OPERATIONS, INFORMATION AND DECISIONS (OIDD)

OIDD 101 An Introduction to Operations, Information and Decisions
OIDD 101 explores a variety of common quantitative modeling problems that arise frequently in business settings, and discusses how they can be formally modeled and solved with a combination of business insight and computer-based tools. The key topics covered include capacity management, service operations, inventory control, structured decision making, constrained optimization and simulation. This course teaches how to model complex business situations and how to master tools to improve business performance. The goal is to provide a set of foundational skills useful for future coursework at Wharton as well as providing an overview of problems and techniques that characterize disciplines that comprise Operations and Information Management.
One-term course offered either term
Activity: Lecture
1.0 Course Unit

OIDD 105 Developing Tools for Data Access and Analysis (VBA and SQL Programming)
This course provides an introduction to the construction of data analysis tools that are commonly used for business applications, especially in consulting and finance. The course builds on the spreadsheet and analytical skills developed in OPIM 101, providing a much more extensive treatment of spreadsheet application development and database management. The first portion of the course will focus on programming in VBA, the embedded programming language in the Microsoft Office suite of applications. This will be supplemented with discussion of industry best practice in software development, such as specification development, interface design, documentation, and testing. The second portion of the class will emphasize data access and analysis utilizing SQL, the industry standard language for interacting with database software.
Activity: Lecture
1.0 Course Unit

OIDD 201 Technology Management, Information and the Digital Economy
OIDD 201 introduces students to two critically important and tightly linked concepts. The first is online business model innovation, including key opportunities to exploit information-based strategies in businesses as diverse as Capital One and Uber (newly vulnerable markets) and Amazon and Airbnb (online channel conflict). The second is computer-based simulation modeling to assess the viability of an online innovation, the strategies for its launch, and its economic value.
Activity: Lecture
1.0 Course Unit

OIDD 210 Online Business Models and the Information-Based Firm
This course provides a broad-based introduction to the management of information technology focusing on three interrelated themes: technology, organization, and strategy. The goal of this course is to equip students with the knowledge and tools to utilize information systems to pursue a firm’s strategic and organizational goals. The course has no prerequisites other than a general interest in the applications of information technology.
One-term course offered either term
Activity: Lecture
1.0 Course Unit

OIDD 215 Intro to Analytics and the Digital Economy
Over the past decade, there has been a dramatic rise in the use of technology skills and data analytic thinking to solve business problems in many domains, including finance, HR, policy, transport, and strategy. As a result, the modern “analytic leader” increasingly requires the use of technology, statistics, and data skills to facilitate business analysis. This includes knowing how to effectively frame data-driven questions and use a new generation of technology tools that are becoming available to acquire, analyze, interpret, and communicate insights derived from data. Students in this hands-on course will engage with weekly labs that introduce them to new technologies, techniques, and data-driven business challenges.
Activity: Lecture
0.5 Course Units

OIDD 220 Introduction to Operations Management
This course introduces basic concepts of operations management and application of the same in business practice today. We will examine the theoretical foundations of operations management and how these principles or models can be employed in both tactical and strategic decision making. Topics covered in detail are forecasting techniques, planning under deterministic and uncertain demand, operations planning and scheduling, queuing theory, service operations management, newsvendor models, risk pooling strategies in firms, capacity and revenue management, and supply chain coordination. We will conclude by discussing how supply chains evolve under technological change.
One-term course offered either term
Activity: Lecture
1.0 Course Unit

OIDD 221 Operations Strategy and Process Management
This course examines how organizations can develop and leverage excellence in process management. The first module focuses on operations strategy. In these classes, we examine what constitutes an operations strategy and how organizations can create value by managing complexity, uncertainty, and product development. In the second half of the course, we discuss recent developments in both manufacturing and service industries. Specifically, we examine initiatives in quality, lean manufacturing and enterprise-wide planning systems. The course is recommended for those interested in consulting or operations careers, as well as students with an engineering background who wish to develop a better understanding of managing production processes.
One-term course offered either term
Activity: Lecture
1.0 Course Unit
Notes: Cross listed with ESE 522

OIDD 222 Internet Law & Policy
The Internet has become central to business and daily life. This course looks at how courts, legislatures, and regulators confront the major legal issues that the Internet poses. The fundamental challenge is that law comes from governments and other institutions in specific places, but the Internet is global and virtual. Conflicts such as the shutdown of the Napster peer-to-peer file-sharing service and the debate over “network neutrality” regulations for broadband access illustrate the challenge. How does the legal system think about Google, Skype, Twitter, and Facebook? How should it?
One-term course offered either term
Also Offered As: LGST 222
Activity: Lecture
1.0 Course Unit
Notes: cross listed with LGST 222
OIDD 224 Analytics for Service Operations
This course considers tools and concepts that can generate operational excellence for the production and delivery of services in industries such as banking, transportation, health care, and communications. Since services typically are intangible, not storable or transportable, and often highly variable, the management of their operations is complex and involves distributed operations with a significant amount of customer contact. Therefore, the understanding and effective management of service operations requires specialized analytical tools and customer-centric focus. This course covers a mix of topics with the emphasis on quantitative methods, application of analytics and strategic frameworks. The class will introduce simple models and basic concepts that support analysis of tradeoffs in a variety of common service processes. Students also will have the opportunity to apply the ideas and analytical models developed in the course to a particular service industry. They will do so by conducting a guided, application group project which includes opportunities for in-depth analysis of a particular service process and field work.
Taught by: Faculty
Activity: Lecture
1.0 Course Unit

OIDD 236 Scaling Operations in Technology Ventures: Linking Strategy and Execution
This course helps students learn to make strategic scaling decisions that are grounded in operational reality. Students will study how to build and evaluate the “operation systems” of the firm to maximize value with the focus on scaling the firm’s operations. This involves tailoring the firm’s operational competencies, assets, and processes to a specific business strategy. The course will approach the challenge of scaling operations and operations strategy by taking a holistic view that incorporates competitive strategy, financial evaluation, and the customer experience.
Activity: Lecture
1.0 Course Unit

OIDD 245 Analytics and the Digital Economy
Students who take this course will engage with the world of data science using tools such as Tableau and R that are becoming increasingly popular in industry. The first half of the course is designed for students with limited experience with data projects, and while familiarity with R, via courses such as STAT 405 or STAT 470, will be ideal preparation, students with other programming exposure can pick up the required skills via review sessions and self-instruction. The second half of the course extends students’ experience to industry applications of text mining and machine learning and requires students to work with more unstructured data. Each week of the course will be devoted to analysis of a data set from a particular industry (e.g. HR, sports, fashion, real estate, music, education, politics, restaurants, non-profit work), which we will use to answer business questions by applying analytic techniques. The course is very hands-on, and students will be expected to become proficient at applying data to business decisions and at effectively analyzing large data sets to inform decisions about business problems.
Activity: Lecture
1.0 Course Unit

OIDD 261 Risk Analysis and Environmental Management
Taught by: Kunreuther
One-term course offered either term
Also Offered As: BEPP 261, BEPP 761, BEPP 961, ESE 567, OIDD 761
Activity: Lecture
1.0 Course Unit
Notes: Crosslisted with OIDD 761, BEPP 261, 761, 961, and ESE 567. See description under OIDD 761.

