COURSE DESCRIPTIONS

Operations and Manufacturing Management Courses

B57 OMM 650 Seminar in Operations Manufacturing and Management I
May be taken a maximum of four (4) times for credit; twelve (12) credits total.

B57 OMM 652 Theory and Research Methods in Inventory
The course covers theories and techniques for inventory management. We introduce discrete and continuous time models with finite and infinite planning horizon, and expose students to computational techniques for solving dynamic inventory models.

B57 OMM 653 Stochastic Models for Production and Service Systems
The course will focus on stochastic processes course with an emphasis on queueing (especially as applied to operations models) and probabilistic reasoning. The approach will be non-measure theoretic but otherwise rigorous. Students are assumed to already have a working knowledge of probability and stochastic processes. The course will contain a sampling of some of the most important stochastic proof techniques for operations. Specific topics include Markov chain analysis, queueing theory, sample path arguments, and limit theorems.

The course will also cover the application of stochastic processes and equilibrium analysis to service operations systems. Classical models covered from the textbook will be studied. Topics include observable queues, unobservable queues, and competition among servers. Students will also be exposed to recent research development by reading and presenting research papers on these topics.

OMM 654 Inventory & Supply Chain Management Theory and Research
This course will provide an in-depth study of classical models for inventory management including single-echelon and multi-echelon inventory systems, and their extensions. We will study both deterministic and stochastic inventory models, and focus on establishing structural results for optimal policies and deriving solution algorithms.

OMM 655 Dynamic Programming & Optimal Control
The course covers the basic models and solution techniques for problems of sequential decision making under uncertainty. We introduce discrete and continues time models with finite and infinite planning horizon, and expose students to computational techniques for solving dynamic models. Applications are drawn from operations management, economics, and engineering.

B57 OMM 656 Managing Flexibility & Risk in Global Supply Chains
In this course, we present at first the modeling tools necessary in studying from a modeling perspective these issues (stochastic dynamic programming, optimal control, and basic real options tools), and then spent time on the many papers (most of them published and working papers of the last few years) that have defined and are breaking ground in this exciting research direction of global supply chain management.

B57 OMM 657 Research Topics in Supply Chain Management
This is a doctoral course on models in operations management (mostly in supply chain management). The course covers important themes in supply chain management research, including information sharing in supply chain, supply chain contracting, application of game theory in supply chain management, operations-marketing interface, dynamic pricing and revenue management. Upon

completing this course a student will have the necessary knowledge and tools to produce novel research in supply chain management.

B57 OMM 658 Independent Study in Operations Manufacturing and Management
Internship must be arranged by the student and approved by the advising faculty member. An outline of objectives must be submitted to the PhD Office prior to enrollment. May be taken a maximum of five (5) times for credit. Credit, variable; fifteen (15) credits combined total.

B57 OMM 659 Directed Readings in Operations and Manufacturing Management
A program of readings developed by and with the approval of one or more members of the OMM faculty. Prerequisite, approval of the Director of the PhD program. Credit, variable. May be taken up to two (2) times for credit; six (6) credits combined total.

Other Courses
MGT 600A Teaching Business
The course is designed to assist doctoral students help themselves advance their teaching capabilities. The format will include in-class discussions, group work, creating an 'out-of-class' video, creating a video of an 'in-class' session, presenting to the class, and constructively critiquing the work of others.

B53 MGT 601 Doctoral Prep: University Teaching
Two (2) credits are required for the PhD. Students must provide an Olin Professor 30 hours of assistance in the teaching function; includes, but is not limited to, conducting help sessions, grading, developing lectures or exams. Maximum of eight (8) credits allowed. Hours performed during this course do not count towards RA/TA requirements. Credits will count towards teaching requirement of the Graduate School of Arts & Science.

B53 MGT 605 Research Internship
Three (3) credits are required for the PhD. Under the direction of a faculty member, students will work (and be graded) on their own research project. This requirement will be completed when students are at candidacy and preparing a dissertation proposal. Internship must be arranged by the student and approved by the advising faculty member. An outline of objectives must be submitted to the PhD Office prior to enrollment. An additional nine (9) credits may be taken; maximum of twelve (12) credits allowed.

