OPERATIONS,INFORMATION AND DECISIONS (WH) {OIDD}

L/R 101. An Introduction to Operations, Information and Decisions. (C) Staff.

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 atWharton as well as providing an overview of problems and techniques that characterize disciplines that comprise Operations and Information Management.

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 OPIM101, 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.

210. Management Information Systems. (C) Staff.

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.

221. (ESE 522) Operations Strategy and Process Management. (C) Staff. Cross listed with ESE 522

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.

222. (LGST222) Internet Law & Policy. (C) Staff. cross listed with LGST 222

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?

223. Service Operations Management. (C) Staff.

240. (LGST240) Gamification for Business.

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261. (BEPP261, BEPP761, BEPP961, ESE 567, OIDD761) Risk Analysis and Environmental Management. (C) Kunreuther. Crosslisted with OPIM 761, BPUB 261, 761, 961, and ESE 567. See description under OPIM 761.

For Spring 2015 - If Risk Analy & Env Mgmt is closed after the pre-registration period, please e-mail Kyle Dix at kyledix@wharton.upenn.edu to be added to the wait list for the class. Please be sure to include your Name, Student ID #, what section you are interested in (OPIM, BPUB, or ESE) and list what class level you are in. We will do our best to accomodate as many students as possible on the wait list.

263. (BEPP263) Environmental & Energy Economics and Policy. Arthur van Benthem.

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 fundamentalconcepts 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 anaylze heavily debated policies such as fuel-economy standards and subsidies for green vehicles.

290. Decision Processes. Prerequisite(s): STAT 101 or equivalent strongly recommended.

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.

291. (LGST206, MGMT291, OIDD691) Negotiations. (C)

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.

292. (LGST292, MGMT292) 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.

OPERATIONS,INFORMATION AND DECISIONS (WH) {OIDD}

299. JUDG & DEC MAKING RES IM. (A)

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 Katy Milkman if you are interested in enrolling in this course: kmilkman@wharton.upenn.edu

311. Business Computer Languages. (C)

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.

314. (OIDD662) Enabling Technologies. (C) Staff.

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 direct enablers of commerce) to first, understanding and then, thinking about technology enablers. Network infrastructure layers include fundamentals of wired and wireless infrastructure technologies such as protocols for networking, broadband technologies - for last (DSL, Cable etc) and other miles (advances in optical networking) and digital cellular communications. Data infrastructure layers include usage tracking technologies, search technologies and data mining. Direct application layers include personalization technologies (CRM), design technologies for content and exchanges, software renting enablers, application service provision, agents and security mechanisms. Finally some emberging technology enablers (such as bluetooth, biometrics and virtual reality) are identified and discussed.

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321. Introduction to Management Science. (C) Staff.

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.

315. Data Base Management Systems. (C) Staff.

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.

316. (OIDD661) Systems Analysis, Design, and Implementation. (C) Staff.

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.

SM 319. Advanced Decision Systems: Evolutionary Computation. (C)

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.

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325. (PHIL203) Computer Simulation Models. (C) Staff.

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.

353. (OIDD653) MATH MDLNG APPL IN FNCE. (C) Tsoukalas.Prerequisite(s): OPIM321 (or a similar optimization class).

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) taugh tin OPIM612 Business Analytics and OPIM321 Management Science (or equivalent). Students should seek permission from the instructor if the background requirements are not met.

410. (OIDD672) Decision Support Systems. (C) Staff. Crosslisted with OPIM 672. See description under OPIM 672.

397. (OIDD697) Retail Supply Chain Management. See description under OPIM 697

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398. (OIDD698) Retail Supply Chains..

The course will examine how retailers understand their customers' preferences and respond with appropriate products through effective supply chain management. The course class sections will deal with the following major items: (1) linking finance and operations in retailing, (2) what assortment of products should a retailer carry in each store, (3) optimizing the inventory carried of each SKU in each store, (4) markdown pricing, (5) store execution and (6) supply chain design. In addition, we will consider a broad range of issues facing two retailers, Mothers Work, and Best Buy, when we are visited by current and past senior executives from these firms.

   The course is highly recommended for students interested in careers in: (1) Retailing and retail supply chains, (2) Businesses like banking, consulting and information technology that provide services to retail firms, (3) Manufacturing companies that sell their products through retail firms. Even if you don't expect to work for a retailer, this course can be useful to you in two ways. First, because retailers are such dominant players in many supply chains today, it is important that the processes they follow be understood by manufacturers and distributors, or by the consultants and bankers that service retailers and their suppliers. Second, the problems retailers face (e.g., making data accessible, interpreting large amounts of data, reducing lead-times, eliciting the best efforts from employees, and so forth), are shared by firms in many other industries. It's easier to understand these issues through case studies in retailing because we all experience the industry as consumers and can readily relate to chronic problems such as stock outs and markdowns.

   The course will be highly interactive, using case discussions in more than half of the classes and including senior retail executives in a number of the class sessions.

399. Supervised Study. (C) 1 c.u. By appointment

Decision science majors read and report on a bibliography of works in their field of specialization provided by a faculty member.

