### Course Information

**Division**
Mathematics

**Course Number**
EGR 102 (SUN# EGR 1102)

**Title**
Introduction to Engineering

**Credits**
4

**Developed by**
Tom Palmer

**Lecture/Lab Ratio**
4 Lecture/0 Lab

**Transfer Status**

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<thead>
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<th>ASU</th>
<th>NAU</th>
<th>UA</th>
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<tr>
<td>FSE 100 (2) &amp; FSE 101 (1) &amp; Elective Credit</td>
<td>EGR 186</td>
<td>ENGR 102</td>
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**Activity Course**
No

**CIP Code**
14.0101

**Assessment Mode**
Pre/Post Test (10 Questions/100 Points)

**Semester Taught**
Fall and Spring

**GE Category**
None

**Separate Lab**
No

**Awareness Course**
No

**Intensive Writing Course**
No

**Prerequisites**
MAT 120 or higher with a grade of "C" or higher or placement test score as established by District policy

### Educational Value

This course is intended not only for engineering students, but also for those who wish to explore and discover a career in engineering. Lectures are specially designed to simulate the tasks that engineers perform. Students design and build several hands-on projects resulting in artifacts or prototypes. Students acquire a general overview of various engineering disciplines, develop their teamwork and organizational skills, learn to use electronic spreadsheets and other engineering software, plan their possible future career in engineering, and participate in fun-filled contests involving friends and peers.

### Description

Engineering design, effective team participation and career preparation. Students are expected to participate in hands-on design projects, develop education/career plans and initiate development of the personal and management skills necessary for lifelong learning.
Supplies
None

Competencies and Performance Standards

1. **Apply the engineering design process.**
   
   **Learning objectives**
   What you will learn as you master the competency:
   a. Formulate a problem
   b. Solve a problem
   c. Implement a solution
   d. Document the process
   e. Use engineering/physical principles
   f. Use quality principles
   
   **Performance Standards**
   You will demonstrate your competence:
   o In team design projects
   o On assignments
   o On midterm and final exams
   Your performance will be successful when:
   o You can formulate an engineering design problem
   o You can solve an engineering design problem
   o You can implement a solution to a design problem
   o You can document the process in an organized fashion
   o You can correctly apply engineering/physical principles in the design process
   o You can correctly apply quality principles in the design process

2. **Become effective team members.**
   
   **Learning objectives**
   What you will learn as you master the competency:
   a. Understand team dynamics
   b. Foster team communication
   c. Establish social norms
   d. Understand and implement techniques for conflict resolution
   
   **Performance Standards**
   You will demonstrate your competence:
   o In team design projects
   o On assignments
   o On midterm and final exams
   Your performance will be successful when:
   o You understand team dynamics
   o You are able to foster team communication
o You are able to establish social norms for the team
o You understand and are able to implement techniques for conflict resolution

3. Understand the engineering profession.

**Learning objectives**

*What you will learn as you master the competency:*
a. Understand the attributes of an engineer
b. Develop an awareness for the various types of engineering disciplines
c. Discuss topics related to professional ethics

**Performance Standards**

*You will demonstrate your competence:*

o On assignments
o On midterm and final exams

*Your performance will be successful when:*

o You understand the attributes of an engineer
o You are aware of the various types of engineering work and the various engineering disciplines
o You can discuss topics related to professional ethics

4. Acquire personal learning and management skills.

**Learning objectives**

*What you will learn as you master the competency:*
a. Design an educational and career plan
b. Understand strategies to facilitate learning in various environments
c. Understand strategies for assessing progress in the career plan
d. Understand the principles of time management

**Performance Standards**

*You will demonstrate your competence:*

o On the team design projects
o On assignments
o On midterm and final exams

*Your performance will be successful when:*

o You have designed an educational and career plan
o You understand strategies to facilitate learning in various environments
o You understand strategies for assessing progress in the career plan
o You understand the principles of time management
5. **Present oral and written reports of technical work.**

*Learning objectives*

*What you will learn as you master the competency:*

a. Understand the basic structure for the presentation of technical work
b. Understand the basic requirements for presenting work in graphical form
c. Organize and present oral and written reports of technical work
d. Access information through a variety of sources including electronic forums

*Performance Standards*

*You will demonstrate your competence:*

- On the team design projects
- On assignments
- On midterm and final exams

*Your performance will be successful when:*

- You understand the basic structure for the presentation of technical work
- You understand the basic requirements for presenting work in graphical form
- You organize and present oral and written reports of technical work
- You can access information through a variety of sources including electronic forums

6. **Create Mathematical Models.**

*Learning objectives*

*What you will learn as you master the competency:*

a. Construct mathematical models to solve technical problems
b. Implement mathematical models using mathematical software

*Performance Standards*

*You will demonstrate your competence:*

- In the team design projects
- In assignments using electronic spreadsheets

*On midterm and final exams*

*Your performance will be successful when:*

- You are able to construct mathematical models to solve technical problems
- You are able to implement mathematical models using spreadsheet software and/or other mathematical software
**Types of Instruction**

Lecture/Discussion

Team Design

**Grading Information**

**Grading Rationale**

Instructors may develop evaluative procedures subject to the following parameters:

1. Design projects must represent at least 40% of the total course grade.
2. Partial-term exam(s) and/or quizzes must represent at least 10% of the total course grade. This does not include the final exam.
3. The final exam must include the pre/post test and must represent at least 15% of the total course grade. The pre/post test portion of the final exam must represent a minimum of 10% points of the total course grade.
4. Attendance must represent at least 5% of the total course grade.
5. Other activities may represent at most 30% of the total course grade. These activities may included the development of a personal Resume, in-class solutions of typical engineering problems using electronic spreadsheets and its graphical capabilities, solutions of typical engineering problems using other Engineering software packages, the participation in cooperative learning, etc. This list is not comprehensive and is provided here as a sample of the type of activities that may be included in this item. Specific activities will be contained in the syllabus or opportunely presented to the students during the semester.

**Grading Scale**

- A 90%-100%
- B 80%-89%
- C 70%-79%
- D 60%-69%
- F Below 60%