### Undergraduate Business Administration Program Courses

**About Course Numbers:**

Each Carnegie Mellon course number begins with a two-digit prefix that designates the department offering the course (i.e., 76-xxx courses are offered by the Department of English). Although each department maintains its own course numbering practices, typically, the first digit after the prefix indicates the class level: 70-1xx courses are freshman-level, 70-2xx courses are sophomore-level, etc. Depending on the department, 70-4xx courses may be either undergraduate senior-level or graduate-level, and xx-7xx courses and higher are graduate-level. Consult the Schedule of Classes (https://enr-apps.as.cmu.edu/open/SOC/socServlet) each semester for course offerings and for any necessary pre-requisites or co-requisites.

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**70-100 Global Business**

Fall and Spring: 9 units

The course is for non-Tepper BA students and provides a comprehensive overview of business, including how enterprises determine goals, strategies and operational tactics in competitive markets and the increasingly global environment. It covers different types of businesses - entrepreneurial and corporate, industries, markets, and economies. Students learn about the role of business in society, the various functional areas that make business work, and how companies develop plans and processes to achieve their goals for customers, shareholders, and employees. The course has special emphasis on providing a broad overview of business to augment students' major area of study for their professional development. Declared Tepper BA students are not eligible to enroll.

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**70-104 Business Leadership Endeavor I**

Fall and Spring: 3 units

Business Leadership Endeavor (BLE) is a required 3-mini course sequence (70-104, 70-204, 70-304) offered to undergraduate business students only. BLE 70-104 is the first mini of the BLE course sequence. Each previous mini will serve as a pre-requisite for the next in sequence. BLE introduces students to their leadership journey via four development frameworks: student development, personal development, professional development, and community development. BLE 70-104 will introduce students to the fundamental building blocks required for their development. Students will learn to develop and improve habits, sharpen personal and professional development skills, and develop meaningful networks.

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**70-106 Business Science**

Fall: 9 units

This course is only available for Business Majors. The focus on the class is on the three core "lenses" used to study and advance the science and practice of business. We will study: the mathematics of optimization, economics, and the behavior in and of organizations. These are the foundations of the disciplines of finance, accounting, marketing, ..., that follow in the curriculum. Over the course of the semester, we will tackle complex multifaceted business problems. Think of examples like, bike-share and the "share-economy," international trade and supply chain, AI and the impact on work. For each case, we will work to apply the three lenses. A pillar for the semester is that business problems are not siloed in narrow disciplines, we must draw resources from disciplines across the entire university. The second pillar of our class is solving all problems - across all of society - requires your understanding of business science. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75.

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**70-110 Business Computing**

Intermittent: 9 units

Students will learn how individuals and organizations use computing technologies to support and improve their businesses. At an individual level, students will build their skills with Microsoft Excel and other personal productivity tools. At an organizational level, the class looks at ways in which businesses of all sizes and types leverage computing technologies to run their businesses more efficiently, make better business decisions, and create new business opportunities. This course is reserved for first-year Business students; others may enroll by special permission from the UBA office only. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.

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**70-122 Introduction to Accounting**

Fall and Spring: 9 units

This course provides the knowledge and skills necessary for the student to understand financial statements and financial records and to make use of the information for management and investment decisions. Topics include: an overview of financial statements and business decisions; the balance sheet, the income statement, and the cash flow statement; sales revenue, receivables, and cash; cost of goods sold and inventory; long-lived assets and depreciation, and amortization; current and long-term liabilities; owners’ equity; investments in other corporations; an introduction to financial statement analysis and international issues dealing with financial statements.

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**70-204 Business Leadership Endeavor II**

Fall and Spring: 3 units

Business Leadership Endeavor (BLE) is a required 3-mini course sequence offered to undergraduate business students only. BLE 70-205 is the second mini of the BLE course sequence. Each previous mini will serve as a pre-requisite for the next in sequence. BLE introduces students to their leadership journey via four development frameworks: student development, personal development, professional development, and community development. BLE 70-104 will introduce students to the fundamental building blocks required for their development. Students will learn to develop and improve habits, sharpen personal and professional development skills, and develop meaningful networks.

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**70-207 Probability and Statistics for Business Applications**

Fall and Spring: 9 units

Elementary ideas in probability, statistics, and data analysis are presented in the context of their importance to modern business management. Course Website: http://tepper.cmu.edu/prospective-students/course-page/70207/probability-and-statistics-for-business

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**70-208 Regression Analysis**

Fall and Spring: 9 units

This class focuses on the statistical analysis of the relationship between two or more random variables. In particular, we examine the estimation of the conditional mean of the dependent variable as a function of independent variables using linear regression. We draw on statistical theory to determine the precision of our estimates and to conduct inference about the population, and we examine a number of applications to business, finance, and economics throughout the course. Prerequisites: 36-201 or 36-218 and 36-247 or 70-207 or 36-200 or 36-220

Course Website: http://tepper.cmu.edu/prospective-students/course-page/70208/regression-analysis

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**70-205 Business Leadership Endeavor III**

Fall and Spring: 9 units

This course provides the knowledge and skills necessary for the student to understand financial statements and financial records and to make use of the information for management and investment decisions. Topics include: an overview of financial statements and business decisions; the balance sheet, the income statement, and the cash flow statement; sales revenue, receivables, and cash; cost of goods sold and inventory; long-lived assets and depreciation, and amortization; current and long-term liabilities; owners’ equity; investments in other corporations; an introduction to financial statement analysis and international issues dealing with financial statements.

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**70-206 Business Leadership Endeavor IV**

Fall and Spring: 9 units

Business Leadership Endeavor (BLE) is a required 3-mini course sequence offered to undergraduate business students only. BLE 70-206 is the third mini of the BLE course sequence. Each previous mini will serve as a pre-requisite for the next in sequence. BLE introduces students to their leadership journey via four development frameworks: student development, personal development, professional development, and community development. BLE 70-205 will help students assemble their fundamental building blocks in a way that supports their continued development. The course will continue to emphasize the importance of strong habits, meaningful networks, and ongoing skill development. Students will begin to connect this development with personal and professional goals. Prerequisites: 70-104 or 70-105

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**70-200 Interdepartmental Studies**

Fall and Spring: 9 units

This course is open to students who wish to pursue an interdepartmental emphasis within the Business School. It allows students to combine their academic interests with the related areas of study available within the Business School. Course Website: http://tepper.cmu.edu/prospective-students/course-page/70200/interdepartmental-studies
70-246 Innovation & Entrepreneurial Mindset
Intermittent: 6 units
This course is designed to introduce students to the theory and frameworks used to develop and implement innovative solutions to societal and entrepreneurial problems. The curriculum incorporates the latest on innovative behavioral traits and frameworks with a highly experiential format to expose undergraduate students to out of the box thinking. For example, the instructor would use the lecture section of the class to explain the behavioral techniques that lead to innovative solutions (based on the Innovator's DNA by Clayton Christensen). Teams of 3-6 students each would then examine a problem and be asked to generate 3 potential solutions and a proposed solution, using the techniques presented. Volunteers from the local Carnegie Mellon and entrepreneurial community will serve as mentors and judges, thereby providing a real world learning and networking experience. Ultimately, the best solution will be selected, using a shark tank format. While the selection of a winning solution will be fun for the class, the students will be graded on their having demonstrated the theory and techniques presented in class. Each week will address a new and important topic related to the innovative and entrepreneurial mindset. Weekly format will include one day of lecture and one day of application of the theory introduced in a fun and competitive format.