OIDD 263 Environmental & Energy Economics and Policy
This course examines environmental and energy issues from an economist’s perspective. Over the last several decades, energy markets have become some of the most dynamic markets of the world economy, as they experienced a shift from heavy regulation to market-driven incentives. First we look at scarcity pricing and market power in electricity and gasoline markets. We then study oil and gas markets, with an emphasis on optimal extraction and pricing, and geopolitical risks that investors in hyrocarbon resources face. We then shift gears to the sources of environmental problems (many of which are energy-related), and policy makers can intervene to solve some of these problems. We talk about the economic rationale for a broad range of possible policies: environmental taxes, subsidies, performance standards and cap-and-trade. In doing so, we discuss fundamental concepts in environmental economics such as externalities, valuation of the environment and the challenge of designing international agreements. At the end of the course, there will be special attention for the economics and finance of renewable energy and policies to foster its growth. Finally, we discuss the transportation sector, and analyze heavily debated policies such as fuel-economy standards and subsidies for green vehicles.
Taught by: Arthur van Benthem
Also Offered As: BEPP 263
Activity: Lecture
1.0 Course Unit

OIDD 290 Decision Processes
This course is an intensive introduction to various scientific perspectives on the processes through which people make decisions. Perspectives covered include cognitive psychology of human problem-solving, judgment and choice, theories of rational judgment and decision, and the mathematical theory of games. Much of the material is technically rigorous. Prior or current enrollment in STAT 101 or the equivalent, although not required, is strongly recommended.
Prerequisites: STAT 101 or equivalent strongly recommended.
Activity: Lecture
1.0 Course Unit

OIDD 291 Negotiations
Negotiation is the art and the science of creating good agreements between two or more parties. This course develops managerial negotiation skills by mixing lectures and practice, using cases and exercises in which students negotiate with each other. The cases cover a wide range of problems and settings: one-shot deals between individuals, repeated negotiations, negotiations over several issues, and negotiations among several parties (both within and between organizations). Class participation and case studies account for half the course grade. Students will also write about a negotiation experience outside of class.
One-term course offered either term
Also Offered As: LGST 206, MGMT 291
Activity: Lecture
1.0 Course Unit
OIDD 292 Adv Topics Negotiation
This course is designed to teach negotiation principles and to enable students to develop their negotiation skills. This course builds upon and assumes familiarity with the negotiation concepts covered in the prerequisite for this course: "Negotiations." In this course, we extend the study and practice of negotiations, and we develop a deeper understanding of how specific aspects of the negotiation process impact outcomes. Through course lectures, readings, and exercises, students will develop a rich framework for thinking about the negotiation process and acquire tools for guiding the negotiation process.
Also Offered As: LGST 292, MGMT 292
Activity: Lecture
1.0 Course Unit

OIDD 298 Study Abroad
Activity: Lecture
1.0 Course Unit

OIDD 299 Judgment & Decision Making Research Immersion
This class provides a high-level introduction to the field of judgment and decision making (JDM) and in-depth exposure to the process of doing research in this area. Throughout the semester you will gain hands-on experience with several different JDM research projects. You will be paired with a PhD student or faculty mentor who is working on a variety of different research studies. Each week you will be given assignments that are central to one or more of these studies, and you will be given detailed descriptions of the research projects you are contributing to and how your assignments relate to the successful completion of these projects. To complement your hands-on research experience, throughout the semester you will be assigned readings from the book Nudge by Thaler and Sunstein, which summarizes key recent ideas in the JDM literature. You will also meet as a group for an hour once every three weeks with the class's faculty supervisor and all of his or her PhD students to discuss the projects you are working on, to discuss the class readings, and to discuss your own research ideas stimulated by getting involved in various projects. Date and time to be mutually agreed upon by supervising faculty and students. the 1CU version of this course will involve approx. 10 hours of research immersion per week and a 10-page paper. The 0.5 CU version of this course will involve approx 5 hours of research immersion per week and a 5-page final paper. Please contact Maurice Schweitzer if you are interested in enrolling in the course: schweitzer@wharton.upenn.edu
Course usually offered in fall term
Activity: Lecture
0.5 Course Units
Notes: Instructor permission required to enroll.

OIDD 311 Business Computer Languages
This course is taught with the more descriptive title of "Scripting for Business Analytics." "Business Analytics" refers to modeling and analysis undertaken for purposes of management and supporting decision making. The varieties of techniques and methods are numerous and growing, including simple equational models, constrained optimization models, probabilistic models, visualization, data analysis, and much more. Elementary modeling of this sort can be undertaken in Excel and other spreadsheet programs, but "industrial strength" applications typically use more sophisticated tools, based on scripting languages. Scripting languages are programming languages that are designed to be learned easily and to be used for special purposes, rather than for large-scale application programming. This course focuses on the special purposes associated with business analytics and teaches MATLAB and Python in this context. MATLAB and Python are widely used in practice (both in management and in engineering), as are the business analytic methods covered in the course. Prior programming experience is useful, but not required or presumed for this course.
One-term course offered either term
Activity: Lecture
1.0 Course Unit

OIDD 314 Enabling Technologies
Conducting business in a networked economy invariably involves interplay with technology. The purpose of this course is to improve understanding of technology (what it can or cannot enable) and the business drivers of technology-related decisions in firms. We will be discussing some of the new and most disruptive technologies right now to stimulate thought on new applications for commerce and new ventures, as well as their implications to the tech industry as a whole. Topics include social media, online advertising, big data, and cloud computing. The course will take a layered approach (from network infrastructure) to data infrastructure to applications infrastructure, or vice versa. This course is designed to teach negotiation principles and to enable students to develop their negotiation skills. This course builds upon and assumes familiarity with the negotiation concepts covered in the prerequisite for this course: "Negotiations." In this course, we extend the study and practice of negotiations, and we develop a deeper understanding of how specific aspects of the negotiation process impact outcomes. Through course lectures, readings, and exercises, students will develop a rich framework for thinking about the negotiation process and acquire tools for guiding the negotiation process.
Also Offered As: LGST 292, MGMT 292
Activity: Lecture
1.0 Course Unit

OIDD 662 Advanced Topics in Business Analytics
This course is taught with the more descriptive title of "Scripting for Business Analytics." "Business Analytics" refers to modeling and analysis undertaken for purposes of management and supporting decision making. The varieties of techniques and methods are numerous and growing, including simple equational models, constrained optimization models, probabilistic models, visualization, data analysis, and much more. Elementary modeling of this sort can be undertaken in Excel and other spreadsheet programs, but "industrial strength" applications typically use more sophisticated tools, based on scripting languages. Scripting languages are programming languages that are designed to be learned easily and to be used for special purposes, rather than for large-scale application programming. This course focuses on the special purposes associated with business analytics and teaches MATLAB and Python in this context. MATLAB and Python are widely used in practice (both in management and in engineering), as are the business analytic methods covered in the course. Prior programming experience is useful, but not required or presumed for this course.
One-term course offered either term
Activity: Lecture
1.0 Course Unit
OIDD 315 Data Base Management Systems
Organizations continue to increase their reliance on computerized database management and information retrieval systems. Whether purchasing airplane tickets, managing retail merchandise, processing financial trades or simply sending email, data management defines the modern firm. This course aims to provide students with both a practical and theoretical introduction to the design, implementation, and use of such systems. Students are introduced to the fundamental concepts and principals of data management and gain practical experience by designing and deploying a working system. Throughout the course, case studies are used to illustrate theoretical concepts while acquainting students with innovative commercial uses of these systems.
One-term course offered either term
Activity: Lecture
1.0 Course Unit

OIDD 316 Systems Analysis, Design, and Implementation
At its surface this course introduces students to the management and technical issues associated with planning and designing large-scale computer systems. It does so in part as an elaboration of Fred Brooks’s observation that “The technology, the surrounding organization, and the traditions of the craft conspire to define certain items of paperwork.” But if that were our only goal, we would soon find ourselves mired in (and probably arguing about) the minutiae of how such paper items ought to be constructed - not a very helpful pedagogical exercise. So then, at a deeper level we seek to understand why the conspiracy endures, and why in spite of it, systems still take too long and cost too much to build as a systems project’s team members struggle to understand one another across disparate discourse communities and world views, differences in experience and training, and over long periods of time. More than anything else, within the context of working with the main tools and techniques of systems analysis and design, this course treats communication, corroboration, and thinking within the boundaries of a technology-oriented project as its primary subjects.
One-term course offered either term
Activity: Lecture
1.0 Course Unit

