

Basic Course Information

Semester:	Fall 2023	Instructor Name:	Octavio Ortiz
Course Title & #:	ENGR 210	Email:	octavio.ortiz@imperial.edu
CRN #:	10603	Webpage (optional):	Canvas Course
Classroom:	2721	Office #:	2767.1
Class Dates:	8/14 – 12/9	Office Hours:	Faculty Schedule
Class Days:	T/R	Office Phone #:	760-355-5706
Class Times:	9:40 – 11:05 PM	Emergency Contact:	Silvia Murray
Units:	3	Class Format:	In-Person

Course Description

A first course in engineering mechanics: properties of forces, moments, couples and resultants; two-and three-dimensional force systems acting on engineering structures in equilibrium; analysis of trusses and beams; distributed forces, shear and bending moment diagrams, center of gravity, centroids, friction, and area and mass moments of inertia. Optional topics include Fluid statics, cables, Mohr's circle and virtual work. (CSU/UC)

Course Prerequisite(s) and/or Corequisite(s)

PHYS 200 and MATH 194 with a grade of "C" or better, or concurrent enrollment in MATH 194.

Student Learning Outcomes

Upon course completion, the successful student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:

1. Solve problems involving statics of particles. (ILO2)
2. Understand and perform calculations using vector algebra. (ILO2)
3. Solve problems involving moments of inertia. (ILO2)
4. Demonstrate problem solving strategies by identifying an appropriate method to solve a given problem, correctly set up the problem, perform the appropriate analysis and computation, and share their interpretation of the conclusion or the outcome, using correct grammar or in an oral presentation. This outcome will be assessed through selected exercises on exams throughout the semester. (ILO1, ILO2)

Course Objectives

Upon satisfactory completion of the course, students will be able to:

1. A significant introduction to the formulation and solution to engineering problems. To effectively communicate legible problem solutions to be understood by engineers in and out of their specific discipline.
2. Determine the forces that act on rigid bodies including external forces, weight, normal, distributed loads, friction and reactions at supports.
3. Calculate internal forces in members and create shear and bending moment diagrams for beams.
4. Perform vector analysis methods addressing forces acting on rigid bodies, trusses, frames, and machines.
5. Analyze two-and three dimensional force systems on rigid bodies and static equilibrium.

Textbooks & Other Resources or Links

Engineering Mechanics: Dynamics (w/out Mastering Access)

Author: Hibbeler

Edition: 14th

ISBN: 978-0133915389

Copyright Year: 2016

Publisher: Pearson Prentice Hall

Course Requirements and Instructional Methods

Students will be exposed to various instructional methods. In person lectures will introduce students to fundamental engineering concepts in Statics. Students will then apply what they learn in lectures to problems selected from the textbook. Guidance and modeling will be provided during the face-to-face component of the course.

Homework assignments will consist of an adequate number of applied problems selected from the textbook. Solving the homework problems will help students develop the problem solving and critical thinking skills that they will need for the chapter tests and the final exam.

The chapter tests will be focused on the content covered in a particular chapter(s). Questions will consist of multiple choice, true/false and short answer to assess conceptual and theoretical understanding. In addition, a few problems will be similar to the ones on the lecture notes and the homework assignments. The final exam will be comprehensive, with more emphasis placed on chapters 4-11.

Course Grading Based on Course Objectives

ASSIGNMENT	POINTS
Homework Assignments	10%
Approximately 10-12 homework assignments	
Tests	60%
Four chapter tests (15% each)	
Final Exam	30%
Comprehensive final exam 12/7/23	
Total	100%

Score	Letter Grade
≥ 90%	A
≥ 80%	B
≥ 70%	C
≥ 60%	D
< 60%	F

Course Policies

Attendance:

Attendance is mandatory. Students are expected to attend every class meeting. Lectures will preview homework assignments, and future assessments.

- Although attendance is not explicitly factored into your grade, failing to complete homework assignments and assessments due to absences will negatively impact your grade.
- Students with excessive absences will be dropped from the course as outlined in AP 5075.

Late Submissions:

Homework assignments are to be completed and submitted by the due date stated on Canvas. Late homework assignments will be accepted and penalized as follows:

- 90% maximum score if submitted within 24 hours past due date
- 80% maximum score if submitted within 48 hours past due date
- 70% maximum score if submitted within 72 hours past due date
- 50% maximum score if more than three days and less than a week past due date
- No credit will be given to assignments that submitted past the hard deadline (see calendar)

Exams and the final exam will NOT be accepted late.

