



Kennedy-Western University

Course Description Catalog

January 2003

KENNEDY-WESTERN UNIVERSITY

IMPORTANT NOTICE

PLEASE READ

The Kennedy-Western University Course Description Catalog is published biannually. The course descriptions presented in this catalog are current as of January 2003. However, due to the dynamic nature of the Kennedy-Western University course revision process, the information listed herein may not reflect the most current description for each course.

Please note that the Kennedy-Western University student website is updated as soon as new course information becomes available. To obtain the most current course descriptions for your coursework, please look to the *My Courses* page of the Kennedy-Western University student website at <http://student.kw.edu>.

Thank you for your attention to this matter. If you have any questions or concerns, please contact your Student Services Advisor via email or by calling 800-635-2900.

Sincerely,

Kennedy-Western University Student Services
<http://student.kw.edu>

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HUMAN RESOURCE MANAGEMENT

The Human Resource Management program at Kennedy-Western is designed to ensure that students have the concepts and knowledge-base necessary for applying practical solutions to challenges within their own workplace. By building upon the student's knowledge-base with current topics and current thinking within the field, this program assists the student in affecting positive innovations within their organization.

The graduate student is focused on more managerial topics such as quality management, performance appraisal and human resource planning. Here, the focus is on building upon and enhancing the student's understanding, thus giving them the opportunity to apply new learning to the workplace.

**Master of Science
Human Resource Management**

HRM500 Human Resource Selection

Theory, techniques, and processes used within an organization to recruit and select the most appropriate candidate for a position. Readings, cases, and projects used to learn and develop effective programs for planning, recruiting, selecting, and placing individuals from inside or outside the organization.

HRM520 Concepts of Employee Participation

Analysis of the popular and influential concept of employee empowerment (participatory management), including its potential to emancipate employees as well as its constraints and limitations. Covers major empowerment theories and viewpoints, the historical and intellectual roots for employee participation, empowerment practices at a Fortune 100 company, and both the emancipatory potential and ideological constraints associated with current empowerment theories and practices.

HRM530 Dynamics of Labor Relations

Key issues of labor-management relations in unionized organizations. Topics include: labor history and law, organizing campaigns, role of the NLRB, collective bargaining, contract administration, impasses and their resolution, grievance and arbitration, public sector labor relations and union-management cooperation.

HRM555 Managing Human Resources in Multicultural Environments

Focuses on the impacts multi-cultures will have on the value systems of human resources and the respective management styles practiced in both local and international environments. Enables students to develop the skills of communication, arts of negotiation and manage cultural differences.

HRM560 Training and Development

State-of-the-art human resource training and development theory and practice is examined, including need identification learning theory; program effectiveness measures; on and off-site methods; leadership and executive development; societal concerns.

HRM570 Performance Appraisal and Compensation Systems

Introduction to planning and administration of performance appraisal and compensation systems, including pay for performance for employees at all levels. Topics include: human and legal challenges in performance appraisal, employee benefit design, and planning, budgeting, and auditing for competitive compensation systems.

HRM590 Employee Discipline, Discharge, and Grievance/Appeal Settlement

Industrial justice in the workplace in both union and non-union settings. Topics include: policies, rules and regulations, discrimination, corrective action, positive discipline, employment-at-will, legal remedies, grievance systems, arbitration, severance, benefits continuation, and other related topics.

HRM600 Managerial Negotiation and Conflict Resolution

Major theories are examined in light of emerging research in relation to human resource development. Methods of intervention as well as damage control and communication theory are explored. Attention to contextual settings is examined as well as ethical processes. Managerial application of negotiation skills is reviewed from multiple organizational settings.

HRM630 Human Resource Planning: Process and Law

Focused study of the legal aspects of human resource management. Review of pertinent federal and state laws, and important judicial decisions impacting on the selection, placement and management of employees. Application of best management practices to reduce liability and positively impact the employer/employee relationship.

HRM650 Quality in Human Resource Management

Systematic review of the quality movement in western industry. Quality control precepts and theories, the role of human relations, industrial psychology, training/education, teamwork and employee empowerment. Application of the concepts and techniques of statistical process control.

HRM680 The Thesis Proposal

The student will choose a pre-approved topic within the field of human resource management which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

HRM690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of human resource management. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

INTERNATIONAL BUSINESS ADMINISTRATION

The International Business Administration program at Kennedy-Western provides a global focus for those students who work on a strategic level requiring integration across different functional areas. In pursuing international arenas, it becomes even more imperative to fully understand all domestic business sectors and the changes which must take place for an international transition.

The emphasis is on theories of international protocol, both old and new, how they have changed, and how they must continue to change for corporations and individuals who are attempting to work on an international level. The program explores the differences among the various economic development levels, the breakup in the "old" world order and new economic groups forming in Europe and Asia.

**Doctor of Philosophy
International Business**

IBA700 International Business Administration

Strategic issues that face international business managers. Topics include: assessing and managing political risk, international organization, political and legal issues, capital flows and foreign exchange, technology transfer, negotiating with foreign parties, human resource development and marketing.

IBA715 International Law

Legal environments in which international business operates, anti-trust, taxation and transfer of capital. Technology regulations, patents, trademark and copyright safeguards. Arbitration of international business disputes, expropriation of foreign investments, and government relations.

IBA730 International Economics

Introduction to the international economy: the theory of international trade, the balance of payments, economic growth and financial commercial policy. Also covers the range from international specialization to foreign exchange (FX) rate systems to tariffs and quotas to the workings of governmental policymaking.

IBA735 International Finance

Provides an understanding of the international dimension of corporate finance as opposed to domestic operations. Examines international capital movements, foreign exchange problems, exchange rates, and interest rates. Also serves to review international financing institutions and their impact on the multi-national firm. Considers the operational dimensions, requirements and procedures of conducting international business.

Requirements: Knowledge of introductory corporate finance

IBA740 International Marketing

The performance of business activities designed to plan, price and direct the flow of a companies goods and services to consumers or users in more than one nation for a profit. Covered is the wide range of developing strategic plans that are competitive in the intensifying global markets and addressing the issues affecting the world economy, trade markets and competition.

IBA745 International Trade

Introduces students to the theory, empirical evidence, and policy of international trade. Includes: introducing international trade theories, including the basis for trade and the gains from international trade; providing empirical evidence supporting or refuting the theories; and discussing trade policies based on the theory and empirical evidence.

IBA750 International Human Resource Management

Evaluation of the problems encountered in dealing with a diverse workforce. Areas of emphasis will include: multi-cultural management, motivation theory and reward systems, women's issues, religion and other factors affecting productivity, promotion and benefits alternatives in the multi-national corporation.

IBA810 International Business Strategy

Detailed discussion of strategic issues in international business and their interaction. Topics include: assessment of foreign opportunities and competition, formation of international structure, R&D management, product line decisions, promotion strategy, strategic planning, dealing with foreign governments and coordinating international manufacturing and marketing resources.

IBA820 International Business: Multi-National Enterprises

Focuses on the subject of international business from a global perspective, rather than from an U.S. perspective. Covers the basis of international trade as well as the various business functions in a multinational enterprise. Marketing, accounting, finance, and logistics are explored in the international setting.

IBA880 The Dissertation Proposal

The student will choose a pre-approved topic within the field of international business which is of sufficient dimension and depth to write a dissertation (research paper) of 150 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

IBA890 The Dissertation (9 Units)

The student will write a dissertation (research paper) on a pre-approved topic within the field of international business. The dissertation will be an extension of the dissertation proposal, and will consist of a minimum of 150 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MANAGEMENT INFORMATION SYSTEMS

The Management Information Systems program at Kennedy-Western focuses on the development, maintenance and management of information systems.

Development and maintenance of systems in management for control of the business enterprise are explored at all program levels. Coursework in management of the ensuing systems is explored more fully in the Master of Science and doctorate programs.

The goal of the undergraduate program at Kennedy-Western is to give the student both short and long-term practical applications of learning by instructing them in the maintenance and development of certain systems.

The goal of the graduate program is to ensure the student is capable of directing effective utilization and management of information systems resources by the business enterprise. At the doctorate level, this process involves more development and theory, and thus coursework is provided in operational and financial models, statistical inference and artificial intelligence, among others.

Bachelor of Science Management Information Systems

MIS100 Introduction to Data Communications

A study of characteristics of data and voice communication networks and their interconnection to impact business enterprise for maximum productivity. Topics include: distributed computing, networking hardware, software, protocols, management, disaster planning, and technology implementation issues faced by managers.

MIS120 Management Information Systems

Provides an understanding of the importance of information technology in the business enterprise. It accentuates the modern concept that MIS should always be major components of top level corporate decision-making, i.e., MIS should be given equal weight with other departments at the most senior management levels. Emphasis placed on helping an organization to integrate the tools and insight MIS can provide for the organization's long-term strategic goals. Students will develop an understanding of a managerial approach to information technology and problem solving.

MIS130 Introduction to JAVA Programming

Developed with an early exposure to "Objects First" approach to teaching Java, with the assumption that teaching beginners the "big picture" early gives them more time to master the principles of object-oriented programming. Focuses on the motivation behind Java's strengths and the benefits of the object-oriented paradigm. Also offers a solid understanding of objects and methods, concentrating on problem decomposition and program design. A firm grasp on these fundamentals allows the smaller details, and some of Java's advanced features, to fall into place from both instructor and student perspectives. Allows for a hands-on approach to learning JAVA.

Recommended: Previous experience with C or C++

MIS150 Introduction to Visual Basic Programming

Learn Visual Basic concepts and terminology to enable students to write effective programs. Explore the Visual Basic Interactive Development Environment; learn how to work with the Visual Basic Toolbox Active X controls, define variables, constants, data and control arrays; how to code statements, expressions and procedures; how to use Visual Basic's Forms; and how to debug projects and work with databases.

MIS220 Introduction to C Programming

An introduction to the widely used C language with emphasis on using a structured approach to programming. Topics include: data types, operators, functions, loops, arrays, strings, structures, and pointers.

MIS225 Supporting Legacy Systems with Cobol

Design-oriented course in Cobol programming for business applications. Emphasizes structured program design, data organization, and modularity as well as coding examples and business case studies.

MIS300 Introduction to Novell Networking

Specifics involving design, installation, and management of Novell NetWare Local Area Networks. Topics covered include: data communication and local area network fundamentals, system analysis, hardware and software design, installing netware based servers, LAN administration, security, maintenance, and troubleshooting.

MIS310 Fundamentals of Wan and Lan

A study of various modes of sharing computing resources through the use of Local Area Networks (LAN) and Wide Area Networks (WAN). Includes computer networking terminology and its applications for business enterprise. Topics include: study of network topologies, communication protocols and standards, server/client hardware and software applied to industry standard network operating systems such as Novell Netware and Windows NT.

MIS320 Management of Local Area Networks

Study of technical, administrative and security aspects of managing local area networks using the Microsoft Windows family of products, network planning, selection, installation, monitoring, security, and user training issues.

MIS330 Business Uses of the Internet

Provides a comprehensive overview of electronic commerce from an unbiased point of view. Designed to familiarize individuals with current and emerging electronic commerce technologies using the Internet. Topics discussed in this course include: Internet technology for business advantage, managing electronic commerce funds transfer, reinventing the future of business through electronic commerce, business opportunities in electronic commerce, electronic commerce website design, social, political and ethical issues associated with electronic commerce, and business plans for technology ventures.

Requirements: IBM/PC and access to the Internet

Recommended: Basic working knowledge of widely-used (conventional) information systems and Internet Explorer

MIS400 Microcomputer Operating Systems Software

Features, key words, and functional modalities of DOS 6.0 and higher operating systems (OS). Emphases include: the configuration and reconfiguration of disks; the management and formatting of files; the building of batch files; handling of peripherals; and the building of shells. Also covers techniques for memory management, virus protection, software installation, productivity software, disk management, utilities, modems, and data communications.

MIS410 Microcomputer System Hardware

Detailed procedures for assembling components of a personal computer in order to enhance its computing performance. These include adding desired peripherals and performing routine maintenance.

Requirements: Basic knowledge of computer technology and its applications in business

MIS420 Unix Operating Systems and System Administration

Introduces students to a popular and widely used variant of Unix called Linux. This course includes Red Hat Linux, one of the public domain versions of Linux so that the student can get direct, hands-on experience in installing and administering a UNIX system. Provides an overview of UNIX philosophy, basic UNIX commands, filename structure, options and arguments, shells and shell programming, text editors, script files, creating users and user groups, file permissions, system and network administration, booting and shutting down, adding and removing users, disks, devices and drivers, performing backups, maintaining log files, configuring the kernel, TCP/IP and routing, daemons and network management.

MIS435 Emerging Information Systems Technology

Information technology and related organizational and societal issues. Hardware and software fundamentals, essential applications, networks and gateways, use of information systems in business and society. Emerging technologies and trends in computing.

MIS440 System Analysis and Design

Development of a computer information system design model. Topics include: systems development process, structured analysis design, prototyping, systems development life cycle, and communication skills.

MIS480 The Final Project Proposal

The student will choose a pre-approved topic within the field of management information systems which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MIS490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of management information systems. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

Master of Science Management Information Systems

MIS500 Information Technologies and Business Functions

Use of the computer to support business functions and problem solving; systems development methodologies; current usages of information system.

MIS510 Management of Information Technology Applications

Overview of information systems applications and management in the business environment. Primary focus is on computer-based information systems and their functions, as well as the information systems technology and their management through planning, organizing, and controlling. Other topics include: management skills, functions and techniques, systems development process and systems development, project management, computer operations, and database management.

MIS520 Computer-Based Business Systems

Focuses on understanding how business uses the computer as a problem-solving tool. Information is seen as a key resource that must be properly managed. Computer-based information systems (CBIS) support an organization's management at all organizational levels: strategic, tactical, and operational; and in all functional areas including: Accounting, Manufacturing, Marketing, Finance, and Human Resources.

MIS535 Electronic Commerce Using the Internet

Topics include: tools and technologies available for effective electronic commerce using the Internet, marketing strategies, cost-benefits, security issues, sales interface, data exchange, electronic banking, electronic cash, electronic funds transfer, document management, and smart cards.

MIS540 Data Communications and Networking

Discusses and examines large portions in the field of data communications. Contains both a technical and managerial focus, although the managerial is most important. The International Standards Organization OSI model is used as the foundation for organization of the topics. Even when the focus appears to be very technical, the course seeks to apply the issues to the broad area of management of the data communications function within business.

MIS550 Global Information Systems

Deployment of information systems and technology in international commerce. Emphasis on unique elements of global information systems and the opportunities and threats they present. Topics include: nature of transborder data flows, electronic data interchange, international telecommunications and global connectivity, global information system design considerations, and country-specific issues.

MIS600 Business Information Systems Analysis and Design

Analysis and design of an information system; modeling techniques; database design; application design; and special processing methods.

MIS620 Project Management

A study of techniques and skills required to manage material, personnel, and cost resources to complete projects on time and within allocated budgets. Topics include: systems theory, organizational structures, management functions, planning, scheduling, pricing, estimating, cost control, and time management.

MIS630 Relational Databases

Design methodologies fundamental to creating an operating relational data base designed to meet specific user application requirements. Topics include: procedures for designing and building a logical data model and/or relational data base including the architecture, SQL standard, necessary attributes, normalization, data integrity, and data redundancy.

MIS645 Decision Support and Expert Systems

Examines intelligent information systems from a variety of perspectives. Detailed study of management support systems is provided as a foundation for presenting the more advanced materials via a theoretical presentation and a modeling orientation. While coverage is managerial with a technical emphasis, the scope of the course is so broad that the student will feel comfortable with all aspects of intelligent systems. Also heavy emphasis on development and implementation.

Requirements: Awareness of the basics of information systems

MIS655 Advanced Visual Basic Programming

This course concentrates on Visual Basic and database applications. Students will learn how to create programming and class models, design multi-tier database applications and use Visual Basic for Internet programming. Topics covered include: interfacing with the user using Visual Basic, Visual Basic and data applications, file systems using Visual Basic, using the ADO programming object model, creating class models, designing multi-tier database applications, creating and managing ActiveX code components and using Visual Basic for Internet programming.

Requirements: Knowledge equivalent to introductory level of Visual Basic programming

MIS660 Computer Programming and Data Structures

Design, implementation, and analysis of data structures used in information processing. Topics include: general programming principles, software engineering issues related to data structures, recursion and its use in programming, data structures, and algorithms used to manipulate data structures.

MIS670 Data Communication and Client Server Systems

Basic concepts of data transmission and telecommunications. Focuses on the fundamentals of communications, principal communication technologies, fundamental communication concepts, communication services, networking/network design issues, and the open systems interconnection model. Also deals with current organizational and managerial issues related to data communications.

MIS680 The Thesis Proposal

The student will choose a pre-approved topic within the field of management information systems which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MIS690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of management information systems. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Doctor of Philosophy
Management Information Systems**

MIS700 Information Systems Strategy

A comprehensive coverage of the key issues in information systems management, especially the emerging technologies and their impact on the organization, the concept of IS as a strategic asset, and the names to develop IS strategies consistent with organizational goals.

MIS710 Operational and Financial Models

Formulating and solving the mathematical models developed for decision problems in industrial operations management and financial planning. Topics include: linear programming, network, integer linear programming and dynamic programming.

MIS720 Advanced Information Technology

Examines the whole range of advanced information systems. These include: decision support systems, group decision support systems, executive information systems, artificial intelligence, expert systems, and neural networks. The focus is upon the use of these advanced systems to aid the organization in its decision making. The implementation and integration of these advanced systems is examined in detail.

MIS730 Statistical Inference

An introduction to the application of probability and statistics as it relates to business trends and economic fluctuations. Topics include: probability; random variables; binomial, Poisson, normal and derived distributions; sampling methods; hypothesis testing; analysis of variance; linear and multiple regression; index numbers; and decision making.

MIS740 Corporate Information Management

Provides a conceptual introduction to the field of information systems. Covers the five main management functions as they are applied using the classical management pyramid. Because understanding information technology requires more than knowledge of basic application packages, the course also emphasizes the importance of communication and integration of data. The course theme is meeting the challenges of continuous change in Information Technology from the perspective of a manager who is trying to learn to use technology while managing it.

MIS760 Object-Oriented System Development

Application of object-oriented concepts to all stages of the software development life cycle including analysis, design, and implementation. Topics include: object-oriented development concepts, modeling as a design technique, object modeling, dynamic modeling, functional modeling, object modeling and design methodology, object-oriented analysis, design, and implementation, programming objects, object-oriented languages, database design using object-oriented concepts, and case studies of object-oriented applications.

Requirements: Knowledge of computer programming languages and exposure to concepts relating to structured programming (syntax, semantics, data structures, recursion, set, graph and state)

MIS800 Regression Models

Regression models are widely used in business, economics, engineering, and the social, health, and biological sciences. The focus on this course is to learn how to use regression analysis and model building techniques to solve problems confronting managers, researchers, and other decision makers. Stresses the importance of using the technique of regression analysis in any applied setting where the research wants to make quantitative statements about functional relationships.

MIS810 Artificial Intelligence

Introduces students to the field of artificial intelligence (AI) as a research discipline. Emphasizes practical problem-solving using techniques and research tools in AI. Major topics include: search methods, knowledge representation, automated reasoning, and machine learning.

Requirements: Knowledge of Calculus

Recommended: Completion of introductory courses in discrete mathematics and data structure

MIS830 Database Management

Conceptual design of database systems emphasizing data modeling, data access, update, programming language interface. Modeling, definition, generalization, normalization will be covered.

MIS840 Decision Support Systems

Computer-based support systems for human decision-making. Managerial knowledge of decision-making, including the decision-maker, and the decision-making process. Application of decision support technology, including groupware, expert systems, artificial intelligence, databases, data warehouses, and data mining.

MIS850 Statistical Analysis for Research Methods

Summarization, analysis and interpretation of financial data. Topics include: graphical techniques, cross sectional and longitudinal studies, univariate and multivariate techniques, statistical process control, random and non random processes, multiple and time series regression.

MIS880 The Dissertation Proposal

The student will choose a pre-approved topic within the field of management information systems which is of sufficient dimension and depth to write a dissertation (research paper) of 150 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MIS890 The Dissertation (9 Units)

The student will write a dissertation (research paper) on a pre-approved topic within the field of management information systems. The dissertation will be an extension of the dissertation proposal, and will consist of a minimum of 150 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

BUSINESS ADMINISTRATION

The Bachelor of Science program in Business Administration at Kennedy-Western University offers students the basic practical considerations and applications of the discipline in topical areas chosen to enhance capabilities and improve career potential.

The graduate program offers a similar exposure to those mid-career professionals with a firm grasp of business fundamentals, who wish to advance themselves in their current work, transition to a new challenge, or simply increase their knowledge in the area of business administration.

The doctoral program builds upon the content laid down in the Master's program while providing considerably more in-depth exposure, orienting itself toward those students with senior management potential.

**Bachelor of Science
Business Administration**

BUS100 Introduction to Business

American business from origin to current interaction with the international business world. Topics include: social responsibility, leadership, production, operations management, computers, information management, principles of management, business organization concepts, human resource management, worker motivation, marketing, retailing, product distribution, advertising, promotion, finance and investment.

BUS110 Corporate Communications

This course covers key issues of written business communications. Effective ways to write letters and reports using current technology. Effective use of graphic aids, physical presentations of reports and letters, communication etiquette, public speaking, oral reporting and other forms of oral communication.

BUS115 Management Principles

Introduces the main managerial functions: planning, organizing, directing, staffing, and controlling. Also provides an understanding of the development of management science from a historical standpoint to current techniques. Discusses topics in organizational theory, organizational behavior, and interpersonal relations that are relevant to effective management performance and includes the global environment of managing in business.

BUS125 Computers and Information Processing

An introduction to microcomputers with emphasis placed on effective use of software and hardware. Includes: word processing, spreadsheets, database management, and presentation graphics packages. Additional topics include: processing units, input/output devices, storage and communications devices, the Internet, multimedia, systems software, languages, and applications.

BUS200 Accounting I

An introduction to the procedures, terms, theories and practical applications of proprietorship and partnership accounting. Topics include: assets, liabilities, owner's equity, double entry journals and ledgers, adjusting and closing of the accounts, preparing financial statements, internal control, receivables, payroll accounting and special journals for service and merchandising organizations.

BUS210 Accounting II

Provides an introduction to the concepts and recordings of partnership and corporate accounting data. An understanding of such will assist a manager in planning and controlling the firm's costs. Topics include: all corporate securities, job order and process cost accounting, budgeting, departmental accounting, retained earnings, stock investments in other corporations, interpretation and analysis of financial statements.

Prerequisites: BUS200

BUS215 Entrepreneurship

Provide the student with a pragmatic overview of the topical areas related to all aspects of starting and operating a new business venture. Addresses such topics as: the role and nature of entrepreneurship; development and use of a business plan; financing methods; and ongoing management of the enterprise.