70-257 Optimization for Business
Fall and Spring: 9 units
This course provides a mathematical foundation for the application of optimization and analytic techniques to business problems, as well as the practical implementation of these methods. Mathematical optimization techniques have been applied for decades in the context of logistics, supply chain management, and strategic planning, with great success. In recent years, the application of mathematical optimization has penetrated, and in some cases (re-)defined, many other areas such as the (financial) service industry, analytical marketing, health care, and web-based businesses. In this course, the most important methods and techniques underlying mathematical optimization are studied. These include linear programming, integer programming, and nonlinear programming as basic mathematical methodologies. Based on these, we also consider methodologies for particular problem classes such as network models and traveling salesman problems. During the course we will emphasize mathematical modeling, that is, creating a mathematical description that reflects a given practical problem described in words. Motivated by these mathematical models, we then discuss the necessary mathematical techniques for finding optimal solutions. Lastly, we consider the solution of these problems using optimization software, i.e., we represent the mathematical models in Excel and use Excel Solver to compute an optimal solution. Prerequisites: 21-259 or 21-256 or 21-254

70-258 Developing Blockchain Use Case
All Semesters: 6 units
Blockchains, or distributed ledger and consensus technologies, hold tremendous promise for improving markets and organically handling private, secure data. As CMU develops its own blockchain and token---CMU Coin---a central concern is to determine the set of applications that such technology would be most useful for. This course is designed for students to propose and, potentially, develop applications or use cases for a campus blockchain. http://tinyurl.com/cmucoincourse The course begins with a brief introduction to blockchain using Bitcoin as an example of a blockchain protocol. We will examine the market failure Bitcoin was intended to resolve and as well as the role of cryptography and distributed systems in enabling this new technology to create societal value. The course will go on to discuss the boundaries of the role of cryptography in blockchain. Next, we will use these tools to evaluate existing, real-world blockchain use cases with an eye towards developing our own applications of these emerging technologies. Along the way, we will learn practical development skills in distributed ledger technologies to understand blockchain programming and application development. Finally, students will propose their own blockchain use cases for CMU's own proprietary blockchain. No formal prerequisites, but familiarity with programming is highly recommended.

70-304 Business Leadership Endeavor III
Fall and Spring: 3 units
Business Leadership Endeavor (BLE) is a required 3-mini course sequence offered to undergraduate business students. BLE 70-305 is the third mini of the BLE course sequence. BLE introduces students to their leadership journey via four development frameworks: student development, personal development, professional development, and community development. BLE 70-305 will continue to build strong personal and professional skills as students get closer to their professional endeavors. Students will be applying learned skills in and out of the classroom and will begin to see the how the assembled skills are beneficial to themselves and others. This course will emphasize the importance of continued broad growth and lifelong learning. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-204 or 70-205

70-311 Organizational Behavior
Fall and Spring: 9 units
As you pursue your careers, you will inevitably depend on people to accomplish organizational goals; you will need to work for bosses, work with colleagues, and manage employees. Your ability to do well depends on having an understanding of the human side of management. This course introduces insights and tools from the behavioral and social sciences that will improve your ability to think and act strategically in these situations. Prerequisites: 76-102 or 76-101 or (76-106 and 76-107) or (76-106 and 76-108) or (76-107 and 76-108) or 76-245 or 76-331 or 76-347 or 76-327 or 76-102

70-321 Negotiation and Conflict Resolution
Intermittent: 9 units
This course will complement the technical and diagnostic skills you have learned in other courses. A basic premise of the course is that, while you will need analytical skills to discover optimal solutions to problems, you will also need a broad array of negotiation skills to implement these solutions and make sure that they are truly effective. Your long-term effectiveness - both in your professional and personal life - is likely to depend on your negotiating abilities. This course will give you the opportunity to develop these skills experientially and to understand the analytical frameworks that underlie negotiations. Prerequisites: 76-102 or 76-101 or (76-106 and 76-107) or (76-106 and 76-108) or (76-107 and 76-108)

70-332 Business, Society and Ethics
Fall and Spring: 9 units
This course draws upon actual cases to explore fundamental questions faced by businesses operating in the United States and elsewhere in the world. What justifies governmental regulation of your business? What are the rights of employers and employees? How does the law protect consumers? What laws protect the environment? How do you choose the best legal form for your business? What are the lines of power within a corporation? What protections are available to stakeholders? How do the antitrust laws protect competition? What responsibilities does a business have to the community in which it operates? What is the ethical foundation on which business ought to be conducted? The course puts businesses in their legal and ethical context. Prerequisites: 76-102 or 76-101 or (76-106 and 76-107) or (76-106 and 76-108) or (76-107 and 76-108)
70-339 FinTech
Intermittent: 9 units
The financial services industry is a leader in the use of information technology. Firms in banking, securities, investments, insurance and financial marketplaces are among the most information intensive and innovative users of technology. The course will examine the role and potential of technology in this industry. The course begins with a description of the financial markets, specifically equity, foreign exchange, and derivative markets, and the systems that enable them. It considers exchanges, ECNs, ATS's, Order Management Systems, Straight through Processing, Fix Protocol, and post trading clearance and settlement. It covers the design, evaluation and execution of popular trading strategies that are utilized by professionals in the various markets. There is increasing interest, in particular, on systematic trading strategies and execution systems because of their scalability and transparency. The course covers both Algorithmic and High Frequency Trading and analyzes issues regarding latency, scalability, and reliability. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisite: 70-391

70-340 Business Communications
Fall and Spring: 9 units
Business Communications develops and sharpens your written, oral, and interpersonal communication, introducing you to common forms of professional writing and speaking in specific business situations. The course explores crucial rhetorical issues that impact your ability to communicate and achieve your objectives as a business leader. Prerequisites: 76-102 or 76-101 or (76-106 and 76-107) or (76-106 and 76-108) or (76-107 and 76-108)

70-341 Team Dynamics and Leadership
Intermittent: 9 units
Organizations have greatly expanded their use of teams to accomplish a wide variety of objectives. Teams develop new products, provide professional services, and start new businesses. Temporary teams are frequently assembled to make difficult decisions, solve cross-functional problems, and generate new ideas. Advances in communication technology allow people dispersed across the globe to collaborate virtually, creating many new opportunities and challenges for leaders of such teams. This course will provide you the knowledge and skills to communicate in teams and to lead them effectively. It will help you better communicate in and lead teams and organizations. You will learn both effective leadership practices as well as how to avoid common leadership mistakes. Our readings reflect both the scientific and practice literatures and class exercises, cases, and projects provide the opportunity to apply what you learn. Prerequisites: 71-225 or 70-207 or 36-237 or 36-207 or 36-201 or 36-200 or 36-247 or 36-220
Course Website: http://tepper.cmu.edu/prospective-students/course-page/70341/organizational-communication (http://tepper.cmu.edu/prospective-students/course-page/70341/organizational-communication/)

70-342 Managing Across Cultures
Intermittent: 9 units
This course is designed for students who expect to do business in other countries or work with people from other cultures. It provides an intellectual framework for understanding other cultures (and eventually one's own), as well as detailed studies of particular countries. It discusses how culture defines organizations, contracts, personal relationships, attitudes toward authority, time and space, ethics, wealth, and subcultures, and how these affect business. Student teams study a culture of their choice and make presentations, based on interviews and literature research. Prerequisites: 76-101 or 76-102 or (76-107 and 76-108) or (76-107 and 76-106) or (76-108 and 76-106)