Make-up Assignments:

There are no make-up assignments.

- Homework assignments and exams cannot be made up, however, if the material is presented again in future applications or exams, then the failed assessment will be reevaluated.

Drop Policy

The instructor reserves the right to drop students who fail to attend the first-class session or fail to complete the first assignment by the assigned due date.

IVC Student Resources

IVC wants you to be successful in all aspects of your education. For help, resources, services, and an explanation of policies, visit <http://www.imperial.edu/studentresources> or click the heart icon in Canvas.

Anticipated Class Schedule/Calendar

The semester calendar is meant to provide an overview of the topics that will be covered throughout the semester. Every effort will be made to adhere to the calendar; however, changes might be necessary.

Week	Date	Topic	Assignment
Week 1	8/15	<ul style="list-style-type: none"> • General Principles (Ch. 1) <ul style="list-style-type: none"> ○ Point-mass, Newton's Laws, Units, Right-triangle Trig 	
	8/17	<ul style="list-style-type: none"> • Force Vectors (Ch.2) <ul style="list-style-type: none"> ○ Scalar & Vector Quantities, Vector Decomposition, Resultant Forces 	
Week 2	8/22	<ul style="list-style-type: none"> • Equilibrium of a Particle (Ch.3) <ul style="list-style-type: none"> ○ Free body diagram, $\sum F = 0$ 	
	8/24	<ul style="list-style-type: none"> • Equilibrium of a Particle (Ch.3) <ul style="list-style-type: none"> ○ Springs ($F = ks$), cables & pulleys, 2D & 3D Force Systems 	
Week 3	8/29	<ul style="list-style-type: none"> • Equilibrium of a Particle (Ch.3) <ul style="list-style-type: none"> ○ Review 	
	8/31	<ul style="list-style-type: none"> • Test: Chapters 1-3 	
Week 4	9/5	<ul style="list-style-type: none"> • Force System Resultants (Ch.4) • Moments/Torque, moment arm, $M_0 = Fd$, Moment of a Couple, F_R for distributed loads 	
	9/7	<ul style="list-style-type: none"> • Force System Resultants (Ch.4) <ul style="list-style-type: none"> ○ Simplifying distributed loadings 	
Week 5	9/12	<ul style="list-style-type: none"> • Equilibrium of a Rigid Body (Ch. 5) <ul style="list-style-type: none"> ○ Free-Body diagrams (rigid body), Equilibrium of a rigid body, Equations of equilibrium 	
	9/14	<ul style="list-style-type: none"> • Equilibrium of a Rigid Body (Ch. 5) <ul style="list-style-type: none"> ○ $\sum F = 0$, $\sum M_O = 0$, Support reactions (Table 5-1), Equilibrium in three dimensions 	
Week 6	9/19	<ul style="list-style-type: none"> • Equilibrium of a Rigid Body (Ch. 5) <ul style="list-style-type: none"> ○ Review 	
	9/21	<ul style="list-style-type: none"> • Test: Chapter 5 	
Week 7	9/26	<ul style="list-style-type: none"> • Structural Analysis (Ch.6) <ul style="list-style-type: none"> ○ Method of Sections, Zero-Force members 	
	9/28	<ul style="list-style-type: none"> • Structural Analysis (Ch.6) <ul style="list-style-type: none"> ○ Frames & machines 	
Week 8	10/3	<ul style="list-style-type: none"> • Internal Forces (Ch. 7) 	
	10/5	Shear force & bending moment diagrams <ul style="list-style-type: none"> • Internal Forces (Ch. 7) Cables	
Week 9	10/10	<ul style="list-style-type: none"> • Structural Analysis & Internal Forces (Ch. 6 & Ch. 7) <ul style="list-style-type: none"> ○ Review 	
	10/12	<ul style="list-style-type: none"> • Test: Chapters 6 & 7 	
Week 10	10/17	<ul style="list-style-type: none"> • Friction (Ch. 8) 	