BUS220 Small Business Management

Introduction to the opportunities, benefits, and challenges of smaller business management. Topics include: risk assessment, planning and organizing the business, selecting and managing employees, operating the enterprise, marketing goods and services, financial planning and control, and security measures for the small business.

BUS225 Introduction to Economics

Provides an overview of the fundamentals of economic principles applied to a wide range of real-world problems. Developing and understanding the market form of economic organization is studied. Topics include: aggregate demand and aggregate supply, production and cost functions, unemployment and national income accounting. The structure and function of the existing economic order, the forces that determine the distribution of wealth and income, and the increasing participation of governments, internationally and domestically, in the control of economic processes add to the comprehensive understanding of the subject.

BUS235 Business Forecasting

Principles of business forecasting methods. Topics include: a review of basic concepts in statistics, correlation and regression analysis, time series, and economic forecasting models.

Requirements: Calculus and solid foundation in statistics or equivalent background

BUS300 Principles of Marketing

Modern marketing concepts focused on medium and small business. Topics include: product planning, pricing, promotion, and placement.

BUS310 Organization and Behavior

Discusses Organizational Behavior as a blend of many subfields; i.e., psychology, sociology, anthropology, and most recently, technology, to create a diverse set of tools to understand the field of organizational behavior. Examines how individuals behave individually, how they behave in group/team settings, and how these factors influence the Organization's behavior to affect overall performance.

BUS320 Business Law

Legal concepts as applicable to the business environment. Topics include: contractual law, torts, product liability, bankruptcy, legal forms of business, and employment law.

BUS400 Introduction to Financial Management

Financial concepts in the management of business organizations. Topics include: financial analysis and planning, cash flow, risk, cost of capital, working capital management, capital investment decisions and valuation.

BUS410 Business and Economic Statistics

Deals with the study of statistical techniques used in analyzing and solving problems encountered in business organizations. The focus will be on theory and applications of these techniques in the areas of organizing and presenting statistical data, descriptive statistical analysis, discrete and continuous probability distributions, sampling, statistical hypothesis testing and inferences, analysis of variance, experimental design, and regression.

Prerequisites: BUS235

BUS420 International Marketing

Marketing function in international business. Emphasis on presenting cultural, tactical and strategic management approaches to global marketing. Topics include: global environments that affect marketing, marketing research, promotion strategies, sales issues, international distribution, export trade mechanics and financial requirements for global marketing.

BUS430 Business and Society

Ethical and strategic considerations of the role of business in a societal context from a managerial perspective. Topics include: corporate social responsibility, the stakeholder management concept, fundamentals of business ethics, business and government regulation, and owners and employees rights.

BUS480 The Final Project Proposal

The student will choose a pre-approved topic within the field of business which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

BUS490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of business. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Master of Science
Business Administration**

BUS505 Business Communications

Exposure to and practice with written communication media. The exploration of effective communication principles, precepts and nuances - stressing the importance of functionally effective communication for business purposes. The student will be encouraged to internalize these essentials for increased appreciation and enhanced communication skill.

BUS510 Organizational Behavior

Advanced theory on the behavior of individuals in medium and large organizations. The primary focus is on management techniques for increasing employee productivity in different organizational situations. Topics include: decision making, communication and conflict, group dynamics, and job design.

BUS520 Technical Managerial Accounting

Long and short-term strategic planning, sales and related cost forecasting techniques, and knowledge of the major cost accounting systems necessary to sound financial and managerial decision-making techniques.

BUS530 Economics for Managers

Attempts to teach the student how to apply economic analysis to improve decision-making. Emphasizes critical thinking and equips students with logical methods of analyzing business decisions. Also covers the topics of demand analysis, production and cost analysis, profit maximization, and risk.

BUS540 Marketing Management

Marketing from strategic and action-oriented management perspectives. Topics include: initiating the marketing process, understanding buyers and markets, targeting and satisfying marketing opportunities and managing the marketing process.

BUS550 New Enterprise Management

Entrepreneurs continually "stir the pot" through the creation of new ventures and new ideas. These dynamics of change have created an economy and society that remains the envy of the world. A pragmatic overview of all aspects of starting and operating a new business venture. Provides the tools and information needed to recognize, analyze, and evaluate entrepreneurial opportunities, presenting both the content and process of entrepreneurship.

BUS560 Principles of Leadership

Increased organizational effectiveness through better understanding and application of leader/follower relationships. Key topics include: leadership theories, assessing leadership, measuring leadership, power, influence, ethics, values, attitudes, personality, charisma, motivation, satisfaction, performance and situation characteristics.

BUS570 Principles of Total Quality Management

Concepts/practices of decision-making to improve productivity using TQM philosophy and tools. Topics include: statistical process control, graphical display, problem solving, quality meetings/audits/costs, quality goals, total employee involvement, quality function deployment, benchmarking, management by objective and by exception, design of experiments.

Requirements: Introductory algebra and ability to interpret graphs

BUS580 Essentials of International Business

Business functions in an international context. Theories of foreign trade and investment, international organizations, foreign exchange and finance, financial forecasts, economic and socio-economic influences, physical and socio-cultural impacts, human resource management and business strategy.

BUS600 Computer Technology for Managers

Emphasis placed on the use of computers as information processors, decision support tools, and a means of linking management more closely to the organization. Topics relating to the acquisition/management of information resources. Includes: systems concepts; purposeful systems within business organizations; management information systems; decision support systems; executive planning and control systems; and project management and evaluation systems.

BUS610 Management Science

Understanding and applying management science techniques. Topics include: linear programming, decision theory models, forecasting, inventory models, queuing systems and Markov analysis.

Requirements: Algebra, basic probability and statistics, and organizational issues (management, structure, and systems)

BUS620 Planning and Control

State-of-the-art aggregate planning and management control concepts and practices applied to operations management including operations in a global environment. Topics include: forecasting; goods/services design; facility location and layout; inventory, quality, human resource, project and supply chain management; capacity planning and scheduling; maintenance and reliability.

BUS630 Financial Management

Provides students with an opportunity to obtain a working knowledge of financial management theory and techniques applied in the business environment. Topics covered include: financial statement analysis, time value of money, securities valuation, capital budgeting, net present value, internal rate of return, project ranking, risk and return, and cost of capital.

BUS660 Strategic Business Policy Essentials

Issues from the top management perspective are approached. Discusses the strategic determinants of success (and failure) of business firms. Examines the roots of competitive advantage. Covers both competitive strategy and corporate strategy.

Prerequisites: BUS520, BUS540 and BUS610

BUS670 Business Law and Ethics

Examines the influence of ethics and law on managerial decision making. Topics include: ethics and the law, contracts, dispute resolution, business organizations and employment discrimination. To provide modern-day perspective, these topics are examined in light of current issues. Examples include: Internet privacy, Bayer's patent on and pricing of an anthrax cure, and arbitration as an alternative to lawsuits.

BUS680 The Thesis Proposal

The student will choose a pre-approved topic within the field of business which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

BUS690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of business. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Doctor of Philosophy
Business Administration**

BUS700 Management of Business and Public Organizations

The analysis of high-level management strategies in planning and setting goals for complex private and public organizations, managerial principles for goal implementation, and management approaches for solving problems in small work groups.

BUS710 Human Behavior in Organizations

Organizational Behavior and Management introduces the student to the concepts, principles, tools and techniques of human behavior in organizations. It draws heavily upon the fields of psychology, sociology and cultural anthropology. Applications based upon sound theoretical foundations are stressed.

BUS730 Corporate Finance

In-depth exposure to and practice with corporate finance, encompassing both theoretical and practical aspects - including cash generation and flows, working capital management, ratio analysis, capital investments, fiscal needs and financial sourcings, pro formas and capital structuring.

BUS740 Business/Management Information Systems

Provides a general overview and the basic concepts of information systems, as well as the approaches to planning, designing, implementing, managing, and organizing information systems and technology. In particular, focus is on the application, implementation, and management of information systems and technology in organizations. Other important issues include: the security, societal, strategic, international, and ethical dimensions of IS, as well as e-commerce and enterprise resource planning, are also covered. In-depth case studies are used to enhance students' understanding of the course materials.

Requirements: An IBM/PC computer with a CD-ROM drive

Recommended: General understanding of computers and their applications

BUS750 Marketing Strategy

Concepts and theory of marketing strategy applied to individual situations using case analysis and problem solving skills. Emphasizes competitive advantages from business level marketing strategy; analysis of competition in specific marketplace situations; and creation and implementation (management) of strategies.

BUS760 Corporate Taxation Principles & Policies

Provides students with an understanding of the working of federal tax law and the taxation effects of various transactions, including international, throughout the life cycle of a corporation. Emphasis is placed on the operating rules contained in Subchapters C and S of the Internal Revenue Code, including the effects of various capital transactions on the corporation and its shareholders.

BUS770 Investments

Provides practical knowledge of financial instruments including: stocks, bonds, options and futures. Covers investment management techniques, securities markets and international investing.

Requirements: Undergraduate principles of micro and macroeconomics, accounting, statistics and algebra

BUS805 Project and Systems Management

Covers advanced topics related to project management. Emphasis is on managing projects in organizations, rather than on learning the principles of management. Specifically, sample topics covered include: managing project risk, project management tools and techniques, structuring of project divisions within organizations. It is noted that many projects fail due to inadequate preparation (e.g., inappropriate or incomplete needs analysis) and underestimation of the tasks involved. Throughout the course, the need to perform the project management tasks with integrity is emphasized.

Requirements: Basic knowledge of project management

BUS810 Strategic Business Policy

Introduces the approaches and analytical tools most frequently utilized in the formulation, implementation and control of business strategies. The strategic management process is explored for firms with national and international dimensions. The forecasting, interpretation and response to economic phenomena in the broader context of a dynamic global environment are emphasized.

BUS815 Legal and Ethical Environments of Business

Legal, ethical, and regulatory environments of business addressed through and organized by business functions. The means by which the law and ethics pertain to each of the functional areas of business (organization, finance, employment, production, marketing, and international) will be emphasized.

BUS820 Advanced Business Policy

Covers the role of the CEO, concepts of planning, setting organizational strategy, the relationship of an organization to environmental influences, and the integration of individual, group, and institutional value systems into organizational policy. Develops theoretical and practical understanding of how decision makers formulate, implement, and evaluate strategies at the corporate and business levels. Uses knowledge acquired from prior business courses, coupled with new strategic-management techniques, to examine past decisions and to chart the future direction of various organizations and industries. Students in this course will make objective strategic decisions and justify them through written communication.

Requirements: Knowledge of functional areas in business administration (economics, accounting, quantitative methods, marketing, management and financial management)

BUS835 Total Quality Management

An overview of principles and practices of production and operations management with emphasis on customer service and continuous quality improvement. Issues related to the applications of total quality concepts and quantitative models for the improvement of operations. Topics include: product/process designs for quality; control for quality; methodologies for master planning, resource scheduling, and flow-control system performance.

Requirements: Understanding of statistics, algebra, manufacturing and service environments and systems

BUS840 Organization Theory

Covers advanced topics related to organizational dynamics and design. Sample topics include understanding and choosing among different structural forms, breaking down structure to its elements and designing organizations with appropriate structures, and understanding the impact of organizational structure on desired outcomes (e.g., innovation). Structure can be a great contributor to organizational goals, but it can also be an inhibitor of individual action. Therefore, structuring organizations such that they do not constrain individual action would be to the organization's advantage.

BUS880 The Dissertation Proposal

Choose a pre-approved topic within the field of business which is of sufficient dimension and depth to write a dissertation (research paper) of 150 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full instructions will be supplied to the student at the appropriate time in their degree program.

BUS890 The Dissertation (9 Units)

Dissertation (research paper) on a pre-approved topic within the field of business. The dissertation will be an extension of the dissertation proposal, and will consist of a minimum of 150 pages excluding tables, figures, appendices, etc. Full instructions will be supplied to the student at the appropriate time in their degree program.

MANAGEMENT OF TECHNOLOGY

The Management of Technology program at Kennedy-Western University provides the opportunity to explore issues and master concepts involved in the management of technology and technology-based organizations.

The Bachelor of Science program in Management of Technology is designed to equip the student with the conceptual and practical skills needed to turn technology into a strategic advantage. Technology may be an organization's primary product or the means to increasing profitability regardless of the service offered.

This program enables the configuration of that technology to interface well with the other aspects of the organization such as employees, customers, suppliers and society at large.

The Master of Science program in Management of Technology takes the student to a greater depth in understanding the implications of technology in the organization, particularly in the light of external forces and how it fits into the general world of science, government, and business. This program recognizes the direction of an organization's efforts in the management of technology and may well be one of the critical success factors in any management portfolio.

Bachelor of Science Management of Technology

MOT100 Introduction to the Management of Technology

Introduction to information systems and information technology with an emphasis on the strategic role of information technology. Topics include: information system concepts, information technology, applications of information technology, approaches to information systems development and issues in managing information technology in today's business environment.

Requirements: Basic computer skills

MOT110 Marketing Management in Technology-Based Organizations

Study of the promises and pitfalls that are inherent in moving technology products through the product life cycle. From developing a corporate marketing strategy through knowing the customer's requirements and competitor's approaches, the process is anything but consistent. The success of actual organizations will be studied and principles will then be derived and applied to new circumstances.

MOT115 Management Accounting

An advanced course in Accounting identifying the information utilized by operating management. Key topics include: determination of product cost and product line profitability, budgeting, profit planning and the use of standard costing.

MOT120 Manufacturing for Competitive Advantage

An examination of the elements of "world class manufacturing" by studying the characteristics of organizations that have won manufacturing excellence awards. The common aspects of their successes can be contrasted with the uncommon types of their products to arrive at principles of excellence which transcend particular manufacturing processes and products.

MOT200 Conflict Management

Focuses on the types of crises managers face. Deals in depth with important characteristics of certain crises, conflicts and the crucial skills needed. Illustrates how managers can become adept at managing unexpected, negative events so as to protect their own reputations and the entire organization. Although crises cannot always be prevented, they can be mitigated.

MOT210 Communications in a Technical Environment

Basic communication principles and fundamental limits, as well as an introduction to information theory as it relates to the digital transmission of information via computer networks. Provides an overview of the field of computer communications with partial emphasis on standards and protocols common in local area and wide area networks (i.e., Internet).

MOT215 Managing in a Technological Environment

Focuses on management issues surrounding information technology and lays the foundation of management knowledge required by successful managers. Teaches sound, proven information technology management basics, and offers processes and procedures for applying management knowledge. Describes what managers must do and how management principles can be applied.

MOT220 Financial Management for Technology Based Organizations

Provides an introduction to financial management decisions for organizational planning. Financial Statements will be used as a key source of information. Topics will include: pro forma projections; time value of money; interest and dividend rates; capital budgeting; risk evaluation; debt and equity financing.

MOT230 Problem Formulation and Managerial Decision Making

Studies the process of human judgment, and improving the process of managerial decision-making. Examines the limitations of the human decision-making abilities, and ways to improve the decision quality.

MOT240 Quality Control and Management

Discusses the role of management in quality control. Quality policies and the importance of leadership stressed. Total Quality Management (TQM) defined and examples of the requirement of management leadership in every function of an organization provided.

MOT250 Support and Control of Manufacturing Processes

This course is a survey of skills involved in modern manufacturing. Technologies covered include: processing metallic, polymeric and ceramic materials including casting, molding, forming, separating, conditioning, assembling and finishing.

MOT270 Pivotal Technologies for the 21st Century

Intends to provide a global overview of multimedia computer and communication technologies. The ability for business leaders to capitalize on emerging technologies is paramount. Enables mainstream business leaders to understand how these technologies can be applied and leveraged for competitive advantage.

MOT480 The Final Project Proposal

The student will choose a pre-approved topic within the field of management of technology which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MOT490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of management of technology. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Master of Science
Management of Technology**

MOT500 Managing Internal and External Interfaces in New Product Development

Systematic evaluation of strategies and approaches involved in tangible and intangible product decisions. Issues and strategies involved in identifying and implementing the development of new goods and services are examined. The management of the total product line to include products at various stages in the product life cycle from introduction to deletion are reviewed.

MOT510 Business, Government and Macroeconomics

Studies the total economic activity of the United States and how governmental activities influence the economy. Special emphasis placed on the relationship between business and government and how this relationship shapes the economy.

MOT520 Strategic Management of Technology

Discusses management strategy and innovation with an emphasis on "new economy" and information technology, including computer communications and the Internet drawing on management, economic and organizational theory. In-depth analysis will be completed with specific attention to emotional intelligence, serendipity and strategy, continuous innovation, and the overlooked Sixth Force: Complementors. Coverage of emerging trends such as network economics - industries in which the size of the network of complementary products is a primary determinant of demands for the industry's product.

MOT530 Project Management and Leadership

Introduces the structure and tools that support the process of project management including assignments and reports. Identifies the skills and styles that translate into quality leadership and team motivation. Applies leadership principles and learned techniques to the responsibilities of a Project Manager.

MOT540 Corporate Responsibility

Designed to provide students with an understanding of the distinction between mortality and ethical theory from the perspective of Corporate Responsibility. Teaches the coverage of corporate social performance organized around the debate between stockholders versus stockholder management.

MOT610 Understanding and Forecasting Technology Development

It is difficult, if not impossible, to manage a modern organization without at least some knowledge of information systems - what information systems are, how they affect the organization and its employees, and how they can make businesses more competitive and efficient. Understanding and forecasting technology development is essential for creating competitive firms, managing global corporations and providing useful products and services to customers.

MOT620 Managing Information Resources in a Technology Organization

Prepares students to be effective exploiters of computer/communications technologies now and in the future. Focuses on the opportunities and pitfalls provided by these technologies; the resources (computers and microelectronics, networks, software, data and people) that organizations provide and alternative approaches to managing them; and what the user-manager needs to know to make effective use of these technologies.

MOT630 Managing Innovation in a Technological Environment

Emphasizes issues critical to innovation. Topics include: technology systems, innovation processes, enterprise systems, technology strategy, high-tech ventures, research and development and strategy integration.

MOT640 Science and Technology Policy

An introduction to scientific and technology approaches to solving management and engineering problems. Topics include: linear programming, transportation and assignment problems, inventory management, dynamic programming, simplex solution method, decision analysis and game theory.

MOT650 International Residency

Focuses on the international residency and presents a critical in-depth look at issues confronting expatriates in the international business arena. Students will learn to understand the logic of international business and management operations, develop an awareness of the range, scope, and complexity of the issues and problems related to international business. Discusses different strategies that business can adopt to compete in the global marketplace and enter specific markets.

MOT680 The Thesis Proposal

The student will choose a pre-approved topic within the field of management of technology which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MOT690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of management of technology. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

EXECUTIVE BUSINESS ADMINISTRATION

The Executive Masters program in Business Administration at Kennedy-Western University focuses on the development of an organization through the study of management, marketing, economics, and the environment.

The primary purpose of the program is to provide opportunities for business persons and others to further their training and be better qualified to fulfill their personal, occupational and professional goals. It is intended that all courses shall require of students a greater intellectual effort, more independence in reading and investigation, and more constructive thinking to prepare practitioners for positions in business administration and other areas.

To increase the effectiveness of business persons and others by broadening and deepening their preparation in their fields of specialization and in general knowledge, the courses emphasize analyzing, designing, synthesizing, and evaluating data from all functional areas of business. Higher level techniques in decision-making abilities, long-range planning knowledge, human relations expertise, and motivational skills as well as social, cultural, political, legal, ethical, and economic factors that shape and impact the business environment are stressed.

**Master of Science
Executive Business Administration**

EMBA500 Data Analysis and Quality Management

Designed to guide students through the process of acquiring secondary and primary data for the purpose of developing data through analysis into useful decision based information. The process emphasizes acquisition of secondary data over the Internet and the generation of primary data through surveys. Executive problem solving using statistical tools and SPSS 7.5 analytical software will form the basis of the critical thinking/analysis portion of the course. Critical events decision making, including Total Quality Management, Service Quality, Importance/Performance analysis will be developed throughout the course.

EMBA510 Design and Management of Operations

Focuses on study of design and operations of manufacturing and services organizations from a management perspective. Examines the key activities of each of the production and operations management functional groups and areas, how these activities interlock, and how such complex systems of activities can be managed effectively.

EMBA520 Managing New Product Development Projects

Introduces concepts and techniques for effective and efficient management of new product development projects. Emphasis placed on manufactured products. Discusses modern project management techniques, variety of roles managers must fulfill in new product development efforts in understanding the relationship between new product development activities and organizational strategy.

EMBA530 Problem Structuring and Analysis for Decision Making

Designed to provide a sound conceptual understanding of the quantitative concepts and techniques useful for all kinds of organizational problem structuring and decision-making processes. The basic techniques and methods of quantitative approaches to decision making will be examined, with emphasis placed on problem formulation and both manual and computer solution methods.

Requirements: IBM/PC

EMBA540 Social, Ethical, Legal and Political Environment of the Firm

Instructs students regarding the social context of business and how to handle the involved and far-reaching affairs of modern business; considers a variety of stakeholder perspectives in assessing corporate decision-making; and teaches students how to understand the effects of non-market and market forces on corporate performance and survival, and how to integrate corporate social performance with strategic management.

EMBA550 International Business Management

Introduces students to issues about globalization of world economy. Examines the changing nature of international business. Discusses international business issues, various global trade and investment environments as well as gives an understanding of the national difference in political economies and differences in culture and a basic understanding of the global monetary system.

EMBA560 Organizational Behavior & Administration

Designed to help students develop the competencies and knowledge needed to become effective professionals, managers, and leaders. Employees are the keys to developing an effective and competitive organization. Technology, financial capital, physical assets, and proprietary process information are no longer the primary sources of long-term competitive advantage. That advantage now arises from the rich array of individual and team-based competencies, which are mobilized, directed, and channeled by an organization's employees, managers, and leaders. Tools are found in Organizational Behavior, which is the study of human behavior, attitudes, and performance within different types of organizations.

EMBA570 Organizational Development and Change

Blends theory, concepts and applications of organizational development and change. Applies behavioral science knowledge to the development of organizational strategies, structures, and processes. Reflects a real-world and international coverage of the basic steps of organization design to improve organization performance and functioning.

EMBA580 International Business Cultures

Focuses on cultural similarities and differences and how they affect international business. Topics include general cultural dimensions as well as specific aspects such as communicating (verbal and non-verbal) and negotiating across cultures, coping with cultural shock and developing global managers.

EMBA600 Competitive Marketing Strategy

Explores the process of formulating and managing marketing strategy for a given market entry. Exposes students to fundamental concepts and terminology in marketing strategy, how strategic marketing fits into both business-level and corporate-level decision making; the analytical tools, techniques and information used to make strategic marketing decisions; and how firms translate brand objectives into strategic marketing programs designed to attract customers and to gain a competitive advantage.

