

# ENGI-241: ENGINEERING MECHANICS: STATICS

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Engineering Courses Updates Fall 2023

Course

- ENGI-110: Introduction to Engineering
- ENGI-241: Engineering Mechanics: Statics
- ENGI-242: Circuits 1

**Effective Term**

Fall 2024

**CC Approval**

10/06/2023

**AS Approval**

10/10/2023

**BOT Approval**

10/19/2023

**COCI Approval**

3/05/2024

**SECTION A - Course Data Elements**

**CB04 Credit Status**

Credit - Degree Applicable

**Discipline**

Minimum Qualifications	And/Or
Engineering (Master's Degree)	

**Subject Code**

ENGI - Engineering

**Course Number**

241

**Department**

Engineering (ENGI)

**Division**

Science and Engineering (SE)

**Full Course Title**

Engineering Mechanics: Statics

**Short Title**

Engineering Mechanics: Statics

**CB03 TOP Code**

0901.00 - Engineering, General (requires Calculus) (Transfer)

**CB08 Basic Skills Status**

NBS - Not Basic Skills

**CB09 SAM Code**

E - Non-Occupational

**Rationale**

Last update was more than 6 years ago.

## SECTION B - Course Description

### Catalog Course Description

This course is a study of rigid bodies in static equilibrium when acted upon by forces and couples in two-dimensional and three-dimensional space. Topics include analysis of equilibrium of rigid bodies, trusses, frames, and machines, as well as the calculation of centers of mass, centroids, friction, distributed forces, beams, shear and moment diagrams, and moments of inertia.

## SECTION C - Conditions on Enrollment

### Open Entry/Open Exit

No

### Repeatability

Not Repeatable

### Grading Options

Letter Grade Only

### Allow Audit

Yes

## Requisites

### Prerequisite(s)

Completion of MATH-121 and PHYS-140 with a minimum grade of C.

## Requisite Justification

### Requisite Description

Course Not in a Sequence

### Subject

PHYS

### Course #

140

### Level of Scrutiny

Required by 4-Year Institution

### Explanation

Calculus-Based Physics for Scientists and Engineers: A (C-ID PHYS 205) listed as a required prerequisite on the C-ID descriptor for Statics (C-ID ENGI 130)

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### Requisite Description

Course Not in a Sequence

### Subject

MATH

### Course #

121

### Level of Scrutiny

Required by 4-Year Institution

### Explanation

Single Variable Calculus II – Early Transcendentals (C-ID MATH 220) listed as a required prerequisite on the C-ID descriptor for Statics (C-ID ENGI 130)

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## SECTION D - Course Standards

Is this course variable unit?

No

Units

3.00000

Lecture Hours

36.00

Lab Hours

54.00

Outside of Class Hours

72

Total Contact Hours

90

Total Student Hours

162

## Distance Education Approval

Is this course offered through Distance Education?

Yes

Online Delivery Methods

DE Modalities	Permanent or Emergency Only?
Entirely Online	Permanent
Hybrid	Permanent
Online with Proctored Exams	Permanent

## SECTION E - Course Content

Student Learning Outcomes

Upon satisfactory completion of the course, students will be able to:	
1.	Demonstrate knowledge and understanding of the equilibrium of rigid bodies, centroids, centers of gravity, and forces on submerged surfaces.
2.	Solve two- and three-dimensional engineering problems using vector mechanics, discuss results both qualitatively and quantitatively, and explain design applications and limitations.
3.	Demonstrate knowledge and understanding in analyzing trusses, frames, and beams, including shear and moment diagrams and friction.

Course Objectives

Upon satisfactory completion of the course, students will be able to:	
1.	Solve two-and-three-dimensional engineering problems involving equilibrium conditions using vector mechanics.
2.	Analyze design problems requiring absolute values of loads on compound bodies, machines, trusses and other structures.
3.	Resolve centroids and centers of gravity.
4.	Solve problems in hydrostatics and related fields.
5.	Resolve shearing and bending movements in beams and related structures.
6.	Explain physical principles involved in bending, torquing.
7.	Set up and solve problems involving friction.

**Course Content**

1. Statics of Particles
  - a. Forces in a Plane
  - b. Forces in Space
2. Rigid Bodies: Equivalent Systems of Forces
3. Equilibrium of Rigid Bodies
  - a. Equilibrium in Two Dimensions
  - b. Equilibrium in Three Dimensions
4. Distributed Forces: Centroids and Centers of Gravity
  - a. Areas and Lines
  - b. Volumes
5. Analysis of Structures
  - a. Trusses
  - b. Frames and Machines
6. Forces in Beams
7. Friction

**Methods of Instruction****Methods of Instruction**

Types	Examples of learning activities
Lab	Lab Experiments: 2-D and 3-D Force Systems, Structural Analysis, Shear Force and Bending Moment Diagrams, Friction
Lecture	Presentation of course material
Observation and Demonstration	Demonstrations using simulations
Discussion	Problem Solving Techniques, Statics vs Dynamics