OIDD 319 Advanced Decision Systems: Evolutionary Computation
This course is taught with the more descriptive title of "Agents, Games, and Evolution." It explores applications and fundamentals of strategic behavior. Strategic, or game-theoretic, topics arise throughout the social sciences. The topics include—and we discuss—trust, cooperation, market-related phenomena (including price equilibria and distribution of wealth), norms, conventions, commitment, coalition formation, and negotiation. They also include such applied matters as design of logistics systems, auctions, and markets generally (for example, markets for electric power generation). In addressing these topics we focus on the practical problem of finding effective strategies for agents in strategic situations (or games). Our method of exploration will be experimental: we review and discuss experiments, principally computational experiments, on the behavior of boundedly rational agents in strategic (or game-theoretic) situations. Course work includes readings, discussions in class (organized as a seminar), examinations, and a course project on a topic chosen by the participants.
One-term course offered either term
Activity: Seminar
1.0 Course Unit

OIDD 321 Introduction to Management Science
Understanding how to use data and business analytics can be the key differential for a company's success or failure. This course is designed to introduce fundamental quantitative decisionmaking tools for a broad range of managerial decision problems. Topics covered include linear, nonlinear, and discrete optimization, dynamic programming, and simulation. Students will apply these quantitative models in applications of portfolio management, electricity auctions, revenue management for airlines, manufacturing, advertising budget allocation, and healthcare scheduling operations. Emphasis in this course is placed on mathematical modeling of real world problems and implementation of decision making tools.
One-term course offered either term
Activity: Lecture
1.0 Course Unit

OIDD 325 Computer Simulation Models
This course focuses on agent-based computational models in the social sciences, especially in economic, in commercial and in strategic (game-theoretic) contexts. This relatively recent and now rapidly-developing form of computer simulation seeks to explain and predict complex social phenomena “from the ground up”, through interactions of comparatively simple agents. The course reviews experimental and theoretical results, and exposes the students to modern development environments for this form of simulation. Students have the opportunity to design and implement agent-based simulations. Programming, however, is not required. This course aims to integrate various topics in agent-based simulation, while developing an appreciation of the problems that are particularly characteristic of this form of simulation so that students will understand its promise and potential.
One-term course offered either term
Activity: Lecture
1.0 Course Unit

OIDD 353 Mathematical Modeling and its Application in Finance
Quantitative methods have become fundamental tools in the analysis and planning of financial operations. There are many reasons for this development: the emergence of a whole range of new complex financial instruments, innovations in securitization, the increased globalization of the financial markets, the proliferation of information technology and the rise of high-frequency traders, etc. In this course, models for hedging, asset allocation, and multi-period portfolio planning are developed, implemented, and tested. In addition, pricing models for options, bonds, mortgage-backed securities, and other derivatives are studied. The models typically require the tools of statistics, optimization, and/or simulation, and they are implemented in spreadsheets or a high-level modeling environment, MATLAB. This course is quantitative and will require extensive computer use. The course is intended for students who have strong interest in finance. The objective is to provide students the necessary practical tools they will require should they choose to join the financial services industry, particularly in roles such as: derivatives, quantitative trading, portfolio management, structuring, financial engineering, risk management, etc. Prospective students should be comfortable with quantitative methods such as basic statistics and the methodologies (mathematical programming and simulation) taught in OIDD612 Business Analytics and OIDD321 Management Science (or equivalent). Students should seek permission from the instructor if the background requirements are not met.
One-term course offered either term
Also offered as: OIDD 653
Prerequisite: OIDD321 (or a similar optimization class)
Activity: Lecture
1.0 Course Unit
**OIDD 380 Operations Strategy Practicum**
This course focuses on the management of operations at manufacturing and service facilities located in Israel that are used either by domestic corporations or by multinational companies. The emphasis is on the evolving patterns of operations strategies adopted by firms for producing products, sourcing manufacturing, distributing products, delivering services and managing product design as well as on programs for enhancing quality, productivity and flexibility and managing technology. We will focus on formulation and execution of such strategies for established Israeli multinationals with world class operations and innovative strategies as well as start-ups and smaller companies that are scaling their global supply chain infrastructure to support growth. The course will consist of a set of site visits in Israel during Winter Break that will provide the opportunity to observe company processes directly and in-class sessions which include lectures, case discussions and management speakers who will describe their companies' current strategy. NOTE: THIS COURSE REQUIRES YOU TO SUBMIT AN APPLICATION FOR ADMISSION. Enrollment will be limited. Please contact Ramon Jones at ramjones@wharton.upenn.edu for more information. Application available at https://global.upenn.edu/pennabroad/pgs.

Prerequisites: OIDD 101 or an equivalent course that introduces basics concepts of operations management, supply chains and quantitative methods. Other OIDD and related courses or prior experience can also be used to satisfy the pre-requisite requirement (check with instructor).

Activity: Lecture
1.0 Course Unit

Notes: Application required through Penn Global: https://global.upenn.edu/pennabroad/pgs.

**OIDD 397 Retail Supply Chain Management**
Also Offered As: OIDD 697
Activity: Lecture
0.5 Course Units

Notes: See description under OIDD 697

**OIDD 399 Supervised Study**
One-term course offered either term
Activity: Independent Study
1.0 Course Unit

Notes: Instructor permission required to enroll (except section 002).
Wharton Undergraduate students must also receive approval from the Undergraduate Division. Section 002 is the Management and Technology Freshman Seminar; instruction permission is not required for this section and is only open to MT students.

**OIDD 410 Decision Support Systems**
One-term course offered either term
Also Offered As: OIDD 672
Activity: Lecture
1.0 Course Unit

Notes: Crosslisted with OIDD 672. See description under OIDD 672.

**OIDD 415 Product Design**
This course provides tools and methods for creating new products. The course is intended for students with a strong career interest in new product development, entrepreneurship, and/or technology development. The course follows an overall product design methodology, including the identification of customer needs, generation of product concepts, prototyping, and design-for-manufacturing. Weekly student assignments are focused on the design of a new product and culminate in the creation of a prototype, which is launched at an end-of-semester public Design Fair. The course project is a physical good - but most of the tools and methods apply to services and software products. The course is open to any Penn sophomore, junior, senior or graduate student.

Also Offered As: IPD 515, MEAM 415, OIDD 515
Corequisite: Studio Recitation (Spring Semester only)
Activity: Lecture
1.0 Course Unit

**OIDD 416 Design and Development of Web-Based Products and Services**
In this course, students will study innovation and new product development in the context of Web-based products and services. This course lies at the intersection of product design and information technology; it is intended for students with general interests in the design of new products and/or information technology management. The course builds from a general product design methodology. For example, students begin with opportunity identification and analysis of user needs. However, the course also extends principles and practices used in innovation and new product development to information technologies in general and the Web in particular. For example, design-for-manufacturing is addressed with open-source software and Web services. Robust Engineering and Design of Experiments is applied to paper prototyping and server log analysis. The course is an interdisciplinary, integrative project-based course. Through weekly assignments, students apply the tools and techniques to the design of a new product, culminating in the initial roll-out of a working service. The course is open to juniors and seniors in SEAS or Wharton

Activity: Lecture
1.0 Course Unit

**OIDD 418 The India Startup Ecosystem**
Introduce Penn undergraduate juniors to the entrepreneurship and innovation ecosystem in India through a pre-departure course covering topics in entrepreneurship, innovation, venture capital and technology in India and then matching students to a specific short-term project with a Bangalore-based startup. The students will complete preliminary work on the project assignment during the second half of the spring semester, then travel as a group to Bangalore with an instructor and course TAs for two weeks of immersion in the startup to which they have been assigned for their entrepreneurship project. Please visit http://bit.ly/OIDD418 for more information and to submit an application.

Also Offered As: MGMT 418
Activity: Lecture
0.5 Course Units

Notes: Penn Wharton Entrepreneurship will manage a competitive application process to admit ten students into the course. All costs associated with international travel, ground transportation, room and board will be covered for student participants through funding provided to Penn Wharton Entrepreneurship to support this immersion experience. For more information and the application: http://bit.ly/OIDD418
**OIDD 469 Information Strategy and Economics**
The course is devoted to the study of the strategic use of information and the related role of information technology. The topics of the course vary year to year, but generally include current issues in selling digital products, intermediation, and disintermediation, designing and competing in electronic markets, outsourcing, and technology project management. Heavy emphasis is placed on utilizing information economics to analyze new and existing businesses in information-intensive industries.