EMBA610 International Marketing Management

Builds on basic marketing knowledge gained in an introductory course. Marketing concepts applied in the context of the global environment while examining special problems, issues, goals and decision processes, that characterize international marketing. Topical areas of emphasis include: how to search for opportunities abroad; how to handle the complex business environment internationally; and how to tailor marketing strategies to optimize rewards.

EMBA620 Product and Price Management

Familiarizes students with the roles and responsibilities of product managers who often have primary responsibility for the market success of their company's products and services. Students will be exposed to techniques used in analyzing the market, developing objectives and strategies for promoting the product or services and making decisions about price, advertising, promotion, channels of distribution and service.

EMBA630 Financial Management

Provides students with an opportunity to obtain a working knowledge of financial management theory and techniques applied in the business environment. Topics covered include: financial statement analysis, time value of money, securities valuation, capital budgeting, net present value, internal rate of return, project ranking, risk and return, and cost of capital.

EMBA640 Corporate Financial Analysis

Provides students with the ability to present an analysis of the financial condition of a corporation as it is set out in the various, publicly available financial reports; to develop reasonable forecasts of a corporation's future financial condition using these selfsame documents and other available information; and to contribute meaningfully in corporate financial planning procedures in which he/she may be involved.

EMBA650 International Financial Management

Immerses the student in the world of international finance. Is designed to provide the student with the theory and tools required to become successful managers in the field of international finance. Topics covered include: foreign exchange markets, balance of payments, parity conditions, forecasting exchange rates, and evaluating forecasts, risks of foreign exchange fluctuations, methods to measure and hedge these risks, fund raising in international money and capital markets, international working capital management, and investment practices of multinational firms.

Requirements: An introduction to international finance

EMBA670 Managerial Economics

Develops the student's capacity to relate the concepts of microeconomics/macroeconomics to the decision-making process of the business manager. Within the context of the total economic environment (private or public) the student will study the economic variables required for successful demand analysis, production and cost analysis, and estimating the impact of competition and market structure using individual company or simulated real-world data. The importance of developing sound long-term investment strategies adds depth to the subject.

EMBA680 The Thesis Proposal

The student will choose a pre-approved topic within the field of business which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

EMBA690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of business. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

E-BUSINESS / E-COMMERCE

The Bachelor of Science in E-Business/E-Commerce program at Kennedy-Western emphasizes e-business/e-commerce issues for those students who work on business platforms that are either stand-alone e-ventures or integrate e-commerce as part of traditional business models. A successful e-strategy makes it imperative to fully understand all enterprise sectors that may be influenced by this new business model and the changes that must take place for a successful e-transition.

The emphasis of this major is on e-commerce protocols, management of e-commerce ventures, e-strategy planning, e-tools and programming, financial analysis with respect to e-ventures, e-marketing mores, Internet and Web concepts and applications, and the impact of e-commerce on organizational behavior. In addition to keeping stride with the overall e-business aspect, the necessary traditional business skills are also provided through courses that attempt to incorporate critical thinking, problem-solving, project planning and implementation as related to e-business. Therefore, this program explores new and novel business models that incorporate the Web and the Internet to formulate business-to-business, business-to-consumer, and other related e-business strategies.

**Bachelor of Science
E-Business/E-Commerce**

ECM100 Management: Theory, Practice and Applications

Introduces the main managerial functions: planning, organizing, directing, staffing, and controlling. Also provides an understanding of the development of management science from a historical standpoint to current techniques. Discusses topics in organizational theory, organizational behavior, and interpersonal relations that are relevant to effective management performance and includes the global environment of managing in business.

ECM110 Business Communications

Key issues of written business communications. Effective ways to write letters and reports using current technology. Effective use of graphic aids, physical presentations of reports and letters, communication etiquette, public speaking, oral reporting and other forms of oral communication.

ECM130 E-Business Marketing

Conveys the principles of e-Business. Involves leveraging Internet resources into a redefinition of market products and services in the pure e-Business firm as well as business management processes into processes of speed, agility and customer focus. Primarily managerial in nature, this course has less emphasis on the technical aspects. Rather, it studies organizations that have succeeded, and those who have failed in e-Business with a focus on the common characteristics for the reasons of the outcome.

ECM200 Organizational Behavior

Presents and explores the primary concepts of Organizational Behavior in the context of the new business environment of E-Commerce. Examines Organizational Behavior from a 21st century perspective; not only reviews the traditional theories of Organizational Behavior that provide a foundation for the student to understand the fundamentals of the field, but also includes material and information into the latest research of Organizational Behavior. Also provided is the unique feature of delving into the latest technology with respect to organizational operations, and how those new technological operations affect the organization and its members' behavior.

ECM220 Financial Analysis in E-Business

Provides an introduction to financial management decisions for organizational planning. Financial Statements will be used as a key source of information. Topics will include: pro forma projections; time value of money; interest and dividend rates; capital budgeting; risk evaluation; debt and equity financing.

ECM300 Database Management Systems

Concepts and principles of database management systems and their use. Topics include: the Database Environment; the Database development process; the Entity-Relationship Model; Relational Model; Logical and Physical Database Design; SQL, a standard for database processing; Database Administration, Normalization, Client-Server Systems, Distributed databases, and Data warehouses.

ECM310 Introduction to Operating Systems

Provides a conceptual foundation of the organization and operation of computers for the E-Business professional. A broad system and network level understanding of computers that support e-business infrastructure is covered. Topics covered in this course include: computer components and operation, operating system concepts, output, input and storage devices, resource sharing over networks, communications, and system optimization for efficient network performance.

ECM320 The Internet: Concepts and Applications

Overview of business uses of the Internet, including the history, facilities and services, browsers, search engines, architecture and intranets. Also included is an overview of development tools and security. The student will be able to use the World Wide Web to research business problems and understand the role of the Internet to support business operations such as marketing, data transfer and customer service.

ECM325 Web Programming

Covers web site design concepts by illustrating do's and don'ts of design and then introduces various web-development tools but concentrates on HTML and DHTML, which are the primary markup languages used to create web page documents on the World Wide Web. HTML, DHTML topics include: structure, presentation format, lists, links, images, tables and frames. This is followed by introducing Javascript so that computations, editing and more difficult designs can be addressed by Web developers. Emphasis is placed upon the appropriate use of the design paradigms and programming tools introduced.

ECM330 E-Business Applications

Provides an in-depth understanding of Electronic commerce (EC) applications, which are divided into three general categories: business-to-consumers (e.g., retailing, home banking or electronic fund transfers), business-to-business and intrabusiness. The infrastructure for E-commerce applications, which includes: hardware, networks and software is also discussed. Further, the major opportunities, limitations, issues, and risks associated with E-commerce are also investigated.

Requirements: IBM/PC

Recommended: Students should have a basic understanding of the Internet and its various applications, and the concept of E-commerce

ECM400 Critical Thinking and Decision Making

Introduces students to both qualitative and quantitative aspects of decision processes. By exploring the nature of critical thinking and the factors that influence successful decision outcomes, students will gain requisite managerial competencies necessary for successful decisions in modern organizations. Also develops the elements and structure of decision methods, taking into account environmental (contextual) degrees of risk and uncertainty. Sensitivity analysis, i.e., how sensitive results are to the accuracy of the inputs and the models themselves, along with risk assessment and scenario analysis, are also covered. Material is drawn from several disciplines, including psychology, management science, and statistics. Numerous examples, exercises, problems, and cases are included.

Prerequisites: ECM110

Requirements: Knowledge of basic business statistics and introductory algebra

ECM420 Project Planning and Implementation

Examines project management roles and environments, and corporate strategy with special emphasis on e-commerce. It highlights the need for e-commerce strategy to be integrated with the strategic vision of the company as a whole. Topics covered in the course include: the formulation of an Internet strategy in a networked world, e-leadership, service-leadership, e-branding, and various techniques of working, planning, control, and evaluation for project success – with particular focus on e-commerce projects.

Prerequisites: ECM400

ECM480 Final Project Proposal

The student will choose a pre-approved topic within the field of E-business/E-commerce which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ECM490 Final Project

The student will write a final project (research paper) on a pre-approved topic within the field of E-business/E-commerce. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.



FINANCE

The Finance program at Kennedy-Western University is offered at the bachelor level for the purpose of providing a broad base for students planning careers in the financial field. The Finance major also is intended to arm students with skills in finance so that they may advance their careers in the areas of corporate and international financial management, personal financial planning, and investment services.

The Finance program consists of financial courses geared to identifying and solving problems in all major areas of financial investment, including public and private management of short-term and long-term financing, banking relations, personal finance, and investment analysis.

The financial graduate will be equipped with tools for understanding the function and applications of financial markets, the acquisition and allocation of funds in the public and private sector in domestic and international organizations, and learn how to access and utilize financial information. Kennedy Western University students enrolled in the Finance major will discover that it draws together aspects of accounting, economics, and social, ethical and legal considerations to offer an integrated approach to financial management decision-making.

Bachelor of Science Finance

FIN100 Finance I

An introduction to the procedures, terms, theories and practical applications of proprietorship and partnership accounting. Topics include: assets, liabilities, owner's equity, double entry journals and ledgers, adjusting and closing of the accounts, preparing financial statements, internal control, receivables, payroll accounting and special journals for service and merchandising organizations.

FIN110 Finance II

Provides an introduction to the concepts and recordings of partnership and corporate accounting data. An understanding of such topics will assist a manager in planning and controlling the firm's costs. Topics include: all corporate securities, job order and process cost accounting, budgeting, departmental accounting, retained earnings, stock investments in other corporations, and interpretation and analysis of financial statements.

Prerequisites: FIN100

FIN220 Personal Finance

The basic principles of finance as relating to the individual. Includes: an introduction to career and personal finance planning, money management, taxes, consumer credit and purchasing, insurance, investments, and retirement and estate planning.

FIN240 Introduction to Investments

Provides a thorough introduction to the field of investments. Topics include: the functioning of financial markets, brokerage accounts, types of investment vehicles and their characteristics, risk and return, the capital asset pricing model, market efficiency, and valuation of debt and equity securities.

Prerequisites: FIN110

FIN320 Principles of Finance

Exposes the undergraduate finance major to some of the most important areas in financial management; corporate finance, investments, financial institutions and international finance, highlighting the career opportunities available in each. Also illustrates the ways finance fits in with other areas such as marketing, management and accounting.

Prerequisites: FIN110

FIN330 Money and Banking

Examines the structure and operations of our monetary system, commercial banking, central banking, money, and capital markets, and provides an introduction to monetary theory and policy.

Prerequisites: FIN110

FIN360 International Finance

Overview study of international business finance. The course will cover international financial institutions and markets, risks of foreign trade, and multinational business operation and management.

Prerequisites: FIN320

Requirements: Some basic knowledge of economics/finance

FIN420 Federal Reserve System and Monetary Policy

Explores the transformation of the Federal Reserve System and reveals how gradual and incremental institutional changes can affect the strategies of political actors and policy outcomes. Challenges the finding that the dominant description of institutional change, that has driven political institutions in both international relations and American politics, has not changed: conventional descriptions emphasize long periods of institutional stability punctuated by short periods of rapid change; institutional change at the Fed is a gradual and continuous process; and incremental changes in monetary policy institutions (reserve requirements, open market rules, selective credit regulations) reveal the rich variety of strategic options for bureaucrats who desire autonomy from elected officials and the real effects of changing policy institutions on macroeconomic and capital market outcomes.

Prerequisites: FIN110

FIN430 Financial Institutions and Markets

Provides an understanding of financial markets that facilitate the flow of funds from investors to organizations in need of those funds. Also includes: a study of financial institutions and their roles in the capital market including savings allocation, banking, markets, insurance, investment, and financial decision-making processes.

Prerequisites: FIN110

FIN435 Bank Management

Application of traditional finance concepts to the management of commercial banks and other financial intermediaries with emphasis on decision making and problem solving techniques to major problem areas in financial institutions. Provides comprehensive coverage of asset and liability management techniques primarily for depository institutions but also applicable to finance companies, insurance companies and other diversified financial services firms, all of which operate in an increasingly competitive environment.

Prerequisites: FIN320

FIN440 Working Capital Management

Designed to provide the student with an in depth understanding of short-term financial management. Topics covered include: liquidity analysis; inventory, credit and payables management; cash collection, concentration, and distribution systems; cash forecasting; short-term forecasting, borrowing, and risk management; and finally treasury information systems. Also covers current liability management, bank relationship management, and risk management issues. Treasury department practitioners and those preparing for the Certified Cash Management (CCM) exam will find the material they need presented in this course.

Prerequisites: FIN320

FIN445 Advanced Corporation Finance

Familiarizes students with financial management theory and techniques applied in the business environment. Topics covered include: financial statement analysis, time value of money, risk and return, bond and stock valuation, capital budgeting, cost of capital, capital structure, and dividend policy.

Prerequisites: FIN110

FIN450 Principles of Investments

Provides students with a cohesive structure by which valuation of financial assets can be done, using information gathered from both academicians and practicing investment professionals. Reflects on the realities of today's investment environment and provides conceptual tools for investment. Key points include: investing in common stock, fixed income securities, the management of a portfolio and derivative securities.

Prerequisites: FIN240

FIN455 Advanced Investment Analysis and Management

Provides in-depth coverage of investment analysis and portfolio management. Topics include: risk and return, the capital asset pricing model, market efficiency, portfolio theory and construction, valuation of stocks, bonds and derivative securities, and portfolio performance measurement.

Prerequisites: FIN240

FIN480 Final Project Proposal

The student will choose a pre-approved topic within the field of finance which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

FIN490 Final Project

The student will write a final project (research paper) on a pre-approved topic within the field of finance. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MANAGEMENT AND LEADERSHIP

The Management and Leadership program at Kennedy-Western University seeks to equip students with a broad base of knowledge that can be utilized to strengthen leadership abilities and improve managerial effectiveness. Recognizing that the separate disciplines are highly interrelated, Kennedy-Western University believes that its students would benefit from a program that combines both Leadership and Management to assist professionals in obtaining success regardless of the hierarchical level in organizations or the types of industry in which they operate.

The following undergraduate level courses introduce students to the wide-ranging field of management by examining a number of important topics (e.g., supervision, organizational behavior, leadership, diversity, communication, culture, human resource management, conflict management, negotiation, motivation, operations management, and employment law). In addition, management principles, business communications, and management and supervision will be studied through the review of theoretical, practical, social and ethical concepts. This well-rounded, comprehensive program encompasses all facets of management and provides essential tools for the making of effective leaders and managers.

Bachelor of Science Management and Leadership

MGT100 Principles of Management

Introduces the main managerial functions: planning, organizing, directing, staffing, and controlling. Also provides an understanding of the development of management science from a historical standpoint to current techniques. Discusses topics in organizational theory, organizational behavior, and interpersonal relations that are relevant to effective management performance and includes the global environment of managing in business.

MGT110 Business Communications

Key issues of written business communications. Effective ways to write letters and reports using current technology. Effective use of graphic aids, physical presentations of reports and letters, communication etiquette, public speaking, oral reporting and other forms of oral communication.

MGT120 Management and Supervision

Exposes the student to a variety of issues and topics that are important to today's manager. A historical look at management enables effective managers to incorporate contributions made by previous management theorists into today's environment. Examines four primary management functions (i.e., planning, organizing, leading, controlling) in detail. Students will develop a better understanding of the communication and decision-making skills that are necessary for success in management. Other topics covered include: ethics, social responsibility, international business, diversity, motivation, leadership, and conflict management.

MGT200 Organizational Behavior

Discusses Organizational Behavior as a blend of many subfields; i.e., psychology, sociology, anthropology, and most recently, technology, to create a diverse set of tools to understand the field of organizational behavior. Examines how individuals behave individually, how they behave in group/team settings, and how these factors influence the organization's behavior to affect overall performance.

MGT220 Organizational Development and Change

Emphasizes the analysis of systems and organizational development models. Covers the technical approach of systems intervention and the people approach of organizational development as mechanisms of managing change. Identifies and develops strategies for managing organizational aspects of change, shifts in leadership, reorganizations, technological change, and change management situations.

MGT230 Human Resource Management

Examines key Human Resource Management functions such as recruitment and selection, training and development, design and administration of compensation and benefits plan, collective bargaining, and development of high-performance work groups. Particular attention is given to the challenges and opportunities attendant to good Human Resource Management in an increasingly competitive, fast changing, global business environment and offers students a broad exposure to the new approaches and techniques Human Resource managers are using to meet those challenges.

Prerequisites: MGT110

MGT235 Employment Law

Provides an overview of federal statutes and state/regulated areas that impact employment and employees in the workplace. Among the topics addressed are employment status, EEO and Affirmative Action, OSHA, ERISA, FLSA, FMLA, and ADA; employee privacy issues (polygraph testing, drug and alcohol testing, employer searching and monitoring); welfare plans, labor relations and wrongful discharge.

Prerequisites: MGT100

MGT320 Corporate Culture and Organizational Climate

Introduces the study of corporate culture and organizational climate. Examines the individual, groups, and the organization in detail as well as analyzes and evaluates how each can contribute to an organization's success. Topics covered include, but are not limited to: motivation, stress, decision making, teamwork, employee involvement, leadership, perception, personality, and culture.

MGT400 Critical Thinking and Decision Making

Introduces students to both qualitative and quantitative aspects of decision processes. By exploring the nature of critical thinking and the factors that influence successful decision outcomes, students will gain requisite managerial competencies necessary for successful decisions in modern organizations. Also develops the elements and structure of decision methods, taking into account environmental (contextual) degrees of risk and uncertainty. Sensitivity analysis, i.e., how sensitive results are to the accuracy of the inputs and the models themselves, along with risk assessment and scenario analysis, are also covered. Material is drawn from several disciplines, including psychology, management science, and statistics. Numerous examples, exercises, problems, and cases are included.

Prerequisites: MGT110

Requirements: Knowledge of basic business statistics and introductory algebra

MGT420 Project Management

Examines project management roles and environments as well as corporate strategy, with special emphasis on leadership. Highlights the need for leadership strategies to be integrated with the strategic vision of the company as a whole. Topics covered in the course include: the nature of leadership, the nature of managerial work, effective leadership strategies, the development of leadership skills and issues of ethical leadership.

Prerequisites: MGT400

MGT440 Industrial Relations

Overview of labor history and law in the United States, as well as an investigation of the contemporary practice of labor relations by management and labor in both the public and private sectors. Specific topics covered include: labor history and labor law, rationale for organization and the organization process, the structure of unions and labor organizations, collective bargaining, impasse resolution, contract administration, grievance and arbitration, and future trends in labor relations.

MGT445 Negotiations and Administration of Labor Agreements

Revolves around case studies in contract negotiations, administration, grievance settlement, and arbitration. As a background to doing so, the student will be exposed to an overview of labor-management relations, its history, challenges, current practices and relevant current labor issues such as wage and salary, benefits, job security, seniority, and recent legal issues.

Requirements: Familiarity with industrial relations system

MGT450 International Management

A study of the management of international/multinational firms in the global environment. Political, regulatory, and economic factors will be investigated from the manager's perspective.

MGT480 Final Project Proposal

The student will choose a pre-approved topic within the field of management and leadership which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MGT490 Final Project

The student will write a final project (research paper) on a pre-approved topic within the field of management and leadership. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

COMPUTER SCIENCE

The Bachelor of Science program in Computer Science is designed to provide a background in programming, programming concepts and operating systems software. Specific courses provide the student with a sample of the most current programming techniques: C, C++, Pascal and Java, and allow understanding in the use of other programming languages. Courses in architecture, data structures, software development and engineering, and computer networks are offered to enhance the students' understanding of software development and provide an understanding of the theory involved in computer systems development. Programming languages and compilers, and artificial intelligence provide the core of the advanced subject matter.

The Master of Science program in Computer Science builds upon the fundamental skills of the undergraduate program, skills gained experientially or educationally. Advanced programming techniques, simulation and modeling are introduced at the master's level. A deeper understanding of programming concepts and the basis of computer systems analysis and design continues with the study of finite languages, and analysis of algorithms. Advanced topics in operating systems design and communications systems design are provided to enhance the student's capabilities in the use of computers in real world applications, while courses in software engineering, artificial intelligence and developing the man/machine interface provide the student with the necessary skills to design and implement successful systems.

The Doctor of Philosophy program in Computer Science is designed to provide a greater depth of understanding in programming, programming concepts and operating systems software for the graduate student with a Master of Science in Computer Science, or the equivalent experiential credit. The program is designed for professionals who have a strong foundation in computer science. Course of study includes topics from other branches of study including numerical analysis and linear programming. A study of distributed computing and networking, optimization, natural language processing, computer graphics and neural networks covers state-of-the-art topics in computer science today.

Bachelor of Science Computer Science

CSI100 Introduction to Computer Programming

Introduces the student to the methodology involved in solving problems by writing, implementing and testing algorithms with the help of the C programming language.

Requirements: IBM/PC

CSI110 Data Structures and Algorithms

Introduction to Data Structures and Algorithms. Provides a firm foundation in data abstraction, emphasizing the distinction between specification and implementation as the foundation for an object-oriented approach. Covers key object-oriented concepts, including encapsulation, inheritance and polymorphism. Also introduces analysis of algorithms and the Big "O" notation. Data structures such as Stacks, Queues, are implemented not only from a static point of view but also from a dynamic point of view. Linked Lists and graphs and trees are emphasized with different applications. Recursive reasoning is exploited and compared to sequential reasoning. A logical framework for designing the different data structures and their interactions is developed.

Prerequisites: CSI235

CSI120 Programming in Operating Systems

Provides an understanding of the Windows-NT operating system giving attention to system administration and use. Fundamental features of the Operating system are learning how to configure the Windows NT Server, using local and global groups to manage user accounts, having access to resources, and learning how to perform disk mirroring and striping with parity. Students will also learn the installation and configuration of Microsoft Network Client, Transmission, Control Protocol/Internet Protocol (TCP/IP), and Gateway Service for NetWare®.

CSI125 Calculus, Part I

Basic algebra, trigonometry, and geometry required for engineering. Topics include: basic algebraic operations, geometry, functions and graphs, trigonometric functions, systems of linear equations, determinants, factoring and fractions, quadratic equations, vectors, graphing, exponents and radicals, complex numbers, exponential and logarithmic functions. Prepares students for Calculus, Part II. Also references tutorials for graphing calculators and an interactive web site.

Recommended: Graphing calculator and Internet access

CSI126 Calculus, Part II

Advanced algebra, trigonometry, and calculus techniques required for engineering analysis. Topics include: Matrix algebra, inequalities, variation, ratios and proportion, sequences and the binomial theorem, advanced trigonometry, plane analytical geometry, statistics, differentiation, integration, series expansion of functions, and differential equations. References tutorials for graphing calculators and an interactive web site.