70-345 Business Presentations
Fall and Spring: 9 units
In this course, students prepare, present, discuss, and critique different oral presentations currently practiced in business. Topics include developing verbal and physical presence; planning presentations based on audience needs and expectations; projecting personal credibility and professionalism. Assignments and cases will vary from term to term and may include talks such as pitches, team-driven strategic plans, rallies, speeches, mock interviews, and other presentations that prepare students to succeed as oral communicators in the business world. Prerequisites: 70-340 or 73-270

70-348 Cross-Cultural Business Communications
Intermittent: 9 units
This course considers cultural behaviors, assumptions, values, and conflicts surrounding business communication across cultures. It will begin with an evolving definition of "culture" and consider several cultural variables that may affect communicative success (i.e. collectivist/individualist cultures, high-low-context languages, monochronic/polychronic cultures). Students will research and present findings on the characteristics of specific cultures. They will prepare business documents and presentations that build on the knowledge and skills acquired in 70-340, Business Communication, and reflect new sensitivities to the needs of specific cross-cultural audiences. This course is offered only at the Carnegie Mellon-Qatar campus. Prerequisites: 70-340 or 15-221 or 76-210

70-350 Acting for Business
Intermittent: 9 units
Acting for Business is an opportunity to unlock your potential as a communicator through becoming proficient, thorough and masterful at the principles and through a practical interpretation of the techniques of Acting. The course concerns itself with: a new self-awareness and greater confidence in public communication; the expansion and diversification of one's range of personal expression; methods to more effectively shape a public performance and of empowering the student to put his/her best self forward when in contact with an audience; and a re-investment in passion. The course focuses on the goals of: 1) solving issues regarding personal confidence; 2) commanding the space; 3) expanding one's personal comfort zone; 4) achieving the "Audience-Pleasing Form;" 5) utilizing the V.A.T. Communication Tools and strategies in learning the stages in the "Seven Stages to Executive Presence." The participants identify their individual challenges and confront those challenges head-on through the various assignments.

70-352 Business Acting
Spring: 3 units
This is a one-week course that is offered only at CMU in Qatar. This course provides a uniquely broadening educational experience for business students through an exploration and understanding of the process of Acting and the unique performer/audience relationship. Using techniques of Acting, the course will concern itself with: a new self-awareness and greater confidence in public communication; the expansion and diversification of one's range of personal expression; methods to more effectively shape a public performance and of empowering the student to put his/her best self forward when in contact with an audience; and a re-investment in passion.

70-353 Financial Regulation in the Digital Age
Intermittent: 9 units
The course will address the foundations of regulation (why regulate?) from various perspectives within the context of a high-tech market economy. Areas of focus include highlighting the sources of market failure (such as externalities, adverse selection, and natural monopoly) and potential remedies (such as taxes and fees, disclosure, price regulation, guarantees). The conflicting goals among regulators (and why we have regulation) as well as the sources of regulation will be considered along with regulatory competition/ arbitrage. Portions of the course will tackle relatively broad questions such as: Why regulate? What is the law of unintended consequences? What is the objective of a policy advocate? Are regulators and regulatory policies a systemic risk? Are our markets rigged? How can regulators enhance the predictability and credibility of their policies? How costly were government guarantees during the financial crisis? Should we bar insider trading? Should regulations be determined and motivated based upon cost-benefit analysis? How can we evaluate the success or failure of particular regulations and whether they have achieved their objectives? How does the Dodd-Frank Act promote financial stability? What basic aspects of the financial crisis did Dodd-Frank not address? (Rerun, 3 hours). Minimum grade standard of "C" applies only to economics courses. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: (21-120 or 21-112) and (21-259 or 21-256 or 21-268 or 21-269) and 73-230

70-349 Cross-Cultural Business Communications
Intermittent: 9 units
This course considers cultural behaviors, assumptions, values, and conflicts surrounding business communication across cultures. It will begin with an evolving definition of "culture" and consider several cultural variables that may affect communicative success (i.e. collectivist/individualist cultures, high-low-context languages, monochronic/polychronic cultures). Students will research and present findings on the characteristics of specific cultures. They will prepare business documents and presentations that build on the knowledge and skills acquired in 70-340, Business Communication, and reflect new sensitivities to the needs of specific cross-cultural audiences. This course is offered only at the Carnegie Mellon-Qatar campus. Prerequisites: 70-340 or 15-221 or 76-210
70-345 Communication: Social Media in Action
Intermittent: 6 units
Building upon what you already learned in Business Communications, this course will amplify your ability to successfully work in teams to produce social media content, collaborate via online mediums, and build online communication skills through development of an effective online presence. You will create and deliver social media content for your chosen organizations in this online space. This is a differentiator for you; after this course, you will be able to go into an interview confidently and share your team experience helping the organization build a successful social media presence. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.
Prerequisite: 70-340

70-364 Business Law
Intermittent: 9 units
This course covers the fundamental principles of law that govern business affairs in the United States, with some reference to the laws of other countries. The topics include constitutional sources of business law, administrative agencies, contract law, agency, employment, business forms (corporations, partnerships, limited partnerships, limited liability companies, agency arrangements, franchises), intellectual property and unfair competition, legal liability of professionals, international trade and antitrust.
Prerequisites: 70-340 or 70-102 or 70-101 or (70-106 and 70-107) or (70-106 and 70-108) or (70-106 and 70-107)

70-365 International Trade and International Law
Intermittent: 9 units
The course discusses the international legal system and laws that affect international trade. It covers the Foreign Corrupt Practices Act, treaties and concessions, shipping and customs, appointment of foreign sales agents, resolution of trade disputes, international mergers and joint ventures, international competition law, UN sales convention, international trade organizations (IMF, WTO, World Bank, etc.), risk insurance, cultural factors, international E-Commerce and intellectual property.
Prerequisites: 73-100 or 73-102

70-366 Intellectual Property and E-Commerce
Intermittent: 6 units
The course is intended to instruct students on the creation of the Internet and the World Wide Web, including the creation of the Domain Naming System. The course will provide an understanding of how the Web operates (from its creation to the present), how the laws of various countries interact with the Web; how issues of privacy are addressed and the role of private parties and government in monitoring privacy. The course will examine how intellectual property is created and protected; who owns the property; and the role of ownership of the intellectual property interacts with antitrust laws. The course examines how contracts are formed and administered on the Web by entities created to minimize taxes and personal liability risks for the owners/shareholders of those entities. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.
Prerequisites: 76-102 or 76-101 or (70-106 and 70-107) or (70-106 and 70-108) or (70-107 and 70-108)

70-371 Operations Management
Fall and Spring: 9 units
This course is an introduction to production and operations management that covers both manufacturing and services. It deals with strategic issues (design of flexible supply), planning issues (capacity management), and operational issues (inventory management and information). The linkage between strategy and tactics will be emphasized. The students will learn concepts and tools that will help them to manage from the "boardroom" to the "toolroom."
Prerequisites: 36-247 or 70-207 or 36-201 or 36-200 or 36-220 or 36-218 or 36-225 or 36-207