412. Intro to Computer Programming.. (C)

415. (IPD 515, MEAM415) 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. The course is open to juniors and seniors in SEAS or Wharton.

416. (IPD 517) 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

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469. Information Strategy and Economics. (C)

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.

611. Quality and Productivity. (A)

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 tactical 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.

612. Business Analytics. (B)

"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.

621. Decision Models and Uncertainty. (A) Lecture and discussion, with case studies and problem assignments.

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 sicnece 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.

613. Managing the Productive Core of the Firm: Information and Business Transformation. (B)

Information technology has transformed many industries, including media, financial services, and retailing, among others. These technologies ahve 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.

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614. Innovation. (A)

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 and 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.

615. Operations Strategy. (B)

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 their 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 framekwork 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.

632. (LAW 517) Operations Management: Supply Chain Management. (B) Lectures, cases, class discussions.

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 wll 1) learn how to assess the apprppriate level of supply flexibility for a given industry and 2) explore stategies 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.
    Inactive

640. (LGST640) Digital Game Design Techniques for Business: Rules, Incentives, Applications. (C) Werbach, Hunter.Prerequisite(s): none.

Why can't work be fun? Leading firms are engaging in the practice of gamification, using the techniques of digital game designers to serve objectives as varied as marketing, human resources management, productivity enhancement, training, innovation, and customer engagement. This course will examine the mechanism of gamification and provide an understanding of their effective use in the modern firm. Cross-listed with LGST 640.
    The course will draw upon interdisciplinary source material as well as real-world case studies and production game environments to identify effective analytical models, strategies, techniques, and metrics for the application of games to business. It will also identify a number of significant pitfalls to the successful implementation of gamification techniques, notably legal and ethical issues, the difficulty of making things fun, and the problems with implementaing radical change in established firms. The course will include both in-person meetings and web-based online sessions.

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654. Product Design and Development. (B) Staff. Lectures, case and problem analyses, group presentations, the development of a new product to the prototype stage.

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.

652. Advanced Management Science: Models and Applications. (M) Prerequisite(s): OPIM 621.

This course will cover applications of decision models to managerial problems in a variety of business functions. The course will use management science techniques such as mathematical programming (LP/IP/NLP), Monte-Carlo simulation, decision trees, probability theory and statistical analysis as the vehicle for applying diverse management theories to real-world problems. Potential in-class applications include product-line selection, risk management, corporate real options, and supply-chain restructuring. The course will emphasize the practical application of these techniques; problems will be solved using popular packages such as Excel, and Crystal Ball.

653. (OIDD353) Mathematical Modeling and its Application in Finance. (C) Tsoukalas.Prerequisite (s): Either OPIM321 or OPIM612 (or a similar optimization class).

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

    quantitative methods, such as basic statistics and the methodologies (mathematical programming and simulation) taught in OPIM612 Business Analytics or OPIM321 Management Science (or equivalent). Students should seek permission from the instructor if the background requirements are not met.

655. (MKTG655) Operations, Marketing, and Design Integration. (B) Staff.Prerequisite(s): MKTG 621, MKTG 622, OPIM 631, OPIM 632. Crosslisted with MKTG 655

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.

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656. (ESE 522) Operations Strategy. (C) Staff.Prerequisite(s): OPIM 621, OPIM 631, and OPIM 632 or equivalent. Crosslisted with ESE 522

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 constitues an operation strategy and how organizations can create value by managing complexity, incertainty, 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 backround who wish to develop a better understandingof managing production processes.

664. Database and Information Management Systems. (C) Staff.

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.
    Inactive

658. Service Operations Management. (C) Staff.Prerequisite(s): Courses in operations management, linear programming, probability and statistics.

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 opertions 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 qalitative 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.

659. Advanced Topics in Quantitative Methods and Operations Management. (C) Staff.Prerequisite(s): OPIM 631 and OPIM 632.

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.
    Inactive

OPERATIONS,INFORMATION AND DECISIONS (WH) {OIDD}

662. (OIDD314) Enabling Technologies. Lectures, discussions, assignments and class participation.

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, investement banking and venture capital in the tech sector.

665. Operations Management in Health Care. Faculty.Prerequisite(s): OPIM 631.

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.

669. Advanced Topics in Information Strategy. (B) Staff.

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.

Inactive

672. (OIDD410) Decision Support Systems. (C) Staff. Lectures and discussions, written assignments, projects using software packagesto build models.

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.

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670. Special topics in Information Systems: Simulation and Dynamic Competitive Strategy. (M)

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.
    Inactive

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 one-third each on class participation, indivudla write-ups of the discussion questions for 3 of the class sessions, and a course paper.

676. Electronic Markets: Structures, Market Mechanisms and IT Enabled Strategies. Prerequisite (s): MGEC 621 is recommended.

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 strategic 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.

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690. (MGMT690) Managerial Decision Making. (C) Staff. Crosslisted with MGMT 690.

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).

698. (OIDD398) Value Netwoks. (M) Staff.

