

## COURSE INFORMATION

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Instructor: Yawo Ezunkpe, PhD  
Class Days: Tuesday & Thursday  
Class Times: 4:30 PM – 7:15 PM  
Class Location: S-42

Email: [ezunkpeyawo@fhda.edu](mailto:ezunkpeyawo@fhda.edu)  
Office Hours Times: Thurs. 3:30 – 4:30 pm  
Office Hours Location: S 42

## ABOUT ENGR 35

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This is the first course that serves as a prerequisite for Solid Mechanics, Mechanics of Material in UC and CSU systems and serves as a solid foundation for structural, Civil, Aerospace, and Mechanical engineering students. It meets the general education, CSU, IGETC, and TAG requirements.

## COURSE OVERVIEW

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**Catalog entry:** Force systems, equilibrium, structures, distributed forces, friction, virtual work, moments of inertia, vector algebra.

**Course description** This course is an analysis of forces on engineering structures in equilibrium. Properties of forces, moments, couples, vector mathematics, friction, distributed forces, centroids, moments of inertia, shear and bending diagrams, virtual work. Introduction to mathematical models and computer simulations. Students will design and construct a model of a space truss.

## COURSE PREREQUISITES

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The course prerequisites are Engineering 10, MATH 1B, and PHYS 4A with a grade of C or better in each course.

## STUDENT LEARNING OUTCOMES

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At the end of the course, students will be able to:

1. Represent physical quantities using vector notation, compute the magnitude and direction of a vector, add vector quantities, and resolve vectors into components.
2. Compute moments caused by planar and 3-D forces acting on rigid bodies.
3. Compute equivalent forces and couples that can replace the given system of loading.
4. Draw a correct and complete free-body diagram (FBD) of forces and moments acting on a structure.
5. Compute support reactions of planar and 3D structures under static loading.
6. Analyze truss structures using the method of joints and the method of sections.

7. Calculate the internal forces in frame structures and mechanisms.
8. Compute and sketch shear and bending moment distribution diagrams for beams.
9. Calculate static equilibrium conditions for rigid bodies with friction forces included.
10. Calculate the centroid and the moment of inertia of lines, areas, and 3D objects using integrations (for continuum shapes) and summation methods (composite shapes).

#### COURSE MATERIALS

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**TEXTBOOKS:** The following materials are required or strongly recommended.

- Engineering Mechanics: Statics, Hibbeler, 15th Edition: ISBN-978-0134814971
- Vector Mechanics for Engineers: Statics, F. Beer and E.R. Johnston, 12th edition: ISBN-13 978-1259977268

#### COURSE STRUCTURE AND CONDUCT

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There will be two lectures per week, two mid-term exams, and a comprehensive final exam. The TENTATIVE lecture schedule for Spring 2024 is shown below:

Lesson	Date	Topic/ Reading	Assignments Due
1	April 09 April 11	Course Info., Fundamental Concepts Force in 2–D, Force in 3–D	Ch. 01 2.1 – 2.3, 2.4 – 2.6
2	April 16 April 18	Position vectors, Force along a line, dot product 2- D particle Equilibrium	2.7 – 2.9 3.1–3.3
3	April 23 April 25	3- D particle Equilibrium Moment of a Force	3.4 Ch 4.1– 4.4
4	April 30 May 02	Moment of a force about an axis Couples	4.5 4.6
5	May 08 May 10	Equivalent force-couple systems Midterm Exam 1	4.7–4.8
6	May 14 May 16	Distributed Load- Area and Lines Distributed load - Volume	4.9
7	May 21 May 23	Rigid Body Equilibrium Rigid Body Equilibrium	Ch 5.1 – 5.4 5.4 – 5.7
8	May 28 May 30	Structural Analysis: Trusses 1 Structural Analysis: Trusses 2	Ch. 6.1 – 6.3 6.4
9	June 04 June 06	Frames & Machines Shear and Moment Diagrams	6.6 Ch. 7.1 – 7.2
10	June 11 June 13	Midterm Exam 2 Center of Gravity, Center of mass, & Centroid of the body	9.2 – 9.5
11	June 18 June 20	Moment of Inertia Moment of Inertia	10.1–10.2 10.3–10.4
12	June 25 June 27	Final Week – Final Exams Final Week–Final Exams	

