

## Enterprise

### ENT 1950 - Enterprise Orientation

An orientation for students to the Enterprise program. Students will evaluate and participate with several different enterprise teams as a way to familiarize themselves with the program, teams, and students through hands-on project activities.

**Credits:** 1.0; Graded Pass/Fail Only

**Lec-Rec-Lab:** (0-0-1)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Junior, Senior

### ENT 1960 - Enterprise Orientation-Spring

An orientation for students to their specific enterprise. Covers enterprise specific topics but should also include organizational structure; past, present and future projects and their results; an evaluation of learning and personality preferences; and exploring the MTU challenge course.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Fall, Spring, Summer

### ENT 2950 - Enterprise Project Work I

An orientation for students to their specific enterprise. Covers enterprise specific topics but should include organizational structure; past, present, and future projects and their results; an evaluation of learning and personality preferences; and exploring the MTU challenge course.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

### ENT 2960 - Enterprise Project Work II

Interdisciplinary teams work as part of an engineering enterprise to address real-world engineering design projects or problems. Second- year students are responsible for achieving some prescribed objectives and performing critical analysis of data.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

### ENT 2961 - Teaming in the Enterprise

Develops group problem-solving skills. Stresses interpersonal skills and skill assessment, communication, group process and teamwork, and action planning. Uses active, hands-on learning.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-1-2)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

### ENT 2962 - Communication Contexts

An introduction to the demands of technical and professional communication in workplace settings, through analyzing project design team experiences.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

**Pre-Requisite(s):** UN 1002 or UN 1003

### ENT 2964 - Machine Tool Fundamentals and Applications

Basic machine processes including setup and operation of lathes, milling machines, drill presses, grinder and saws. Students are exposed to fundamental machining processes, nomenclature, and machine operation with an overall focus on quality control and safety.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-2)

**Semesters Offered:** Fall

### ENT 3950 - Enterprise Project Work III

Interdisciplinary teams work as part of an engineering enterprise to address real-world engineering design projects or problems. Third-year students will practice designing approaches to solve problems and develop procedures to achieve specified project objectives.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** Must be enrolled in one of the following Class(es): Junior

### ENT 3954 - Enterprise Market Principles

Fundamental principles of marketing in a lecture format augmented by a simulation played in small groups. The course is completed in two day-long, Saturday sessions separated by one week. Examines marketing in the six stages of product life cycle (opportunity identification, product development, introduction, growth, maturity, and decline).

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall

**Restrictions:** Permission of instructor required; Must be enrolled in one of the following Class(es): Junior, Senior

### ENT 3956 - Industrial Health and Safety

Instruction of health and safety in engineering practice. Integrates the study of health and safety regulations, risks, and potential for improvement. Also covers the tremendous financial, ethical, and public relations implications of disregarding this critical aspect of engineering.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall

**Restrictions:** Must be enrolled in one of the following Class(es): Junior, Senior

### ENT 3957 - Fundamentals of Engineering & Technology

Course provides an overview of the major activities involved in developing a product or service which will satisfy the customer. Introduces major engineering tools used for team-based integrated product/process development (IPPD) such as project management, benchmarking, quality function deployment, process flow charting, cost analysis, and failure modes and effects analysis.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Major(s): Engineering, Civil Engineering, Chemical Engineering, Materials Science and Engrg, Electrical Engineering, Environmental Engineering, Geological Engineering, Mechanical Engineering, Biomedical Engineering, Computer Engineering; May not be enrolled in one of the following Class(es): Freshman

### ENT 3958 - Ethics in Engineering Design and Implementation

The focus of this course is on ethical considerations in the engineering design and implementation process. Basic ethical analysis tools will be explored through various exercises. Students will analyze and present life engineering ethics case studies.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall, Spring

**Restrictions:** Must be enrolled in one of the following Class(es): Junior, Senior

**Pre-Requisite(s):** ENG 1101 or (ENG 1001 and ENG 1100)

### ENT 3960 - Enterprise Project Work IV

Interdisciplinary teams work as part of an engineering enterprise to address real-world engineering design projects or problems. Third-year students practice designing approaches to solve problems and develop procedures to achieve specified project objectives.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** Must be enrolled in one of the following Class(es): Junior

### ENT 3961 - Enterprise Strategic Leadership

This 1-credit module focuses on exploring research findings about leadership, the practice of leadership, and providing skill assessment and development opportunities. Topics include leadership traits, behaviors, theories, and leadership of change. Combines a variety of teaching methods, including self-assessment, cases, discussion, experiential exercises, role-playing, videotaping.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

**Pre-Requisite(s):** ENT 2961 and UN 2002

**ENT 3962 - Communication Strategies**

Drawing on the broad understanding of workplace communication developed in ENG2962, students will learn and practice strategies for effective oral and written communications in technical and professional settings. Emphasis is on audience adaptation of technical information and on achieving clearly specified purposes.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