Technology skills are not required, although a background in information technology management (equivalent to OPIM210), strategic management or managerial economics is helpful.

One-term course offered either term
Activity: Lecture
1.0 Course Unit

**OIDD 490 The Science of Behavior Change**
The objective of this 14-week discussion-based seminar for advanced undergraduates is to expose students to cutting-edge research from psychology and economics on the most effective strategies for changing behavior sustainably and for the better (e.g., promoting healthier eating and exercise, encouraging better study habits, and increasing savings rates). The weekly readings cover classic and current research in this area. The target audience for this course is advanced undergraduate students interested in behavioral science research and particularly those hoping to learn about using social science to change behavior for good. Although there are no pre-requisites for this class, it is well-suited to students who have taken (and enjoyed) courses like OIDD 290: Decision Processes, PPE 203/PSYC 265: Behavioral Economics and Psychology, and MKTG 266: Marketing for Social Impact and are interested in taking a deeper dive into the academic research related to promoting behavior change for good. Instructor permission is required to enroll in this course. Please complete the application if interested in registering for this seminar: https://tinyurl.com/bcfg-class-application. The application deadline is July 15, 2019.

One-term course offered either term
Also Offered As: PSYC 490
Activity: Seminar
1.0 Course Unit
Notes: Please complete the application if interested in registering for this seminar: https://tinyurl.com/bcfg-class-application. The deadline to apply is July 15, 2019.

**OIDD 515 Product Design**
This course provides tools and methods for creating new products. The course is intended for students with a strong career interest in new product development, entrepreneurship, and/or technology development. The course follows an overall product design methodology, including the identification of customer needs, generation of product concepts, prototyping, and design-for-manufacturing. Weekly student assignments are focused on the design of a new product and culminate in the creation of a prototype, which is launched at an end-of-semester public Design Fair. The course project is a physical good - but most of the tools and methods apply to services and software products. The course is open to any Penn sophomore, junior, senior or graduate student.

Also Offered As: IPD 515, MEAM 415, OIDD 415
Corequisite: Studio Recitation
Activity: Lecture
1.0 Course Unit
Notes: Only Wharton MBA candidates are allowed to register for OIDD 515. Non-MBA students must register for the OIDD 415, MEAM 415 or IPD 515 cross-listing for the course.

**OIDD 611 Quality and Productivity**
Matching supply with demand is an enormous challenge for firms: excess supply is too costly, inadequate supply irritates customers. In the course, we will explore how firms can better organize their operations so that they more effectively align their supply with the demand for their products and services. Throughout the course, we illustrate mathematical analysis applied to real operational challenges—we seek rigor and relevance. Our aim is to provide both practical knowledge and high-level insights needed by general managers and management consultants. We will demonstrate that companies can use (and have used) the principles from this course to significantly enhance their competitiveness.

Course usually offered in fall term
Activity: Lecture
0.5 Course Units

**OIDD 612 Business Analytics**
"Managing the Productive Core: Business Analytics" is a course on business analytics tools and their application to management problems. Its main topics are optimization, decision making under uncertainty, and simulation. The emphasis is on business analytics tools that are widely used in diverse industries and functional areas, including operations, finance, accounting, and marketing.

Course usually offered in spring term
Activity: Lecture
0.5 Course Units

**OIDD 613 Online Business Models and the Information-Based Firm**
Information technology has transformed many industries, including media, financial services, and retailing, among others. These technologies have changed not only how we produce services (e.g., outsourcing and offshoring, and their newest extension, cloud computing) but what services we offer (virtual experiences, online advertising, long tail products and services, and social networking). The purpose of this course is to improve understanding of how information technologies enable transformation of business models within existing organizations as well as the development of completely new business models and new organizational forms. The course will serve as an introductory course on information technologies and will serve as a foundation on which students can explore more advanced technology concepts.

Course usually offered in spring term
Activity: Lecture
0.5 Course Units

**OIDD 614 Innovation**
The course is first and foremost an intensive, integrative, project course in which student teams create one or more real businesses. Some businesses spun out of the course and now managed by alumni include Terrapass Inc. and Smatchy Inc. The project experience is an exciting context in which to learn key tools and fundamentals useful in innovation, problem solving, and design. Examples of these tools and fundamentals are: problem definition, identification of opportunities, generating alternatives, selecting among alternatives, principles of data graphics, and managing innovation pipelines. The course requires a commitment of at least 10 hours of work outside of class and comfort working on unstructured, interdisciplinary problems. Students with a strong interest in innovation and entrepreneurship are particularly encouraged to enroll.

Please read carefully the syllabus posted on-line before registering for this course.

Course usually offered in fall term
Activity: Lecture
0.5 Course Units
OIDD 615 Operations Strategy
Operations strategy is about organizing people and resources to gain a competitive advantage in the delivery of products (both goods and services) to customers. This course approaches this challenge primarily from two perspectives: 1) how should a firm design its products so that they can be profitably offered; 2) how can a firm best organize and acquire resources to deliver its portfolio of products to customers. To be able to make intelligent decisions regarding these high-level choices, this course also provides a foundation of analytical methods. These methods give students a conceptual framework for understanding the linkage between how a firm manages its supply and how well that supply matches the firm's resulting demand. Specific course topics include designing service systems, managing inventory and product variety, capacity planning, approaches to sourcing and supplier management, constructing global supply chains, managing sustainability initiatives, and revenue management. This course emphasizes both quantitative tools and qualitative frameworks. Neither is more important than the other.
Course usually offered in spring term
Activity: Lecture
0.5 Course Units

OIDD 621 Decision Models and Uncertainty
The applicability and use of management science models have increased dramatically in recent years due to the extraordinary improvements in computer, information, and communication technologies. Personal computers and friendly interfaces have become effective "delivery vehicles" for powerful decision models that were once the exclusive province of experts. This core course in management science has a twofold purpose. First, it seeks to introduce simple models and ideas that provide powerful (and oftentimes surprising) qualitative insights about a large spectrum of managerial problems. Its main topics include linear and integer programming, decision making under uncertainty, and simulation. Second, it aims to give a feeling for the kinds of problems that can be tackled quantitatively, the methods and software available for doing so and the difficulties involved in gathering the relevant data. The emphasis is on models that are widely used in diverse industries and functions areas, including finance, operations, accounting, and marketing.
Course usually offered in fall term
Activity: Lecture
0.5 Course Units
Notes: Lecture and discussion, with case studies and problem assignments.

OIDD 632 Operations Management: Supply Chain Management
Matching supply with demand is a primary challenge for a firm: excess supply is too costly, inadequate supply irritates customers. Matching supply to demand is easiest when a firm has a flexible supply process, but flexibility is generally expensive. In this course we will 1) learn how to assess the appropriate level of supply flexibility for a given industry and 2) explore strategies for economically increasing a firm's supply flexibility. While tactical models and decisions are part of this course, the emphasis is on the qualitative insights needed by general managers or management consultants. We will demonstrate that companies can use (and have used) the principles from this course to significantly enhance their competitiveness.
Course usually offered in spring term
Activity: Lecture
0.5 Course Units
Notes: Lectures, cases, class discussions.

OIDD 636 SCALING OPERATIONS: Linking Strategy and Execution
THE GOAL OF THIS COURSE is to make strategic scaling decisions that are grounded in operational reality. We study how to build and evaluate the operational business model of the firm to maximize value with the focus on scaling the firm's operations. We will approach the challenge of scaling by taking a holistic view that incorporates competitive strategy, financial evaluation, and the customer experience. We focus on decisions and challenges that many firms that try to scale their operations face with the focus on assessing the readiness of the firm to scale, and the required steps to scale. In particular, we will discuss whether the firm should build competencies in-house (i.e., investing in a portfolio of assets) or buy them (i.e., developing and implementing a global sourcing strategy and integrating external partners) and the risks associated with scaling these. We will also discuss the organizational implications of scaling.
Prerequisites: There are no formal prerequisites to the class. Students who have already taken OIDD 611, OIDD 615, and STAT 613 should be equipped for the class. Other students should have a solid understanding of elementary probability and statistics. For questions regarding the specifics of your background, please contact the instructor.
Activity: Lecture
0.5 Course Units

OIDD 642 Analytics for Services
This course covers a range of analytical methods that are useful tools for capacity management in services, and it will provide you with insights into the economics of a range of services businesses including (i) High-level planning models that account for multiple dimensions of service capacity, (ii) Low-level models of system congestion that capture the relationship between capacity choices, quality of service and, in some cases, system revenue, (iii) Statistical estimation and forecasting models to characterize key measures of future supply and demand.
Prerequisites: Students who have already taken OIDD 611, OIDD 612, and STAT 613 should be well equipped for the class. Other students should have a solid understanding of elementary probability, statistics and linear programming. For questions regarding the specifics of your background, please contact the instructor.
Activity: Lecture
0.5 Course Units
Notes: Class participation, case write-ups, online quizzes, self-study exercises and a final exam.