## COURSE REQUIREMENTS AND ASSIGNMENTS

### Homework and Lab

*Individual and/ or group assignments. Note that homework and Lab activities will be assigned to allow students to prepare for in-class activities and quizzes. Some of the assignments may not be graded; however, they must be turned in and show enough effort to receive a grade in the related. Homework and Lab assignments must be submitted by the due date. Works delivered after the due date will not be accepted. **Note: no late work (homework or Lab) will be accepted unless a written verification of a valid excuse (such as hospitalization, family emergency, religious observance, court appearance, etc.) is provided***

### Group Problem Solving (GPS) /Workouts

*GPS are group efforts that will tentatively be held weekly in the classroom (exact times of the workouts may vary during lectures), for a total of approximately 5 group assignments during the semester. Assigned problems will be solved during class time by groups of 3 to 4 students and must be turned in at the end of the meeting unless differently specified by the instructor. If not typed, the assignment should be hand-written, and, in any case, it must include all the pertinent information (assumptions, explanation of steps, equations, etc.). Trying to answer questions (even if you're unsuccessful) will help with your recall of material and understanding of the course, and that will help with the quizzes and final exams. Everyone in a group will receive the same grade as the group, provided that the student submitted the homework assignment related to the workout.*

#### Policies:

- You are expected to attend each meeting of the class for which you are registered, except when absence cannot be prevented for reasons beyond your control. Therefore, regular attendance and class participation are vital in this class. Your presence will be counted not only by taking roll, but also by your regular contributions/participation in academically related activities for this course (activities including, but not limited to, submitting an assignment, taking a quiz, and working in a group). You will be considered absent if there is no evidence of your participation in the academic activities of this course.
- Assignments for this course should be completed and submitted on time so that we all move through the class together. Sometimes, though, life gets in the way of learning. In unexpected situations leading to late work, please contact me to discuss a plan for success.
- During the workout, students will be divided into groups of 3 to 4 members. The instructor will answer questions, provide guidance, and help the groups if needed. The instructor may temporarily stop all the groups to provide explanations to the whole class if needed.

#### Quizzes

There will be a few quizzes, a total of Two (2) midterm exams, and One Comprehensive Final. All the quizzes and Exams are CLOSED-BOOK and CLOSED-NOTE unless instructed otherwise by the instructor. Midterm exams (the dates shown on this syllabus are tentative). The final exam will be in the week of June 24-27 (Date and Time TBA). The final exam will be CUMULATIVE and will be in class. **Note: neither rescheduled nor make-up exams will be allowed unless a written verification of a valid excuse (such as hospitalization, family emergency, religious observance, court appearance, etc.) is provided**

#### Policies:

- *Specific rules for the quiz will be communicated in class and posted on Canvas on the day of the announcement.*
- *You should bring to each examination a calculator that works and one in which the batteries will not go dead during the examination (the instructors do not bring extra calculators to the examinations), pencil(s), eraser, and a straight edge for help when drawing diagrams.*
- *In case of absence, a make-up exam may be granted at the instructor's discretion only in these cases: - the absence is justified by a letter signed by a medical doctor in case of illness; - the absence is justified by a signed supervisor's statement, in case of work duties.*

#### **Project**

This is a group effort. Teams of 3 to 4 students will pick or be assigned open-ended design problems in Statics.

All groups must submit:

- A final written report due on the last day of class must include:
  - A clear and thorough description of all the steps taken towards the solution.
  - Plots and graphs must be commented on and well-presented with appropriate labels.
  - A clear conclusion or recommendation
- A presentation of the work (dates and times TBD).

Everyone in a group will receive the same grade as the group.

