

# ENGR300 16

**STUDENT WARNING:** This course syllabus is from a previous semester archive and serves only as a preparatory reference. Please use this syllabus as a reference only until the professor opens the classroom and you have access to the updated course syllabus. Please do NOT purchase any books or start any work based on this syllabus; this syllabus may NOT be the one that your individual instructor uses for a course that has not yet started. If you need to verify course textbooks, please refer to the online course description through your student portal. This syllabus is proprietary material of APUS.

---

## Course Summary

**Course :** ENGR300 **Title :** Fundamentals of Mechanical Engineering

**Length of Course :** 16

**Prerequisites :** SCIN234, MATH240 **Credit Hours :** 3

---

## Description

**Course Description:** This course presents the fundamental mechanical principles of engineering required for any course of study in the engineering sciences. The student will be introduced to the principles and applications of statics, dynamics, thermodynamics and heat transfer. Students will study the interaction between mechanical and electrical systems and apply analogies between the two. Topics include: Technical problem solving and communication skills; Forces in Structures and Machines; Materials and Stresses; Fluids Engineering; Thermal and Energy Systems; Motion and Power Transmission. Finally, the course will present the essentials of the mechanical engineering profession and where it fits in the world of technology. Prerequisites: SCIN234 and MATH240

### Course Scope:

This course is delivered online and provides instruction and practice in the fundamentals of mechanical engineering in terms of design, professional practices, forces, materials, fluids, energy and motion. It delves into the top ten achievements of mechanical engineers and outlines the fundamental process to analyze and solve engineering problems. Students will gain a fundamental understanding on how mechanical engineering and electrical engineering differ and complement each other. This course incorporates an introduction to computer-aided design. Additionally, by the end of this course you will have an understanding of the key concepts and basic theories of statics, dynamics, thermodynamics and heat transfer particularly as the subjects apply to electrical engineering.

---

## Objectives

After completing the course, the student should be able to accomplish these Course Objectives (CO):

CO-1 Differentiate among engineers, mathematicians, and scientists.

CO-2 Outline the major steps involved in a mechanical design process.

CO-3 Examine advantages of multidisciplinary teams, collaboration, and technical communication in engineering.

CO-4 Evaluate the role played by computer-aided engineering tools in linking mechanical design, analysis, and manufacturing.

CO-5 Use vector algebra and polygon methods to produce the resultant of a system.

CO-6 Apply the principles of static equilibrium from Newton's first law to both moving and stationary structures and machines.

CO-7 Evaluate the integration of safety into the design of mechanical components subjected to tension or shear stress.

CO-8 Differentiate between a solid and a fluid, and the physical meanings of a fluid's density and viscosity properties.

CO-9 Utilize both SI and USCS calculations of various energy, heat, work, and power quantities that are encountered in mechanical engineering.

CO-10 Explain how heat engines operate and limitations on their efficiency.

---

## Outline

### Week 1: Mechanical Engineering Profession

---

Learning Objective(s)

CO-1

Readings

Ch. 1

Assignment(s)

Assignment 1

Forum: Introduction

### Week 2: Mechanical Design

---

Learning Objective(s)

CO-2, CO-3, CO-4

Readings

Ch. 2 & Ch. 3

Assignment(s)

Assignment 2

Forum:

Topics 1-3

### Week 3: Resultant Force

---

Learning Objective(s)

CO-3, CO-5, CO-6

Readings

Ch. 4  
(pp.131-140)

Assignment(s)

Assignment 3

Forum:

Topics 4-5

### **Week 4: Moment of a Force**

---

Learning Objective(s)

CO-5, CO-6

Readings

Ch. 4  
(pp. 140-148)

Assignment(s)

Assignment 4

Forum:

Topic 6

### **Week 5: Freebody Diagrams**

---

Learning Objective(s)

CO-5, CO-6

Readings

Ch. 4  
(pp. 148-167)

Assignment(s)

Assignment 5

Forum:

Topic 7

### **Week 6: Exam 1 Review and Catch-up**

---

Learning Objective(s)

CO-1, CO-2, CO-3, CO-4, CO-5, CO-6

Readings

Ch1-4

Assignment(s)