Prerequisites: CSI125

Recommended: Graphing calculator and Internet access

CSI130 Introduction to Operating Systems

Provides an understanding of the basic operating principles that are essential components in understanding how modern computing systems work. Includes: computer and operating systems overview, processes, memory, scheduling, input/output and file management, distributive systems and security.

CSI200 Software Development

Introduction to software development techniques and issues. Topics include: design trade-offs and functionality in software development environments, evaluation tools for existing and future languages and their constructs with respect to software issues, introduction to compiler construction and design.

Requirements: Knowledge of C and Pascal environments

CSI210 Computer Languages

Evaluates existing and future programming languages and constructs. Computer program design and construction are discussed and analyzed in this context. Fundamental concepts of programming languages are described by defining the design issues using common programming languages as examples. Various design choices are demonstrated, analyzed, and evaluated. Computer programming or coding is beyond the scope of this course. Emphasis is placed on the design, analysis, and evaluation of programming fundamentals independent of any specific programming language.

Prerequisites: CSI100 and CSI110

CSI220 Introduction to C Programming

An introduction to the widely used C language with emphasis on using a structured approach to programming. Topics include: data types, operators, functions, loops, arrays, strings, structures, and pointers.

Requirements: Any commercially available C Compiler

CSI230 Introduction to Databases

Introduces the fundamental concepts in designing, using, and implementing database systems and applications. Topics include: data modeling, physical file organization, relational data model, relational algebra, SQL, object-oriented databases, database design theory, system implementation techniques, and advanced database concepts and applications.

Prerequisites: CSI100 and CSI110

CSI235 C++ Programming

Provides in-depth review of the fundamentals and advantages of object-oriented programming methodology using C++ such as message passing, data hiding, encapsulation, and inheritance, and examines C++ features. Reviews in-depth study of the major object-oriented methodology (Booch, Rumbaugh, Jacobson) employed by many industry professionals. Also focuses on data modeling and the creation of reusable data classes.

Requirements: A C++ compiler

CSI300 Computer Architecture

Computer hardware, logic, flip-flop types, computer arithmetic, CPU structure, I/O Structure, the 68000 microprocessor, memory, computer communications, and operating systems.

CSI310 Computer Networks: Architecture and Protocols

Concepts of inter-connectivity of computer systems, theoretical and applied techniques. Addresses network layout and layered software protocols, local area networks, long-haul networks, packet switching, address routing, and data flow control. Includes Windows NT.

Prerequisites: CSI126 or trigonometry

CSI320 Introduction to Artificial Intelligence

Provides a balanced perspective on the language schools, theories, and applications of artificial intelligence (AI). Unifies the diverse branches of AI through a detailed discussion of its theoretical foundations. Presents case-based reasoning, genetic algorithms, neural nets, agents, and stochastic models of natural language understanding, as well as coverage of emergent computation and artificial life. Also includes: AI concepts; discusses the research tools for AI problem solving; demonstrates representations for AI and knowledge-sensitive problem solving; offers an extensive presentation of issues in machine learning; presents the important AI application areas; and presents Lisp and Prolog.

Prerequisites: CSI100 and CSI110

CSI400 Fundamentals of Software Engineering

Concepts and principles that underlie current and emerging methods, tools and techniques for software development, validation and maintenance. Topics include: software lifecycle models, project management, requirements engineering and specification, prototyping, architectural and object-oriented design, verification and validation, CASE, process improvement and software maintenance. The Unified Modeling Language, UML, is included as it relates to both system design and object design.

Prerequisites: C Proficiency

Requirements: A C/C++ compiler

CSI410 Operating Systems Design

Provides an overview of basic principles and issues in modern operating system design. Topics include: process concept and management, concurrent programming, deadlock prevention and recovery, storage management and virtual storage architecture, job and processor scheduling, and file and database systems. Case studies include: UNIX, Windows NT, and Linux operating systems.

CSI430 Introduction to JAVA Programming

Developed with an early exposure to "Objects First" approach to teaching Java, with the assumption that teaching beginners the "big picture" early gives them more time to master the principles of object-oriented programming. Focuses on the motivation behind Java's strengths and the benefits of the object-oriented paradigm. Also offers a solid understanding of objects and methods, concentrating on problem decomposition and program design. A firm grasp on these fundamentals allows the smaller details, and some of Java's advanced features, to fall into place from both instructor and student perspectives. Allows for a hands-on approach to learning JAVA.

Recommended: Previous experience with C or C++

CSI440 Introduction to Systems Analysis and Design

Provides a blend of traditional development with current techniques, such as client-server and object-oriented development, graphical user interfaces, and electronic data interchange. Covered is information as a corporate resource, the life cycle of computer-based business systems, the role of systems analyst, and the importance of examining business processes as significant inputs to information systems.

Requirements: IBM/PC and basic working knowledge of widely-used (conventional) information systems

CSI460 Compiler Construction

Introduces the students to Compiler Design. Important compiler design techniques are discussed. A translator from infix to postfix is developed. Different issues of compiler design in different programming languages including object oriented languages are reviewed. Specification and implementation of Lexical analyzers, parsing techniques, syntax directed translation and semantic translation are included.

Prerequisites: CSI220

Recommended: Knowledge of programming languages

CSI480 The Final Project Proposal

The student will choose a pre-approved topic within the field of computer science which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

CSI490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of computer science. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

CSI500 Programming Languages

Analysis of the fundamental design concepts underlying modern programming languages. Examination and comparison of programming constructs in a number of languages. Includes: discussion of syntax, semantics, data types, and the major categories of programming languages.

Requirements: LISP and Prolog language processors

Recommended: Knowledge of Pascal, Ada, Java and C or C++; and FORTRAN compilers and data structures

CSI510 Computer Science Theory

Developed with an early exposure to regular expressions and their importance in building Finite Automata. Focuses on the motivation behind teaching a computer science theory and the benefits of learning the theory behind building theoretical machines. Offers a solid understanding of regular expressions, concentrating on manipulating regular expressions and reducing them. A firm grasp on these fundamentals of regular expression and languages allows understanding of context-free grammar and languages as well as Turing machines and the Turing Thesis. All this makes both the student's perspectives and the teacher's perspectives fall into the right place.

CSI520 Systems Architecture

Technical presentation of the internal structure and function of modern-day computers (both serial and parallel architectures). The major components (CPU, control unit, memory, I/O) and the associated hierarchy of subcomponents are described from a physical and operational perspective.

CSI530 Operating Systems I

Emphasis on the components of distributed operating systems, communication, synchronization, processes and processors, file systems and shared memory. Case studies of distributed operating systems such as AMOEBA, MACH, CHORUS, and DCE.

Requirements: Borland C/C++ compiler

CSI540 Relational Databases

Design methodologies fundamental to creating an operating relational database designed to meet specific user application requirements. Topics include: procedures for designing and building a logical data model and/or relational database including the architecture, SQL standard, necessary attributes, normalization, data integrity and data redundancy.

Requirements: IBM/PC

CSI550 Analysis of Algorithms

Reviews a number of important data structures along with the algorithms designed for manipulating the data structures with emphasis on correctness and efficiency. Topics include: abstract data types (arrays, stacks, queues, and derivatives); fundamental tree and graph algorithms; heap structures; hashing; sorting and searching.

CSI560 Object-Oriented Design

Introduces the software development methodology referred to as "object-oriented". Object-oriented modeling (OOM), Object-oriented analysis (OOA) and, Object oriented design (OOD) are the major areas covered. A study of the static and dynamic characteristics of a problem via a formal denotation of relationships between components in the object model; integration of these ideas into an object-oriented design. The UML notation, developed by Booch, Rumbaugh and Jacobson, "The Three Amigos", has become a de facto world standard. It has been adopted by the Object Management Group (OMG) as the official world standard object notation and it's terminology, notation and concepts have been integrated into this course via real world examples.

Requirements: IBM/PC

CSI570 Compiler Design

Important compiler design techniques are discussed. A translator from infix to postfix is developed. Different issues of compiler design in different programming languages including object oriented languages are reviewed. Specification and implementation of Lexical analyzers, parsing techniques, syntax directed translation and semantic translation are included.

Prerequisites: CSI500

Recommended: Knowledge of programming languages, especially in-depth understanding of C

CSI600 Software Engineering

Describes the concepts and techniques for engineering large and small software systems. Discussion of Software Engineering principles and practices encompassing the entire software lifecycle from requirements definition to product release. Covers project management, CASE, Software Dependability, Verification and Validation and all of the different phases of the software development lifecycle. Modern techniques that have been developed in the last decade are used extensively. Notably, these include the unification of object-oriented analysis and design methods to produce the Unified Modeling Language (UML).

CSI620 Artificial Intelligence

Overview of software tools and techniques used to achieve machine intelligence. Topics include: knowledge representation, search techniques such as mini-max and alpha-beta, expert systems, logic via proof by resolution, learning by induction, and neural networks.

Requirements: Internet access and knowledge of calculus or linear algebra

CSI630 Data Communications

Assumes a basic knowledge of computers. Topics covered provide the students with a thorough understanding of computer networks, computer networking terminology, interconnection of computer networks, internet applications, network security, and major wireless and mobile technologies. Detailed discussions of the principles, modeling and performance of protocols in various layers and discussions of the underlying hardware technologies will also be studied in this course.

CSI635 Expert Systems Development

Provides an introduction to the design, development, and application of expert systems technology for the engineering of intelligent systems. Topics discussed include: object-oriented programming, logic programming, both rule- and frame-based software programming techniques, knowledge acquisition, knowledge representation, machine learning, several expert system development tools, and verification of knowledge bases. Inference strategies such as forward and backward chaining and conflict resolution techniques are also studied. The application of uncertainty factors and fuzzy logic are described. Many popular expert systems, such as MYCIN and DENDRAL, are also discussed in details.

Requirements: IBM/PC

CSI650 Human Computer Interface Design

Intended to provide an overview of issues involved in systems engineering with considerations of human engineering. Covers specific technologies used to enhance the man-machine interface as well as related theories, principles and guidelines. Provides the student with an understanding of major issues in human factors, as well as relevant technologies and their usability in diverse applications.

CSI680 The Thesis Proposal

The student will choose a pre-approved topic within the field of computer science which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

CSI690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of computer science. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Doctor of Philosophy
Computer Science**

CSI700 Logic Programming

Predicate calculus approach to computer programming, emphasizing the declarative, rather than the standard procedural style of program specification. Includes: analysis of basic declarative semantics and proof procedures, and extensions for handling negation and disjunction of clauses.

CSI710 Machine Vision

Machine vision, or computer vision concepts, theory, techniques, and applications. Topics include: binary image processing, sensor processing and integration, graphs, texture analysis, color perception and processing, dynamic vision, object recognition, and practical applications.

Requirements: Calculus

CSI730 Numerical Analysis

An advanced introduction to numerical analysis and exposes students to the development, analysis, and implementation of advanced numerical techniques for solving problems that arise in many disciplines. Topics include: nonlinear systems of equations, interpolation, data fitting and approximation, numerical differentiation and integration, boundary problems, and partial differential equations.

CSI750 Operating Systems II: Distributed and Computing Networks

Distributed systems: hardware, software, and communication architectures. Synchronization in distributed systems: clock synchronization, mutual exclusion, and deadlocks. Distributed file systems and shared memory. Case studies: Amoeba, Mach, Chorus, and DCE systems.

CSI800 Optimization

Mathematical modeling and the operations research approach, formulation and classification of optimization models, search-based optimization algorithms, formulation and classification of linear programs, Simplex algorithms for solving linear programs, multiobjective optimization and goal programming, shortest paths and CPM, formulation and structure of network flow models, formulation and classification of discrete optimization models.

Requirements: Calculus

CSI810 Natural Language Processing

Concepts and issues associated with machine processing and interpretation of natural language. Discusses possible internal machine representations of natural language syntax and semantics using Prolog. Applications such as text-to-text and speech-to-speech translation are also studied.

Recommended: Knowledge of artificial intelligence techniques including a symbolic programming language (Lisp or Prolog)

CSI820 Computer Graphics

An introduction to the topic of Computer Graphics with an emphasis on the problems of representing, manipulating, and representing graphical information with computers. Topics include: an overview of the hardware and software techniques for using refresh, storage and faster scanning devices; two-dimensional transformations, clipping, and windowing algorithms; display files; graphical databases; input devices; three-dimensional graphics including painting algorithms, solid models, texturing, coloring, lighting models, and shading.

Requirements: Knowledge of calculus, data structures and algorithms, and a programming language (either C, C++ or Java)

CSI830 Artificial Neural Networks

This course is an advanced introduction to artificial neural networks with an emphasis on mathematical modeling. Topics include: Neural information processing, Hybrid intelligence, learning supervised and unsupervised, knowledge based neural networks, mathematical modeling.

Requirements: Calculus

CSI840 Computational Complexity

Includes exposure to the fundamental mathematical properties of computer hardware, software and applications. Students will seek to determine what can and cannot be computed, how quickly algorithms can be computed, how much memory algorithms use, and on which type of computational model an algorithm must be run. Topics include: regular languages, context-free languages, the Church-Turing thesis, decidability, reducibility, time and space complexity, and intractability.

CSI880 The Dissertation Proposal

The student will choose a pre-approved topic within the field of computer science which is of sufficient dimension and depth to write a dissertation (research paper) of 150 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

CSI890 The Dissertation (9 units)

The student will write a dissertation (research paper) on a pre-approved topic within the field of computer science. The dissertation will be an extension of the dissertation proposal, and will consist of a minimum of 150 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ELECTRICAL ENGINEERING, OPTION A

The Bachelor of Science program in Electrical Engineering is divided into two options: Option A: Digital Communications/Signal Processing; and Option B: Control Systems/Computer Systems Performance.

Option A: Digital Communications/Signal Processing is designed to prepare the students with the necessary background to work or continue with graduate study in the areas of video and signal/image processing, and digital communications. It is also directed toward individuals who desire further specialization in telecommunications, communication networks, multimedia communications and wireless communications.

Bachelor of Science
Electrical Engineering, Option A

EE100 Linear Circuits

Introduction to electric circuit analysis. Illustrates the relationship between circuit analysis and design. Topics include: electric circuit variables (current, voltage, power and energy), circuit elements (resistors, dependent and independent sources, transducers, and switches), resistive circuits and analysis techniques, circuit theorems, operational amplifiers, energy storage elements (capacitors and inductors), RL and RC circuit response, and sinusoidal steady-state circuit analysis.

Prerequisites: EE126

Recommended: Knowledge of complex variables for circuit analysis

EE101 Electronic Circuits

Basic circuits used in electronic systems, operational amplifier circuits, design issues, feedback and stability issues, active filters, pulsed waveforms and timing circuits, digital logic circuits, and electronic system design.

Prerequisites: EE100

EE105 Introduction to Digital Logic

Concepts of computer mathematics: Boolean algebra, number systems and binary arithmetic. An introduction to digital logic and gates, Boolean expressions, Boolean switching functions. Synthesis of Boolean switching, iterative arrays and sequential state machines. Minimization techniques, sequential circuits using Flip Flops and shift registers which then lead to processor design.

EE115 Physics

Introductory course in physics emphasizing the solution of practical problems. Mechanics, dynamics, thermodynamics, electricity and magnetism, and fluid mechanics will be covered.

Prerequisites: EE126

EE124 Engineering Math, Part I

Basic algebra, trigonometry, and geometry required for engineering. Topics include: basic algebraic operations, geometry, functions and graphs, trigonometric functions, systems of linear equations, determinants, factoring and fractions, quadratic equations, vectors, graphing, exponents and radicals, complex numbers, exponential and logarithmic functions. Prepares students for Calculus, Part II. Also references tutorials for graphing calculators and an interactive web site.

Recommended: Graphing calculator and Internet access

EE125 Electronic Devices

Introduction to semiconductor material and properties; basic devices made of semiconductor; theory of p-n junction diode, bipolar junction transistor, field effect transistor (FET), operational amplifier; basic digital electronics; CMOS, TTL, and ECL digital circuits.

Prerequisites: EE100

EE126 Engineering Math, Part II

Advanced algebra, trigonometry, and calculus techniques required for engineering analysis. Topics include: Matrix algebra, inequalities, variation, ratios and proportion, sequences and the binomial theorem, advanced trigonometry, plane analytical geometry, statistics, differentiation, integration, series expansion of functions, and differential equations. References tutorials for graphing calculators and an interactive web site.

Prerequisites: EE124

Recommended: Graphing calculator and Internet access

EE130 Ethics and Engineering Decision-Making

A study of ethics and professionalism as it relates to the engineering profession and the student's career. Introduces the engineer to the ethical theory and practice, moral reasoning, legal, and professional attitudes to be encountered in the future working environment. Includes business, patent, and copyright law considerations.

EE205 Power Electronics

Applications of power electronic devices such as rectifiers, thyristors, bi-polar and MOSFET power transistors, TRIACs, IGBTs. Topics include: principles of thyristor control, single-phase and three-phase converters and AC voltage controllers, commutation techniques, switching characteristics of power transistors, DC choppers.

Prerequisites: EE126

EE210 Power Systems

Concepts of electric power systems based on one-line diagrams and per-unit representation. Topics include: power system representation, transmission line parameters and calculations, symmetrical and asymmetrical fault calculations, power-flow, power system control, stability and protection.

Prerequisites: EE126

EE220 Computer Applications for Engineers

Introduction to computers and information processing. Topics include: information systems and management information systems, computer hardware, input/output devices, storage devices, file organization and database design, microcomputers, telecommunications and computer networks, system and application software, programming languages, system analysis and design, and computer security.

EE310 Field and Wave Electromagnetics

Static and time varying electric and magnetic fields and development of Maxwell's equations from the laws of Coulomb, Gauss, Biot-Savart, Ampere and Faraday. Propagation of electromagnetic energy in free space and material media, including elementary radiators and guided waves in transmission lines and waveguides.

Prerequisites: EE126

EE405 Probability Theory and Applications for Electrical Engineering

Introduction to axiomatic foundations of probability theory, probability models, random variables, and probability distributions: Gaussian and Poisson. Fundamentals of random variable functions, linear estimation theory, orthogonality principles, sequences of random variables, stochastic processes, Markov chains. Application of these concepts to algorithm analysis and computer modeling.

Prerequisites: EE126

Requirements: Knowledge of matrix algebra

EE410 Microprocessors

Serves as an in-depth introduction to microprocessors. Topics covered include: microprocessor hardware, software, and architecture of both eight-bit and sixteen-bit machines. Assembly language fundamentals are also covered.

Prerequisites: EE126

EE415 Introduction to Digital Signal Processing

Fundamental concepts of processing signals in the discrete time domain. Topics include: linear systems, discrete time variant/invariant systems, quantization, sampling theory, Z-Transform, Discrete Fourier Transform (DFT), Fast Fourier Transform (FFT) and digital filter design techniques.

Prerequisites: EE430

EE420 Transform Theory for Electrical Engineers

An introductory study of complex variable theory: Cauchy-Riemann equations and conditions, Contour integrations and Residue theory. This leads to the development of continuous frequency transforms: Fourier, Laplace and their inverses. And finally, discrete time/frequency transforms: Z-Transform, Discrete Fourier Transform and Fast Fourier Transform.

Prerequisites: EE126

EE430 Signals and Systems

Signal and systems analysis in the time and frequency domains. Topics include: continuous and discrete convolution to determine responses to excitations, Laplace and Fourier Transforms, and the integration of concepts applicable to time and frequency analyses of systems.

Prerequisites: EE126

EE450 Elements of Communication Systems

Covers basic concepts of analog and digital communication systems, including: analysis and transmission of signals, analog (AM, FM, PM) and digital (PCM, FSK, PSK, ASK) modulation schemes, coding techniques, multiplexing, behavior of analog and digital systems in the presence of noise, and signal detection.

EE480 The Final Project Proposal

The student will choose a pre-approved topic within the field of digital communications /signal processing which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

EE490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of digital communications/signal processing. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ELECTRICAL ENGINEERING, OPTION B

The Bachelor of Science program in Electrical Engineering is divided into two options: Option A: Digital Communications/Signal Processing; and Option B: Control Systems/Computer Systems Performance.

Option B: Control Systems/Computer Systems Performance is designed to prepare students with the necessary background to work or continue with graduate study in the areas of robotics, artificial neural networks, multivariable feedback control, computer-aided control system design, adaptive control and large scale system control of large, flexible structures.

Bachelor of Science
Electrical Engineering, Option B

EE100 Linear Circuits

Introduction to electric circuit analysis. Illustrates the relationship between circuit analysis and design. Topics include: electric circuit variables (current, voltage, power and energy), circuit elements (resistors, dependent and independent sources, transducers, and switches), resistive circuits and analysis techniques, circuit theorems, operational amplifiers, energy storage elements (capacitors and inductors), RL and RC circuit response, and sinusoidal steady-state circuit analysis.

Prerequisites: EE126

Recommended: Knowledge of complex variables for circuit analysis

EE101 Electronic Circuits

Basic circuits used in electronic systems, operational amplifier circuits, design issues, feedback and stability issues, active filters, pulsed waveforms and timing circuits, digital logic circuits, and electronic system design.

Prerequisites: EE100

EE105 Introduction to Digital Logic

Concepts of computer mathematics: Boolean algebra, number systems and binary arithmetic. An introduction to digital logic and gates, Boolean expressions, Boolean switching functions. Synthesis of Boolean switching, iterative arrays and sequential state machines. Minimization techniques, sequential circuits using Flip Flops and shift registers which then lead to processor design.

EE115 Physics

Introductory course in physics emphasizing the solution of practical problems. Mechanics, dynamics, thermodynamics, electricity and magnetism, and fluid mechanics will be covered.

Prerequisites: EE126

EE120 Numerical Methods and Software for Electrical Engineering

Basic numerical methods for solving problems used in electrical engineering. A building block for subsequent courses in electrical and computer engineering where numerical methods are implemented. Topics include: roots of equations, systems of linear equations, matrix inversion, interpolation, splines, least-squares fitting, curve fitting, linear programming, numerical integration and differentiation, ordinary differential equations.

Prerequisites: EE126

EE124 Engineering Math, Part I

Basic algebra, trigonometry, and geometry required for engineering. Topics include: basic algebraic operations, geometry, functions and graphs, trigonometric functions, systems of linear equations, determinants, factoring and fractions, quadratic equations, vectors, graphing, exponents and radicals, complex numbers, exponential and logarithmic functions. Prepares students for Engineering Math, Part II. Also references tutorials for graphing calculators and an interactive web site.