#### Policies:

- *Projects must be typed following one of the professional Engineering report formats (AIAA, IEEE, ASME, etc..).*
- *Each member of the group must provide one page describing the work accomplished by him/her throughout the semester. Failure to do so will result in a zero in the project for that member.*
- *No late assignments will be accepted unless documentation of a compelling reason for not being able to complete the work in time is provided.*

The final score out of 100 % calculated and a letter grade will be assigned as follows:

Quizzes	15
Homework	15
Workouts	10
Midterm 1	15
Midterm 2	15
Project	10
Final Exam	20

A+	95+
A	90 to 95-
A-	85 to 90-
B+	82 to 85-
B	77 to 82-
B-	73 to 77-
C	70 to 73-
C-	60 to 70-
D	55 to 60-
F	55-

Note: *Final grades will not be adjusted for overall class performance.*

#### ACADEMIC POLICIES

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De Anza College adheres to a strict set of rules and codes of conduct put together as [De Anza College policies](#). It is your responsibility to know the following policies for this class. These policies are part of the syllabus and will be strictly enforced. By enrolling in this course, you as the student agree to accept these policies and to follow them and agree that the instructor reserves the right to drop a student from the course with a **W** if any of the policies are violated. Further action may also be taken against a student who violates specific policies, such as the policy on cheating.

Examples of plagiarism include but are not limited to:

- Using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs, and/or pages of work)
- Copying and pasting work from an online or offline source directly and calling it your own
- Using information, you find from an online or offline source without giving the author credit.

#### TECHNICAL SUPPORT SERVICES

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De Anza Technical resources can be found on the Student Tech support [link](#). It provides student support for Canvas, etc. ...

#### INTERACTING WITH THE INSTRUCTOR

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The instructor will have office hours throughout the quarter. Please use this time to talk with your instructor in person regarding any questions, concerns, and suggestions you might have. If you need to talk, but cannot make it to office hours, please email your instructor to schedule a meeting time. Queries submitted via email may or may not receive a timely response based on the severity of the issue, the brevity of the response required, and the ease of finding the answer elsewhere (such as by consulting the course syllabus). Please make sure your emails to the instructor follow the proper protocol of formal communication to elicit a response. The instructor will go over this protocol (format) in class on the first day.

#### STUDENTS WITH DISABILITIES

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If you are a student with a disability and believe you will need accommodation for this class, it is your responsibility to contact Disability Support Programs and Services (DSPS) at (408) 430-7681. You can also learn more about the services by visiting the [Disability Support Programs and Services](#).

To avoid any delay in the receipt of your accommodation, you should contact DSPS as soon as possible. Please note that accommodation is not retroactive, and that accommodation based on disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.

#### STUDENT SERVICES

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A complete list of all academic support services is available on the [Academic Success](#) section of the DeAnza Students Success Center website.

#### ***Important information:***

- Any type of disruption committed during the lecture is not allowed and disruptions will not be tolerated. Disruptions include but are not limited to Talking during lectures; leaving the classroom during lectures; and entering the classroom late in a way that disrupts the class. Disruptions such as these interfere with other students' ability to listen and learn. If you cause any disruptions during class, you will receive a warning both verbally and via email. If you cause a second disruption, you will receive a second and final warning. If you cause 3 disruptions during the quarter, you will be dropped from the course. Please be mindful of this rule. It is contained in writing in this syllabus and fully enforceable phones anywhere in evidence during an exam will be considered primary evidence of cheating. You will be given a zero on your exam and invited to leave the classroom.
- Tests and quizzes are usually given at the end of class and must be completed by the time class time expires. You will receive a two-minute warning before your time is fully up. When class time has expired, you must put down your pencil or pen and stop writing immediately. If you do not stop writing immediately, your test or quiz may not be collected, and you may receive a grade of ZERO.
- Cell phone usage of any kind is not allowed during tests and quizzes. If your phone rings during a test, 5 points will be deducted from your score, so make sure your phone is turned off.
- Once a test and quiz has been handed out, or during the time a test or quiz is being handed out,

**any kind** of cell phone or other electronic device usage is not allowed, especially the taking of pictures. Students are required to turn off all electronic devices before any tests, quizzes, or final exams are given and to not have their cell phones or electronic devices in their laps. The instructor will walk around the room and closely observe students to make sure this rule is being followed. Please do not let this bother you. If the instructor observes a student placing his or her hands beneath his or her desk for an extended period, the instructor may ask that student to stand up or move to another desk. **If a student is observed with a cell phone turned on in his or her hands, lap, or other easily accessible place after the student has received his or her test, that student will be considered cheating and will receive a ZRO on that test, quiz, or final exam.**

**Student Learning Outcome(s):**

- Analyze two- and three-dimensional force systems on rigid bodies in static equilibrium using vector and scalar analysis methods.

**Office Hours:**

TH    03:30 PM    04:30 PM    In-Person