Exam 1

### **Week 7: Materials and Stresses**

---

Learning Objective(s)

CO-7

Readings

Ch. 5

(pp.183-204)

Assignment(s)

Assignment 6

Forum:

Topic 8

### **Week 8: Materials and Stresses (contd)**

---

Learning Objective(s)

CO-7

Readings

Ch.5

(pp.205-225)

Assignment(s)

Assignment 7

### **Week 9: Fluids Engineering**

---

Learning Objective(s)

CO-8

Readings

Ch.6

(pp.238-258)

Assignment(s)

Assignment 8 Forum:

Topic 9

### **Week 10: Fluids Engineering continued**

---

Learning Objective(s)

CO-8

Readings

Ch.6

(pp.259-290)

Assignment(s)

Assignment 9

### **Week 11: Exam review and catch-up**

---

Learning Objective(s)

CO-7, CO-8

Readings

Ch. 5-6

Assignment(s)

Exam 2

### **Week 12: Thermal and Energy Systems**

---

Learning Objective(s)

CO-9

Readings

Ch. 7

(pp.291-299)

Assignment(s)

Assignment 10

### **Week 13: Thermal and Energy Systems continued**

---

Learning Objective(s)

CO-9

Readings

Ch. 7 (pp.300-350)

Assignment(s)

Assignment 11

---

### **Week 14: Motion and Power Transmission**

---

Learning Objective(s)

CO-10

Readings

Ch. 8

(pp.351-359)

Assignment(s)

Assignment 12

---

### **Week 15: Geartrain Applications**

---

Learning Objective(s)

CO-10

Readings

Ch.8 (pp.359-407)

Assignment(s)

Assignment 13

---

### **Week 16: Exam review and catch-up**

---

Learning Objective(s)

CO-1 through CO-10

Readings

Ch. 1-8 (pp.1-407)

Assignment(s)

Exam 3-Final Exam

---

## **Evaluation**

**Instructor announcements:** Weekly announcements will appear on Monday of each week in the online classroom. This announcement will also be e-mailed to each student. The announcement will discuss the assignments for the week along with any other pertinent information for the week.

This is an upper level engineering course; all students' work is to be presented as such in terms of quality and content. The grading system will be based on your forum participation (10%), weekly assignments (60%), and three exams (30%).

**Reading Assignments:** Please refer to the Course Outline section of this syllabus for the weekly reading assignments.

**Week 1 Introductions:** Students must log into the classroom and post an introduction to the class during the first week of class. This assignment is worth 5% of the course grade. Your response is due by Sunday of Week 1. Your response must be greater than 250 words (a requirement) and include the following information.

- a. Your name
- b. Your university major or program
- c. Where you are in the program of study
- d. Your academic goals, to include why you are taking this class
- e. Information that you would like to share about yourself

**Weekly Forums:** The weekly discussion forum is for students to post their questions on course content for that week. This forum should not be used to discuss specific test questions prior to receiving feedback from the instructor (after the test is graded). If there is a question on a specific question, find a similar problem in the book and ask a question on that problem or concept. Asking specific questions on test questions creates an unfair advantage and defeats the purpose of the assessment tool.

**Weekly Assignments:** There will be ten weekly assignments during the course worth a total of 60% of your total grade. Each weekly assignment will cover one or more chapters in the book used in this course. For all problems requiring mathematical calculations, all work must be shown.

**Exams:** There will be three exams worth 30% of your final grade. Exams will be open book, open note tests. Exams will be administered without a proctor. Students must complete the numbered exam by the end of the week indicated in the schedule.

**Grading:**

Name	Grade %
------	---------

---

## Materials

**Book Title:** An Introduction to Mechanical Engineering - the VitalSource e-book is provided via the APUS Bookstore. Hard copy not available from the APUS Bookstore, please try other sources.