Recommended: Graphing calculator and Internet access

EE125 Electronic Devices

Introduction to semiconductor material and properties; basic devices made of semiconductor; theory of p-n junction diode, bipolar junction transistor, field effect transistor (FET), operational amplifier; basic digital electronics; CMOS, TTL, and ECL digital circuits.

Prerequisites: EE100

EE126 Engineering Math, Part II

Advanced algebra, trigonometry, and calculus techniques required for engineering analysis. Topics include: Matrix algebra, inequalities, variation, ratios and proportion, sequences and the binomial theorem, advanced trigonometry, plane analytical geometry, statistics, differentiation, integration, series expansion of functions, and differential equations. References tutorials for graphing calculators and an interactive web site.

Prerequisites: EE124

Recommended: Graphing calculator and Internet access

EE130 Ethics and Engineering Decision-Making

A study of ethics and professionalism as it relates to the engineering profession and the student's career. Introduces the engineer to the ethical theory and practice, moral reasoning, legal, and professional attitudes to be encountered in the future working environment. Includes: business, patent, and copyright law considerations.

EE205 Power Electronics

Applications of power electronic devices such as rectifiers, thyristors, bi-polar and MOSFET power transistors, TRIACs, IGBTs. Topics include: principles of thyristor control, single-phase and three-phase converters and AC voltage controllers, commutation techniques, switching characteristics of power transistors, DC choppers.

Prerequisites: EE126

EE210 Power Systems

Concepts of electric power systems based on one-line diagrams and per-unit representation. Topics include: power system representation, transmission line parameters and calculations, symmetrical and asymmetrical fault calculations, power-flow, power system control, stability and protection.

Prerequisites: EE126

EE220 Computer Applications for Engineers

Introduction to computers and information processing. Topics include: information systems and management information systems, computer hardware, input/output devices, storage devices, file organization and database design, microcomputers, telecommunications and computer networks, system and application software, programming languages, system analysis and design, and computer security.

EE300 Control Systems

Design and analysis of classical feedback control systems in the time and frequency domains. Modeling of engineering and physical systems. System stability and sensitivity in the time and frequency domains.

Prerequisites: EE101

EE305 Control Systems Analysis Using MATLAB

Design and analysis of practical feedback control systems utilizing the MATLAB software program. Determine responses and performances of complex control systems to various excitations. Introduction to state-space matrix analysis.

Prerequisites: EE300

EE310 Field and Wave Electromagnetics

Static and time varying electric and magnetic fields and development of Maxwell's equations from the laws of Coulomb, Gauss, Biot-Savart, Ampere and Faraday. Propagation of electromagnetic energy in free space and material media, including elementary radiators and guided waves in transmission lines and waveguides.

Prerequisites: EE126

EE315 Basic Organization of Computer Systems

Introduction to fundamental architecture of modern digital computer systems. Major hardware components and their interconnected functions are studied; CPU, I/O, Bus, ALU, memory hierarchy, registers, and control and timing. Detailed operational software concepts are examined; operating systems, memory management, Boolean algebra, CPU interrupts, memory addressing modes and format, characteristic machine instruction sets, and various performance enhancement schemes.

EE405 Probability Theory and Applications for Electrical Engineering

Introduction to axiomatic foundations of probability theory, probability models, random variables, and probability distributions: Gaussian and Poisson. Fundamentals of random variable functions, linear estimation theory, orthogonality principles, sequences of random variables, stochastic processes, Markov chains. Application of these concepts to algorithm analysis and computer modeling.

Prerequisites: EE126

Requirements: Knowledge of matrix algebra

EE410 Microprocessors

This course serves as an in-depth introduction to microprocessors. Topics covered include: microprocessor hardware, software, and architecture of both eight-bit and sixteen-bit machines. Assembly language fundamentals are also covered.

Prerequisites: EE126

EE420 Transform Theory for Electrical Engineers

An introductory study of complex variable theory: Cauchy-Riemann equations and conditions, Contour integrations and Residue theory. This leads to the development of continuous frequency transforms: Fourier, Laplace and their inverses. And finally, discrete time/frequency transforms: Z-Transform, Discrete Fourier Transform and Fast Fourier Transform.

Prerequisites: EE126

EE430 Signals and Systems

Signal and systems analysis in the time and frequency domains. Topics include: continuous and discrete convolution to determine responses to excitations, Laplace and Fourier Transforms, and the integration of concepts applicable to time and frequency analyses of systems.

Prerequisites: EE126

EE470 Computer System Modeling Techniques

Covers the basic analytic techniques used in modeling and performance evaluation of computer systems and computer communication networks. Assumes previous knowledge of calculus and some understanding of computer systems. It is intended to provide all of the necessary material to introduce the basic concepts of performance modeling. The topics include: the introduction to probability theory and modeling, transform theory, simulation, Markov models, queues and some case studies.

Prerequisites: EE405

EE480 The Final Project Proposal

The student will choose a pre-approved topic within the field of control systems or computer systems performance which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

EE490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of control systems or computer systems performance. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ENGINEERING MANAGEMENT

The Engineering Management program is designed to augment the engineering competency of the student by providing instruction in the process of management as it applies to technically-based enterprises. By combining qualitative approaches and quantitative techniques in a balanced curriculum, management credentials are strengthened and technical proficiency is increased.

Applicants must have earned a Bachelor of Science degree in engineering, the physical sciences, mathematics, or computer science.

Students in either the Master of Science or Doctor of Philosophy program should consult the University with respect to choosing their courses.

**Master of Science
Engineering Management**

EMN500 Organizational Behavior and Management

Organizational theory, and the concepts and functions of management. Inter-relational behavior of the individual, the work group, and the organization are addressed.

EMN510 Financial Management in Engineering

Financial concepts in the management of technologies in technology-based organizations. Topics include: the analysis of financial statements, cash flow, risk, and capital budgeting in technical organizations.

EMN530 Managing Technology for Competitive Advantage

Focuses on the strategic management of technology and innovation in established firms. The issues include: technological innovation process; the role of idea champion and participative management; creativity; and entrepreneurship in small and large companies.

EMN540 Systems Management

Concepts and practices of systems theory applied to the management of technical organizations. Topics include: general systems theory, organizational systems, management functions, planning systems, time management and conflicts, quality management, and planning and control techniques.

EMN550 Analysis of Production and Operating Systems

Decisions and trade-offs associated with a company's operations function; analysis and control of tactical issues. Topics include: forecasting, capacity analysis, facility layout and design, aggregate and material requirement planning, detailed scheduling, project management and quality control.

EMN560 Industrial Management

Marketing and management policy for industrial products. Stresses the interaction of functional policies and overall corporate strategy. Topics include: market segmentation and selection, positioning, product design, pricing, channels of distribution, sales organization, promotion, communication, and response to competitive actions.

EMN580 Engineering Law I

Major emphasis of this course lies on identifying and addressing basic facts and procedures of tort law in application to the engineering function, including basic flaws and merits of the system. Topics include: causes of action; fees and costs; negligence; product, employer and governmental liability; tangible and intangible damages and awards.

EMN600 Statistical Methods for Engineers

Confidence intervals for parameters, sample size to control interval width, tests of hypotheses, operating characteristics curves, inference associated with discrete random variables, construction of acceptance sampling plans, comparison of two populations, least squares method, introduction to analysis of variance, and experimental design.

EMN610 Quality Control

Provides the student with an introduction to the field of quality engineering, including quality practices, statistical principles, product, process and materials control, measurement systems, safety and reliability, data collection and analysis, maintainability and availability, and a wide variety of quality related tools. These tools are appropriate for use in idea creation, process analysis, planning, evaluation and data collection/analysis.

EMN620 Technical Project Management

Explores the specific concepts, systems and techniques for management of technical projects. Leads the student through a complete project life-cycle, from requirements analysis and project definition to start-up, stage-gate reviews, and phase-out. Examines the project manager's role as cross-functional team leader, and key techniques for controlling project costs, schedules and performance.

EMN640 Operations Research in Engineering Management

Quantitative techniques for the formulation and solution of resource allocation problems, and the interpretation of results in technological systems. Topics include: project control networks, linear programming, post-optimality analysis, and an introduction to simulation in a decision framework.

Recommended: Understanding of introductory statistics and linear algebra

EMN680 The Thesis Proposal

The student will choose a pre-approved topic within the field of engineering management which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

EMN690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of engineering management. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Doctor of Philosophy
Engineering Management**

EMN700 Strategy and Organization

The strategic management of the enterprise requires the recognition of the strategy of the enterprise and the role and integration of a company's technology strategy. Strategy of manufacturing technology, organizational strategy, strategy of product research and development, and integrating with the marketing and financial strategies.

EMN710 Financial Decisions

Focuses on the utilization of finance concepts to make effective and efficient business decisions. Concepts explored include: uncertainty modeling, capital market dynamics, portfolio theory, real/financial option pricing, capital project evaluation, and cost of capital. Emphasis on the application of these concepts to real world problems.

EMN730 Management Decisions in Engineering

Designed to give students a greater understanding of the process of decision making. Examines decision theory, risk and uncertainty, preference measurement, making decisions involving multiple objectives, and prioritization of alternatives.

EMN740 Cases in Systems Management

Formulation of strategy for technical and scientific organizations. Organizational theory and policies, the chief executive's role, relating strategic opportunities to resources, environmental assessment, organizational change processes, relating strategy to organizational purpose, and managing the strategic process.

EMN750 Management of Technological Innovation

Focuses on the strategic management of technology and innovation in established firms. It emphasizes issues such as technological innovation process; planning and organization for innovation; the role of idea champion and participative management; risk-taking; technological risk-assessment; creativity; and entrepreneurship in small and large companies.

EMN760 Management and Organization of Research and Development

Focuses on the management of innovation in 4th generation Research & Development and encompasses the management of knowledge and its diverse sources, marketing strategies, model development for competitive architecture and organizational capability, new approaches to finance and accounting, the management of intellectual property, and the process and tools through which these elements are integrated. The business process of Research & Development replaces the business structure of R&D, technology development, and product/service development.

Recommended: Knowledge of engineering management fundamentals

EMN780 Engineering Law II

Major emphasis of this course is identifying and addressing areas of potential legal liabilities for engineers in the areas of tort law, regulatory compliance and discrimination. Topics include: negligence, Occupational Safety and Health Administration (OSHA), Americans with Disabilities Act (ADA), privacy rights, land rights, product liability and potential liabilities in the employment area.

EMN800 Quality and the Products of Technology

Examines the introduction of new technology in a variety of businesses and industry including: the role and impact of technology on quality, innovation, and business strategies. Application of theory and concepts reviewed using various domestic and international business cases.

EMN810 Organizational Research Methods

A study of the concepts, techniques, methods, and processes that should be used to effectively research business situations. Emphasis on the design of research that can be applied in actual business settings to decide on the research question, design and collect data, analyze results, and interpret and present recommendations. Focus on application of research to solve business problems.

EMN880 The Dissertation Proposal

The student will choose a pre-approved topic within the field of engineering management which is of sufficient dimension and depth to write a dissertation (research paper) of 150 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

EMN890 The Dissertation (9 Units)

The student will write a dissertation (research paper) on a pre-approved topic within the field of engineering management. The dissertation will be an extension of the dissertation proposal, and will consist of a minimum of 150 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ENVIRONMENTAL ENGINEERING

Environmental Engineering is a diverse discipline which focuses on innovative technology for reuse, recycle and recovery measures, and on the biological, chemical and physical reactions in the land, air and water environments. The political system has also had a major impact on the discipline of environmental engineering, paving the way for comprehensive legislation and extensive regulations which are regularly reviewed and updated by various legislative bodies.

The Environmental Engineering curriculum at Kennedy-Western continues to respond to the demand for up-to-date education with practical applications. Coursework is available in the fundamental aspects of legislation, quality standards, and environmental assessment procedures. Added to this, learning in the areas of water supply, air, hazardous and solid wastes, wastewater, and environmental management offer the undergraduate and graduate student both the foundations and the specialties of the discipline.

Bachelor of Science Environmental Engineering

ENE125 Engineering Math, Part I

Basic algebra, trigonometry, and geometry required for engineering. Topics include: basic algebraic operations, geometry, functions and graphs, trigonometric functions, systems of linear equations, determinants, factoring and fractions, quadratic equations, vectors, graphing, exponents and radicals, complex numbers, exponential and logarithmic functions. Prepares students for Calculus, Part II. Also references tutorials for graphing calculators and an interactive web site.

Recommended: Graphing calculator and Internet access

ENE126 Engineering Math, Part II

Advanced algebra, trigonometry, and calculus techniques required for engineering analysis. Topics include: Matrix algebra, inequalities, variation, ratios and proportion, sequences and the binomial theorem, advanced trigonometry, plane analytical geometry, statistics, differentiation, integration, series expansion of functions, and differential equations. References tutorials for graphing calculators and an interactive web site.

Prerequisites: ENE125

Recommended: Graphing calculator and Internet access

ENE200 General Chemistry

Concepts and principles of the macroscopic aspects of chemistry, oriented to problem-solving and descriptions of everyday phenomena. Topics include: chemical reactions, atomic structure, states of matter, phase and chemical equilibria, heat effects, and reaction rates.

Prerequisites: ENE126

ENE225 Principles of Biology

An introductory course in biology which will present a basic overview of the patterns and functions which characterize living organisms. The emphasis is placed on cellular biology. Topics include: the chemistry of life, cell structure, a survey of the five kingdoms of life, principles of ecology, and human ecology. Cell metabolism (respiration, photosynthesis, protein synthesis) will also be covered.

ENE230 Principles of Fluid Mechanics

An introductory course in engineering fluid mechanics. Covers fundamentals of engineering fluid mechanics including fluid properties; fluid static and dynamics; principles of continuity, energy and momentum; dimensional analysis; laminar and turbulent flow; turbo machinery; and introduction to open channel flow.

Prerequisites: ENE126

ENE300 Physics

Introductory course in physics emphasizing the solution of practical problems. Mechanics, dynamics, thermodynamics, electricity and magnetism, and fluid mechanics will be covered.

Prerequisites: ENE126

ENE305 Introduction to Environmental Science

Fundamental concepts and understanding of geology and groundwater hydrology and quality. Topics include: air quality, human risk assessment, ecological toxicology, environmental chemistry, analysis of regulated compounds, controlling contaminants, management options (technical and administrative) for pollution prevention and hazardous waste treatment.

Prerequisites: ENE200

ENE310 Elasticity and Plasticity

Fundamental concepts of stress, strain, elastic behavior, and inelastic behavior are covered at a level suitable for junior engineering students. Concepts are applied to the analysis and design of structural members subjected to tension, compression, torsion, and bending. Both the International System of Units (SI) and the U.S. Customary Systems are used.

ENE400 Thermodynamics

Emphasizes the fundamentals of classical thermodynamics. The following topics are covered: fundamental concepts and definitions, work, heat, internal thermal energy and the First Law of Thermodynamics, including closed system analysis, properties and state determination of pure, simple, compressible substances, including ideal gases, open system analysis, Second Law of Thermodynamics, including maximum power analysis for refrigeration, heat pump and power cycles, entropy considerations, including nozzles, compressors and pumps, psychrometrics.

Prerequisites: ENE126

ENE410 Air Pollution Fundamentals

Introductory and comprehensive overview of air pollution engineering. Covers the importance of air pollution control, air pollution laws and regulations, air pollution sampling and measurements, and introduction to meteorology including air pollution models. Also covered are important considerations for air pollution control (flow rates, kinetics, temperature, ultimate fate of pollutants) control of particulate pollutants, VOCs, sulfur oxides, and nitrogen oxides. Pollution from motor vehicles and global climate change are also discussed. Although the book contains mathematical formulae and theoretical descriptions, the examinations will focus on qualitative and practical aspects of air pollution engineering.

Prerequisites: ENE200

Recommended: Scientific calculator

ENE420 Environmental Compliance

Fundamentals of environmental compliance including: the Clean Air Act, Clean Water Act, RCRA, CERCLA, SARA, and the Hazardous Waste Operations and Emergency Response Act.

ENE450 Principles of Hazardous Materials Management

An overview of key aspects of hazardous materials. Topics covered include: regulations, handling procedures, medical surveillance, toxicology, respiratory protection, emergency planning, drum handling, and monitoring. The association of these topics will be related to the types of environmental media; land, air, and water.

Prerequisites: ENE305

ENE470 Introduction to Environmental Engineering

Comprehensive understanding of the technology for municipal water processing, distribution, collection and treatment. Fundamentals of hydraulics, hydrology and chemistry of water, soil and air.

Prerequisites: ENE200 and ENE300

ENE480 The Final Project Proposal

The student will choose a pre-approved topic within the field of environmental engineering which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ENE490 The Final Project (9 units)

The student will write a final project (research paper) on a pre-approved topic within the field of environmental engineering. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Master of Science
Environmental Engineering**

ENE501 Quantitative Methods for Environmental Assessment

Identifies and addresses such environmental problems as transport, burial/storage, monitoring, spillage, leakage and clean-up of hazardous wastes. Topics include: utility theory and working-interest optimization; catastrophic events, insurance and unilateral regulatory changes; corporate involvement in multiple environmental projects: methods of limiting environmental risk; hazardous waste site safety and monitoring; and anthropogenic environmental problems and their remediation.

ENE505 Environmental Chemistry

Provides the fundamentals of environmental chemistry needed for a practicing environmental engineer. Study of the chemistry of water, soil, and air which will be used as a basis for understanding wastewater, hazardous waste and air pollution technology.

Requirements: Scientific calculator

ENE510 Air Pollution Phenomena and Systems

Key issues of air quality, its pollution and its management. Topics include: the atmosphere and its contaminants; effects of air pollution; air quality standards and monitoring; sources and measurements methodologies; meteorology, dispersion and modeling; stationary source control approaches; mobile source control approaches; air quality laws and regulations; management, trends, and indoor quality.

ENE515 Environmental Management

Foundations and principles of environmental management. Topics include: air, water, solid and hazardous waste management, economic considerations, regulatory framework, worker training and safety, and monitoring methods.

Requirements: Algebra and trigonometry

ENE520 Hydrologic Science

Quantitative analyses of urban hydrology stemming from rainfall events. Included are: modeling and forecasting based upon population density, infrastructure and topography. Regional and local planning to accommodate storm water runoff are addressed.

Requirements: Calculus

ENE535 Groundwater Treatment Technology

Concepts of groundwater remediation treatments and technologies for containment removal. Topics include: groundwater remediation, in-situ treatment, removal of contaminants from sub-surface environments, subsurface transport processes, groundwater and contaminated soil bio-remediation, groundwater pump-and-treat technologies, and soil vapor extraction.

Requirements: Chemistry

ENE540 Solid Waste Management

Engineering and management concepts and practices for the collection and disposal of solid waste. Topics include: sources, composition, and properties of solid waste; engineering principles; separation, transformation, and recycling of waste materials; closure, restoration, and rehabilitation of landfills; and solid waste management and planning issues.

ENE545 Theory of Radiation

Presents the theory and principles of radiation, including the origins and types of radiation, radioactive decay, interactions of radiation with matter, dosimetry, and the chemical and biological effects of radiation.

ENE550 Hazardous Waste Management

Concepts and practices for hazardous waste administration, focusing on key issues in management and compliance. Topics include: regulations, hazardous waste identification, storage of hazardous waste, TSD permits, waste analysis plan, transportation, record keeping system, training programs, waste oil, underground storage tanks and recycling.

Requirements: Chemistry

ENE555 Environmental Project Management

An examination of the role the project manager plays in managing an environmental project. It reviews the fundamental applications of business, technical, and regulatory expertise needed to plan and control resources, costs, risk, and profitability. It discusses effective project control systems necessary for successful cost and schedule control. The selections of an environmental project manager and the process of contract negotiation and administration will be reviewed.

ENE565 Structural Analysis and Design

Fundamental concepts and principles for the analysis and design of structures. Emphasis on the analysis structures such as trusses and beams using Statics. Determination of the internal forces of structures (required for the structural design), given the application of externally applied environmental forces such as moving live, wind or snow loads. Calculation of the deformations of structures due to these applied loads. Influence of moving loads on beams. Introduction to structural design and to concrete design.

Requirements: Calculus

ENE570 Waste Remediation

The application of using various treatment technologies to reduce or eliminate the volume, toxicity, and/or the mobility of waste at contaminated sites. Topics include: risk assessment, oxidation, thermal technologies, physical/chemical technologies, bioremediation, management of residuals, source control and preventive engineering.

Requirements: Chemistry

ENE600 Environmental Law and Regulatory Compliance

Introduces fundamental concepts behind legal principles of enforcement and administrative organization in the practice of environmental engineering and pollution control.

ENE610 Energy Conservation and Utilization in Industry

Key issues and current trends in the energy conservation field are emphasized as well as regulatory changes, new technologies, case studies, and the environmental impacts of energy conservation. Topics include: pollution prevention strategies, green house gases, indoor air quality, and new refrigerants requirements.

ENE620 Toxicology

Introduction to the study of how chemicals can be harmful to organisms and the environment. Key issues include: understanding and application of general toxicological principles; mechanisms of the actions of toxic substances (doses, responses of populations, detection and measurement); risk assessments and management issues; and uncertainties and limitations inherent in toxicological studies.

ENE630 Ergonomics and Environmental Safety

Introduction to designing tools and tasks to be compatible with human capabilities and limitations by understanding human beings and their behavior as it relates to anatomy, physiology, and psychology. Topics include: Introduction to Ergonomics, Design Application of Ergonomics, and The Ergonomic Knowledge Base.

ENE680 The Thesis Proposal

The student will choose a pre-approved topic within the field of environmental engineering which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ENE690 The Thesis (9 units)

The student will write a thesis (research paper) on a pre-approved topic within the field of environmental engineering. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Doctor of Philosophy
Environmental Engineering**

ENE700 Advanced Environmental Engineering

Examines complexities associated with industrial environmental systems. Quantitative design parameters, economics, regulatory impact, risk, ethics, and global implications are considered. Comprehension of multifaceted philosophies and complex decision making are stressed.

Requirements: Chemistry and basic engineering science

ENE705 Chemical and Biological Processes in Environmental Engineering

Covers the field of environmental biotechnology. Specific topics include: Biofilm Kinetics, microbial kinetics, reactors, activated sludge processes, wetlands, aerobic processes, nitrification, denitrification, phosphorus removal, methanogenesis, metabolism of toxic or hazardous chemicals, and biological treatment of drinking water. Typical problems in the course use actual data and design problems to explain concepts and to calculate the effectiveness and efficiency of treatment systems. Several mathematical models are developed based on mass balance and kinetics to aid in the design and analysis of these systems. Examples of these are: kinetics of substrate utilization in biofilms; models of settling efficiency in sludge tanks given input flux and flow rates; prediction of oxygen demand in bioreactors.

ENE720 Water Quality Control

Water quality, fundamentals of water chemistry; water and wastewater characteristics; water and wastewater flow; water and wastewater treatment methods, disposal, and reuse of wastewater; waste characteristics, liquid and solid waste disposal.

