INDUSTRIAL ENGINEERING (IE-GY)

IE-GY 930  Readings in Industrial Engineering I  (3 Credits)
In this course, students individually read selected papers and current
literature in specialized area and are guided by a faculty member. | 
Prerequisite: Approval of adviser, instructor and department head.
Grading: Grad Poly Graded
Repeatable for additional credit: Yes
IE-GY 6003 Engineering Economics  (3 Credits)
Typically offered occasionally
Engineers are responsible for the design, development, deployment
of products and projects and should evaluate alternatives when
available. Solutions run from the simple where the decisions are made
quickly to detailed analysis of complex alternatives. Student will
learn the necessary accounting terms, financial concepts, costing,
investment analysis, time-value of money, equipment, and how material
specifications are used in the investment decisions processes.
Upon completion of the course, students will be able to quantify the
alternatives used as part of the decision process in recommending what
course of action to be taken. The most economical choice may not be
the recommended alternative based on other considerations i.e. political,
past experience with suppliers, equipment standardization.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 6063 Work Design and Measurement  (3 Credits)
Typically offered occasionally
Principles and techniques of designing work methods and work
simplification programs. Theory and techniques of workplace design,
work measurement, time study, work sampling, standard data systems,
methods analysis, rating, and work allowances. Applications of
ergonomics and anthropometrics to promote worker health and safety in
lean manufacturing environments.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 6113 Quality Control and Improvement  (3 Credits)
Typically offered occasionally
This course provides students with a solid foundation in the cost of
quality, quality assurance and quality management. Emphasis is on
the basic tools of quality control such as control charts and their use,
the concept of "out of control," acceptance sampling, variables and
attributes charts and producer's and consumer's risk. A unique aspect
of this course is the demonstration of the power of teams of people
with different expertise to improve quality. A course project is required. |
Prerequisite: MA-GY 6513 or familiarity with the concepts of probability
and statistics. Also listed under MN-GY 6113.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 6123 Quality Engineering Using Robust Design  (3 Credits)
This course provides a broad review of procedures to improve
manufacturing quality. By employing both Taguchi techniques, such as
the use of signal-to-noise ratio representations and other techniques
less sensitive to parameter interactions, a full spectrum of robust design
methods are presented. Applications of these procedures are reviewed,
including online trouble-shooting methods to assure manufacturing
quality. | Prerequisite: IE-GY 6113. Also listed under MN-GY 6123.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 6163 Job and Workplace Design  (3 Credits)
This course examines theory, research and applications of job and
workplace design. Job design is presented from an interdisciplinary
perspective, focusing on how job design influences attitudes and work
behavior within organizations. Students are exposed to diagnostic tools
for measuring and evaluating jobs and the psycho-social aspects of
the workplace environment, as well as the principles of work redesign.
Topics include influences on work design by innovations in information
technology, modern manufacturing, virtual work arrangements and
open office systems; design and support of effective work teams;
re-engineering and total quality management; and privacy and
communication in the workplace. *An online version is available.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 6193 Production Planning and Control  (3 Credits)
Typically offered occasionally
This is a survey course in basic and advanced manufacturing planning
and control systems, covering short-term forecasting systems, master
production scheduling, material requirements planning, inventory
management, capacity management, production activity control and just-
in-time.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 6203 Project Planning and Control (Project Management)  (3 Credits)
Typically offered occasionally
This course discusses the knowledge and process required to manage
a project through its life cycle, from concept to completion. Topics
include engineering analysis, screening and selection, configuration and
total quality management, scheduling using Program Evaluation and
Review Technique (PERT) and Critical Path Method (CPM), budgeting and
resource management, computer support and software. Case studies are
used to illustrate the process.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 6213 Facility Planning and Design  (3 Credits)
Typically offered occasionally
Topics in this course include facilities design for global competitiveness,
strategic master-site planning, site selection, factory layout and design,
facility-management systems and materials handling and storage
planning. Also presented are guidance on selecting alternative facility
plans and application of queuing methods and computer modeling for
facility design and evaluation.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 6453 PRODUCTIVITY MANAGEMENT  (3 Credits)
This course examines modern approaches to productivity measurement,
evaluation, planning and improvement in both manufacturing and service
industries. Participants develop productivity models for various types of
organizations.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 6473 STRATEGIC CHANGE MANAGEMENT (3 Credits)
Typically offered Fall, Spring, and Summer terms
This course focuses on all aspects of defining, managing, and implementing large and complex organizational, and systems change. It encompasses core aspects of organizational behavior, team development and leadership to teach the effective components of how to ensure change initiatives can be both properly framed and effectively managed. | Prerequisite: Graduate Standing.
Grading: Grad Poly Graded
Repeatable for additional credit: No
Prerequisites: Graduate Standing.

IE-GY 7113 ENGINEERING PRACTICES IN THE BUSINESS
ENVIRONMENT 1 (3 Credits)
This course immerses the student into actual engineering problems in operating businesses. It emphasizes experiential, hands-on learning that includes project planning and management, and application of industrial engineering and manufacturing engineering techniques to real world problems with real world constraints. The student experiences, first hand, the actual practice of engineering and applies the engineering education to solution of industrial operations. For the project, students work in a client company under the academic supervision of a faculty member. Course will focus on applying theory and academic knowledge to analysis and improvement of processes, products and operations. Students will also experience the demands of meeting deadlines and providing cost-benefit solutions in the practice of engineering.
Grading: Grad Poly Graded
Repeatable for additional credit: No

IE-GY 7113 ENGINEERING PRACTICES IN THE BUSINESS
ENVIRONMENT 2 (3 Credits)
This course immerses the student into actual engineering problems in operating businesses. It emphasizes experiential, hands-on learning that includes project planning and management, and application of industrial engineering and manufacturing engineering techniques to real world problems with real world constraints. The student experiences, first hand, the actual practice of engineering and applies the engineering education to solution of industrial operations. For the project, students work in a client company under the academic supervision of a faculty member. Course will focus on applying theory and academic knowledge to analysis and improvement of processes, products and operations. Students will also experience the demands of meeting deadlines and providing cost-benefit solutions in the practice of engineering. | Prerequisite: IE-GY 7113, Required courses in major or permission from Program Director
Grading: Grad Poly Graded
Repeatable for additional credit: No
Prerequisites: IE-GY 7113.