OIDD 643 Analytics for Revenue Management
This course introduces you to the essential concepts and techniques required to understand and implement revenue management (RM). The need for repeated, rapid cycles of estimation and optimization has driven the development of a set of analytical tools that are particularly well suited for RM. This course focuses on those tools.
Prerequisites: Students who have already taken OPIM 612 and STAT 613 should be well equipped for this class. Other students should have a solid understanding of elementary probability, statistics and constrained optimization. For questions regarding the specifics of your background, please contact the instructor.
Activity: Lecture
0.5 Course Units
Notes: Class participation, case write-ups, online quizzes, self-study exercises and a final exam.
OIDD 652 Design and Development of Web-Based Products and Services
This course is designed as an introduction to the process of product design with a focus on Web-based desktop and mobile consumer products and services. This is a course on designing products as distinct from (and complementary to) building a business. The course is implemented as a team-based experiential learning exercise; students learn the design process by developing multiple prototypes of a Web/mobile-based product or service. Teams will apply different prototyping techniques (paper, wireframes, landing pages) over multiple iterations of their project. This is not a course on Web engineering. Technical skills are not a prerequisite. Neither should students expect to learn specific programming tools or techniques. This is not an entrepreneurship course. Students do not analyze business models, market size, pricing, costs, etc. This class introduces an iterative, data-driven, experiment-based design process. Through their project, students will practice multiple design iterations and gain exposure to tools for designing digital products and services.
Course not offered every year
Prerequisite: OIDD 614
Activity: Lecture
0.5 Course Units

OIDD 653 Mathematical Modeling and its Application in Finance
Quantitative methods have become fundamental tools in the analysis and planning of financial operations. There are many reasons for this development: the emergence of a whole range of new complex financial instruments, innovations in securitization, the increased globalization of the financial markets, the proliferation of information technology and the rise of high-frequency traders, etc. In this course, models for hedging, asset allocation, and multi-period portfolio planning are developed, implemented, and tested. In addition, pricing models for options, bonds, mortgage-backed securities, and other derivatives are studied. The models typically require the tools of statistics, optimization, and/or simulation, and they are implemented in spreadsheets or a high-level modeling environment, MATLAB. This course is quantitative and will require extensive computer use. The course is intended for students who have strong interest in finance. The objective is to provide students the necessary practical tools they will require should they choose to join the financial services industry, particularly in roles such as: derivatives, quantitative trading, portfolio management, structuring, financial engineering, risk management, etc. Prospective students should be comfortable with quantitative methods, such as basic statistics and the methodologies (mathematical programming and simulation) taught in OIDD 612 Business Analytics or OIDD 632 Management Science (or equivalent). Students should seek permission from the instructor if the background requirements are not met.
Taught by: Tsoukalas
One-term course offered either term
Also Offered As: OIDD 353
Prerequisite: Either OIDD 612 or OPIM 612 (or a similar optimization class)
Activity: Lecture
1.0 Course Unit

OIDD 654 Product Design and Development
The course provides the student with a number of tools and concepts necessary for creating and managing product development processes. The course consists of two interwoven parts. First, it presents the basic steps that are necessary for moving from a "cool idea" to a product sufficiently mature to launch an entrepreneurial start-up. This includes cases, lectures, and exercises on topics like identifying customer needs, developing a product concept as well as effective prototyping strategies. The capstone of this first part is a real project in which student teams conceptualize and develop a new product or service up to the completion of a fully functional prototype. Second, the course discusses a number of challenges related to product development as encountered by management consultants, members of cross-functional development teams as well as general managers. We will analyze several cases related to, among others, resource allocation in R&D organizations, organizational forms of product development teams, as well as managing development projects across large geographic distances.
Course usually offered in spring term
Activity: Lecture
0.5 Course Units
Notes: Lectures, case and problem analyses, group presentations, the development of a new product to the prototype stage.

OIDD 655 Operations, Marketing, and Design Integration
This course covers topics that span marketing and operations management. Students will examine issues and decisions that require significant coordination between managers in marketing and operations. Topics include channel management, supply chain design, product variety management and service operations, pricing and control.
Course usually offered in spring term
Prerequisites: MKTG 621, MKTG 622, OPIM 631, OPIM 632.
Activity: Lecture
0.5 Course Units
Notes: Crosslisted with MKTG 655

OIDD 656 Operations Strategy
This course examines how organizations can develop and leverage excellence in process management. The first module focuses on operations strategy. In these classes, we examine what constitutes an operation strategy and how organizations can create value by managing complexity, uncertainty, and product development. In the second half of the course, we discuss recent developments in both manufacturing and service industries. Specifically, we examine initiatives in quality, lean manufacturing, and enterprise-wide planning systems. The course is recommended for those interested in consulting or operations careers, as well as students with an engineering background who wish to develop a better understanding of managing production processes.
One-term course offered either term
Prerequisites: OPIM 621, OPIM 631, and OPIM 632 or equivalent
Activity: Lecture
1.0 Course Unit
Notes: Crosslisted with ESE 522
OIDD 658 Service Operations Management
The service sector represents the largest segment of most industrial economies. In the U.S., for example, it accounts for approximately 70% of GDP and 70% of employment. In addition to this "pure" service sector, the operations and competitive positions of many manufacturing firms are becoming increasingly service-oriented. While operational excellence is critical for success in most industries today, in a wide range of service industries this is particularly true. For example, recent, significant deregulation in banking, health care, and communications has led to intensified competition and pressure on operations. At the same time, the rapid evolution of information technology has enabled firms to operate in a fashion - and offer a level of service - that has not been previously possible. Elements common to most services make the management of their operations complex, however. In particular, services are intangible, not storable or transportable, and often highly variable. Frequently their delivery involves distributed operations with a significant amount of customer contact. All of these factors make service operations end up looking quite a bit different than manufacturing operations, and the task of achieving excellence in them requires specialized analysis frameworks and tools. This course covers a mix of qualitative and quantitative models that provide the necessary tools. The class will focus on simple models that should help you to better understand both the difficulty of managing and the underlying economics of the service operations being considered. You will have the opportunity to apply these course tools in a group service assessment field project.
One-term course offered either term
Prerequisites: Courses in operations management, linear programming, probability and statistics
Activity: Lecture
0.5 Course Units

OIDD 659 Advanced Topics
The specific content of this course varies from semester to semester, depending on student and faculty interest. Recent topics have included global operations, product design and development, quality management, and logistics strategy. See department for course description.
One-term course offered either term
Prerequisites: To enroll, you should have already completed one of the following courses: OIDD 415, MEAM 415, IPD 509, OIDD 515, IPD 515, MKTG 262, ARCH 725 or MKTG 853.
Activity: Lecture
1.0 Course Unit

OIDD 662 Enabling Technologies
This course is about understanding emerging technology enablers with a goal of stimulating thinking on new applications for commerce. No prerequisite or technical background is assumed. The class is self-contained (mainly lecture-based) and will culminate in a class-driven identification of novel businesses that exploit these enablers. No prerequisite or technical background is assumed. Students with little prior technical background can use the course to become more technologically informed. Those with moderate to advanced technical background may find the course a useful survey of emerging technologies. The course is recommended for students interested in careers in consulting, investment banking and venture capital in the tech sector.
Also Offered As: OIDD 314
Activity: Lecture
1.0 Course Unit
Notes: Lectures, discussions, assignments and class participation.