ENE730 Air Pollution Control

This course is in the broad field of air pollution control in which the design approach is stressed in process design, electrostatic precipitation, fabric filtration, particulate and gaseous control, incineration together with meteorology and atmospheric modeling.

ENE735 Water Resource Engineering

Planning and design of water resources projects. Topics include: hydrology, hydraulics of open channels and pressure conduits, probability concept, economic study, hydraulic structure, and so on, which are utilized in control and utilization of water resources projects.

ENE740 Recycling

Presents detailed information on the Recycling Phase of a Solid Waste Management Plan. Also, students will analyze the various technologies available for the design of a recycling program. The beneficial reuse of materials as part of the students current State's requirements will be explored as well as the State's approach to recycling.

ENE750 Hazardous Waste Management

Key issues in the management of hazardous waste are examined. Topics include: environmental standards and regulations, transportation of hazardous waste, emergency removal actions, disposal and treatment of hazardous waste, permitting procedures, environmental risk assessment, and storage of hazardous materials.

ENE770 Managing Environmental Risks

An introduction to the basic principles of environmental risk assessment. Topics include: environmental resource assessment, exposure assessment, toxicity assessment, and risk characterization. Mathematical modeling and computational techniques are utilized to establish the potential threat to environmental resources.

Requirements: Algebra and trigonometry

ENE800 Ergonomic Design and Environmental Safety Engineering

Workplace improvements to reduce musculoskeletal stress and cognitive workload in office and industrial environments. Risk factors for cumulative trauma and repetitive strain injuries. Environmental safety standards regarding temperature, vibration and noise. Accommodation techniques for physically challenged workers.

ENE810 National and International Environmental Law

Concepts and practices of national and international environmental law. Emphasizes similarities and major differences in origins, such as legislation vs. case decisions and treaties; in the nature of the regulations; and in enforcement methods regarding breaches and liabilities for harm.

ENE820 Environmental Economics

Centers on the current commitment by the citizens of the United States to protecting the environment. Emphasizes that spending on environmental problems is rising; that the allocation of resources is changing, and; that the costs of pollution control are rising at a time when unmet environmental needs are still quite large.

ENE830 Ecology for a Sustainable Future

The long-term well-being of this planet and its inhabitants are in jeopardy unless a sustainable philosophy replaces the present industrial expansion paradigm. A sustainable society manages balance between anthropogenic need and ecosystem equilibrium. Topics include: environmental ethics in light of economic/political reality, ecosystem imbalance due to industrialization, and mitigation of resource stress due to pollution and overpopulation.

ENE880 The Dissertation Proposal

The student will choose a pre-approved topic within the field of environmental engineering which is of sufficient dimension and depth to write a dissertation (research paper) of 150 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ENE890 The Dissertation (9 Units)

The student will write a dissertation (research paper) on a pre-approved topic within the field of environmental engineering. The dissertation will be an extension of the dissertation proposal, and will consist of a minimum of 150 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.



GENERAL ENGINEERING

The General Engineering program is designed to broaden the student's knowledge in the field of engineering by providing a range of classes relevant to various engineering disciplines. At the Bachelor of Science level, courses are offered in engineering fundamentals and more specific advanced topics. In combination with the technical education and work experience of the student, the proper selection of courses and final project will provide a solid technical background and prepare the student for an engineering career.

At the Master of Science and Doctorate levels, courses may be chosen to complement the student's technical background and to focus on a specific area of interest. Students should design their program in consultation with the University, and in preparation for their thesis or dissertation proposal.

Bachelor of Science General Engineering

ENG100 Introduction to Modern Engineering and Technology

Provides an introduction to the engineering profession. Covers the fundamentals of several engineering disciplines, what is expected of engineers, and problem solving techniques. Engineering disciplines are introduced with the standard mathematical and science based topics. Includes: verbal and written communication, ethics, problem solving techniques, mathematics, basics of computers, Newton's laws, statics, dynamics, and thermodynamics.

ENG115 Introduction to Computer Aided Design and Drafting

Introduction to Computer Aided Design and Drafting and its applications in producing design drawings, focusing on 2D drawings and multi view drawing of 3D objects. Topics include: basics of CAD; setting up an electronic drawing; graphic entities, drawing construction techniques using CAD; editing commands; display commands; hard copy production; sheet composition; scaling; and plotting.

Prerequisites: ENG300

Requirements: Computer literacy and engineering principles

ENG125 Engineering Math, Part I

Basic algebra, trigonometry, and geometry required for engineering. Topics include: basic algebraic operations, geometry, functions and graphs, trigonometric functions, systems of linear equations, determinants, factoring and fractions, quadratic equations, vectors, graphing, exponents and radicals, complex numbers, exponential and logarithmic functions. Prepares students for Calculus, Part II. Also references tutorials for graphing calculators and an interactive web site.

Recommended: Graphing calculator and Internet access

ENG126 Engineering Math, Part II

Advanced algebra, trigonometry, and calculus techniques required for engineering analysis. Topics include: Matrix algebra, inequalities, variation, ratios and proportion, sequences and the binomial theorem, advanced trigonometry, plane analytical geometry, statistics, differentiation, integration, series expansion of functions, and differential equations. References tutorials for graphing calculators and an interactive web site.

Prerequisites: ENG125

Recommended: Graphing calculator and Internet access

ENG200 General Chemistry

Concepts and principles of the macroscopic aspects of chemistry, oriented to problem-solving and descriptions of everyday phenomena. Topics include: chemical reactions, atomic structure, states of matter, phase and chemical equilibria (including acid-base equilibria) heat effects, and reaction rates.

ENG220 Fundamentals of Electrical Engineering

Teaches students about systems encountered in everyday life: air-bag inflation system, CD players, telephones, fax machines, bar codes on products and mail, computers, modem, etc. Discusses how to convert analog information into digital form and back again; examines different computers including PC's, smart cards and microcomputers; illustrates how to measure the amount of information present in the data; describes ways to encode information and provides glimpse into the future of digital technology.

Prerequisites: ENG126

ENG230 Statics and Mechanics of Materials

Fundamentals of statics and mechanics of materials. Topics include: forces (characteristics, resultants, and components), equilibrium force systems (free-body diagrams), stress, strain and deformation for axial loading, equivalent force/moment systems, equilibrium of rigid bodies, torsional loading of shafts, flexural loading and stresses in beams, and combined static loading. Emphasis on an organized procedure for analysis and the use of free-body diagrams in problem solving.

Prerequisites: ENG300

ENG300 Engineering Physics

Introductory course in physics emphasizing the solution of practical problems. Mechanics, dynamics, thermodynamics, electricity and magnetism, and fluid mechanics will be covered.

Prerequisites: ENG126

ENG305 Introduction to Environmental Science

Fundamental concepts and understanding of geology and groundwater hydrology and quality. Topics include: air quality, human risk assessment, ecological toxicology, environmental chemistry, analysis of regulated compounds, controlling contaminants, management options (technical and administrative) for pollution prevention and hazardous waste treatment.

Prerequisites: ENG200

ENG330 Electronics for General Engineers

Electrical analysis of series, parallel, and series-parallel circuits. After a review of basic electronics, several network theorems for circuit analysis are covered. The networks will include resistive, capacitive, inductive, and resonant circuits. The course will emphasize practical applications of the circuits.

Prerequisites: ENG220 and ENG300

ENG340 Engineering Economics

Covers the basic principles and applications of engineering economic analysis that bear on design and decision-making. The following major topics are covered: principles of economic equivalence; time value of money; analysis of single and multiple investments; comparison of alternatives; capital recovery and tax implications; public sector analysis and break-even concepts. Also designed to help the student prepare for professional exams such as the FE (Fundamentals of Engineering) Exam.

ENG345 CAD Design and Implementation

Introduction to CAD and its applications in producing design drawings, focusing on 2D drawings. Topics include: basics of using CAD, setting up an electronic drawing, graphic entities, drawing construction techniques, drawing enquiry, editing commands, display commands, hard copy production, sheet composition, scaling and plotting.

ENG350 Introduction to Industrial Engineering

Definition of industrial and systems engineering; methodologies, problems and solutions. Business applications of industrial and systems engineering, and their management and control. An overview of the functional areas, including tools such as CAD/CAM, robotics and resource management. Introduction to integrated systems design.

Prerequisites: ENG126

ENG360 Materials Science

Introductory course in materials science and engineering. Covers the relationship between structures and mechanical and physical properties of metals, polymers, ceramics and composite materials; properties modification, corrosion processes, selection of materials for various design requirements.

Prerequisites: ENG200 and ENG300

ENG400 Engineering Thermodynamics

Emphasizes the fundamentals of classical thermodynamics. The following topics are covered: fundamental concepts and definitions, work, heat, internal thermal energy and the First Law of Thermodynamics, including closed system analysis, properties and state determination of pure, simple, compressible substances, including ideal gases, open system analysis, Second Law of Thermodynamics, including maximum power analysis for refrigeration, heat pump and power cycles, entropy considerations, including nozzles, compressors and pumps, psychrometrics.

Prerequisites: ENG126

ENG410 Quality Considerations for Engineers

Introduction to design, methods, operation, and control of statistical quality control. Focus is on Dorian Shainin's methods and the design of experiments to maximize yield. Topics include C_p and C_{pk} , and the search for the red X.

ENG420 Statistical Methods for Engineers

Concepts and practices of probability, various distributions, statistics, and their applications to a variety of engineering problems. Topics include: tests of hypothesis, single and multi-factor experiments, linear regressions and correlation, statistical quality control and decision theory.

ENG430 Engineering Systems Analysis

Introduction to systems analysis and design. Techniques and tools to set up and prepare for solution problems such as computer network facilities, inventory systems, petroleum, satellite systems, transportation systems, life cycle costs, and other more complex systems. Topics include: analytical and design methods to create a valid systems description; systems planning and analysis; phases of systems development; systems implementation and support facets of systems development.

ENG440 Energy Conversion Principles

Fundamentals of energy conversion methods. Topics include: energy classification, principle sources (fossil, nuclear and solar), utilization, economics, conversion of energy to thermal, mechanical, and electrical forms. In addition, fossil-fuel systems, nuclear reactors, and the environmental impact of power plant operation are studied.

Prerequisites: ENG400

ENG480 The Final Project Proposal

The student will choose a pre-approved topic within the field of engineering which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ENG490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of engineering. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

Master of Science General Engineering

ENG503 Computerized Mathematics

Development and application of numerical methods for engineering problem solving. Topics include: modeling, computers, and error analysis, finding roots of equations, solving systems of linear algebraic equations, optimization, and curve fitting. Presents sample implementations of many of the techniques using Microsoft Excel and Mathworks MATLAB.

Requirements: Knowledge of calculus, physics and engineering principles

ENG510 Engineering Systems

Application of systems engineering principles and systems analysis to problems and exercises. Systems development, systems test and evaluation optimization in design and operations, probability and statistical methods, and systems engineering management. Procedures for design of reliability, design for supportability, and design for economic feasibility.

Requirements: Calculus

ENG520 Quality Engineering

Provides the student with an introduction to the field of quality engineering, including quality practices, statistical principles, product, process and materials control, measurement systems, safety and reliability, data collection and analysis, maintainability and availability, and a wide variety of quality related tools. These tools are appropriate for use in idea creation, process analysis, planning, evaluation and data collection/analysis.

ENG530 Safety

Safety principles and management practices as they relate to the engineering field. Topics include: safety management, common hazards encountered in the workplace, and effective methods to eliminate hazards and ensure worker's health in the workplace.

Requirements: Calculus

ENG535 Management of Technology

Focuses on the strategic management of technology and innovation in established firms. The issues include: technological innovation process; the role of idea champion and participative management; creativity; and entrepreneurship in small and large companies.

ENG540 Economics of Technology

Principles of engineering economy which include developing decision alternatives, focusing on relevant criteria and the differences among the alternatives, using a consistent viewpoint/unit of measure, dealing with uncertainty, and applying an adaptive process of evaluating decisions previously made. Specific engineering economy topics include: cost concepts and the economic environment; money-time relationships; benefit/cost ratio method; depreciation and income taxes; and estimating cash flows.

ENG550 Operations and Productions Management

Decisions and trade-offs associated with a company's operations function; analysis and control of tactical issues. Topics include: forecasting, capacity analysis, facility layout and design, aggregate and material requirement planning, detailed scheduling, project management and quality control.

ENG600 Operations Research

The development of quantitative modeling techniques proven useful in the public and private sectors. Topics include: linear, goal and integer programming, the simplex algorithm, duality, network analysis, queuing theory and simulation.

Requirements: Calculus

ENG620 Random Variables and Stochastic Processes

Application of stochastic processes using data smoothing, ergodicity, correlation estimates, and spectral estimation. Discrete systems, Fourier transforms, and digital processing of analog signals. Factorization, windows, Hilbert transforms, frequency modulation, uncertainty and ambiguity to solve band-limited functions.

ENG630 Advanced Computer Automated Design Systems

Provides a comprehensive view of computer-aided manufacturing (CAM). The main emphasis is the understanding of the principles of and relationships among the various components in CAM including computer-aided design (CAD), geometric modeling, process engineering, automated manufacturing, numerical control (NC), industrial robotics, and process planning.

Prerequisites: ENG510

Requirements: Calculus

ENG640 Organizational Management

Organizational theory, and the concepts and functions of management. Inter-relational behavior of the individual, the work group, and the organization are addressed.

ENG645 Engineering Optimizing Techniques

Systematic presentation of modeling and optimizing techniques for design of various engineering systems, including mechanical systems, transportation systems, and engineering systems. Includes: use of probability theory, economic analysis, and mathematical methods of optimizing. Advantages and limitations of numerical optimization.

Requirements: Calculus

ENG680 The Thesis Proposal

The student will choose a pre-approved topic within the field of engineering which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ENG690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of engineering. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

Doctor of Philosophy General Engineering

ENG700 **Analytic Methods of Engineering**

Prepares for skillful use of analytic methods of engineering in defining and solving problems in engineering practice. Based on the fundamental material from probability and stochastic processes, the methods concentrate on design and analysis of queuing (or waiting-line) systems that appear in many branches of engineering.

Requirements: Calculus and probability

ENG710 **Physics of Semi-Conductor Devices**

The properties of semi-conductors will be used to develop an understanding of the basic building blocks of integrated circuits. P/N junctions, bipolar transistors, metal oxide semi-conductor capacitors (MOSC), and MOSFETS. The static as well as the dynamic (current-voltage relations) characteristics will be addressed.

Requirements: Calculus and physics

ENG720 **Solid State Electronics**

Provides coverage of fundamental properties of solid-state electronic devices. Topics include: crystal properties of semiconductors, energy bands and charge carriers, semiconductor junctions, transistor types (bipolar-junction and field-effect), optoelectronic devices, integrated circuits, and semiconductor power devices.

Requirements: Knowledge of calculus and physics

ENG730 **Stochastic Modeling**

Provides coverage of fundamental topics in information theory and practice, with applications related to telecommunications. Topics include: entropy and mutual information, entropy rates of a stochastic process, data compression, channel capacity, differential entropy, gaussian channels, rate distortion theory, and elementary coding theory.

Prerequisites: ENG700

Requirements: Knowledge of probability, stochastic processes, optimization, theory of linear systems, mathematical analysis

ENG740 **Linear Programming**

Development of quantitative modeling techniques proven useful in the public and private sectors. Topics include: linear, goal, and integer programming, the simplex algorithm, duality, network analysis, queuing theory, and simulation.

Requirements: Matrix/vector algebra or calculus

ENG750 Quantum Mechanics

This course covers the fundamental principles of quantum mechanics theory. Topics include: the wave function, the time-independent Schrodinger Equation, formalism, quantum mechanics in three dimension, and identical particles.

Requirements: Calculus and physics

ENG760 Management and Organization of Research and Development

Focuses on the management of innovation in 4th generation Research and Development and encompasses the management of knowledge and its diverse sources, marketing strategies, model development for competitive architecture and organizational capability, new approaches to finance and accounting, the management of intellectual property, and the process and tools through which these elements are integrated. The business process of Research and Development replaces the business structure of Research and Development, technology development, and product/service development.

ENG800 Management Theory and Practice

The theory and practice of management from the perspective of the engineer and technologist. Forecasting the demand for product and relating those forecasts to the forecast of technology. Managing and integrating the technology into the dynamic business and technical environment, including: benefit/cost analysis, risk analysis, technology transfer, impact assessment, identification of future impacts, and managing the future from the present.

ENG810 Quality Planning and Analysis

Included are topics such as: quality control, process management, continuous improvement, supply chain management, design for quality, and operations, among others. These are all approached from the view of how each of these areas of organizations may be managed with the ultimate aim of providing world class customer service.

ENG820 Engineering Economics Analysis

Provides students with instruction in cost concepts and design economies, money-time relationships, comparing investment alternatives, depreciation and income taxes, cost estimation techniques, price changes and exchange rates, replacement analysis, evaluating projects with the benefit/cost ratio method, probabilistic analysis, and capital financing and allocation.

ENG830 Strategic Management

The strategic management of the enterprise requires the recognition of the strategy of the enterprise and the role and integration of the firm's technology strategy. Strategy of manufacturing technology, organizational strategy, strategy of product research and development, and integrating with the marketing and financial strategies.

ENG840 Production and Operations Management

Designed to cover the fundamentals of production and operations management (POM). Topics include: decision analysis, product/process evaluation, TQM, statistical process control, facility location analysis, facility layout and assembly line balancing, project management techniques, production scheduling, material management, and inventory control. Also provides an understanding of how the design, operation, and control of production systems can most effectively provide goods and services.

Requirements: Some understanding of introductory statistics, linear algebra and mathematical modeling

ENG860 Environmental Compliance Technology

Intended to provide an integration of the key environmental laws and regulations with the technology basis needed to more fully comprehend the requirements for effective environmental compliance.

ENG880 The Dissertation Proposal

The student will choose a pre-approved topic within the field of engineering which is of sufficient dimension and depth to write a dissertation (research paper) of 150 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

ENG890 The Dissertation (9 Units)

The student will write a dissertation (research paper) on a pre-approved topic within the field of engineering. The dissertation will be an extension of the dissertation proposal, and will consist of a minimum of 150 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MECHANICAL ENGINEERING, OPTION A

The Bachelor of Science program in Mechanical Engineering is designed to provide the student with a broad background for a wide variety of careers. The discipline of mechanical engineering is one of the oldest in the field of engineering and while having a broad focus, it emphasizes an appropriate mix of energy science and technology, applied mechanics, thermal sciences and design. Mechanical engineers are involved in research, product design and development, manufacturing, testing, operations and maintenance.

The Bachelor of Science program in Mechanical Engineering at Kennedy-Western focuses on two areas: thermal sciences and machine design. These two options are defined in such a way as to offer the student a fundamental foundation in the discipline of mechanical engineering, while at the same time offering an opportunity for specialization.

The first section of each option comprises the core courses for the general discipline of mechanical engineering. This grouping of courses is the same for both Option A and Option B, and provides a foundation in the discipline. The second section of each option offers core courses in the specialty selected, either thermal sciences or machine design.

Option A: Thermo-Sciences Energy is designed to enhance the skills and knowledge of a student who has chosen a career in a thermal energy-oriented field such as design of heating, ventilation and air conditioning (HVAC), combustion, power plant, etc. The necessary tools for this specialty involve thermodynamics, heat transfer, and combustion processes, among others.

Bachelor of Science
Mechanical Engineering, Option A

MEC100 Vector Mechanics for Engineering: Statics

Concept of vector analysis, including resultants of force systems; free-body diagrams; elements of statics in two and three dimensions; analysis of structures and machines; systems of forces and couples; concept and fundamentals of static equilibrium of rigid bodies, centroids, friction, moments of inertia and virtual work.

Prerequisites: MEC126

MEC110 Vector Mechanics for Engineering: Dynamics

Concept of vector analysis; particle and rigid body kinematics (including rectilinear, rotational, and plane motion); particle and rigid body kinetics (including Newton's laws and D'Alembert's principles); moment of inertia; work and energy methods applied to kinetics of particles and rigid bodies; impulse and momentum principles; mechanical vibrations; free-body diagrams; and elements of dynamics in two and three dimensions.

Prerequisites: MEC100

MEC120 Electronics for Engineers

Electronic analysis of series, parallel, and series-parallel circuits. After a review of basic electronics, several network theorems for circuit analysis are covered. The networks will include: resistive, capacitive, inductive, and resonant circuits. Emphasizes practical applications of the circuits.

Prerequisites: MEC130

MEC125 Engineering Math, Part I

Basic algebra, trigonometry, and geometry required for engineering. Topics include: basic algebraic operations, geometry, functions and graphs, trigonometric functions, systems of linear equations, determinants, factoring and fractions, quadratic equations, vectors, graphing, exponents and radicals, complex numbers, exponential and logarithmic functions. Prepares students for Calculus, Part II. Also references tutorials for graphing calculators and an interactive web site.

Recommended: Graphing calculator and Internet access

MEC126 Engineering Math, Part II

Advanced algebra, trigonometry, and calculus techniques required for engineering analysis. Topics include: Matrix algebra, inequalities, variation, ratios and proportion, sequences and the binomial theorem, advanced trigonometry, plane analytical geometry, statistics, differentiation, integration, series expansion of functions, and differential equations. References tutorials for graphing calculators and an interactive web site.

Prerequisites: MEC125

Recommended: Graphing calculator and Internet access

MEC130 Physics

Introductory course in physics emphasizing the solution of practical problems. Mechanics, dynamics, thermodynamics, electricity and magnetism, and fluid mechanics will be covered.

Prerequisites: MEC126

MEC200 Strengths of Materials

Mechanics of deformable bodies, analysis and design of various structural elements, unsymmetrical bending, center, energy methods, stresses and strains, bending, beam deflections by integration, moment-area methods, column theory, and torsion.

Prerequisites: MEC100

MEC205 Properties and Selection of Materials

Relationship between structures and mechanical and physical properties of metals, polymers, ceramics and composite materials, properties modification, corrosion processes, selection of materials for various design requirements.

Requirements: Chemistry

MEC220 Engineering Thermodynamics

Study of how energy is stored in systems and how it is transferred between systems and their surroundings through the processes of heat and work. Also is the study of practical systems which operate under thermodynamic principals and the materials used to facilitate the energy transfer.

Prerequisites: MEC130

MEC230 Principles of Fluid Mechanics

An introductory course in engineering fluid mechanics. Covers fundamentals of engineering fluid mechanics including fluid properties; fluid static and dynamics; principles of continuity, energy and momentum; dimensional analysis; laminar and turbulent flow; turbo machinery; and introduction to open channel flow.