70-374 Data Mining & Business Analytics
Intermittent: 9 units
Interest in big data analytics has skyrocketed recently. The recent explosion in large-scale high-resolution data enables managers to ask and answer questions regarding businesses and consumers at a whole new level. Managers are faced with data about businesses and consumers that are growing faster than they can be utilized. Data mining enables business to extract useful consumer behavior and preferences from seemingly tremendous and unorganized data, which then can be utilized for data-driven decision-making and competitive advantage. Applications can be found in e-commerce, sales, marketing, finance, operations, etc. In this hands-on introductory class, you will learn the basic concepts and techniques of data mining in addition to when and how they can be applied to improve many aspects of business and consumers' welfare. Throughout the course, we will use R, a powerful open-source statistical language and one of the main tools in data mining and business analytics, fast becoming a mainstream tool. With this tool, you will learn about variety of exploratory and predictive data analytics techniques such as Naive Bayes classifier, nearest neighbor approaches, decision trees, clustering algorithms, etc. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.
Prerequisites: 36-202 or 36-208 or 36-225 or 70-208

70-376 Energy Systems
Fall: 9 units
This course will provide students with an understanding of the systems and markets that provide energy to businesses and consumers. Students will be introduced to the sources and uses of energy, and how they have evolved and the possible paths over which they may evolve in the next decades. The course places an emphasis on electric energy, the single largest energy source in many industrial economies, but also covers natural gas, oil, and selected other primary energy sources. Students will learn the energy flows in the USA and the world, as well as the business-relevant characteristics of the engineered systems that provide the energy in various forms. Both traditional and emerging energy sources will be discussed, and students will understand the difference between an energy carrier and an energy source. We will also discuss some of the issues that arise without proper management of the physical risks of energy systems. Students will learn some of the history of electric power regulation and the inconsistent subsidy structures that have provided opportunities and challenges for energy companies and investors, including discussion of how emissions restrictions affect fuel, engineering, investment, and project finance choices. The history of electric power markets will be discussed, with an eye to examining the opportunities that market changes create for business.
Prerequisites: 70-340 or 70-101 or (70-106 and 70-107) or (70-106 and 70-108) or (70-108 and 70-107)

70-381 Marketing I
Fall and Spring: 9 units
An introduction to the nature and fundamentals of marketing and consumer behavior. Topics include an analysis of the economic and psychological factors influencing buyer behavior, marketing research, market segmentation, and the development of marketing programs (new product, price, advertising and distribution decisions).
Prerequisites: 76-102 or 76-101 or (76-106 and 76-107) or (76-106 and 76-108) or (76-108 and 76-107)
70-385 Consumer Behavior
Intermittent: 9 units
Marketing, in particular, begins and ends with the consumer from determining consumer needs to ensuring customer satisfaction. In this course, we will explore the most recent scientific research in marketing, psychology, and behavioral economics on judgment and decision-making. We will develop your ability to understand and influence what people want, how people decide what and when to buy, and whether people will be satisfied or dissatisfied with their decisions. These psychological insights are particularly useful for marketing strategy, brand positioning, and marketing communication decisions, but also yield insight into common biases in judgment and decision making, beyond marketing, to which you would otherwise fall prey. Why people are willing to drive across town to save $5 on a tank of gasoline, for example, when they would not drive a minute to save $5 on a refrigerator. We will discuss some of these applications in class. In addition, we will examine the methodology of market research (specific to consumer behavior) to build the tools you will need to interpret and base decisions on it. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisite: 70-381

70-386 Applied Behavioral Decision Making For Business
Intermittent: 6 units
This course is intended to give future managers, consultants, and policy makers an introduction to the insights and applications of behavioral decision making. Behavioral decision making is the interdisciplinary study of how people make decisions. It draws together research from psychology, economics, political science, and management, among other fields. Topics include heuristics and biases in inference and prediction, risk perceptions and attitudes, and the roles of group and emotional processes in decision making. In this course we will address applications of these findings from the various behavioral sciences to the study of business. This course is offered only at the Carnegie Mellon-Qatar campus. Prerequisites: (36-200 or 36-201 or 70-207) and 73-100

70-391 Finance
Fall and Spring: 9 units
This course is the introductory finance course in the undergraduate business program. The main topics covered in the course are financial markets, net present value, discounted cash flow, portfolio theory, the cost of capital, the capital asset pricing model, the efficient markets hypothesis, corporate capital structure, and business valuation. By the end of the course, a student will be able to consider a large and complex capital and business decision problem, make some assumptions, structure the firms’ cash flows in a spreadsheet, calculate the value of different solutions to the problem, and make an investment decision. Prerequisites: (73-100 or 73-102) and (36-201 or 36-225 or 36-217 or 36-207 or 70-207 or 36-200 or 36-218)

70-395 Funding Entrepreneurial Ventures
Intermittent: 9 units
So you want to do a startup and you know that you need funding. There are multiple ways to fund a new venture: bootstrapping, economic development, angels, venture capitalists. The question is what are these funders looking for in an early stage investment? What is important to them? How do they decide which companies to invest in and which not? This class looks at funding from the funder’s point of view and provides the student with a framework of the investment process: investment criteria, sourcing, selection, due diligence, deal structure, valuation, post investment involvement. Real companies seeking funding are used for the final project in which students will be expected, as investment teams, to make investment decisions and convince their fellow investors (the class) to join them (or not). This is a highly interactive and project class. There will be multiple guest speakers. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-425 or 70-420 Min. grade C or 70-415 Min. grade C or 70-421 Min. grade C or 70-414 Min. grade C or 15-396

70-398 International Finance
Intermittent: 9 units
International Finance is an elective course designed to give students the opportunity to analyze real-world problems in international capital markets. Topics covered include: exchange rate determination and quoting, international parity relations, foreign exchange hedging strategies using forwards and options, foreign exchange exposure management, international bond market, currency swap market, global equity market, international portfolio risk assessment and performance measurement. Students develop problem solving and communication skills with presentations and critical discussions of case studies. Prerequisite: 70-391

70-401 Management Game
Fall and Spring: 12 units
This course is designed to integrate the managerial concepts and techniques studied earlier in the curriculum and to focus on elements of organizational structure and behavior. Student teams assume the role of top management of firms competing in an international economy simulated by the Carnegie Mellon University Management Game. Each team is responsible to a Board of Directors comprised of alumni of the MBA program and business masters students. Emphasis is placed on the development and implementation of sound organizational decision structures as well as the formulation of effective competitive strategies. The course is for senior-year business majors (including business additional majors). Other students who meet the course prerequisites may enroll only with permission of the instructor. Prerequisites: 70-122 and 70-371 and 70-391 and 70-381

70-412 Advanced Business Communications: Power, Persuasion, and Problem-solving
All Semesters: 9 units
Challenges such as communicating leadership and expertise to a newly formed team, receiving unclear expectations, limited time to complete a complex problem, persuading a reluctant colleague, showcasing yourself in a crucial performance review all occur in business. This advanced course digs deeper into how leaders and successful professionals navigate the complex workplace of surprise, agility, crisis, and diversity. You’ll explore varied, often high-stakes workplace scenarios to build your persuasive ability, linguistic skill, communicative flexibility, agility, and confidence. Prerequisites: (70-345 and 70-340) or 73-270

70-415 Introduction to Entrepreneurship
Fall and Spring: 9 units
This course is designed primarily to provide an overview of entrepreneurship, develop an entrepreneurial frame of mind and learn the rudiments of how to differentiate an idea from an opportunity. Students will come up with a business idea and explore its potential for becoming a viable business. They learn to do market research and experience first-hand the rewards and difficulties in dealing with people in the real world. They will meet entrepreneurs and business professionals as part of the course and learn how to make effective presentations - both written and oral. Other important aspects of the course include self-assessment to determine one’s strengths and weaknesses, understanding the “magic” of leadership and gaining an entrepreneurial perspective on life.