OIDD 664 Database and Information Management Systems
Data and information are critical to the modern organization. Whether used in knowledge management, business intelligence, enterprise resource planning (ERP), product design, marketing, personalization and other aspects of managing customer relationships (CRM), the underlying principles of data management are the same. This course aims to provide a practical introduction to the fundamental principles. Examples and exercises will cover the relational database tools at the core of ERP, CRM, and on-line exchanges and portals. However, the course will also use the same basic foundations to consider emerging technologies and standards such as XML, ebXML, UDDI, etc.
One-term course offered either term
Activity: Lecture
1.0 Course Unit

OIDD 665 Operations Management in Health Care
In an era where health care systems around the world face rapidly rising costs and quality issues, organizations large and small are looking into the operational side of health care for solutions. Likewise, the abundance of unfulfilled needs in the health care marketplace has led to an array of technology ventures with innovative new products and services. In this course, we apply the tools of operations management to analyze the health care value chain. The course consists of four modules: (1) the management of productivity, quality, and variability by care providers, (2) capacity and investment decisions under uncertainty confronting pharmaceuticals, (3) the design of health insurance by health plans and the determination of health benefits by employers, and (4) business ideas and operations models from the intersection of academic research and technology ventures. Students will learn from case discussions, hands-on decision tools, and several distinguished speakers and alumni from Stanford Hospital & Clinics, Merck, U.S. Naval Academy, and Deloitte Consulting. No prior exposure to the health care industry is assumed. The course prepares students for several career paths including consulting, operations management, and health care administration and is open to both first- and second-year MBA students.
Taught by: Faculty
Prerequisite: OPIM 631
Activity: Lecture
0.5 Course Units

OIDD 669 Advanced Topics in Information Strategy
The capstone course for the MBA major "Information Strategy, Systems, & Economics," OPIM 669 covers essential topics in information strategy - such as pricing of information goods; competing in electronic markets; market transparency and search issues; information-intensive strategies; IT outsourcing; and software project management - that have high impact on 21st-century business but are not typically covered in other Wharton courses.
Course usually offered in spring term
Activity: Lecture
1.0 Course Unit
OIDD 670 Special topics in Information Systems: Simulation and Dynamic Competitive Strategy
This course introduces tools and techniques for modeling dynamic competitive strategies - strategies that evolve over time as you and competitors take actions in response to each other and to changes in the competitive environment. This goes beyond case discussions and approximates the rigor of theoretical or game theoretical analyses, even for problems for which no traditional analytical solutions exist. Students of the course will learn to model business environments and design simulators with the goal of gaining insight and designing policies for strategy implementation. Students will develop understanding of the timing and sequencing of the actions required, as well as understanding how to modify strategies on the fly based on changing conditions or objectives. Students are introduced to state of the art software for general purpose business modeling and simulation.
Course not offered every year
Activity: Lecture
0.5 Course Units

OIDD 672 Decision Support Systems
The past few years have seen an explosion in the amount of data collected by businesses and have witnessed enabling technologies such as database systems, client-server computing and artificial intelligence reach industrial strength. These trends have spawned a new breed of systems that can support the extraction of useful information from large quantities of data. Understanding the power and limitations of these emerging technologies can provide managers and information systems professionals new approaches to support the task of solving hard business problems. This course will provide an overview of these techniques (such as genetic algorithms, neural networks, and decision trees) and discuss applications such as fraud detection, customer segmentation, trading, marketing strategies and customer support via cases and real datasets.
One-term course offered either term
Also Offered As: OIDD 410
Activity: Lecture
1.0 Course Unit
Notes: Lectures and discussions, written assignments, projects using software packages to build models.

OIDD 673 Global Supply Chain Mgmt.
Several forces, ranging from technology that has dramatically reduced the cost of communication, to political developments such as the opening up of China, Vietnam, and Eastern Europe, have created an avalanche of outsourcing and offshoring and lead to supply chains that stretch halfway around the world. This course will study the many questions that arise in the management of such global supply chains, including: Which design and production activities to do in-house and which to outsource? Where to locate various activities around the world? How to forecast the many factors that influence these decisions, including inflation in cost factors such as labor and freight, and the likelihood of future government regulation or political instability? How to keep the supply chain flexible so as to adapt to change? How to manage a geographically disbursed supply chain, including what relationships to have with vendors to ensure low cost, high quality, flexibility, safety, humane labor practices and respect for sustainability of the environment? The course is highly interactive, using case discussions in most classes and senior supply chain executives in many sessions. Grades are based on one-third each on class participation, individual and/or write-ups of the discussion questions for 3 of the class sessions, and a course paper.
Activity: Lecture
0.5 Course Units

OIDD 676 Electronic Markets: Structures, Market Mechanisms and IT Enabled Strategies
This course deals with Electronic Markets and Market structures and the strategic uses of information within the firm. The course consists of four related modules on the design and functioning of Business to Business markets, use of technology to source services from global providers - i.e., outsourcing of business processes (as opposed to IT), the use of technological platforms such as CRM and Web Services and the technology-enabled precision pricing techniques. Further, students are exposed to strategy formulation and execution in an online market where they compete both against each other and against (electronic) agents. This course is recommended for students interested in a career in consulting, strategic management and to students interested in information technology related professions. The course will be delivered through a mix of lectures, case discussions and hands-on trading in virtual markets using different market mechanisms. The course Web cafe will be used for discussions and responses from instructor and TA. We do not assume or require any specific technical knowledge. Workings of electronic markets and market mechanisms and how IT can enable the formulation of new strategies and empower firms to define new markets in ways that were not possible until recently. This is an advanced elective that covers several essential topics in information strategy - IT and market structure, impact of IT on knowledge-intensive products and services and creating hybrid markets that span multiple channels. Students will compete in simulated electronic markets, using different market mechanisms and formulate information-based strategies. Students will also study how IT has enabled the globalization of services through the outsourcing of processes (BPO) and how quasi market structures which combine elements of organization and markets are emerging in knowledge-intensive service industries.
Prerequisites: MGEC 621 is recommended.
Activity: Lecture
0.5 Course Units

OIDD 680 Operations Strategy Practicum
This course will focus on the management of operations at manufacturing and service facilities of domestic corporations and foreign multinational companies. Our emphasis will be on the evolving patterns of operations strategies adopted by firms for producing products, sourcing manufacturing, distributing products, delivering services and managing product design as well as on programs for enhancing quality, productivity and flexibility. The course will focus on the formulation and execution of such strategies for a collection of firms in the context of the current dynamics of global competition. The course consists of a set of site visits and in-class sessions which include lectures, case discussions and management speakers who will describe their company's current strategy.
Activity: Lecture
1.0 Course Unit

OIDD 690 Managerial Decision Making
The course is built around lectures reviewing multiple empirical studies, class discussion and a few cases. Depending on the instructor, grading is determined by some combination of short written assignments, tests, class participation and a final project (see each instructor’s syllabus for details).
One-term course offered either term
Also Offered As: MGMT 690
Activity: Lecture
1.0 Course Unit
Notes: Crosslisted with MGMT 690.
**OIDD 691 Negotiations**

Negotiation is the art and science of creating good agreements. In this course we will work on both, studying economics and psychology for the science, and practicing actual negotiations for the art. Throughout we think of negotiation in general terms, relevant not only to salary negotiations and home buying, but performance evaluations, speeches, group collaborations and interpersonal relationships. We practice these kinds of negotiations in 2-, 3-, 4-, and 6-person exercises. Potential reasons to skip this particular negotiation course: 1) We have a strong attendance policy, 2) We have strong no-computers/phones policies, 3) the course is very discussion oriented, 4) We survey your work colleagues about your influence tactics, and 5) you have a short assignment due almost every class. Beginning with the second week of class, if you miss one class you lose a letter grade. If you miss two classes you fail. We have this policy because it is an experiential class, and because your attendance directly affects classmates you are paired with. For some weeks you can attend another section if necessary. Cross-listed with MGMT691 and LGST806.