**Author:** Wickert

**Publication Info:** Cengage

**ISBN:** 9781111576806

**Book Title:** You must validate your cart to get access to your VitalSource e-book(s). If needed, instructions are available here - <http://apus.libguides.com/bookstore/undergraduate>

**Author:** N/A

**Publication Info:** N/A

**ISBN:** N/A

---

## **Websites**

**Site Name-** Book Website

**Website URL/Address-** [Introduction to Mechanical Engineering\\_website](#)

**[BSEE Course Materials List](#) (Not Covered by Undergraduate Book Grant)**

---

## **Course Guidelines**

### **Citation and Reference Style**

- Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

### **Tutoring**

- [Tutor.com](#) offers online homework help and learning resources by connecting students to certified tutors for one-on-one help. AMU and APU students are eligible for 10 free hours\* of tutoring provided by APUS. Tutors are available 24/7 unless otherwise noted. Tutor.com also has a SkillCenter Resource Library offering educational resources, worksheets, videos, websites and career help. Accessing these resources does not count against tutoring hours and is also available 24/7. Please visit the APUS Library and search for 'Tutor' to create an account.

### **Late Assignments**

- Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. The due date for each assignment is listed under each Assignment.
- Generally speaking, late work may result in a deduction up to 15% of the grade for each day late, not to exceed 5 days.
- As a working adult I know your time is limited and often out of your control. Faculty may be more flexible if they know ahead of time of any potential late assignments.

### **Turn It In**

- Faculty may require assignments be submitted to Turnitin.com. Turnitin.com will analyze a paper and report instances of potential plagiarism for the student to edit before submitting it for a grade. In some cases professors may require students to use Turnitin.com. This is automatically processed through the Assignments area of the course.

### **Academic Dishonesty**

- Academic Dishonesty incorporates more than plagiarism, which is using the work of others without citation. Academic dishonesty includes any use of content purchased or retrieved from web services such as CourseHero.com. Additionally, allowing your work to be placed on such web services is academic dishonesty, as it is enabling the dishonesty of others. The copy and pasting of content from any web page, without citation as a direct quote, is academic dishonesty. When in doubt, do not copy/paste, and always cite.

### **Submission Guidelines**



- Some assignments may have very specific requirements for formatting (such as font, margins, etc) and submission file type (such as .docx, .pdf, etc) See the assignment instructions for details. In general, standard file types such as those associated with Microsoft Office are preferred, unless otherwise specified.

## **Disclaimer Statement**

- Course content may vary from the outline to meet the needs of this particular group.

## **Communicating on the Forum**

- Forums are the heart of the interaction in this course. The more engaged and lively the exchanges, the more interesting and fun the course will be. Only substantive comments will receive credit. Although there is a final posting time after which the instructor will grade comments, it is not sufficient to wait until the last day to contribute your comments/questions on the forum. The purpose of the forums is to actively participate in an on-going discussion about the assigned content.
- “Substantive” means comments that contribute something new and hopefully important to the discussion. Thus a message that simply says “I agree” is not substantive. A substantive comment contributes a new idea or perspective, a good follow-up question to a point made, offers a response to a question, provides an example or illustration of a key point, points out an inconsistency in an argument, etc.
- As a class, if we run into conflicting view points, we must respect each individual's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

## **Identity Verification & Live Proctoring**

- Faculty may require students to provide proof of identity when submitting assignments or completing assessments in this course. Verification may be in the form of a photograph and/or video of the student's face together with a valid photo ID, depending on the assignment format.
- Faculty may require live proctoring when completing assessments in this course. Proctoring may include identity verification and continuous monitoring of the student by webcam and microphone during testing.

---

## **University Policies**

### [Student Handbook](#)

- [Drop/Withdrawal policy](#)
- [Extension Requests](#)
- [Academic Probation](#)
- [Appeals](#)
- [Disability Accommodations](#)

The mission of American Public University System is to provide high quality higher education with emphasis on educating the nation's military and public service communities by offering respected, relevant, accessible, affordable, and student-focused online programs that prepare students for service and leadership in a diverse, global society.

**STUDENT WARNING:** This course syllabus is from a previous semester archive and serves only as a preparatory reference. Please use this syllabus as a reference only until the professor opens the classroom and you have access to the updated course syllabus. Please do NOT purchase any books or start any work based on this syllabus; this syllabus may NOT be the one that your individual instructor uses for a course that has not yet started. If you need to verify course textbooks, please refer to the online course description through your student portal. This syllabus is proprietary material of APUS.