Prerequisites: MEC110

MEC280 Alternative Energy Systems

Introductory course in energy resources and utilization. Provides information on petroleum, natural gas, coal, electric power, nuclear energy, solar energy, as well as pollution of the atmosphere from energy use. Includes: the nature and magnitude of resources available for supplying energy, how to obtain energy from those resources, the extend to which each resource is now utilized in providing our energy needs, and how to explore what we may need to do in the future to adapt a resource such that it can serve the needs of the future.

Prerequisites: MEC220 or MEC300

MEC290 Internal Combustion Engines

Internal combustion engine including: major characteristics of spark-ignition and compression-ignition engines, fundamental thermodynamics and combustion theory required to understand and analyze engine behavior, engine flow exchanges in four and two stroke engines, combustion phenomena in internal combustion engines and operating characteristics.

Prerequisites: MEC126

MEC300 Mechanics of Heat Transfer

Covers the fundamentals of heat transfer and its applications in mechanical thermal processes. Topics include: one-dimensional and multi-dimensional conduction heat transfer, radiation heat transfer, natural and forced convection heat transfer, and practical analysis of heat exchangers.

Prerequisites: MEC126

MEC400 Design of Thermal Systems

Discusses the principles of solar energy and its application in solar thermal processes. Topics include: solar radiation, selected heat transfer topics, flat-plate collectors, energy storage, solar process loads, and applications.

Prerequisites: MEC220 or MEC300

MEC405 Heating Ventilation and Air Conditioning

Describes the fundamental of heating, ventilating, refrigerating, and air conditioning systems including heat transmission in building structures; space heating load; cooling load; energy calculations; flow, pumps, and piping design; fans and building air distribution; and refrigeration.

Prerequisites: MEC220, MEC230 and MEC300

MEC410 Mechatronics

Fundamentals and applications of mechanical, electrical, and electro-mechanical systems. Topics include: mechanical systems, electrical systems, electro-mechanical systems, mathematical modeling of dynamic systems, and feedback control.

Prerequisites: MEC110

MEC420 Industrial Heat Exchangers

Provides insights related to boiler-tube failure analysis including corrosion, high-temperature related phenomena, welding, fabrication defects, oxidation, and decarburization.

Prerequisites: MEC220 or MEC300

MEC460 Technical Writing

A comprehensive and flexible introduction to technical and professional communication. Topics include: writing long and short reports, proposals, manuals, memos, letters, and specifications.

MEC470 Ethics and Engineering Decision-Making

A study of ethics and professionalism as it relates to the engineering profession and the student's career. Introduces the engineer to the ethical theory and practice, moral reasoning, legal, and professional attitudes to be encountered in the future working environment. Includes: business, patent, and copyright law considerations.

MEC480 The Final Project Proposal

The student will choose a pre-approved topic within the field of mechanical engineering which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MEC490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of mechanical engineering. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MECHANICAL ENGINEERING, OPTION B

The Bachelor of Science program in Mechanical Engineering is designed to provide the student with a broad background for a wide variety of careers. The discipline of mechanical engineering is one of the oldest in the field of engineering and while having a broad focus, it emphasizes an appropriate mix of energy science and technology, applied mechanics, thermal sciences and design. Mechanical engineers are involved in research, product design and development, manufacturing, testing, operations and maintenance.

The Bachelor of Science program in Mechanical Engineering at Kennedy-Western focuses on two areas: thermal sciences and machine design. These two options are defined in such a way as to offer the student a fundamental foundation in the discipline of mechanical engineering, while at the same time offering an opportunity for specialization.

The first section of each option comprises the core courses for the general discipline of mechanical engineering. This grouping of courses is the same for both Option A and Option B, and provides a foundation in the discipline. The second section of each option offers core courses in the specialty selected, either thermal sciences or machine design.

Option B: Machine Design Structures deals with planning or devising new or improved machine components to accomplish specific purposes found in the manufacturing, automobile and aerospace industries, among others. The necessary study for this specialty involves the examination of structural and thermal stress analysis, material strength properties and dynamics and vibration analysis.

**Bachelor of Science
Mechanical Engineering, Option B**

MEC100 Vector Mechanics for Engineering: Statics

Concept of vector analysis, including resultants of force systems; free-body diagrams; elements of statics in two and three dimensions; analysis of structures and machines; systems of forces and couples; concept and fundamentals of static equilibrium of rigid bodies, centroids, friction, moments of inertia and virtual work.

Prerequisites: MEC126

MEC110 Vector Mechanics for Engineering: Dynamics

Concept of vector analysis; particle and rigid body kinematics (including rectilinear, rotational, and plane motion); particle and rigid body kinetics (including Newton's laws and D'Alembert's principles); moment of inertia; work and energy methods applied to kinetics of particles and rigid bodies; impulse and momentum principles; mechanical vibrations; free-body diagrams; and elements of dynamics in two and three dimensions.

Prerequisites: MEC100

MEC120 Electronics for Engineer

Electronic analysis of series, parallel, and series-parallel circuits. After a review of basic electronics, several network theorems for circuit analysis are covered. The networks will include resistive, capacitive, inductive, and resonant circuits. Emphasizes practical applications of the circuits.

Prerequisites: MEC130

MEC125 Engineering Math, Part I

Basic algebra, trigonometry, and geometry required for engineering. Topics include: Basic algebraic operations, geometry, functions and graphs, trigonometric functions, systems of linear equations, determinants, factoring and fractions, quadratic equations, vectors, graphing, exponents and radicals, complex numbers, exponential and logarithmic functions. Prepares students for Engineering Math, Part II. Also references tutorials for graphing calculators and an interactive web site.

Recommended: Graphing calculator and Internet access

MEC126 Engineering Math, Part II

Advanced algebra, trigonometry, and calculus techniques required for engineering analysis. Topics include: Matrix algebra, inequalities, variation, ratios and proportion, sequences and the binomial theorem, advanced trigonometry, plane analytical geometry, statistics, differentiation, integration, series expansion of functions, and differential equations. References tutorials for graphing calculators and an interactive web site.

Prerequisites: MEC125

Recommended: Graphing calculator and Internet access

MEC130 Physics

Introductory course in physics emphasizing the solution of practical problems. Mechanics, dynamics, thermodynamics, electricity and magnetism, and fluid mechanics will be covered.

Prerequisites: MEC126

MEC200 Strengths of Materials

Mechanics of deformable bodies, analysis and design of various structural elements, unsymmetrical bending, center, energy methods, stresses and strains, bending, beam deflections by integration, moment-area methods, column theory, and torsion.

Prerequisites: MEC100

MEC205 Properties and Selection of Materials

Relationship between structures and mechanical and physical properties of metals, polymers, ceramics and composite materials, properties modification, corrosion processes, selection of materials for various design requirements.

Requirements: Chemistry

MEC210 Structural Analysis

Introduction of basic principles of structural analysis and linear theory of elasticity. Emphasis is on blending a physical approach with classical methods: compatibility relations for displacements, slope-deflection, and moment distribution. Linear elastic structures under applied loading are reinforced with a mathematical basis. Energy concepts such as virtual work are introduced to supplement the force-displacement methods. Mathematically rigorous sign conventions for shear and bending moments are used throughout to remove the ambiguities that is commonly confusing to students.

Prerequisites: MEC100

MEC220 Engineering Thermodynamics

Study of how energy is stored in systems and how it is transferred between systems and their surroundings through the processes of heat and work. Includes: the study of practical systems which operate under thermodynamic principals and the materials used to facilitate the energy transfer.

Prerequisites: MEC130

MEC230 Principles of Fluid Mechanics

An introductory course in engineering fluid mechanics. Covers fundamentals of engineering fluid mechanics including fluid properties; fluid static and dynamics; principles of continuity, energy and momentum; dimensional analysis; laminar and turbulent flow; turbo machinery; and introduction to open channel flow.

Prerequisites: MEC110

MEC310 Industrial Robotics

Provides an overview of robotics, presenting the material in a descriptive manner. Topics include: classification of robots, description of the major components, fixed versus flexible automation, current and future application of industrial robots.

Prerequisites: MEC110

MEC320 Machine Design

Covers fundamentals of mechanical engineering design and application of these fundamentals to specific machine components. Topics include: load analysis, materials, stability, failure theory, fatigue, and design applications.

Prerequisites: MEC200 and MEC205

MEC330 Mechanical Vibrations

This is an introductory in mechanical vibrations. Topics include: review of dynamics, periodic motion, energy method, forced periodic motion, initial conditions, damping, torsional vibration, and damped forced vibration.

Prerequisites: MEC126

MEC345 Computer-Aided Manufacturing

Application of computers to the planning and controlling of manufacturing processes, numerical control systems, manual and computer-assisted NC part programming, automation and robotics.

Prerequisites: MEC125

MEC410 Mechatronics

Fundamentals and applications of mechanical, electrical, and electro-mechanical systems. Topics include: mechanical systems, electrical systems, electro-mechanical systems, mathematical modeling of dynamic systems, and feedback control.

Prerequisites: MEC110

MEC440 Electric Machinery

Basic principles of electro-mechanical energy conversion and their applications. Magnetic circuits and the analysis of balanced three-phase systems. Circuit models for power transformers, synchronous machines, poly-phase induction machines, DC machines, and variable reluctance machines.

Prerequisites: MEC220

Requirements: Knowledge of Ampere's Law, Faraday's Law, and their applications, and AC/DC circuit theory

MEC460 Technical Writing

A comprehensive and flexible introduction to technical and professional communication. Topics include: writing long and short reports, proposals, manuals, memos, letters, and specifications.

MEC470 Ethics and Engineering Decision-Making

A study of ethics and professionalism as it relates to the engineering profession and the student's career. Introduces the engineer to the ethical theory and practice, moral reasoning, legal, and professional attitudes to be encountered in the future working environment. Includes: business, patent, and copyright law considerations.

MEC480 The Final Project Proposal

The student will choose a pre-approved topic within the field of mechanical engineering which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

MEC490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of mechanical engineering. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

QUALITY CONTROL

Recognizing the need to make Statistical Quality Control (SQC) and Total Quality Management (TQM) major goals, American manufacturers, service deliverers and academicians have refocused their attention to SQC and TQM as long-term strategic initiatives.

The Bachelor of Science and Master of Science in Quality Control programs at Kennedy-Western University comprehensively address SQC and TQM through courses in statistical and industrial quality control; quality engineering and management; quality functions within organizations; and ISO 9000 quality standards.

Whereas the bachelor's level program emphasizes basic SQC and TQM terminology and methodologies, the master's program concentrates on conceptual aspects and issues of these subject topics. Where applicable, the Kennedy-Western University curriculum follows subject content "bodies of knowledge" as promulgated by the American Society for Quality Control.

Bachelor of Science Quality Control

QC100 Introduction to Quality Control Systems

Fundamentals of quality control addressed in this course set the foundation for other coursework in quality control and analysis. Topics of study include quality control systems development, purchasing quality, quality audit systems, and the measuring and testing of equipment controls and procedures.

Prerequisites: QC135

QC110 Introduction to Quality in Manufacturing

Processes, principles and practices of quality control are emphasized. Topics include: Statistical Process Control (SPC), Just-In-Time (JIT) concepts, processes, and role of quality control in manufacturing environment.

Prerequisites: QC135

QC120 Quality Teams for Total Quality Management

Description of the necessary stages in the development and implementation of a quality assurance program in a production system. Emphasizes basic Total Quality Control (TQC) and Just-in-Time (JIT) techniques to continuously improve quality and to minimize costs.

QC125 ISO/QS 9000

Provides a much-improved model for structuring and implementing a contemporary quality management system. Promotes an understanding of the requirements as they relate to each of the product categories. Also facilitates an understanding of what the new standard says, what it means, and how to apply it in any organization to achieve internal operating effectiveness and improved performance as viewed by customers.

QC135 Probability and Statistics for Quality

A non-calculus-based first course in probability and statistics. Topics include: measures of center and spread, concepts of probability, normal distributions, sampling and the central limit theorem, and an introduction to inference.

Requirements: Statistics and intermediate algebra

QC200 Principles of Quality Leadership

Introduces skills necessary to develop leadership and management. Concepts such as personality, trust, creativity, affect, moods, emotions, virtual teams, telecommuting, and knowledge management are discussed. An introduction to Total Quality Management (TQM) and its application to industry will also be discussed.

QC210 Methods for the Improvement of Quality

Introduction to the vast array of tools available for quality improvement. Topics include: the philosophies of total quality management, probability and statistics, control charts, and tools for diagnosing process problems.

QC215 Quality Standards

Continuous process improvement, customer/vendor relationships, quality planning goals as well as recognized quality standards and quality awards.

QC220 Quality Control Applications

The concept, techniques and methods of quality control in all types of enterprises. Establishing quality standards and specifications, measuring and controlling quality, charts and calculations for quality control, statistical control procedures, acceptance control procedures, managing the quality control process.

Recommended: Introductory statistics

QC300 Introduction to Statistical Quality Control

Describes the basic concepts and terminology embodied within Statistical Quality Control (SQC). Compares and contrasts modern and traditional approaches to quality. Also presents tools and techniques (FMEA, QFD and process flowcharting) used to organize and summarize statistical data in graphical presentations, such as histograms, run charts, control and Pre-control charts, box plots, and Pareto charts. Using the proposed strategic approach to implement Six Sigma, the course guides the readers to how to improve the bottom line in their organizations.

QC310 Fundamentals of Industrial Quality Control

Emphasizes the concepts and applications of statistical methods in industry rather than qualitative problem solutions. Covers the description and use of tools for improving productivity and quality. These tools include: quality costs, design of experiments for improving robustness, Taguchi loss function, ISO 9000, statistics and statistical process control, attribute control charts, design for manufacturability, inspection capability, and process characterization and advanced techniques.

Prerequisites: QC135

QC400 Introduction to Quality Management

Covers the fundamentals of quality management and how quality theories and concepts can be applied in real manufacturing and organizations with a strategic focus on improving total quality. Included is: the importance of continuously improving quality of products, processes, and customer service in the private sector as well as in the public sector, in small business, manufacturing, and government entities.

QC410 Productivity and Quality Manufacturing

Introduction to the various elements and philosophies of TQM as to what it is, how it's applied and how it all ties together. Topics include: process variation, critical role of management, systems approach to improvements, total employee involvement, empowerment training and benchmarking.

Requirements: Basic knowledge of algebra and manufacturing

Recommended: Probability and statistics

QC420 Product Development

Key issues of the product development process are addressed. Topics include: identifying customer needs, establishing product specifications, generating product concepts and selecting the best, designing for manufacturing, minimizing product development cost, and managing the product development project.

QC430 Engineering Economics

Covers the basic principles and applications of engineering economic analysis that bear on design and decision-making. The following major topics are covered: principles of economic equivalence; time value of money; analysis of single and multiple investments; comparison of alternatives; capital recovery and tax implications; public sector analysis and break-even concepts. Also designed to help the student prepare for professional exams such as the FE (Fundamentals of Engineering) Exam.

Requirements: Calculus

QC480 The Final Project Proposal

The student will choose a pre-approved topic within the field of quality control and/or quality assurance which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

QC490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of quality control and/or quality assurance. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

Master of Science Quality Control

QC500 Quality Engineering Management

Applications of modern statistical and managerial concepts for the quality control of products and services. Includes: processes for quality assessment, planning and cost reduction; and new concepts of strategic quality management and competitive benchmarking. Covers quality control activities such as design for customer quality needs, supplier quality evaluation, quality data analysis, statistical process control, inspection and testing, and quality assurance.

QC510 Methods in Reliability Engineering

Application of reliability engineering methods, techniques and processes to product development and management. Reliability data analysis, statistical inference, system reliability prediction, and measuring reliability under diverse test conditions. Application of probability and statistics to critically examine the mathematics underlying real-life reliability case studies.

Requirements: Calculus

QC520 Advanced Systems Quality Control

The systems approach to Total Quality Management, with emphasis on defining information requirements, analyzing information, and defining quality objectives for defect prevention and achieving customer satisfaction. The Malcolm Baldrige Award and ISO 9000 criteria are introduced as frameworks for quality systems.

QC530 Quality Engineering Methods

Provides the student with an introduction to the field of quality engineering, including quality practices, statistical principles, product, process and materials control, measurement systems, safety and reliability, data collection and analysis, maintainability and availability, and a wide variety of quality related tools. These tools are appropriate for use in idea creation, process analysis, planning, evaluation and data collection/analysis.

QC540 Quality Functions Within Organizations

Concepts and processes necessary for implementing total quality within organizations including: top management commitment, teamwork, organizational vision, communicating, identifying advocates and resisters, establishing a baseline, customer satisfaction, and changing the organizational infrastructure.

QC600 Building Consumer Satisfaction

Focuses on the issues of making quality a strategic weapon. Topics include: defining customer satisfaction, developing market-perceived quality and value, the tools and metrics of customer value analysis, and integrating customer value management into the strategic management process.

QC610 Statistical Process Control

Introduction to quality management theory, variable and discrete data, probability theory, probability distributions, statistical modeling techniques, regression analysis, control charts, statistical process control (SPC), and process capability. Course is very technical and provides a comprehensive presentation of variation, including its basis in statistics and importance in organizations. Also is practical and incorporates most of the frequently-applied techniques for observing, measuring, and depicting variation.

Requirements: Knowledge of statistics

QC625 Auditing

Focuses on the financial and non-financial aspects of auditing. It helps students working in a manufacturing or service environment understand how their actions may impact different financial measures that the financial auditor checks. Auditing is not limited to financial reports. It may focus on the quality of products, processes, inventory, procedures, schedules, and systems depending upon the auditor's interest. Auditing can be conducted in every area/function of the business.

QC630 Quality By Design

Continuous improvement accomplished through the "Juran Trilogy", customer focus, process improvement, and total involvement necessary for a structured, measured effort to raise the level of quality consciousness in an organization. Case histories of quality control programs included.

QC640 Design of Experiments

Techniques of design of experiments in order to measure product quality, to characterize a process, to troubleshoot problems, and in the quantification of errors. Reducing defects, determining control characteristics of a process, and minimizing costs are results of topics such as factorial and fractional factorial design of experiments, multi-level designs, ANOVA, hypothesis testing, and other statistical analysis techniques.

Requirements: Statistics

QC650 Total Quality Management

Concepts/practices of decision-making to improve productivity using TQM philosophy and tools. Topics include: statistical process control, graphical display, problem solving, quality meetings/audits/costs, quality goals, employee involvement, quality function deployment, benchmarking, design of experiments.

Requirements: Introductory algebra and ability to interpret graphs

QC660 Quality Management Standards

Obtain the meaning and intent of the requirements of ISO 9001:2000 explained and also understand the requirements as they relate to each of the product categories.

QC670 The Certified Quality Manager

General overview of the materials required for the ASQ Certified Quality Manager exam. Included are topics such as quality control, process management, continuous improvement, supply chain management, design for quality, and operations, among others. These are all approached from the view of how each of these areas of organizations may be managed with the ultimate aim of providing world-class customer service.

Requirements: Statistics

QC680 The Thesis Proposal

The student will choose a pre-approved topic within the field of quality which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

QC690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of quality. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

SAFETY ENGINEERING

The Safety Engineering program is a discipline which is regulatory driven as well as technology driven, and as such is continually evolving with new legal and regulatory requirements being addressed by safety professionals. New interpretations of the discipline are also introduced by innovative technology, and Kennedy-Western continues to adapt the Safety Engineering program as the needs of the industry change.

At the Bachelor of Science level, the program addresses the various themes within the field of safety, and students should consult with their faculty advisor for the overall focus of their program.

At the graduate level, the more senior responsibilities of a safety professional are addressed, such as property loss control and safety program design and management. At the doctorate level, action-oriented research is encouraged, with clear applications to industry.

Bachelor of Science Safety Engineering

SE100 Safety and Health for Engineers

General introductory course to the concepts of health and safety engineering. A wide variety of topics are included: overview of health and safety terms; orientation to safety planning, management techniques, and hazard recognition.

SE135 Probability and Statistics for Safety

A non-calculus-based first course in probability and statistics. Topics include: measures of center and spread, concepts of probability, normal distributions, sampling and the central limit theorem, and an introduction to inference.

Requirements: Statistics and intermediate algebra

SE200 Introduction to Occupational Safety and Health

An overall synopsis of technology and management fundamentals for the practice of safety. Provides an overview of the latest trends in this dynamic discipline that includes many diverse subject areas, including: ergonomics, industrial hygiene, workplace violence, fire prevention, environmental, construction, security, emergency response, and system safety.

SE210 Air Quality Control

Identification and description of the indoor air quality problems. Indoor air quality analysis in public and commercial buildings. Collection and evaluation of data on indoor air quality. Outline of measures necessary for corrections in indoor air quality problems.

SE220 Introduction to Industrial Hygiene Toxicology

Concepts of toxicology including: recognition and evaluation of toxic agents, dose response, acute and chronic effects, carcinogenicity, and applications in the work environment.

SE310 Ergonomics

The application of human factors engineering and ergonomic principles and practices to common problems as they arise in computerized facilities, including vision and visual strain, design of VDT work-station and lighting, noise and vibration control, and the effect of work environment on productivity. Concepts relating to the capabilities and limitations of human body mechanics within the workplace environment, and exploration of interaction between operator and system and how to design a system for the human operator.

SE320 Accident Investigation Techniques

Examines the many issues involved in the accident investigation process. Overviews the general philosophy undergirding proactive accident investigation processes, with an eye to enabling the student to be an active participant in an accident investigation team. Enables the student to gain insight into the accident investigation process and to learn what materials, personnel, actions, questions, and reporting techniques are vital to conducting a successful investigation and analysis of adverse events in any workplace.

SE400 Fire Prevention and Protection

Provides the student with an understanding of Life Safety Code requirements for not only new but existing structures. The history, intent, and purpose of the Life Safety Code will also be covered. An understanding of required egress capacity, occupant load, smoke barriers, classification of occupancies and other life safety issues will be gained by the student. Lastly, a brief overview of fire alarm and sprinkler systems will also be covered.

SE410 Safety Management

A summary of the basic concepts of safety management. Designed to give a broad application of management practices and processes of the safety function. Special emphasis will be placed upon participation of all levels of management and safety management philosophy.

SE420 Regulatory Aspects of Safety

Fundamentals of environmental compliance including the Clean Air Act, Clean Water Act, RCRA, CERCLA, SARA, and the Hazardous Waste Operations and Emergency Response Act.

SE440 Probability, Risk and Statistics

Introduction to decision-making under uncertainty and its application to the management of risk. Topics include: descriptive statistics, frequency distributions, probability theory, sampling distribution, estimation, statistical inference, linear regression, correlation and decision trees.