70-416 New Venture Creation
Intermittent: 9 units
This course exposes students to the nuances of financing new ventures, getting them started legally and marketing their products or services. Students pull together all the ideas and information from different functional aspects of their projects into coherent and persuasive mini-business plans that serve as roadmaps for building their businesses; and useful instruments to find sufficient financing for the new ventures, so that they can convince the outside world that these opportunities are viable, with substantial potential for success. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-425 or 70-420 Min. grade C or 70-415 Min. grade C or 70-421 Min. grade C or 70-414 Min. grade C or 15-396
70-422 Managerial Accounting
Intermittent: 9 units
The purpose of this course is to prepare students to make sensible business decisions using accounting information. An essential topic in the course is the measurement and allocation of costs to assist decision making in organizations. The course covers standard topics in cost accounting, such as cost behavior and relevant costs, and connect these to broader issues in microeconomics, decision theory, corporate finance, and operations management. Classes contain a mixture of conventional lectures, problem solving, business cases, and simulations. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-122 and (36-207 or 70-207 or 36-200 or 36-201)

70-423 Technology-Based Entrepreneurship
Spring: 9 units
This course is offered only at Carnegie Mellon’s campus in Qatar. This course is designed as an introduction to entrepreneurship and basic business concepts for engineering and science students. There are no prerequisites. Students learn basic business concepts, business models, entrepreneurial thinking, idea generation, opportunity recognition, and the basics of accounting, marketing and strategy development. There is no final examination. Instead, students, working in teams, generate an original idea for a startup business and prepare a business plan and an investor presentation, which sets forth the basic strategies, business models and evaluates the opportunity afforded by their original idea. This course also is consistent with the broad mission of Carnegie Mellon University in Qatar’s entrepreneurship program, which is described below. The broad mission of the entrepreneurship program at Carnegie Mellon University in Qatar is three-pronged: a. To encourage and develop entrepreneurial and innovative thinking in a business setting, whether or not it is a startup company; b. To obtain the basic skills to start a new venture; c. To stimulate self-evaluation for life direction.

70-424 Corporate Financial Reporting
Intermittent: 9 units
This course is designed to strengthen your ability to correctly interpret financial statements and their accompanying disclosures. The course is aimed at anyone whose career might involve working with accounting and other financial data, and should be especially useful for those interested in consulting and financial analysis. Throughout the semester we will discuss the key disclosure rules in the United States, the communication methods available to managers, managers’ incentives and ability to exert discretion over reported earnings, and the interplay between a company’s corporate strategy and its financial reporting policies and practices. The course emphasizes a number of topics of recent interest to the business community including the quality of earnings, mergers and acquisitions, corporate innovation and R and D, post-employment benefits, executive compensation, and intangible assets. Prerequisite: 70-122

Course Website: http://tepper.cmu.edu/prospective-students/course-page/70424/corporate-financial-reporting (http://tepper.cmu.edu/prospective-students/course-page/70424/corporate-financial-reporting/)

70-427 Fundamentals of Banking Institutions
Intermittent: 9 units
What is the main role that banks play in the economy? Are banks safe and trustworthy? What are the main business areas of a modern full service bank and how does it make profit in each area? What are the main risks that they face and how do they manage those risks? How can the public assess the risks a bank faces and measure its performance? Does the regulation governing banking address these risks effectively? The main goal of this course is to examine these and related questions by focusing on the analysis of banks’ financial reports. Students will learn how accounting and disclosure rules for financial instruments and institutions convey detailed information that is useful to evaluate their risks and performance. Potential limitations of the current financial reporting requirements facing banks will also be discussed. The course covers crucial topics in modern banking strategy and regulation such as interest rate risk, provision on loan losses, fair value accounting for financial instruments, repos, securitization, capital requirements, and derivative and hedge accounting. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-122 and 70-391

70-428 Financial Statement Analysis
Intermittent: 9 units
This course is about fundamental analysis using financial statements. We develop and apply technologies for understanding and identifying firm activities that generate shareholder value and for developing valuation benchmarks. The ultimate goal of such analysis is to aid the security valuation and risk analysis exercises. This course is intended to help students establish a good foundation and introduce students the basics of equity and debt analysis techniques. Taking Finance (70-391) before this course is recommended, though not a formal prerequisite. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisite: 70-122

70-429 Accounting for Financial Institutions
Fall: 9 units
The banking sector is important because it drives the financial growth of an economy. This sector accepts deposits from the public and issues loans, and thus the banking sector expands in response to positive changes in retail, corporate and government business demand. Similarly, if a slowdown occurs this results in a reduction in demand for banking sector services. As a result, the important starting point for a financial analyst, who wants to assess current and future economic growth, are the financial statements of banks and the information they contain. To extract this information, however, requires being able to read and interpret the financial statements of a bank. These statements are very different from reading traditional corporate financial statements. As a result, the first objective of this course is to learn how to read financial statements generated from the banking sector including how to interpret and evaluate these statements. The banking sector in Qatar is unique because it has two important and separate subsectors — Islamic and conventional banking. Each of these subsectors have a different banking business model which in turn generate differences in their financial statements. As a result a second important objective for this course is to learn how to read and evaluate the financial statements from each of these subsectors. Prerequisite: 70-122

70-430 International Management
Intermittent: 9 units
This course uses the case method to examine the strategic and operational issues in management practice and decision-making that are important in operating a business that spans national borders. Topics include political and economic risk assessment, technology transfer, cultural analysis, negotiation, social responsibility, organization structure, supply chain management and trends in foreign direct investment and their impact on developing strategies for entering and becoming successful in international markets.

Intermittent: 9 units
70-437 Strategic Management and Innovation
Intermittent: 9 units
This course focuses on how organizations deliver value in changing business environments, using analytical techniques to evaluate business situations and develop strategies that improve organizational performance. By focusing on the organizational perspective, you will develop practical skills in evaluating and designing ways for firms to achieve key strategic outcomes like growth and innovation, which determine the firm’s chances of success in dynamic environments. This course is particularly useful if you are interested in careers such as consulting, business development, investment banking, private equity, entrepreneurship, or simply want a better understanding of how their firm can develop a more innovative outlook. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-311

70-438 Commercialization and Innovation
The course is targeted at entrepreneurs and innovators who are interested in introducing innovations to the marketplace through start-up, emerging and established organizations. Class participants will learn how to evaluate, develop and implement opportunities for innovation, using an emergent or iterative approach (the lean methodology). Students will also learn a variety of methodologies to identify opportunities for innovation including how to identify unserved customers, identifying what jobs customers need to do, and how to incorporate innovations originating from end users, suppliers, materials manufacturers, and other entities outside the firm. Students will learn how to develop a Business Model, identify a Minimum Viable Product, and a Market Entry Point. The course is divided into two parts. In the first half students will be exposed to theories and strategies of innovation through readings and case studies. In the second half students will identify and develop their own product concept utilizing concepts developed in the first part of the course, and step-by-step develop their business model, organizational plan, strategic partners, marketing message, sales plan, and financing strategy. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: (73-102 or 73-100) and (70-421 or 15-390 or 70-414 or 70-425 or 70-415 or 70-420)