B53 MGT 607A Teaching Presentation Skill Workshop
This course focuses on developing presentation skills for the classroom and for conference papers. Students will deliver three presentations and write a summary performance evaluation. This course is required for all students prior to graduation in compliance of the teaching requirement governed by the Graduate School of Arts & Science.

B53 MGT 610 Dissertation
Maximum of twelve (12) credits allowed, six (6) per semester. Prerequisite: submission of Title, Scope, and Procedure Form and successful Proposal of dissertation.

CSE541T Advanced Algorithm
(Provides a broad coverage of fundamental algorithm design techniques with the focus on developing efficient algorithms for solving combinatorial and optimization problems. The topics covered include: greedy algorithms, dynamic programming, linear programming, NP-completeness, approximation

algorithms, lower bound techniques, and on-line algorithms. Throughout this course there is an emphasis on correctness proofs and the ability to apply the techniques taught to design efficient algorithms for problems from a wide variety of application areas. Prerequisites: CSE 240/CS 201 and CSE 241.)

E35 ESE 501 Mathematics of Modern Engineering I
Vectors and vector spaces, Matrix operations, System of linear equations, Eigenvalues and eigenvectors, vector fields, Line and surface integrals, Solutions to ordinary and partial differential equations, Series expansions, Fourier Series. Fall.

E35 ESE 503 Operations Research
Introduction to the mathematical aspects of various areas of operations research, with additional emphasis on problem formulation. This is a course of broad scope, emphasizing both the fundamental mathematical concepts involved, and also aspects of the translation of real-world problems to an appropriate mathematical model. Subjects to be covered include linear and integer programming, network problems, and dynamic programming. For graduate credit, a term project is required. Fall.

E35 ESE 544 Optimization and Optimal Control
Constrained and unconstrained optimization theory. Continuous time as well as discrete-time optimal control theory. Time-optimal control, bang-bang controls and the structure of the reachable set for linear problems. Dynamic programming, the Pontryagin maximum principle, the Hamiltonian-Jacobi-Bellman equation and the Riccati partial differential equation. Existence of classical and viscosity solutions. Application to time optimal control, regulator problems, calculus of variations, optimal filtering and specific problems of engineering interest. Prerequisites: ESE 551, ESE 552. Fall.

Math 411 Introduction to Analysis
(The real number system and the least upper bound property; metric spaces (completeness, compactness, and connectedness); continuous functions (in R^n; on compact spaces; on connected spaces); C(X) (pointwise and uniform convergence; Weierstrass approximation theorem); differentiation (mean value theorem; Taylor´s theorem); the contraction mapping theorem; the inverse and implicit function theorems. Prerequisite: Math 310 or permission of instructor.)

Math 417 An Introduction to Topology and Modern Analysis I
(An introduction to set theory, metric spaces, and general topology. Connections to tools useful in analysis are made as appropriate. Prereq: Math 411)

Core Foundation Courses
E35 ESE 520 Probability and Stochastic Processes I
Review of probability theory, models for random signals and noise, calculus of random processes, noise in linear and nonlinear systems, representation of random signals by sampling and orthonormal expansions. Poisson, Gaussian, and Markov processes as models for engineering problems. Prereq: ESE 326. Fall.

L11 Econ 503 Microeconomics I
The first of a two-semester graduate sequence in microeconomic theory. The courses cover the determination of relative prices and quantities exchanged of final products and factors of production. The first semester considers production and costs, supply of output and demand for inputs, demands for final products, market organization, time and capital. Fall.

L11 Econ 504 Microeconomics II
The second of a two-semester graduate sequence in microeconomic theory. The second semester considers the further development of individual consumer behavior, aggregated demand, general equilibrium analysis, Leontief models, consumer's surplus analysis, social choice, and expected utility analysis. Spring.

L11 Econ 511 Quantitative Methods in Economics I
Study of those topics of mathematics of special usefulness in economic research. Selection and ordering of topics will vary with level of student preparation but will usually include the following: vectors, matrices, lines mappings; their manipulation and elementary properties; elementary topology, and elements of multidimensional calculus. Fall.

Course descriptions represent courses offered recently. Not all courses are offered every semester, and it is important to check with Olin Business School prior to scheduling classes to determine course availability for any given semester. Olin Business School reserves the right to make changes in the course offerings or descriptions.