One-term course offered either term
Also Offered As: LAW 518, LGST 806, MGMT 691
Prerequisites: STAT 621, OPIM 621
Activity: Lecture
1.0 Course Unit
Notes: Crosslisted with LGST 806, MGMT 691. Lectures, cases, presentations, and written assignments.

**OIDD 692 Advanced Topics Negotiation**

This is a course the builds on the basic Negotiation course. In this course, we explore a wide range of negotiation topics from crisis and hostage negotiations, to the role of emotions including anxiety, envy and anger in negotiations, to backlash effects for women in negotiations, and the role of alcohol in negotiations. We will survey many aspects of current negotiation research, discuss historic negotiation cases, and students will participate in role-play exercise. Many of the role play exercises will involve multi-party negotiations and afford opportunities to hone skills in team-based negotiations.

One-term course offered either term
Also Offered As: LGST 692, MGMT 692
Activity: Lecture
1.0 Course Unit
Notes: Cases, presentations, lecture and discussion.

**OIDD 693 Influence**

One-term course offered either term
Also Offered As: LGST 693
Activity: Lecture
0.5 Course Units

**OIDD 695 Semester in San Francisco Regional Seminar**

As part of the Wharton Semester in San Francisco (SSF) program, this course is designed to (i) provide integrative material that emphasizes links between finance, marketing, product design, negotiations, and other themes in the SSF academic curriculum; (ii) link classroom theories and principles to actual practice by reflecting on the academic literature and (iii) highlight the unique characteristics of, and the programs proximity to, the Bay Area economy. All students participating in the SSF are required to register for this Regional Seminar.

One-term course offered either term
Activity: Lecture
0.5 Course Units

**OIDD 697 Retail Supply Chain Management**

This course is highly recommended for students with an interest in pursuing careers in: (1) retailing and retail supply chains; (2) businesses like banking, consulting, information technology, that provides services to retail firms; (3) manufacturing companies (e.g. P&G) that sell their products through retail firms. Retailing is a huge industry that has consistently been an incubator for new business concepts. This course will examine how retailers understand their customers' preferences and respond with appropriate products through effective supply chain management. Supply chain management is vitally important for retailers and has been noted as the source of success for many retailers such as Wal-mart and Home Depot, and as an inhibitor of success for e-tailers as they struggle with delivery reliability. See M. L. Fisher, A. Raman and A. McClelland, "Rocket Science Retailing is Coming - Are You Ready?" Harvard Business Review, July/August 2000 for related research.

One-term course offered either term
Also Offered As: OIDD 397
Activity: Lecture
0.5 Course Units
Notes: Lectures, case discussion, guest speakers. Class participation, papers, and a team report.

**OIDD 761 Risk Analysis and Environmental Management**

This course is designed to introduce students to the role of risk assessment, risk perception and risk management in dealing with uncertain health, safety and environmental risks including the threat of terrorism. It explores the role of decision analysis as well as the use of scenarios for dealing with these problems. The course will evaluate the role of policy tools such as risk communication, economic incentives, insurance, regulation and private-public partnerships in developing strategies for managing these risks. A project will enable students to apply the concepts discussed in the course to a concrete problem. Cross-listed with BEPP 761.

One-term course offered either term
Also Offered As: BEPP 261, BEPP 761, BEPP 961, ESE 567, OIDD 261
Activity: Lecture
1.0 Course Unit
Notes: Cross-listed with OIDD 261, BEPP 761, 761, 961, and ESE 567

**OIDD 762 Environmental Sustainability and Value Creation**

This course provides an overview of topics related to corporate sustainability with a focus on how sustainable approaches can create value for the firm. We will explore trends in corporate practices and consider several case studies to examine the interactions between the firm and the environment. Several guest lecturers will discuss how they have addressed sustainability within their company. This course has three objectives: to increase your knowledge as future top decision makers on key environmental questions; to recognize environmental concerns as competitive opportunities; to teach students to think strategically and act entrepreneurially on environmental issues. You will leave the class with a tool-kit for action.

One-term course offered either term
Activity: Lecture
0.5 Course Units

**OIDD 763 Energy Markets & Policy**

Also Offered As: BEPP 763
Activity: Lecture
1.0 Course Unit

**OIDD 793 People Analytics**

Also Offered As: MGMT 793
Activity: Lecture
0.5 Course Units
OID 898 Advanced Topics
Course not offered every year
Activity: Lecture
1.0 Course Unit

OID 900 Foundations of Decision Processes
The course is an introduction to research on normative, descriptive and prescriptive models of judgement and choice under uncertainty. We will be studying the underlying theory of decision processes as well as applications in individual group and organizational choice. Guest speakers will relate the concepts of decision processes and behavioral economics to applied problems in their area of expertise. As part of the course there will be a theoretical or empirical term paper on the application of decision processes to each student's particular area of interest.
One-term course offered either term
Prerequisite: STAT 510 or 550
Activity: Lecture
1.0 Course Unit
Notes: Non-PhD students must contact instructor for permission to enroll.

OID 904 Experimental Economics
Many theories in economics can be tested usefully in experiments in which researchers control parameters that are uncontrolled in natural settings. This course presents the theory of the experimental method and validity along with several examples of experimental testing: simple competitive equilibrium, intertemporal competitive equilibrium, asset markets, futures markets, bargaining models, tournaments, reputation-building in repeated games, etc.
Course not offered every year
Also Offered As: BEPP 904
Prerequisite: OIDD900 or permission of the instructor
Activity: Lecture
1.0 Course Unit

OID 906 Proseminar in Operations and Information Management
Advanced seminar focusing on topics in Operations, Information and Decisions research
Course not offered every year
Activity: Seminar
1.0 Course Unit

OID 910 Intro to Linear, Nonlinear and Integer Optimization
Introduction to mathematical optimization for graduate students who would like to be intelligent and sophisticated users of mathematical programming but do not necessarily plan to specialize in this area. Linear, integer and nonlinear programming are covered, including the fundamentals of each topic together with a sense of the state-of-the-art and expected directions of future progress. Homework and projects emphasize modeling and solution analysis, and introduce the students to a large variety of application areas.
Course usually offered in fall term
Also Offered As: ESE 504
Activity: Lecture
1.0 Course Unit
Notes: Crosslisted w/ ESE 504.

OID 912 Introduction to Optimization
This course constitutes the second part of a two-part sequence and serves as a continuation of the summer math camp. Mathematical optimization provides a unifying framework for studying issues of rational decision-making, optimal design, effective resource allocation and economic efficiency. It is a central methodology of many business-related disciplines, including operations research, marketing, accounting, economics, game theory and finance. In many of the disciplines, a solid background in optimization theory is essential for doing research. This course provides a rigorous introduction to the fundamental theory of optimization. It examines optimization theory in two primary settings: static optimization and optimization over time (dynamic programming). Applications from problem areas in which optimization plays a key role are also introduced. The goal of the course is to provide students with a foundation sufficient to use basic optimization in their own research work and/or to pursue more specialized studies involving optimization theory. The course is designed for entering doctoral students. The prerequisites are calculus, linear algebra and some familiarity with real analysis, as covered in summer math camp. Other concepts are developed as needed throughout the course.
Prerequisites: OID 910, OID 930.
Activity: Lecture
0.5 Course Units

OID 913 Advanced Linear Programming
Course not offered every year
Prerequisite: OID 910/ESE504 or equivalent
Activity: Lecture
1.0 Course Unit

OID 914 Advanced Non-Linear Programming
Course not offered every year
Prerequisite: OIDD910 or equivalent
Activity: Lecture
1.0 Course Unit