Week	Date	Topic	Assignment
		<ul style="list-style-type: none"> ○ Limiting static frictional force, $F_s = \mu_s N$ (impending motion), Angle of static friction 	
	10/19	<ul style="list-style-type: none"> ● Friction (Ch. 8) <ul style="list-style-type: none"> ○ Equilibrium of systems with dry friction, Wedges 	
Week 11	10/24	<ul style="list-style-type: none"> ● Friction (Ch. 8) <ul style="list-style-type: none"> ○ Review 	
	10/26	<ul style="list-style-type: none"> ● Test: Chapter 8 	
Week 12	10/31	<ul style="list-style-type: none"> ● Center of Gravity and Centroid (Ch. 9) <ul style="list-style-type: none"> ○ Center of gravity/center of mass/centroid, Centroid of an area, Centroid of a line segment 	
	11/2	<ul style="list-style-type: none"> ● Center of Gravity and Centroid (Ch. 9) <ul style="list-style-type: none"> ○ Centroid of composite figures, Theorems of Pappus & Guldinus 	
Week 13	11/7	<ul style="list-style-type: none"> ● Center of Gravity and Centroid (Ch. 9) <ul style="list-style-type: none"> ○ Review 	
	11/9	<ul style="list-style-type: none"> ● Moments of Inertia (Ch. 10) <ul style="list-style-type: none"> ○ Inertia, Definition of moment of inertia, Parallel-axis theorem, Radius of Gyration 	
Week 14	11/14	<ul style="list-style-type: none"> ● Moments of Inertia (Ch. 10) <ul style="list-style-type: none"> ○ Composite areas & moments of inertia, Mass moment of inertia 	
	11/16	<ul style="list-style-type: none"> ● Moments of Inertia (Ch. 10) <ul style="list-style-type: none"> ○ Review 	
Thanksgiving Break			
Week 15	11/28	<ul style="list-style-type: none"> ● Virtual Work (Ch. 11) <ul style="list-style-type: none"> ○ Principle of virtual work 	
	11/30	<ul style="list-style-type: none"> ● Virtual Work (Ch. 11) <ul style="list-style-type: none"> ● Gravitation and elastic potential energy 	
Week 16	12/5	<ul style="list-style-type: none"> ● Virtual Work (Ch. 11) <ul style="list-style-type: none"> ● Review 	
	12/7	<ul style="list-style-type: none"> ● Comprehensive Final Exam 	

Subject to change without prior notice



IMPERIAL VALLEY COLLEGE

OCTAVIO ORTIZ
IVC Instructor's Schedule of Classes and Office Hours
Science, Math and Engineering Department
Fall 2023

	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1PM	2:00 PM	3:00 PM	4:00 PM	
M	COURSE	CS 221			ENGR 100			Office Hour Online - Zoom 1:30 - 2:30 PM			
	CRN	LEC/LAB 10521			LEC/LAB 10929						
	LEC/LAB	7:30 - 10:00 AM			10:15 - 12:45 PM						
	FACULTY	RM #2724			RM #3119						
T	COURSE	Office Hour In-Person 8:30 - 9:30 AM RM #2767	ENGR 210		CS 281			CS 221 - Hybrid Lab/Lec 10962 2:40 - 4:05 PM Online - RM #3109			
	CRN		LEC 10603		LEC/LAB 10522						
	LEC/LAB		9:40 - 11:05 AM		11:30 - 2:10 PM						
	FACULTY		RM #2721		RM #3109						
W	COURSE	CS 221			ENGR 100			Office Hour Online - Zoom 1:30 - 2:30 PM			
	CRN	LEC/LAB 10521			LEC/LAB 10929						
	LEC/LAB	7:30 - 10:00 AM			10:15 - 12:45 PM						
	FACULTY	RM #2724			RM #3119						
R	COURSE	Office Hour In-Person 8:30 - 9:30 AM RM #2767	ENGR 210		CS 281			CS 221 - Hybrid Lab/Lec 10962 2:40 - 4:05 PM Online - RM #3109			
	CRN		LEC 10603		LEC/LAB 10522						
	LEC/LAB		9:40 - 11:05 AM		11:30 - 2:10 PM						
	FACULTY		RM #2721		RM #3109						
F	COURSE										
	CRN										
	LEC/LAB										
	FACULTY										

Course No	Sections	Lec Hrs	Lab Hrs
CS 221	2	4	6
CS 281	1	2	3
ENGR 100	1	2	3
ENGR 210	1	3	0
Total		11	12

Instructor's Name	Octavio Ortiz
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