70-440 Corporate Strategy
Intermittent: 9 units
This course is designed to provide the student with a general management perspective and an understanding of the total business enterprise. It builds upon previous course work in functional areas and provides insights and analytical tools which a general manager should have in order to plan and implement successful business strategy. The student will analyze complex business problems and formulate realistic strategic solutions. Emphasis is placed on the practical application of business theory by the student in their business career. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-381 and 70-391 and 70-371

70-443 Digital Marketing and Social Media Strategy
Intermittent: 9 units
This course explores issues related to digital and social media marketing. This is a hands-on class where students utilize real world data. Specifically, we study the following topics: (a) Search Engine and Sponsored Search Optimization: how search engines, keyword auctions, retargeting, mobile marketing, social network marketing and search engine marketing work, and how to optimize pay per click advertisement efforts. (b) Econo-Mining: how firms are getting or can get useful information from user generated content using text mining and opinion mining capabilities to drive their product development, placement, and advertisement decisions. (c) Social Media/Viral Marketing: how to design a social media marketing campaign; the key ingredients that make such campaigns successful; how to run a campaign for a viral product; measuring the success of a social media campaign (d) Wisdom of the Crowds: how to design crowdsourcing contests; what and how to crowdsource; prediction markets and how to design them for success and the kinds of questions are best suited for prediction markets. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.

70-447 Client Consulting Project: Strategic Management of the Enterprise
Intermittent: 12 units
This is a project course for senior business majors offered in partnership with real-world client companies. Students will learn about the challenges of the multi-dimensional and complex issues faced by managers, including learning the concepts and skills to handle ambiguity, perform a persuasive data analysis, and communicate the findings effectively. Students will develop a deeper understanding of how organizations can co-ordinate and leverage synergies across a range of disciplines by effective deployment of technologies and organizational structures and processes. Teams will have an opportunity to work with clients on a wide mix of problems spanning multiple functions, including strategy, operations, technology and marketing. Specifically, teams will address issues such as big data, mobile application strategies, supply chain, digital media, complexity management, health care delivery models and healthcare marketing strategy. Regular meetings with the instructor will be scheduled to guide teams during client engagement and co-ordinate with the executives at their client company. The deliverables will be in the form of a report/prototype and a final presentation to the client’s executive team. No classes to attend, but weekly team meetings with times to be determined. The course is open only to undergraduate seniors only, and enrollment is by special permission. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.

70-381 and 70-391 and 70-371
70-449 Social, Economic and Information Networks
Spring: 9 units
Interaction is a fundamental part of social science: firms market products to consumers, people share opinions and information with their friends, workers collaborate on projects, agents form alliances and coalitions. In this course, we will use the emerging field of social networks to put structure on this diverse mass of connections. Using a mixture of theoretical, empirical, and computational methods, we will learn about the structure and function of social networks. We will look at how an individual's position in a social network reflects her role in the community. We will learn to identify tastemakers and trendsetters by looking at how information moves through our increasingly connected society. We will consider how our own position in the social network affects our behavior, opinions, and outcomes. And we will explore where social networks come from, and what affects their structure. The material in this course will be interdisciplinary, drawn from the fields of math, computer science, physics, sociology, political science, and economics. By the end of the course, you will have the tools and knowledge needed to analyze social networks on your own. The course is capped with a project where you will use your skills to answer your own questions. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75.
Prerequisites: (36-200 or 36-201 or 73-230 Min. grade C) and (36-207 or 36-201 or 70-207)

70-453 Business Technology for Consulting
Intermittent: 9 units
In this course, you will learn to how to effectively lead and undertake information systems analysis and design projects. In doing so you will develop your 'intellectual toolbox' for business technologies consulting by learning to apply specific tools and techniques such as BPMN and Agile development methodologies. You will practice applying these techniques on a variety of case studies, examples, and a substantial semester-long project. Beyond the concrete analysis and design techniques, you will develop a set of work practices and habits of thought that should serve you well in your consulting career. This will be a very hands-on course in which you will largely learn by doing. Most class sessions will include a combination of some presentation by the instructor, some discussion (possibly of a case study), and exercises to practice working with the day's tools and concepts. Homework assignments, in-class presentations, and a semester-long term project are essential parts of the course.
Prerequisites: 70-451 or 70-110

70-455 Modern Data Management
Intermittent: 9 units
Students completing this course will develop a solid conceptual understanding of modern approaches to corporate data management, as well as developing hands-on skills with a variety of commonly used data management and analysis tools. More specifically, by the end of the course students should be able to do the following: o Write SQL queries to retrieve data from a relational database o Setup, connect to, and retrieve data from, database servers in the cloud via Amazon Web Services (AWS) o Use data wrangling tools such as Tableau Data Prep to profile, clean, and transform datasets o Improve the quality of a given dataset through data transformation, cleaning, and wrangling techniques o Explore, analyze, and visualize data with Tableau or a similar data visualization toolset o Present the results of your data exploration and analysis to others in a concise and compelling way.

70-458 Advanced Data Management
Intermittent: 9 units
The course will pick up where 70-455 leaves off, with a focus on hands-on work with NoSQL tools to wrangle and analyze loosely-structured data. At the end of the course you will be able to: Collect, organize, store, and otherwise provide an appropriate form and level of structure to data that is not well suited to traditional tabular/relational formats; Use NoSQL tools to query, manipulate, and analyze this data using datastores (key, value) stores, document databases, graph databases, and geographic and geometric databases (physical location data)); Use standard data wrangling tools and techniques to evaluate and improve the quality of loosely-structured datasets; and use proven data visualization techniques to present their findings in a compelling way. As with 70-455, you will do substantial lab work on large NoSQL databases hosted in the cloud. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75.
Prerequisite: 70-455

70-460 Mathematical Models for Consulting
Intermittent: 9 units
This course will cover a wide variety of mathematical models and techniques that are used by consultants and lie at the heart of modern decision-support systems. We will discuss the benefits and limitations of different models and follow a practical spreadsheet-based approach to provide hands-on experience with Excel Solver. The course will build on the knowledge you have gained from the prerequisite courses; we will develop your model-building skills, explore some technique-oriented skills such as linear, integer, and nonlinear programming, and experiment with heuristic solution methods. While going through different models and techniques, we will also see real-world examples of how these models are actually used in practical business environments.
Prerequisites: 21-292 or 70-257 or 21-257

70-462 Uncertainty and Risk Modeling
Intermittent: 9 units
This course takes the perspective of the consultant whose job is to analyze existing or potential business processes and provide recommendations for managerial decision-making. Recognizing that most businesses are subject to high levels of variability, risk and uncertainty, it will adopt a stochastic approach to characterize the behavior of business systems and processes, and explore the effects of alternative decisions in this context. Two modeling methodologies will be covered: (i) stochastic modeling, and (ii) stochastic simulation. Examples are drawn from different managerial domains, such as supply chain management, risk management, marketing, and project management. The lectures, homework assignments, exam and term project will focus on modeling, computational, and analytical skills. Computational implementations will be done in Excel using the @Risk add-in (during the first half of the course to build simple simulation models) and the Arena software (during the second half of the course to build more complex models based on discrete-event simulation). This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75.
Prerequisites: 70-207 or 36-225 or 36-220 or 36-201 or 36-200 or 36-207
70-465 Technology Strategy
Intermittent: 9 units
This course is about business strategy for technology-intensive industries. Examples of such industries are computer hardware and software, media and entertainment, telecommunications and e-commerce. We will explore the unique economic circumstances facing firms in these industries and identify strategies that enable firms to succeed given these circumstances. You will learn to analyze pricing strategies including versioning and bundling; product standardization decisions; managing product complements; exploiting network effects; managing platform competition. This course will help you understand the unique economic characteristics seen in today’s technology-intensive markets and how they impact the strategic interactions among firms and consumers. We will study, for example: Why firms in the IT industry give away their best products for free. Why makers of video gaming consoles subsidize end users (but tax game developers) while computer operating system makers subsidize software developers (but overcharge end users). Why Sony won the Blu-Ray format war against HD-DVD which was sponsored by a whole array of companies. In order to understand how firms strategically interact with consumers in technology-intensive industries this course will use a combination of simple but rigorous analytical models, emerging theories, and formal case studies.
Prerequisites: 21-120 and (21-256 or 21-259) and 73-100 and 73-230