OID 915 Advanced Graph Theory
Deals mainly with algorithmic and computational aspects of graph theory. Topics and problems include reachability and connectivity, setcovering, graph coloring, location of centers, location of medians, trees, shortest path, circuits, traveling salesman problem, network flows, matching, transportation, and assignment problems.
Course not offered every year
Prerequisite: OIDD910 / ESE504 or equivalent
Activity: Lecture
1.0 Course Unit
OIDD 916 Advanced Integer Programming
In-depth review of solution methods: Lagrangean relaxation and column generation, Benders partitioning, cross-decomposition, surrogate relaxation, cutting planes and valid inequalities, logical processing, probing, branch-and-bound, branch-and-price. Study of special problems and applications: matching, location, generalized assignment, traveling salesman, forest planning, production scheduling. Prerequisite: OIDD 910/ESE 504 or equivalent. Please email the instructor for any questions regarding the prerequisite. Course not offered every year
Prerequisite: OIDD 910/ESE 504 or equivalent
Activity: Lecture
1.0 Course Unit

OIDD 920 Empirical Research in Operations Management
Empirical research in Operations Management has been repeatedly called for over the last 10-15 years, including calls made from the academic thought leaders in the field as well as by many of the editors of the top academic journals. Remarkably though, most researchers in the field would be pressed to name even three empirical papers published in such journals like Management Science or Operations Research. But, has there really been so little published related to empirical Operations Management (you might be surprised to learn that all five bullets listed above has been addressed by Management Science papers)? What types of problems in operations are interesting and worthwhile studying from an empirical viewpoint? How can one get started with an empirical research project in Operations Management? These are the questions that are at the heart of this course. Specifically, the objective of this course is to (a) expose doctoral students to the existing empirical literature and (b) to provide them with the training required to engage in an empirical study themselves.
Activity: Lecture
0.5 Course Units

OIDD 930 Stochastic Models
This course introduces mathematical models describing and analyzing the behavior of processes that exhibit random components. The theory of stochastic processes will be developed based on elementary probability theory and calculus. Topics include random walks, Poisson processes, Markov chains in discrete and continuous time, renewal theory, and martingales. Applications from the areas of inventory, production, finance, queueing and communication systems will be presented throughout the course.
Course usually offered in fall term
Prerequisite: STAT510 or 550 or equivalent
Activity: Lecture
0.5 Course Units

OIDD 931 Stochastic Processes II
Extension of the material presented in OIDD930 to include renewal theory, martingales, and Brownian motion.
Course usually offered in spring term
Prerequisite: OIDD930
Activity: Lecture
0.5 Course Units

OIDD 932 Queuing Theory
This course presents the mathematical foundations for the analysis of queueing systems. We will study general results like Little's law and the PASTA property. We will investigate standard queueing systems (Markovian systems and variations thereof) and simple queueing networks, and we will analyze standard queueing systems through renewal approximations, and read papers on applied queueing models.
Course offered in spring term
Prerequisite: OIDD930 and OIDD931
Activity: Lecture
0.5 Course Units

OIDD 934 Dynamic Programming and Stochastic Models
The course goal is to provide a brief but fairly rigorous introduction to the formulation and solution of dynamic programs. Its focus is primarily on understanding the mathematical foundations of dynamic programming. We will cover discrete state space problems, over finite or infinite time horizon, with and without discounting. Structured policies and their theoretical foundation will be of particular interest. Computational methods and approximation methods will be addressed. Applications are presented throughout the course, such as inventory policies, production control, financial decisions, and scheduling.
Course usually offered in spring term
Prerequisite: OIDD930
Activity: Lecture
0.5 Course Units

OIDD 937 Methods Stumblers: Pragmatic Solutions to Everyday Challenges in Behavioral Research
This PhD-level course is for students who have already completed at least a year of basic stats/methods training. It assumes students already received a solid theoretical foundation and seeks to pragmatically bridge the gap between standard textbook coverage of methodological and statistical issues and the complexities of everyday behavioral science research. This course focuses on issues that (i) behavioral researchers are likely to encounter as they conduct research, but (ii) may struggle to figure out independently by consulting a textbook or published article. One-term course offered either term
Activity: Lecture
0.5 Course Units

OIDD 940 Operations Management
Concepts, models, and theories relevant to the management of the processes required to provide goods or services to consumers in both the public and private sectors. Includes production, inventory and distribution functions, scheduling of service or manufacturing activities, facility capacity planning and design, location analysis, product design and choice of technology. The methodological basis for the course includes management science, economic theory, organization theory, and management information system theory.
Course usually offered either term
Activity: Lecture
1.0 Course Unit
Notes: Crosslisted with ESE 620

OIDD 941 Distribution Systems Seminar
Seminar on distribution systems models and theory. Reviews current research in the development and solution of models of distribution systems. Emphasizes multi-echelon inventory control, logistics management, network design, and competitive models.
Course usually offered in spring term
Prerequisite: OIDD940
Activity: Lecture
1.0 Course Unit
OIDD 943 Retail Operations  
Activity: Lecture  
0.5 Course Units  

OIDD 950 Perspectives on Information Systems  
Provides doctoral students in Operations and Information Management and other related fields with a perspective on modern information system methodologies, technologies, and practices. State-of-the-art research on frameworks for analysis, design, and implementation of various types of information systems is presented. Students successfully completing the course should have the skills necessary to specify and implement an information system to support a decision process.  
One-term course offered either term  
Activity: Lecture  

OIDD 951 Seminar on Logic Modeling  
Seminar on the elements of formal logic necessary to read and contribute to the Logic modeling literature, as well as the implementation principles for logic models. The primary topics include elements of sentence and predicate logic, elements of modal logics, elements of semantics, mechanical theorem proving, logic and database, nonmonotonic reasoning, planning and the frame problem, logic programming, and metainterpreters.  
Course not offered every year  
Prerequisites: Permission of the instructor and some prior knowledge of logic or Prolog  
Activity: Seminar  
1.0 Course Unit  

OIDD 952 Computational Game Theory  
Seminar on principles of knowledge-based systems including expert systems. Topics include basics of expert systems, knowledge representation, meta-level reasoning, causal reasoning, truth maintenance systems, model management, planning systems and other applications.  
Course not offered every year  
Prerequisites: Permission of instructor and knowledge of logic and Prolog or Lisp  
Activity: Seminar  
1.0 Course Unit  

OIDD 955 Research Seminar in Information Systems  
This course provides an overview of some of the key Information Systems literature from the perspective of Insormation Strategy and Economics (ISE) and Information Decision Technologies (IDT). This course is intended to provide an introduction for first year OIDD doctoral students, as well as other Wharton doctoral students, to important core research topics and methods in ISE and IDT in order for students to do research in the field of Information Systems. While it is intended as a "first course" for OPIM doctoral students in ISE and IDT, it may also be useful for students who are engaged in research or plan to perform information technology related research in other disciplines.  
Activity: Lecture  
1.0 Course Unit  

OIDD 960 Research Seminar in Information Technology - Economic Perspectives  
Explores economic issues related to information technology, with emphasis on research in organizational or strategic settings. The course will follow a seminar format, with dynamically assigned readings and strong student contribution during class sessions (both as participant and, for one class, as moderator.)  
Course usually offered in fall term  
Activity: Lecture  
1.0 Course Unit  

OIDD 961 Research Seminar in Information: Strategy, Systems and Economics  
This is the advanced doctoral-level research research in information strategy and economics that builds on the foundations developed in OPIM960. Much of the content will be focused on current research areas in information strategy such as the information and organizational economics, information technology and firm performance, search cost and pricing, information and incentives, coordination costs and the boundary of the firm, and the economics of information goods (including pricing and intellectual property protection). In addition, promising empirical approaches such as the use of intelligent agents for data collection or clickstream data analysis will be discussed.  
Activity: Lecture  
1.0 Course Unit  

OIDD 989 Topics in Operations and Information Management  
The specific content of this course varies form semester to semester, depending on student and faculty interests.  
Course not offered every year  
Activity: Lecture  
0.5 Course Units  

OIDD 992 Conflict Mgmt Seminar  
This seminar exposes students to the central issues in conflict management research. This course covers both analytic and behavioral perspectives of conflict management, and describes how the field has developed. Through discussions of theory and empirical research, the course aims to develop a foundation for understanding the extant literature and how common methodological tools have shaped the types of questions conflict management scholars have investigated - and neglected.  
Course usually offered in spring term  
Activity: Lecture  
1.0 Course Unit