**Instructor-Initiated Online Contact Types**

Announcements/Bulletin Boards  
 Chat Rooms  
 Discussion Boards  
 E-mail Communication  
 Video or Teleconferencing

**Student-Initiated Online Contact Types**

Chat Rooms  
 Discussions  
 Group Work

**Course design is accessible**

Yes

**Methods of Evaluation****Methods of Evaluation**

Types	Examples of classroom assessments
Exams/Tests	Multiple Choice Questions, Conceptual Questions, and Numerical Problems Final Exam -- Multiple Choice Questions, Conceptual Questions, and Numerical Problems
Projects	Structures in the Real World, Applications of Statics
Homework	Textbook problems, Problems from handouts
Lab Activities	Pre-labs, Execution of labs, Lab Reports

**Assignments****Reading Assignments**

Sample Reading Assignment

1: Read Section 7.1 - Internal Forces Developed in Structural Members Sample Reading Assignment

2: Read Section 8.4 - Frictional Forces on Screws

### Writing Assignments

Complete Laboratory Reports, Responses and Reflection to Applications of Statics

### Other Assignments

Homework Problems

Sample Problem 1: Two particles have a mass of 8 kg and 12 kg, respectively. If they are 800 mm apart, determine the force of gravity acting between them. Compare this result with the weight of each particle.

Sample Problem 2: A chain is suspended between points at the same elevation and spaced a distance of 60 ft apart. If it has a weight per unit length of 0.5 lb/ft and the sag is 3 ft, determine the maximum tension in the chain.

## SECTION F - Textbooks and Instructional Materials

### Material Type

Textbook

### Author

R.C. Hibbeler

### Title

Engineering Mechanics Statics

### Edition/Version

15th

### Publisher

Pearson

### Year

2022

### ISBN #

9780134814971

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### Material Type

Textbook

### Author

Michael Plesha, Gary Gray, Robert J. Witt, and Francesco Costanzo

### Title

Engineering Mechanics: Statics

### Edition/Version

3rd

### Publisher

McGraw Hill

### Year

2023

### ISBN #

9781264975532

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## Proposed General Education/Transfer Agreement

Do you wish to propose this course for a UC Transferable Course Agreement (UC-TCA)?

Yes

### Course Codes (Admin Only)

**ASSIST Update**

No

**C-ID Approval Dates**

C-ID Descriptor	Approval Date
Expired C-ID ENGR 130 approval. Resubmission required.	

**CB00 State ID**

CCC000310891

**CB10 Cooperative Work Experience Status**

N - Is Not Part of a Cooperative Work Experience Education Program

**CB11 Course Classification Status**

Y - Credit Course

**CB13 Special Class Status**

N - The Course is Not an Approved Special Class

**CB23 Funding Agency Category**

Y - Not Applicable (Funding Not Used)

**CB24 Program Course Status**

Program Applicable

**Allow Pass/No Pass**

No

**Only Pass/No Pass**

No

**Reviewer Comments**

**Stacey Howard (showard) (Thu, 28 Sep 2023 17:52:53 GMT):** Added anticipated Fall 2023 effective date as no rearticulation required.

**Stacey Howard (showard) (Thu, 28 Sep 2023 18:25:31 GMT):** Selected anticipated fall 2023 begin date as no rearticulation required for existing CSU/UC transferability. No matching C-ID descriptor currently.

**Stacey Howard (showard) (Thu, 28 Sep 2023 18:26:38 GMT):** Correction on last comment: Anticipated fall 2024 implementation.

**Stacey Howard (showard) (Thu, 28 Sep 2023 18:45:37 GMT):** ENGI 160 - Anticipated Fall 2024 begin date of COR update ok as no rearticulation for CSU/UC transferability required. Changed term from fall 2025 to 2024. Please add "group" to term or final project. Highly recommended to add this as UC Davis will not articulate this course for any applicable major agreement in ASSIST without inclusion of a group term project. Thank you!

**Stacey Howard (showard) (Thu, 28 Sep 2023 19:21:38 GMT):** ENGR 242 - Suggestion addition of Differential Equations (C-ID MATH 240) as co-requisite. Previous C-ID denial due to missing co-req as per C-ID ENGR 260 descriptor and reviewer.

**Stacey Howard (showard) (Thu, 28 Sep 2023 19:58:57 GMT):** ENGI 240 - Anticipated fall 2024 implementation ok as CSU/UC rearticulation is not required.

**Stacey Howard (showard) (Thu, 28 Sep 2023 20:10:50 GMT):** ENGR 241 - Anticipated begin date of fall 2024 ok as CSU/UC rearticulation not required. C-ID ENGR 130 submission expired. Resubmission required.