Prerequisites: SE135

SE450 Transportation Safety

An examination of the safety issues in all major modes of transportation including: road, air, water and rail transit. For each mode, both the causes and costs (both human and economic) are looked at. Additionally, cross-modal comparisons are made to highlight common causal factors for accidents. Methods for accident prevention are reviewed, along with an examination of the role of public policy in impeding adverse events in all forms of transportation.

SE480 The Final Project Proposal

The student will choose a pre-approved topic within the field of safety which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

SE490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of safety. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

Master of Science Safety Engineering

SE505 Accident Investigation and Reconstruction

An introductory course in accident investigation principles and reconstruction guidelines. Emphasizes the roles of the investigator, interacting personnel, machines and environment, and analytical techniques. Examines the rationale and techniques for accident investigation in the workplace, with practical applications as to how to respond to accidents. Also, investigates the root causes of incidents with an eye towards promoting employee health and safety and minimizing future losses.

SE510 Contemporary Ergonomics

Ergonomics applications can prevent the largest number of employee injuries in the workplace today. Every worker has ergonomic requirements. Helps the student understand and effectively prepare a program in the workplace to help workers avoid many injuries related to fitting the task and workplace to the worker.

SE520 Safety Engineering

Comprehensive course in safety engineering. Comparison of industrial safety and system safety concepts. Review of accident investigation techniques. Emphasis on control of hazards through engineering design.

SE560 Structural Analysis and Design

Fundamental concepts and principles for the analysis and design of structures. Emphasis on the analysis of statically determinate structures such as trusses and beams using statics. Determination of the internal forces of structures (required for the structural design), given the application of externally applied environmental forces such as moving live, wind or snow loads. Calculation of the deformations of structures due to these applied loads. Influence of moving loads on beams. Introduction to structural design and to concrete design.

Requirements: Calculus

SE610 Property Loss Control

Introductory principles of the protection of industrial property through analysis of construction, occupancy, protection, and exposures. Topics include a variety of recommended readings in loss control and approaches to property protection.

SE620 Industrial Hygiene

This course presents the fundamental principles of industrial hygiene: recognition, evaluation and control of occupational health hazards. Specific topics include: toxicology, noise, heat and cold stress, ionizing and non-ionizing radiation, ventilation, ergonomics and techniques for evaluation and control of hazards.

Requirements: Knowledge of algebra

SE635 Safety Law

Presents information that allows the safety professional the means to identify legal risks for corporations and individuals in the areas of safety, health and loss prevention. Additionally provides guidance on what to expect from OSHA in regards to citations and penalties and how the employer can respond.

SE640 OSHA Compliance

A comprehensive understanding of the Occupational Safety and Health Act (OSHA). Topics include: purpose of the OSHA Act, classifications of OSHA standards, record keeping requirements, Hazard Communication Standards, purpose and types of OSHA inspections, and the categories of OSHA violations.

SE660 Safety Program Design and Management

To provide the student with information on how to plan and implement a company's safety and health program as well as ways to improve an existing safety and health program. Information provided will include: specific safety hazards, best safety practices, control procedures, safety management, accident investigations, and other related safety and health topics. The majority of the course will be geared towards general safety issues with some of the topics being applied not only to general industry safety but also construction safety.

SE670 Environmental Risk Assessment

Introduction to the methods of control hazard, evaluation risk, and prevention of environment. Protecting workers' health and other conditions associated from exposure to substances in the workplace. Design of environmental epidemiologic studies and risk assessments.

SE680 The Thesis Proposal

The student will choose a pre-approved topic within the field of safety which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their program.

SE690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of safety. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their program.

SE700 Safety Management

The supervisor is critical to an effective safety process. Presents tools and techniques to promote safe performance. Concepts include: description of the attributes of an effective safety process, tools to implement and maintain an effective safety process, supervisor's role and accountability for safety, human performance improvement concept and effective and efficient uses of training to improve safety performance.

SE705 Advanced Accident Investigation and Reconstruction

An overview of the multifaceted issues involved in the investigation and analysis of workplace accidents. Presents a framework through which to work through the post-event process that will serve to prevent future accidents, thereby minimizing future human and property harm and legal liability.

SE710 Human Factors Engineering

Examines the needs, capabilities and limitations of the human element in the design of systems. Examples of such systems range from a simple control panel layout to the cockpit design of space exploration craft. The essential principles of human factors engineering relating to workplace design and seating; measurement and control of lighting, noise and thermal environments; and the design of display and control panels will be studied.

SE725 Advanced Industrial Hygiene

The safety professional is often involved in testing of the work environment for airborne contaminants, such as toxic or harmful gases and dusts, that are immediately harmful. The essential principles of measurement and analysis, including problem solving, will be studied by readings and practice calculations, using situations that the safety engineer often faces.

Requirements: Knowledge of algebra and an understanding of the field of industrial hygiene

SE730 Advanced Property Loss Control

Review of the multifaceted issues relating to safety on construction projects, spotlighting the critical roles played by effective engineering for safety design and energetic, safety-focused management of construction projects. Addressed are: the inherent danger of construction work; theories of accident causation, regulations of OSHA and other regulatory bodies; engineering of safer job sites and construction projects; employee safety education and work design; and managerial actions to promote safer workplaces.

SE750 Advanced Transport Safety

Review of the safety issues involved across all major modes of transportation including: highway, air, waterway, and rail transit. Within each mode, accident statistics, hazard costs (both human and economic), and causal forces are examined. Investigates the impact of technological developments, engineering designs, economic forces, and policy actions on transport safety from both retrospective and prospective standpoints.

SE820 Analytical Safety

An advanced practicum in safety performance evaluation and measurement principles, applying analytical methods to a specific industrial safety problem. Topics may include: conducting a MORT, fault tree, HAZOP or system safety analysis, or similar technique which analyzes a specific safety or safety performance.

SE840 Safety and Health Law

Review of the safety and health regulations, specifically focused on the legalities of environmental health, and interpretation of compliance requirements. Topics include: adjudication, litigation, employer/employee safety and health responsibilities.

Requirements: Familiarity with OSHA, EPA, and DOT regulations

SE860 Emergency and Disaster Preparedness Management

Management aspects of emergency and disaster preparedness. Topics include: plan preparation, evaluation, training and integration with other entities to effectively react to natural or industrial disasters.

SE870 Research Methods and Design

The concepts, techniques, and methods used to study organizations and effectively utilize results. Process model for research used to coordinate data collection, analysis, and presentation of results. Emphasis on cases and applied projects.

SE880 The Dissertation Proposal

The student will choose a pre-approved topic within the field of safety which is of sufficient dimension and depth to write a dissertation (research paper) of 150 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

SE890 The Dissertation (9 Units)

The student will write a dissertation (research paper) on a pre-approved topic within the field of safety. The dissertation will be an extension of the dissertation proposal, and will consist of a minimum of 150 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.



SOFTWARE ENGINEERING

The Bachelor of Science program in Software Engineering at Kennedy-Western University is designed to provide students with a theoretical and practical background in software development and maintenance. It focuses on the full software development life-cycle, including a thorough coverage of tools, techniques, principles, and guidelines for software requirements, specification, design, and implementation. Students are guided toward a better understanding of the various tasks and specialties that contribute to the development of a software product. Courses are offered to allow understanding and use of the most current software development tools and techniques, and to enhance the students' understanding of the theories involved in software development.

Bachelor of Science Software Engineering

SFE100 Software Life-Cycle, Requirements, Specification and Design

Provides broad coverage of the Systems Development Life Cycle (SDLC), although the first three phases (Systems Planning, Systems Analysis, and Systems Design) are discussed in detail. Includes: Business Information System Concepts; Strategic Planning; Feasibility Studies; Object-Oriented Analysis and Design; Enterprise Computing; Prototyping; Case Tools; Data Security; Automated Design Tools; Entity-Relationship Diagrams; Unified Modeling Language; Database Design and Management; LANs and WANs; and Client/Server Systems.

SFE110 Software Implementation, Verification and Maintenance

Provides broad coverage of the Systems Development Life Cycle (SDLC). The last two phases of the SDLC (Systems Implementation and Systems Operation/Support) are discussed in detail. Included are: Software Engineering; Unit, Link, and Systems Testing; Documentation; Training; Systems Changeover; Post-Implementation Evaluation; Support Activities; Maintenance Activities; Capacity Planning; Communication Tools; Feasibility and Cost Analysis Tools; and Project Management Tools.

Prerequisites: SFE100

SFE120 Object-Oriented Techniques, Analysis, Design, Implementation and Testing

Covers the basic concepts of object-oriented software development using C++. Key UML concepts are also introduced. Basic data types and control structures are introduced. Abstract data types, Objects, Classes, Message Passing, Inheritance, Operator Overloading, Polymorphism, Template Classes, Object-Oriented Modeling, Unified Modeling Language, C++ and the Standard C++ Template Library are addressed.

SFE130 Principles and Use of Database Management Systems

Concepts and principles of database management systems and their use. Topics include: the Database Environment; the Database development process; the Entity-Relationship Model; Relational Model; Logical and Physical Database Design; SQL, a standard for database processing; Database Administration; and Client-Server Systems.

SFE150 Graphical User Interface Design, Evaluation and Implementation

Design, implementation and evaluation of graphical user interfaces (GUIs) using a popular language such as Visual Basic for constructing GUIs. GUI components covered include: forms/windows, labels, text boxes, command buttons, option buttons, check boxes, list boxes menus, tool bar & image lists, timers, common dialogs, OLE containers, picture boxes, file/directory/drive lists and data-access controls.

SFE200 Software Project Management

Covers software development from the manager's perspective rather than from the developer's perspective. Software management practices and techniques that have been developed and refined over the past decade are discussed. The major topics covered in the course are: risk analysis, contracts, development cycle, staffing, estimation, scheduling, standards, configuration control, quality assurance, and software testing.

SFE250 Quality Assurance and Process Improvement

Concepts and principles of software quality and process improvement. Topics include: process discipline, process maturity, software process infrastructure, software process assessment, software process improvement environment, implementing and institutionalizing, and current models and standards for software process improvement.

SFE260 Software Development for Real-Time Systems

Introductory course focused on software development with an emphasis on analysis and structure of real-time systems. Issues discussed in the course include architecture issues, operating system issues as well as programming languages, databases and performance measures.

SFE270 Formal Modeling and Analysis in Software Engineering

Fundamental concepts of software engineering with emphasis on the formal structure of data processing. Logical problems common to many programming languages are presented. Flowcharts and pseudocode techniques are used as well as logical structures such as decision tables. Topics also include interactive programs for single-line entry and full screen entry.

SFE280 GUI Toolkits

Introduces students to Graphical User Interface (GUI) Toolkits. Visual Basic, a general purpose tool for GUI programming, is used to demonstrate the important elements of GUI toolkits, such as data controls, program modules, and menus. The important user interface design principles for GUI programming are discussed.

Requirements: Students must have some programming knowledge (any programming language) and access to Visual Basic 6 software

SFE290 Object-Oriented Databases

Object-Oriented concepts and principles to design and implement database systems. Topics include: Basic and Advanced Object Modeling, Analysis and Design, Files, Basic and Advanced Relational Databases, and Object-Oriented Databases.

SFE300 Network Programming

Provides an introduction to network programming with an emphasis on developing network programs (both applets and applications) using the Java programming language. Topics include: TCP and UDP sockets, multicasting protocols and content handlers, and servlets.

Requirements: IBM/PC, working knowledge of widely-used (conventional) information systems, Java language and programming, object-oriented programming, Internet (knowledge of ftp files, write simple HTML, and ability to publish a home page that includes Java applets).

SFE480 The Final Project Proposal

The student will choose a pre-approved topic within the field of software engineering which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

SFE490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of software engineering. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

HEALTH ADMINISTRATION

The Health Administration program at Kennedy-Western University is directed towards entry-level, mid-career, and advanced-level professionals within the health administration field. The structure of the program allows students to receive both theoretical and practical applications needed for health care management to prepare for an ever-changing health care environment. Input and supervision is provided by current senior level health care administrators, researchers and professors.

The undergraduate program provides current health or business administrators with a general focus of the concepts and analytical techniques needed to understand the administrative structure of health organizations. This course of study introduces students to the various health organizations, structures, planning, information systems, economics and the legal aspects of health care.

The graduate curriculum prepares individuals for more senior-level positions with the theoretical and applied knowledge-base required for successful planning of health initiatives within a dynamic, changing health care environment. Both master of science and doctoral degrees are offered. This level prepares students to be able to think critically about health care problems and solutions. Specific areas include managed care, marketing, policy analysis, quality management and advanced financial management systemic processes.

**Bachelor of Science
Health Administration**

HA100 Introduction to Health Administration

Principles of health administration encompassing the key areas of functional/technical areas of the health care industry. Specific components of the organizational structure, organized delivery systems, planning, implementing, and managing organized delivery systems are discussed. Other key areas include: structural, financial, and legal changes as they relate to clinical operations, practice and management studies, operations and other factors pertaining to the organized delivery system.

HA200 Function and Organization of Community Health Services

The primary aim of this course is to introduce the student to the broad, challenging, controversial, academic discipline and profession of Community Health Organization and Education. This introductory course will provide the student with an overview of the major community health issues that affect the health care system and the organization of the health care system from past to present.

HA210 Current Issues in Health Care Reform

Introduces students to the historical development, structure, operation, and current and future directions of the major components of the U.S. health care delivery system. Examines the ways in which health care services are organized and delivered, the influences on health care public policy decisions, factors that determine the allocation of health care resources and the establishment of priorities, and the relationship of health care costs to measurable benefits.

HA230 Health Care Economics

Introduction to the principles of health care economics as it relates to the financing and delivery of personal medical services. Specific topic areas include: extensive emphasis of federal and state legislation and of current policy issues, financing of medical services and concern with efficiency in the delivery of services.

HA300 Leadership in Health Care Administration

Skills and concepts for effective management of health care facilities and human resources. Emphasis is on practical application, cost containment, and modeling, teaching, and leading cooperative teams for organizations and patient care.

HA310 Human Resources for Health Care Delivery

Comprehensive review of the concepts, theories and processes relating to the function of human resource management (HRM) in the health care delivery environment. Emphasizes the strategic role of HRM in selecting, staffing, evaluating performance, compensating and developing organizational personnel.

HA320 Health Information Systems

Organization and functions of medical practice including conceptual models. Emphasis will be placed on the delivery of health care according to its organization, governmental involvement, financing and administration, morbidity and mortality trends and the development of effective community health systems for diverse populations.

HA340 Health and Drug Abuse

A survey of information necessary for a basic understanding of substance abuse and addictions in general. Students will learn about the current research related to substance abuse, understand the different prevention and treatment approaches, and have an understanding of the concerns facing special populations who are struggling with addiction.

HA350 Health Care Marketing

Designed to provide healthcare professionals with an understanding of the role of marketing within the successful contemporary healthcare organization. Focuses on the use of marketing, sales and customer service as means to gaining and sustaining a competitive advantage.

HA400 Introduction to Epidemiology

Presentation of the concepts of epidemiology as they are applied to the prediction of health care service needs of a population. Identification and integration of the diseases and how to look for them.

HA410 Statistics in Health Research

An introduction to the application of statistics to the Biological and Health Sciences. Topics include: experimental design; estimation; hypothesis testing; analysis of variance; simple linear and multiple regression; longitudinal data analysis; and demography and vital statistics.

HA420 Health Planning

Community analysis, mode for behavioral assessment, the planning process, phases of implementation, and criteria for evaluation. Topics include: program planning, community analysis, program development, developing a program plan, program implementation and evaluation.

HA430 Legal Aspects of Health Care

Focuses on the legal environment of health care administration for providers, patients and policymakers in the United States. Examines a wide variety of medical, legal, ethical, political, and moral issues as they intersect in today's arena of American health care.

HA480 The Final Project Proposal

The student will choose a pre-approved topic within the field of health administration which is of sufficient dimension and depth to write a final project (research paper) of 75 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

HA490 The Final Project (9 Units)

The student will write a final project (research paper) on a pre-approved topic within the field of health administration. The final project will be an extension of the final project proposal, and will consist of a minimum of 75 pages excluding tables, figures appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Master of Science
Health Administration**

HA505 Health Services Administration

Addresses the changing health care system with respect to the emergence of organized delivery systems, that must include the role of planning, implementing, and managing diverse health care systems. Focuses on the functional, technical and organizational matters of hospital systems and corporate culture. Concentrates on the changes of financing, delivery, and shifting health care industry, such as Health Maintenance Organizations, physician hospital organizations and practice management companies.

HA510 The U. S. Health System: Function and Origin

Introduction to the U.S. health system focusing on four interrelated components: how the system developed, how it works today, why it costs so much, and what its problems are. Key areas identified include: the relationship of government and health, health policy and the political structure, and the role of interest groups and public opinion in the health care system.

HA525 Health Information Systems: Organization and Management

Concepts related to organization, evaluation, selection, and strategic management of information systems being used in hospitals and health services organizations by executives, clinical professionals and managers. Topics include: systems analysis, database management, health services applications of computers, decision support systems, electronic health records and future trends in health care information systems.

HA530 Financial Management of Health Services

Provides the practical financial management knowledge and skill to read, analyze, understand and use financial statements, reports and analytical tools to make competent decisions about the use of health care organizations' resources.

HA550 Management of HMO's and Ambulatory Care

Administrative practices and organizational transitions of ambulatory, HMO and managed care systems. The functions of managers and operations in these diverse settings are examined in terms of legal, financial, policy, resource and marketing implications.

HA560 Marketing of Health Services

Designed to provide healthcare professionals with an understanding of the role and techniques of service marketing within the successful contemporary healthcare organization. Focuses on the use of marketing, sales and customer service as means to gaining and sustaining a competitive advantage based on the services offered by the healthcare organization.

HA600 Management of Health Services

Provides overview of the issues facing executives and managers in all levels of health care organizations today. Examines both the relationship of the health care organization and its environment and inner workings of the environment within the structure of the organization. Addresses the unique strategic planning, information coordination and marketing issues facing health care executives, as well as the financing, staffing and maintenance challenges that must be dealt with in order to assure cost-effective, quality health care delivery.

HA610 Health Policy

Health policy making formulation, implementation and modification in American medical practices. Trends and issues in the changing configurations of governmental policy are reviewed in conceptual and operational dimensions to understand the analytical and organizational positioning basis of health systems managers.

HA630 Quality Management in Health Care

Examines both theoretical constructs and application techniques available for employment of TQM (Total Quality Management) and CQI (Continuous Quality Improvement) in health care settings today. Explores the methods for applying TQM/CQI in hospital settings, primary care clinics and physicians offices, managed care organizations, contract research organizations, public health organizations, and academic health centers.

HA640 Legal and Ethical Problems in Health Care Administration

The multi-faceted legal issues or problems which affect health administrators. Topics include: Tort Law, criminal aspects of health care, contracts and antitrust, civil procedure and trial practice, corporate liability, nursing and the law, liability by department and health professional, patient consent, legal reporting problems, patients' rights and responsibilities, Acquired Immune Deficiency Syndrome, end of life issues, malpractice insurance, managed care and organizational restructuring and tort reform and reducing the risks of malpractice.

HA680 The Thesis Proposal

The student will choose a pre-approved topic within the field of health administration which is of sufficient dimension and depth to write a thesis (research paper) of 100 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

HA690 The Thesis (9 Units)

The student will write a thesis (research paper) on a pre-approved topic within the field of health administration. The thesis will be an extension of the thesis proposal, and will consist of a minimum of 100 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

**Doctor of Philosophy
Health Administration**

HA700 Health and the Workplace

Organization, implementation and administration of wellness programs in the workplace. The impact on business profitability of investments in employee wellness will be addressed.

HA710 Health Maintenance Organizations

Introduction to the strategic and operational resources needed for health managers to understand Health Maintenance Organizations and all types of managed care organizations. Specific areas include: the actual operations of managed care plans; antitrust issues; quality management and marketing strategies for managed care organizations.

HA735 Infectious Diseases

This course covers a broad range of infectious diseases. Topics include: basis of infection, host-agent interaction, host immune/defense mechanisms, organ/agent-specific infections, basic concepts of diagnostic and therapeutic approach.

HA740 Ambulatory Care: Organization and Management

Design, policy and management approaches involved in independent and integrated systems of ambulatory-based medical services. Emerging changes and restructuring of America's primary health care system are examined for organizational and policy implications to guide administrative decisions determining future ambulatory medical care and alternative delivery settings.

HA750 Health Services Administration

Focus on the implications for the management of health care services. Examination of key contemporary issues in the organization and management of health care services including: in-depth discussion of managerial, social, behavioral, legal, and economic aspects from a macroscopic viewpoint.

HA800 Biological and Social Basis of Prevention

Examines the principles of disease transmission and the workings of successful preventative health strategies. Includes: coverage of epidemiological principles, statistical techniques, case-control and cohort investigational studies, and randomized clinical trials. Applies concepts from the field of epidemiology to the management of health services organizations, looking at how health care executives can use epidemiological knowledge to foster better communication within their organizations and promote better health outcomes, both in their institutions and in their communities.

HA805 Problems and Issues in the Health Field

Controversial issues ranging from AIDS to abortion, aging, costs, mental health and health care providers. Provides for an understanding and contribution to solutions for these complex issues.

HA825 Adding Quality to Health Care

Overview of the concept of Total Quality Management and its applicability to health care organizations. There is a blending of theory and practical applications. Topics include: history and overview of quality management, principles, tools, and techniques of total quality, total quality environment, and strategic directions.

HA830 Biomedical Ethics

The role of the ethics consultant, the function of the ethicist in a medical setting, the formation of ethical biases and value judgments and the legal implications and standards resulting. Presentation of select issues in medical ethics and competing rationales for the allocation of scarce medical resources.

HA840 Strategic Planning and Marketing in Health Care

An overview of the challenges facing health care executives today. Examines distinguishing characteristics of marketing services, as opposed to products. Looks at opportunities and threats involved with marketing-related services, in the context of the present and future environment for health care. Subject areas include: the service marketing mix, planning and execution of marketing plans, customer service management, leveraging information technology, demand management, pricing and promotional policies, and managing service quality.

HA850 Research Methods and Design

Relates to the description, explanation and justification of methods for conducting research. Formulation of concepts and hypotheses, developing valid measurement procedures, performing true and quasi-experiments. Challenges abstract theories with real-world data within the context of the specific discipline.

HA880 The Dissertation Proposal

The student will choose a pre-approved topic within the field of health administration which is of sufficient dimension and depth to write a dissertation (research paper) of 150 pages minimum length. The proposal is based on a standard academic format and is subject to the quality standards of the Faculty Review Committee. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.

HA890 The Dissertation (9 Units)

The student will write a dissertation (research paper) on a pre-approved topic within the field of health administration. The dissertation will be an extension of the dissertation proposal, and will consist of a minimum of 150 pages excluding tables, figures, appendices, etc. Full guidelines and instructions will be supplied to the student at the appropriate time in their degree program.