This is a project-based course run in a seminar format to explore current trends and opportunities for integration and coordination in IT-enabled value-chain networks. The curriculum is structured around a live case; students will work in teams to synthesize data from the live case and evaluate possible operational strategies and IT enablers in the context of a real, on-going business restructuring decision. Students will review a set of operations strategies affecting production, fulfillment, procurement product design, and support that may prove relevant e.g. Postponement, Mass Customization, Customer Service Differentiation, Buyer/Supplier Coordination. We also consider functionality that underlies relevant information technologies like Enterprise Resource Planning (ERP) or Customer Relationship Management (CRM), e.g. data integration, information quality, and security. Finally, we invite different vendors into the class to provide students with the opportunity to compare and contrast state-of-the-art IT and Operations Management solutions.
  Inactive

691. (LGST806, MGMT691, OIDD291) Negotiations. (C) Staff.Prerequisite(s): STAT 621,OPIM 621. Crosslisted with LGST 806, MGMT 691. Lectures, cases, presentations, and written assignments.

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.

693. (LGST693) INFLUENCE. (C)

697. (OIDD397) Retail Supply Chain Management. (C) Lectures, case discussion, guest speakers. Class participation, papers, and a team report.

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.

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761. (BEPP261, BEPP761, BEPP961, OIDD261) Risk Analysis and Environmental Management. (C) Staff. Cross listed with OPIM 261, BPUB 261, 761, 961, and ESE 567

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 BPUB 761.

762. Environmental Sustainability and Value Creation. (C) Staff. MBA mini elective.This course is one of the set of mini-elective courses satisfying the core requirement. Lecture and discussion including guest speakers. Class discussion, presentations, and final project.

This course approaches environmental issues, and sustainable development more largely, from the standpoint of business. It emphasizes the trends in corporate practices and uses case studies to examine the interactions between the environment and the firm. Value creation focuses on new innovative services and financial products in this fast growing sphere. 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.

763. (BEPP763) ENERGY MARKETS & POLICY.

898. Advanced Topics. (M)

900. (PSYC608) Foundations of Decision Processes. (C) Staff.Prerequisite(s): STAT 510 or 550.

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.

913. Advanced Linear Programming. (M) Prerequisite(s): OPIM 910/ESE504 or equivalent.

In-depth study of the theory and algorithms related to the solution of linear programming problems. Optimality conditions, duality and sensitivity analysis. Primal and dual simplex methods. Interior point methods. Large-scale optimization. Dantzig-Wolfe decomposition.

904. (BEPP904) Experimental Economics. (M) Staff.Prerequisite(s): OPIM900 or permission of the instructor.

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.

SM 906. Proseminar in Operations and Information Management. (M) Staff.

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910. (ESE 504) Concepts of Math Programming. (A) Staff. Crosslisted w/ ESE 504.

Introduction to mathematical programming for PhD students who would like to be intelligent and sophisticated consumers of mathematical programming theory but do not plan to specialize in this area. Integer and nonlinear programming are covered, including the fundamentals of each area together with a sense of the state-of-the-art and expected directions of future progress.

914. Advanced Non-Linear Programming. (M) Staff.Prerequisite(s): OPIM910 or equivalent.

Convex sets and functions. Tangent cones. Polar cones. Optimality conditions and duality theory. Methods for unconstrained and constrained optimization. Interior and exterior penalty methods. Lagrangean and augmented Lagrangean methods.

915. Advanced Graph Theory. (M) Staff.Prerequisite(s): OPIM910 / ESE504 or equivalent.

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.

916. Advanced Integer Programming. (M) Staff.Prerequisite(s): OPIM 910 or equivalent.

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.

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.

930. Stochastic Models. (A) Staff.Prerequisite(s): STAT510 or 550 or equivalent.

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.

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931. (STAT901) Stochastic Processes II. (B) Staff.Prerequisite(s): OPIM930. Crosslisted with STAT 901

Extension of the material presented in OPIM930 to include renewal theory, martingales, and Brownian motion.

932. Queuing Theory. (J) Staff.Prerequisite(s): OPIM930 and OPIM931.

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 analyze standard queueing systems (Markovian systems and variations thereof) and simple queueing networks, investigate infinite server models and many server approximations, study GI/G/1 queues through random walk approximations, and read papers on applied queueing models.

934. Dynamic Programming and Stochastic Models. (B) Staff.Prerequisite(s): OPIM930.

The course goal is to provide a brief but fairly rigorous introduction to the formulation and solution of dynamic programs. Its focus is primarily methodological. 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.

940. Operations Management. (C) Staff. Crosslisted with ESE 620

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.

941. Distribution Systems Seminar. (B) Staff.Prerequisite(s): OPIM940.

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.

943. Retail Operations..

950. Perspectives on Information Systems. (C) Staff.

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 inplementation 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.

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SM 951. Seminar on Logic Modeling. (M) Staff.Prerequisite(s): Permission of the instructor and some prior knowledge of logic or Prolog.

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.

SM 952. Computational Game Theory. (M) Staff.Prerequisite(s): Permission of instructor and knowledge of logic and Prolog or Lisp.

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.

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 OPIM 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.

960. Research Seminar in Information Technology - Economic Perspectives. (A)

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.)

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.

992. Conflict Mgmt Seminar. (B)