**Pre-Requisite(s):** ENT 2962 and (UN 1002 or UN 1003)

**ENT 3963 - Technology Commercialization**

Presents fundamentals important to moving technology from idea to market. Topics covered include technology assessment and evaluation, intellectual property protection, competitive analysis, legal agreements and transfers of rights, market analysis, marketing, business planning, development financing, and company formation.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall, Spring

**Restrictions:** Must be enrolled in one of the following Class(es): Junior, Senior

**ENT 3964 - Project Management**

Project definition, developing a work breakdown structure, responsibility assignment and milestone development. Covers techniques for project scheduling and practical application of Gantt and PERT/CPM charts; resource management and application of critical chain method; project budgeting and cost estimation; project monitoring, control, evaluation, and termination; and project teams, their structure, and interactions.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Class(es): Junior, Senior

**ENT 3966 - Design for Manufacturing**

This course supplements courses that address "design for function." Products "designed for manufacturing" are lower cost, higher quality, and have a shorter time to market. The course describes how the capabilities and limitations of common manufacturing processes translate into qualitative design guidelines. Topics include design for casting, forging, sheet metal forming, machining, plastics and assembly.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Class(es): Junior, Senior

**Pre-Requisite(s):** ENG 1102

**ENT 3967 - Fundamentals of Product/Process Development**

This course provides an overview of the major activities involved in developing a product or service which will satisfy the customer. The course introduces tools used for team-based integrated product/process development (IPPD) and cost-effective development of manufacturing processes including lean manufacturing and six sigma principles.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

**ENT 3970 - Enterprise Special Topics**

For the development of new, junior-level instructional modules in support of the engineering enterprise.

**Credits:** 1.0; May be repeated

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall, Spring

**Restrictions:** Must be enrolled in one of the following Class(es): Junior, Senior

**ENT 3971 - Seven Habits of Highly Effective People**

Focuses on personal and professional effectiveness through greater productivity, increased influence in key relationships, stronger team unity and complete life balance. This course will explore these areas through interactive exercises, case studies, videos, and sharing of experiences.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Class(es): Junior, Senior

**ENT 3972 - Practical Electronic Circuit Design and Fabrication**

This is a hands-on laboratory course that focuses on practical implementation of electronic circuits, especially for students enrolled in the Enterprise Program. Topics include grounding, wiring, analog/digital circuits, power supplies, EMC, board layout/fab/test, soldering, safety and instrumentation.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-2)

**Semesters Offered:** Fall, Spring

**Restrictions:** Permission of instructor required

**ENT 3973 - Introduction to Geohydrological Characterization Techniques**

Students will have the opportunity to conduct geohydrologic field work and apply the principles observed in the field to mathematical models. They will learn basic hygienic-oriented analytical techniques for evaluating well water. The course will require a weekend field excursion.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-1)

**Semesters Offered:** Fall, Spring

**ENT 3974 - Fuel Cell Fundamentals**

This course provides an introduction to fuel cells and fuel cell systems. Topics include an overview of fuel cell construction, fuel cell chemistry, fuel cell losses and efficiency, and integrating fuel cells onto vehicles.

**Credits:** 1.0

**Lec-Rec-Lab:** (1-0-0)

**Semesters Offered:** Fall

**Pre-Requisite(s):** CH 1100 or CH 1110 or CH 1112 or (CH 1150 and CH 1151)

**ENT 3975 - Introduction to Vehicle Design and System Modeling**

Enterprise module introduces students to vehicle design process and system modeling. Students will be shown the formulation of math based models of systems and will use MATLAB as the computing engine. Computing applications include matrixes, arrays, logical operators, program control flow, looping, iterative solutions and output manipulation including two and three dimensional graphics. The course is presented in an interactive Lecture/Computer Laboratory format. Theory is developed for each topic, demonstrated in MATLAB and example problems are solved by students using MATLAB during the period.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Fall

**Pre-Requisite(s):** ENG 1102

**ENT 3976 - Personal Brand Management**

Principles of personal brand management that athletes, entertainers, and successful companies and business leaders employ. Intended to develop the entrepreneurial spirit while cultivating integrity-based leadership skills and enabling students to distinguish and package their skills and abilities in a professional manner. The brand YU life philosophy focuses on planning, time-management, interpersonal skills and communication, and mission statement development, marketing and planning.

**Credits:** 1.0

**Lec-Rec-Lab:** (1-0-0)

**Semesters Offered:** Spring

**Restrictions:** Must be enrolled in one of the following Class(es): Junior, Senior

**ENT 3977 - Fundamentals of Hydrogen as an Energy Carrier**

This course provides an overview of traditional and alternative energy sources, with particular emphasis on hydrogen energy. Discussion of energy production and sources; electric and hydrogen vehicles; production, distribution, and policy of hydrogen and the hydrogen economy.

