

Northern Marianas College

CURRICULUM ACTION REQUEST

Effective Semester / Session: Fall 2021

Type of Action:

- New
- Modification
- Move to Inactive (Stop Out)
- Cancellation

Course Alpha and Number: EG100

Course Title: Introduction to Pre Engineering

Reason for initiating, revising, or canceling:

This course is being created to help support the AA in Liberal Arts with an emphasis in pre-engineering.



Velma C. Deleon Guerrero

4/27/2021

Proposer

Date



Velma C. Deleon Guerrero

4/27/2021

Department Chair

Date



Adam Walsh

04.27.21

Language & Format Review Specialist

Date

Ajani Burrell



5.3.2021

Academic Council Chair

Date

Charlotte Cepeda



05/03/2021

Dean of Learning & Student Success

Date

Course: EG100 Introduction to Pre-Engineering

1. Department

Science, Math, Health, and Athletics

2. Purpose

The purpose of this course is for students with interests in engineering and plan to transfer to an accredited engineering program. Students will receive a basic introduction to the engineering profession and the academic program it entails.

3. Description

A. Required/Recommended Textbook(s) and Related Materials

Required:

Moaveni, Saeed. *Engineering Fundamentals: An Introduction to Engineering*, 6th Edition. Cengage Learning, 2019.

Recommended: N/A

B. Contact Hours

1. **Lecture:** 3 per week / 45 per semester
2. **Lab:** None
3. **Other:** None

C. Credits

1. **Number:** 3
2. **Type:** Regular Degree Credits

D. Catalogue Course Description

This course will provide an introduction to the range of disciplines in engineering including civil, electrical, computer, and mechanical among others. It will include problem-solving exercises that apply fundamental concepts from these subfields to integrate the steps of analysis, synthesis, and evaluation through individual homework assignments and group projects that require attention to engineering issues. The course will expose students to issues related to engineering practice such as working in teams, scheduling, evaluating risk, and making ethical decisions. Prerequisite: MA091 and EN095. (Offered Fall and Spring).

E. Degree or Certificate Requirements Met by Course

A grade of "C" or higher in this course fulfills the AA in Liberal Arts with an emphasis in pre-engineering. This course will also be an elective requirement for any A.S. degree with a science major and satisfies an elective option for non-majors.

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F. Course Activities and Design

This course includes: lectures, group work, discussions, homework, web-based assignments, viewing audio-visual materials, periodic quizzes, tests, field trips, comprehensive final exam, and research projects that require presentations.

4. Course Prerequisite(s); Concurrent Course Enrollment

Prerequisites: None

Concurrent Course Enrollment: None

Required English/Mathematics Proficiency Level(s)

English Placement Level: EN101

Mathematics Placement Level: MA132

5. Estimated Cost of Course; Instructional Resources Needed

Cost to the Student: Tuition for a 3-credit course; cost of the textbooks; and instructional materials fee.

Cost to the College: Instructor's salary.

Instructional resources needed for the course include: classroom; whiteboard and pen; audio-visual programs/software; and multimedia projectors; and various course materials and supplies.

6. Method of Evaluation

Student grades will be based on: class attendance and participation, homework completion, in-class and online quizzes, presentations, midterm and final exams. NMC's grading and attendance policies will be followed.

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7. Course Outline

This is a topical outline and does not necessarily indicate the sequence in which the material will be presented.

- 1.0 Introduction to the Engineering Profession
 - 1.1 Engineering disciplines
 - 1.2 Professional practice and licensing
 - 1.3 Communication and teamwork
 - 1.4 Ethics

- 2.0 Introduction to Engineering Design
 - 2.1 Engineering design process
 - 2.2 Engineering standards and codes
 - 2.3 Problem solution process

- 3.0 Engineering Fundamentals
 - 3.1 Making math and science relevant
 - 3.2 Fundamental dimensions and systems of units
 - 3.3 Length, time, mass, force, temperature, and related variables
 - 3.4 Electric current and related variables
 - 3.5 Energy and power

- 4.0 Computational Engineering Tools
 - 4.1 Electronic spreadsheet
 - 4.2 MATLAB

- 5.0 Engineering Graphical Communication
 - 5.1 Drawings and symbols
 - 5.1.1 Mechanical
 - 5.1.2 Civil, electrical, and electronic drawings
 - 5.1.3 Solid modeling
 - 5.1.4 Engineering symbols

- 6.0 Engineering Material Selection
 - 6.1 Material selection and origin
 - 6.2 Properties of materials

- 7.0 Mathematics, Statistics, and Engineering Economics
 - 7.1 Symbols and Greek alphabet
 - 7.2 Linear and nonlinear models
 - 7.3 Exponential and logarithmic models
 - 7.4 Matrix algebra
 - 7.5 Calculus
 - 7.6 Differential equations

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- 7.7 Basic probability and statistics
- 7.8 Frequency and normal distributions
- 7.9 Mean, median, and standard deviations
- 7.10 Engineering economics

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8. Instructional Goals

The course will introduce students to:

- 1.0 Weaving knowledge in mathematics, science, and engineering;
- 2.0 Critical analysis of data;
- 3.0 Collaborative, communication, and teamwork required as a skill in the engineering career;
- 4.0 Engineering solutions in a global, economic, environmental, and societal context;
- 5.0 Techniques, skills, and modern engineering tools necessary for engineering practice; and
- 6.0 Lifelong learning in the pursuit of continuous professional development.

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9. Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1.0 Explain the nature of the role of engineers in society;
- 2.0 Demonstrate the basic principles of the engineering method;
- 3.0 Apply the key concepts of design, ethics, safety, and sustainability;
- 4.0 Explain the nature of the work of an engineer in fields of civil, environmental, chemical, electrical and electronic, and mechanical;
- 5.0 Critically evaluate and interpret information through research;
- 6.0 Write and speak in a style appropriate to academic and professional contexts; and
- 7.0 Work effectively in small teams.

10. Assessment Measures of Student Learning Outcomes

Assessment of student learning may include, but not be limited to, the following:

- 1.0 Tests and Quizzes;
- 2.0 Homework;
- 3.0 Presentation;
- 4.0 Project; and
- 5.0 Exam.