
Prepared by the Department of Engineering Sciences & Applied Technology

Date of Departmental Approval: January 11, 2017

Date Approved by Curriculum and Programs: February 15, 2017

Effective: Fall 2017

1. **Course Number:** ENR101/ENR101L
Course Title: Introduction to Engineering and Advanced Manufacturing
Introduction to Engineering and Advanced Manufacturing Laboratory
2. **Description:** Students are introduced to the world of engineering and manufacturing through activities that showcase how products are designed and built. Teams design, build, and test a weight-bearing structure, as-well-as reverse engineer a product to improve its design. Classroom and laboratory exercises are designed to expose the student to the different engineering and advanced manufacturing disciplines. Lab sessions provide hands-on exposure to the concepts discussed in the lecture sessions. This course does not require any prior engineering background.
3. **Student Learning Outcomes:** Upon successful completion of this course, students are able to do the following:
 - Describe the roles and responsibilities of the most common engineering and advanced manufacturing disciplines
 - Explain the steps needed to prepare for a meaningful engineering, design, or advanced manufacturing career
 - Describe the key steps in the engineering analysis and design process
 - Discover and document the requirements needed for an engineering or advance manufacturing design
 - Explain the importance of reverse engineering in the (re)design of products or services
 - Know how to organize, schedule and complete an engineering design project
 - Develop and analyze working models of basic engineering systems to solve an open-end problem
 - Recognize the importance of collecting, recording, plotting, and interpreting technical data for engineering analysis and design
 - Describe and demonstrate methods for the graphical presentation of technical data and analysis of plotted data
 - Synthesize data analysis into a potential engineering/advanced manufacturing solution
 - Test and evaluate an engineering design against a set of requirements
 - Demonstrate and practice laboratory etiquette
 - Work as part of a team, design a simple engineering device, write a design report, and present the design
 - Use a calculator or computer as a tool in solving a wide variety of problems
 - Use a variety of devices and instruments in taking laboratory measurements
 - Use word processing, graphics, and spreadsheet software to prepare and present designs and laboratory reports
 - Demonstrate a basic awareness of contemporary global issues and the relationship to emerging technologies
 - Describe the impact engineering has had on the modern world
 - Exhibit an understanding of professional ethics and the application to real-life situations
 - Explain why the engineer is a team worker who needs strong skills in problem solving and communication
4. **Credits:** 4 credits (3 class hours / 2 laboratory hours)
5. **Satisfies General Education Requirement:** General Education Elective (Interdisciplinary Studies)
6. **Prerequisites:** MAT035 (Algebra for Non-STEM) or MAT041 (Elementary Algebra for STEM), ENL108 (Critical Reading & Thinking) or satisfactory basic skills assessment scores
7. **Semester Offered:** Fall
8. **Suggested Guidelines for Evaluation:** Course grading procedures and make-up policies are detailed in a student handout. In summary, grades will be based on homework; class work and participation; one-hour tests; laboratory work and reports; and a final examination.
9. **General Topical Outline:** see attached

ENR101. Introduction to Engineering and Advanced Manufacturing Outline

Lecture Topic	Lab Exercise
Introduction – Role of engineering in today's society, the engineering and manufacturing disciplines	Team assignments, campus computing environment and Moodle, maintain an engineering laboratory notebook
Education for Engineering	Team building activity
Introduction to design	Hands-on design activity (project 1-Design of a weight-bearing structure)
Sketching for creating engineering pictorial and perspective drawings	Project 1 continue
Geometric dimensioning and tolerancing (GD&T) and its importance in engineering and manufacturing, Measurements and estimations	Advanced manufacturing significant digit, units, and conversion problem
Engineering problem analysis	Engineering method activity
Representation of technical information	Recording and plotting exercise,
Manufacturing and assembly techniques	Project 2-Reverse engineer a product
Engineering and Advanced Manufacturing as a profession	Project 2 continue
Ethics in engineering and manufacturing	Project 2 reports