**Credits:** 1.0

**Lec-Rec-Lab:** (1-0-0)

**Semesters Offered:** Fall

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

**Pre-Requisite(s):** CH 1100 or CH 1110 or (CH 1150 and CH 1151) and PH 2200

**ENT 3978 - Hydrogen Measurements Laboratory**

This course provides an introduction to basic experiments and measurements that relate to hydrogen and hydrogen powered fuel cells. Includes chemical and electrical safety, fuel cell operation and introduction to fuel cell integration into practical applications.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-0-2)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Class(es): Freshman

**Pre-Requisite(s):** PH 2200 and CH 1150 and CH 1151

**ENT 4900 - Senior Enterprise Project Work I for Non-Engineering Majors**

Interdisciplinary teams work as part of an enterprise to address real-world projects or problems of significance to industry, government and communities. Fourth-year students gain experience in defining project objectives and planning strategies to achieve these objectives, and leading teams to accomplish project goals. This course is for non-engineering majors.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-0-6)

**Semesters Offered:** Fall, Spring

**Restrictions:** May not be enrolled in one of the following College(s): College of Engineering; Must be enrolled in one of the following Class(es): Senior

**ENT 4910 - Senior Enterprise Project Wok II for Non-Engineering Majors**

Interdisciplinary teams work as part of an enterprise to address real-world projects or problems of significance to industry, government and communities. Fourth-year students gain experience in defining project objectives and planning strategies to achieve these objectives, and leading teams to accomplish project goals. This course is for non-engineering majors.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-0-6)

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** May not be enrolled in one of the following College(s): College of Engineering; Must be enrolled in one of the following Class(es): Senior

**ENT 4950 - Enterprise Project Work V**

Interdisciplinary teams work as part of an engineering enterprise to address real-world engineering design projects or problems. Fourth-year students gain experience in defining project objectives, planning strategies to achieve these objectives, and leading technical teams to accomplish project goals. Must be Senior Project ready as defined by major.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-0-6)

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** Permission of department required; Must be enrolled in one of the following College(s): College of Engineering; Must be enrolled in one of the following Major(s): Civil Engineering, Chemical Engineering, Software Engineering, Electrical Engineering, Environmental Engineering, Mechanical Engineering, Materials Science and Engrg, Biomedical Engineering, Computer Engineering; Must be enrolled in one of the following Class(es): Senior

**Pre-Requisite(s):** BE 3500(C) or (CE 3620 or CE 3810) and CE 3810) or CM 4855(C) or (CS 4710 and CS 4711 and CS 4712) or (EE 3173 or EE 3305) and EE 3173 or EE 3130 or EE 4431 or (MEEM 3000(C) and MEEM 3900) or (MY 3110 and MY 3200 and MY 3210 and MY 3300 and MY 3400)

**ENT 4951 - Business Plans and Budgeting in the Enterprise**

Introduction to the mechanics, dynamics and concepts of the financial budgeting process. Applications of financial concepts is emphasized through the development of basic business plans. Topics and activities include budget preparation, performance assessment, and financial evaluation of projects.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Spring

**Restrictions:** May not be enrolled in one of the following Major(s): Business Administration; Must be enrolled in one of the following Class(es): Junior, Senior

**ENT 4952 - Complex Communication Practices**

Students apply strategies and knowledge learned in ENG2962 and ENG3962 to the achievement of more complex communication practices demanded in technical and professional settings. Emphasizes creating professional identities, management communication skills, and responsible messages within teams and organizations and for a variety of technical and nontechnical audiences.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall, Summer

**Pre-Requisite(s):** ENT 3962 and (UN 1002 or UN 1003)

**ENT 4954 - Global Competition**

Emphasizes unique economic, market, and political risks faced by organizations as operations expand beyond domestic borders. Discusses establishing risk profiles to analyze new labor, product, capital markets on a global scale and appropriate market entry strategies. Small teams will do a risk profile and recommend market entry strategies for selected countries.

**Credits:** 1.0

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall

**Pre-Requisite(s):** ENT 2961 and UN 2002

**ENT 4960 - Enterprise Project Work VI**

Interdisciplinary teams work as part of an engineering enterprise to address real-world engineering design projects or problems. Fourth-year students gain experience defining project objectives, planning strategies to achieve these objectives, and leading technical teams to accomplish project goals.

**Credits:** 2.0

**Lec-Rec-Lab:** (0-0-6)

**Semesters Offered:** Fall, Spring, Summer

**Restrictions:** Must be enrolled in one of the following Class(es): Senior

**Pre-Requisite(s):** ENT 4950

**ENT 4961 - Enterprise Project Work VII**

Course intended for students who have completed all project courses in Enterprise and who wish to continue with the program through graduation.

**Credits:** 1.0; Repeatable to a Max of 2

**Lec-Rec-Lab:** (0-0-3)

**Semesters Offered:** Fall, Spring

**Restrictions:** Permission of instructor required; Must be enrolled in one of the following Class(es): Senior

**Pre-Requisite(s):** ENT 3950 and ENT 3960 and ENT 4950 and ENT 4960

**ENT 4970 - Enterprise Special Topics**

For the development of new, senior-level instructional modules in support of the engineering enterprise.

**Credits:** 1.0; May be repeated

**Lec-Rec-Lab:** (0-1-0)

**Semesters Offered:** Fall, Spring

**Restrictions:** Must be enrolled in one of the following Class(es): Senior