IE-GY 7653 Human Factors in Engineering Design (3 Credits)
Typically offered occasionally
Human Factors is a body of knowledge about human abilities, human limitations, and other human characteristics that are relevant to design. Human factors engineering is the application of human factors information to the design of tools, machines, systems, tasks, jobs, and environments for safe, comfortable, and effective human use.
Grading: Grad Poly Graded
Repeatable for additional credit: No

IE-GY 7763 Manufacturing Resources Planning (3 Credits)
Typically offered occasionally
This course studies computerized systems to effectively run a manufacturing business. Also covered is the process of software specification, evaluation, selection and implementation. Topics include Manufacturing Resources Planning (MRP) logic, enterprise resource planning, manufacturing execution systems, inventory management and bill of materials. Several software systems and their features are highlighted. Also listed under MN-GY 7763.
Grading: Grad Poly Graded
Repeatable for additional credit: No

IE-GY 7853 COMPUTER INTEGRATED MANUFACTURING SYSTEMS (CIMS) (3 Credits)
This course examines the basic concepts of manufacturing complex products with complex processes. It relies heavily on computer and data processing technologies, which are introduced. Also a variety of perspectives are addressed from all aspects relative to products and processes-planning, design, manufacturing and shipping. Students explore techniques for managing and optimizing manufacturing productivity. Also listed under MN-GY 7853.
Grading: Grad Poly Graded
Repeatable for additional credit: No

IE-GY 7873 LEAN MANUFACTURING (3 Credits)
Typically offered occasionally
This course provides an overview to the basic principles, and theories of lean manufacturing which involves identifying and eliminating non-value-adding activities in design, production, and supply chain management. Students will learn an integrated approach to efficient manufacturing with emphasis on synchronized product, quick changeover, cell design, visual factory, value stream, one-piece flow and learn metrics.
Grading: Grad Poly Graded
Repeatable for additional credit: No

IE-GY 7883 Manufacturing Systems Engineering (3 Credits)
Topics in this course concentrate on contemporary techniques for product design and manufacture, including financials of the manufacturing firm, quality, reliability, Taguchi methods of product and process design, scale-up and partitioning, production flows, modern manufacturing methods such as JIT/TQC, pull and synchronized manufacturing. Cultural factors are also discussed. Also listed under MN-GY 7883.
Grading: Grad Poly Graded
Repeatable for additional credit: No
IE-GY 7923 Design for Manufacturability (3 Credits)
Typically offered occasionally
This course introduces concepts and techniques for economical, functionally sound and high-quality product design for manufacture. Emphasis is on designing for easy assembly, manually and with robotics and on the effective use of plastics to reduce manufacturing costs. Managerial and organizational approaches and case studies of successful designs are reviewed. | Also listed under MN-GY 7923.
Grading: Grad Poly Graded
Repeatable for additional credit: No

IE-GY 7933 Environmental Health and Safety (3 Credits)
Typically offered occasionally
This course presents an overview of environmental, health and safety management, and introduces students to management systems within a manufacturing operation. The course explores motivations and strategies for environmental, health and safety management. Students learn about the mandatory standards understanding the technical and legal rationale for insuring that workers are provided with a safe and healthy workplace. These skills are needed to work effectively in operations, human resources and employee development as well as in industrial relations, since the law provides workers specific safety and health rights. | Also listed under MN-GY 7933.
Grading: Grad Poly Graded
Repeatable for additional credit: No

IE-GY 7993 SUPPLY CHAIN ENGINEERING (3 Credits)
Typically offered occasionally
Students in this course gain an understanding of how companies plan, source, make and deliver their products with a global competitive advantage. The course stresses the engineering components in developing an integrated supply chain that covers the entire manufacturing enterprise. It looks at the supply-chain infrastructure and the velocities of different models. The focus is on understanding and detecting the constraints of the infrastructure and the lowest common denominator of the information system used. Students also gain an understanding of logistical networks and the optimizing of the various traffic and location alternatives. Synchronization of supply and demand is examined in detail, looking at variability in both processes with the objective of maximizing throughput and capacity, emphasizing partnering, e-commerce and the bullwhip effect. Finally, the course establishes global performance measurements that compare companies in different industries.
Grading: Grad Poly Graded
Repeatable for additional credit: No

IE-GY 9113 Selected Topics in IE (3 Credits)
Typically offered occasionally
These topics cover areas not covered in other courses. Specific topics vary according to instructor, who may be a visiting professor. Topics and prerequisites announced during the term before classes.
Grading: Grad Poly Graded
Repeatable for additional credit: Yes

IE-GY 9303 Readings in Industrial Engineering I (3 Credits)
In this course, students individually read selected papers and current literature in specialized area and are guided by a faculty member. | Prerequisite: Approval of adviser, instructor and department head.
Grading: Grad Poly Graded
Repeatable for additional credit: Yes