70-467 Machine Learning for Business Analytics
Intermittent: 9 units
This course introduces students to the machine learning tools and software that drive modern predictive analytics in business settings. Students will gain an understanding of a variety of popular machine learning algorithms including linear and logistic regression, random forests, and neural networks. Each algorithm will be introduced with real-world business applications, and students will learn to implement these algorithms on data. The course is taught in the programming language R (prior programming experience is not required). This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.
Prerequisites: (21-256 or 21-259) and (36-225 or 70-207 or 36-220 or 36-200)

70-469 End to End Business Analytics
Intermittent: 9 units
Deriving value from business data is an integrative process. It requires putting together the virtuous pipeline of using the data to derive descriptive and diagnostic inferences, building explainable predictive models and incorporating them in prescriptive decision making. This course charts this process end-to-end by describing and integrating common tools for modeling uncertainty, machine learning, and optimization in the context of common applications from finance, marketing, and operations. The coursework is based on data-driven cases that will have students analyzing data from real business applications to derive their own insights, predictions and decisions and communicating them effectively. The course will prepare students for careers in consulting and any form of business data analysis in any functional area. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.
Prerequisites: (36-200 or 70-207 or 36-225 or 36-220) and (21-257 or 21-292 or 70-257)

70-471 Supply Chain Management
Intermittent: 9 units
This course will discuss basic issues in supply chain management to answer how a company should design its supply chain and how a company should administer its operations policy to satisfy the company’s business strategy. We will also examine how firms interact with other entities within the supply chain, and how one can turn the system/network of entities across the supply chain to its own advantage by capturing economic surplus effectively. Special attention will be paid to analyzing the strengths and weaknesses of supply chains from a strategic, qualitative level. At the same time, we will also learn how to make effective trade-offs in operational decisions from a tactical, quantitative level. This course uses course material that requires students to pay an additional course fee. The course material is secured by the Tepper School because it is otherwise unavailable and directly provided to each student. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.
Prerequisite: 70-371

70-477 Real Options: Creating Value Beyond NPV
Intermittent: 9 units
Real options analysis is an approach to the management of operational assets that exploits managerial flexibility in decision-making and combines it with market-driven valuation of cash flows. It is thus particularly useful when managing projects that involve dynamic and state-contingent choices among alternatives (options), especially of a strategic nature. The valuation of financial options is the conceptual basis of real options management (but this course does not assume prior knowledge of this topic). Real options analysis extends this fundamental market-driven valuation approach to a much broader spectrum of business applications that feature dynamic decision-making. It thus contrasts the standard net present value rule used by static discounted cash flow analysis. The resulting managerial decisions and asset valuations can be very different when real options analysis is used rather than static discounted cash flow analysis. The course learning objectives are to (i) develop the students ability to take an unstructured problem and implement real options analysis in a structured manner; (ii) integrate market-driven valuation and dynamic decision-making techniques into a practical, yet rigorous, business analytics toolkit; and (iii) provide examples of successful practice and applications in a variety of industries. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.

70-480 International Marketing
Intermittent: 9 units
This course is designed to provide students with a basic understanding of global marketing opportunities, key issues, and strategies. It introduces the main characteristics of international markets and addresses the impact of global environmental factors (economic, social, legal, and cultural) on marketing decisions such as market entry, product development, pricing, promotion, and distribution. The objective of the course is to help students acquire knowledge of major international marketing concepts and develop cross-cultural sensitivities and skills that would enable them to identify, analyze, and solve international marketing problems. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.
70-481 Marketing Research
Intermittent: 9 units
The purpose of this course is to teach multiple research techniques used in marketing. This course is an applied marketing course that gives insight into how various techniques are used in marketing research firms. There are three projects and a final. The first project is designed to teach students about research survey methods. The second is an experiment in which the whole class is involved. The third, an individual project, is designed to teach quantitative research techniques. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: (36-202 or 70-208) and 70-381

70-482 Pricing Strategy
Intermittent: 9 units
Pricing is a critical marketing decision which enables a firm to translate customer value into profit. This course provides a first survey of pricing concepts. Instead of discussing pricing in isolation, we focus on the interplay between pricing and other aspects of marketing, such as positioning, branding and advertising. To this end, we provide a formal treatment of pricing concepts in the framework of game theory. Finally, we also discuss non-pricing tools that firms can use in order to capture customer value. Specifically, we cover cases wherein firms generate a profit while keeping their services free, a phenomena that is widely observed among Internet firms. This course has no formal prerequisite, but a willingness to study formal (i.e., mathematical) models is assumed. Any previous exposure to microeconomics analysis and game theory will be helpful. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75.

70-483 Advertising and Marketing Communications
Intermittent: 9 units
It is critical that marketers understand the limitations of marcom tactics as well as how to best leverage and integrate marcom tactics for the strongest, most consistent and authentic brand voice in the targeted marketplace. The entire IMC process is driven by the customer, and in the case of our discussions in this class, the consumer. The course is designed to help students understand the integrated marketing communications model, the strategy and tools of the marketing mix and what makes an iconic brand. The course is designed in five sections: Part One focuses on understanding brands - iconic brands, terminology and types of branding. Part Two focuses on the understanding of consumer behavior - one of the, if not the most critical part of understanding marketing. Brands are built and defined in the minds of consumers. Part Three focuses on IMC and the framework used by brand management to develop strategy, and understand audience segmentation and brand positioning to drive IMC. Part Four focuses on understanding the IMC tactics available to marketers including advertising, social media and digital marketing, events and public relations. Part five concludes with the deeper study of an iconic brand. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisite: 70-381

70-484 Data Science for Finance
Intermittent: 9 units
This course first reviews the fundamentals of Financial Data Science with Python. The course then introduces several financial applications that rely heavily on data analytics, including 1) Algorithmic Trading, 2) Quantitative portfolio management, and 3) "Smart" beta and performance analysis. The class uses tools from statistics, machine learning and natural language processing. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-391 and (36-208 or 36-202 or 70-208)

70-485 Product and Brand Management
Intermittent: 9 units
Product managers are essentially the "CEO" of the product line. Brand and product management provides strategic vision and leadership for the product and service, both 1) understanding the market opportunity and what must be done for successfully delivering on the brand promise and 2) leading across the organization, often without authority, to achieve that success. Product/service success in a dynamic market is subject to many factors, including marketplace needs, reactions and activities of competition, the strategy and change within one's own firm, operating and financial constraints, demand forecast uncertainty, and more. By taking this course, you will learn the principles of product and brand management and understand what it is like and what it takes to be a successful marketing leader. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisite: 70-381

