and cloud solutions (Ariba, Concur, SuccessFactors, and Fieldglass). The course relies heavily on hands-on experience and case studies that utilize SAP Fiori and SAP GUI. (3-0) Y

OPRE 6393 (ACCT 6320 and MIS 6320) Database Foundations (3 semester credit hours) The course provides database knowledge for non-MIS business students to function effectively in their functional area. The course covers conceptual data modeling with the entity-relationship diagram, the fundamentals of relational data model and database queries, and the basic concepts of data warehousing. Structured Query Language will be used extensively. Applications of databases for accounting, finance, marketing, and other areas of business will be emphasized. May not be used to fulfill degree requirements in MS Information Technology and Management. Credit cannot be received for more than one of the following: ACCT 6320 or ACCT 6321 or BUAN 6320 or MIS 6320 or MIS 6326 or OPRE 6393. (3-0) Y

OPRE 6394 (ENTP 6375 and MIS 6375 and SYSM 6332) Technology and New Product Development (3 semester credit 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 analyze actual situations in organizations and summarize their findings and recommendations in an in-depth term paper. The course also introduces concepts related to agile engineering. Case studies and class participation are stressed. (3-0) Y

OPRE 6398 (BUAN 6398) Prescriptive Analytics (3 semester credit hours) Introduction to decision analysis and optimization techniques. Topics include linear programming, decision analysis, integer programming, and other optimization models. Applications of these models to business problems will be emphasized. Prerequisite: OPRE 6301 or OPRE 6359 or BUAN 6359. (3-0) S

OPRE 6399 (BUAN 6324 and MIS 6324) Business Analytics With SAS (3 semester credit hours) This course covers theories and applications of business analytics. The focus is on extracting business intelligence from firms' business data for various applications, including (but not limited to) customer segmentation, customer relationship management (CRM), personalization, online recommendation systems, web mining, and product assortment. The emphasis is placed on the 'know-how' -- knowing how to extract and apply business analytics to improve business decision-making. Students will also acquire hands-on experience with business analytics software in the form of SAS Enterprise Miner. Credit cannot be received for more than one of the following: BUAN 6324 or BUAN 6356 or MIS 6324 or OPRE 6399. Prerequisite or Corequisite: OPRE 6301 or OPRE 6359 or BUAN 6359. (3-0) Y

OPRE 6V08 Special Topics in Operation Research (1-4 semester credit hours) May be lecture, readings, or individualized study. May be repeated for credit as topics vary. Additional prerequisites may be required depending on the specific course topic. Instructor consent required. ([1-4]-0) S

OPRE 6V98 Supply Chain Management Internship (1-3 semester credit 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. Pass/Fail only. May be repeated for credit as topics vary (3 semester credit hours maximum). Prerequisites: (MAS 6102 or MBA major) and department consent required. ([1-3]-0) S

OPRE 6V99 Special Topics in Operations Research (1-6 semester credit hours) May be repeated for credit as topics vary (6 semester credit hours maximum). Additional prerequisites may be required depending on the specific course topic. Department consent required. ([1-6]-0) S

OPRE 7051 Seminar in Operations Management (0 semester credit hours) The seminar covers topics of current research in the area of Operations Management. Research papers on a variety of topics are presented including supply chain management, inventory models, production planning and control, decision and risk analysis and behavioral operations management. Pass/Fail only. May be repeated for credit as topics may vary in coordination with OPRE 7351. Additional prerequisites may be required depending on the specific course topic. Instructor consent required. (3-0) Y

OPRE 7309 Behavioral Operations Management (3 semester credit 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 credit 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. Instructor consent required. (3-0) Y

OPRE 7311 Stochastic Models in Operations Research (3 semester credit 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. Instructor consent required. (3-0) R

OPRE 7318 (MATH 7318) Stochastic Dynamic Programming (3 semester credit hours) Stochastic Dynamic Programming (SDP) is a general methodology which plays an essential role in many areas of economics and management science. The course provides students with a solid background on SDP, the core theory and its evolution and applications. The course discusses many models, particularly in finance and operations management, as well as additional concepts such as principal-agent concepts for dynamic systems. Instructor consent required. (3-0) Y

OPRE 7320 Optimal Control Theory and Applications (3 semester credit 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 instructor consent required. (3-0) Y

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

OPRE 7343 Modern Machine Learning Methods (3 semester credit hours) The increasing availability of data provides firms substantial opportunities to leverage modern machine learning methods to inform decision making. This course provides a rigorous introduction to the most commonly used machine learning methods. Emphasis will be on understanding the mathematical and technical aspects behind the algorithms, but students will also implement some of the algorithms (in a programming language of their choice) to gain hands-on experience in applying the learnt methods on real datasets. Topics include classification and regression, clustering, ensemble learning, dimensionality reduction, and deep learning. Instructor consent required. (3-0) Y

OPRE 7351 Seminar in Operations Management (3 semester credit 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. Pass/Fail only. May be repeated for credit as topics vary (18 semester credit hours maximum). Instructor consent required. (3-0) Y

OPRE 7353 Optimization (3 semester credit hours) The course covers the fundamentals of

optimization theory and introduces linear algebra and real analysis. Topics include existence of an optimal solution, unconstrained and constrained optima, convexity and quasi-convexity, and linear programming. Instructor consent required. (3-0) Y