70-488 Marketing Digital Media
Spring: 6 units
(Formerly titled "Interactive Marketing") In this course we analyze how marketing practice changes when products are distributed and consumed in digital formats. This course focuses on several areas where digitization is likely to have the most profound affect on the field of marketing. These areas include promotion, competitive strategy, channel conflict, pricing, and identifying and differentiating customers. We will use both lectures, cases, and analysis of real-world datasets to analyze these issues. Prerequisite: 70-381

70-490 Big Data in Finance and Machine Learning
Spring: 12 units
This course deals with the financial decisions of corporations. The focus is on learning through "hands-on" experience of the corporate world, supplemented by a discussion of theoretical concepts and analysis of data. This "hands-on" experience is in computerized lab games that simulate the corporate world, in which students participate as CEO's, investors, and directors. Topics to be covered include the following: dividend policy; financial reporting; CEO compensation; and valuation. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University’s cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-391 and 70-122
70-492 Investment Analysis
Intermittent: 9 units
Investment analysis provides you the concepts and tools used to analyze publicly traded securities, and you will learn how to use these tools to address more sophisticated issues and problems including risk management, mergers, acquisitions, executive compensation, corporate governance, and dividend payout policies. Theory is supplemented with numerous case study examples. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-391 or 21-370

70-493 Valuation and Financial Modeling
Intermittent: 9 units
This course focuses on valuing companies. Students will learn theoretical valuation frameworks and then apply them practically. The class will cover a range of valuation approaches including discounted cash flow analyses, price multiples, real options and the venture capital method. The class will be very hands-on - we will be building valuation models in excel in-class and in case assignments using real-world data such as company financial statements and stock prices. This is particularly useful for students considering careers in investment banking and private equity. We will focus not just on learning valuation methods but also understanding the assumptions that underlie them. We will ask when such assumptions are trivial and when they can lead to large errors. We will value a variety of companies including Ferrari, WhatsApp and Snap Inc. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisite: 70-391

70-495 Corporate Finance
Spring: 9 units
Students develop an advanced financial perspective on how firms make investment, financing, and management decisions. The course starts with simple net present value rules and builds the theoretical framework to address more sophisticated issues and problems including capital management, mergers, acquisitions, executive compensation, corporate governance, and dividend payout policies. Theory is supplemented with numerous case study examples. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 21-370 or 70-391

70-497 Derivative Securities
Intermittent: 9 units
This course has two goals. The first goal is to help you to master the tools to price and hedge and understand the risk exposures of any contingent claim on any underlying variable. The second goal in this course is to practice using these pricing and hedging tools in derivative structuring and sales. The focus here is on designing and pricing derivative securities to trade on specialized market views and to hedge customized risk exposures. The course also highlights practical issues about model calibration, model risk, and dynamic and static hedging. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisites: 70-391 or 21-370

70-498 Business Language Analytics: Mining Financial Texts and Graphs
Spring: 9 units
This course provides students with hands-on experience in applying data mining tools to analyze business language, both text and numbers, used in formal documents written following specific accounting language rules. Accounting numbers: Accounting numbers obey a basic double-entry bookkeeping structure leading to a graph representation. One half of the course covers recent graph mining techniques to examine accounting data for solving problems such as pattern recognition and anomaly detection. Accounting texts: While texts in accounting documents are written in natural language they must obey regulatory disclosure requirements in both substance and form. The second half of the course shows students how Data in text form from accounting disclosures such as annual reports or earnings conference calls can be examined systematically using textual analysis techniques to gain further insight and knowledge about reporting firms and industries beyond those inferred from non-textual data. Examples include measures of readability to assess communication effectiveness, the analysis of tone as a measure of uncertainty or as a predictor of performance, and topic classification to quantify similarity or incremental information. This course may use third-party course material that is not available for individual purchase from the publisher. If so, the third-party course material will be secured and provided by the Tepper School to students enrolled in the course, and students enrolled in the course will be required to pay to the University the associated additional course materials fee for the third-party course material provided. The amount of the course materials fee is dependent on the University's cost of the particular materials provided, and typically ranges from $13 to $75. Prerequisite: 70-122

70-499 Internship
Fall and Spring: 3 units
Students doing a business-related internship for academic credit may enroll in this course for three units with a pass/no pass grade. Students must submit an internship agreement form to the instructor for approval prior to the start of the internship. A summary writing assignment must be submitted after the internship in order to receive credit. Business majors may enroll directly; non-business majors may enroll with special permission.

70-500 Honors Thesis I
Fall and Spring: 3 units
Business students with outstanding academic records may undertake an Honors Thesis. The topic is of the student's choice but must have some original aspect in the question being explored, the data set, or in the methods that are used. It must also be of sufficient academic rigor to meet the approval of a faculty advisor with expertise in the project's area. Students enroll each semester in a 9-unit independent study course with their faculty advisor for the project (70-500 in the fall and 70-501 in the spring). Students and their faculty advisor develop a course description for the project and submit it for approval as two 9-unit courses to the BA department. Enrollment by permission of the BA Program.

70-501 Honor Thesis II
Fall and Spring: 3 units
Business students with outstanding academic records may undertake an Honors Thesis. The topic is of the student's choice but must have some original aspect in the question being explored, the data set, or in the methods that are used. It must also be of sufficient academic rigor to meet the approval of a faculty advisor with expertise in the project's area. Students enroll each semester in a 9-unit independent study course with their faculty advisor for the project (70-500 in the fall and 70-501 in the spring). Students and their faculty advisor develop a course description for the project and submit it for approval as two 9-unit courses to the BA Department. Enrollment by permission of the BA Program.

70-502 Independent Study in Management
Fall and Spring: 3 units
Students with a special interest in Management/Production not covered by a formal Business course may develop an Independent Study course in that area. Readings and work to be completed are by agreement between the student and an individual faculty member. Enrollment by permission of the BA program.

70-503 Independent Study in Marketing
All Semesters
Students with a special interest in Marketing not covered by a formal Business course may develop an Independent Study course in that area. Readings and work to be completed are by agreement between the student and an individual faculty member. Enrollment by permission of the BA Program.
70-504 Independent Study in Organizational Behavior
All Semesters
Students with a special interest in Organizational Behavior not covered by a formal Business course may develop an Independent Study Course in that area. Readings and work to be completed are by agreement between the student and an individual faculty member. Enrollment by permission of the BA Program.

70-505 Independent Study in Finance
All Semesters
Students with a special interest in Finance not covered by a formal Business course may develop an Independent Study Course in that area. Readings and work to be completed are by agreement between the student and an individual faculty member. Enrollment by permission of the BA Program.

70-506 Independent Study Management Information Systems
All Semesters
Students with a special interest in Management Information Systems not covered by a formal Business course may develop an Independent Study Course in that area. Readings and work to be completed are by agreement between the student and an individual faculty member. Enrollment by permission of the BA Program.

70-507 Independent Study in Business Communications
All Semesters
Students with a special interest in Business Communications not covered by a formal Business course may develop an Independent Study Course in that area. Readings and work to be completed are by agreement between the student and an individual faculty member. Enrollment by permission of the BA Program.

70-508 Independent Study in International Management
All Semesters
Missing Course Description - please contact the teaching department.

70-515 Independent Study in Operations Management or Operations Research
Intermittent
For students completing an independent study in operations management or operations research; consult the business administration program for independent study information.