COURSE SYLLABUS STEM Ed Abroad Program

Course Title: Engineering Statics

Course Semester: Fall

University and Country: Adam Mickiewicz University; Poznan, Poland

Number of ECTS: 6 (lecture)

For transfer credit to: MAE206 (NCSU)

Content: Basic concepts of forces and moments in equilibrium. Distributed forces, friction forces, moments of inertia, and fluid statics. Applications to structures and systems including frames, machines, and trusses.

Pre-requisites: Calculus II and Physics I. Calculus III is a co-requisite. Credit will not be given for both this course and similar Statics courses in Industrial Engineering.

Aims: The student will be able to

1. Model physical systems using free body diagrams;
2. Write the equations for static equilibrium for particles, rigid bodies, and systems (trusses, frames and machines);
3. Model correct reaction forces and moments and solve the equations of equilibrium for them;
4. Account for friction and fluid pressure loads in equilibrium problems;
5. Calculate and graph internal forces and moments;
6. Calculate centroids and moments of inertia using integration or composite body methods;
7. Determine equivalency for systems of loads.

Topics Covered: (numbers in parentheses indicate number of 50-minute class periods on each topic) Course Introduction, Prerequisites Review (1) Particles and Point Forces in Two Dimensions (2) Free Body Diagrams and Equilibrium for Particles in Two Dimensions (2) Forces in Three Dimensions, Equilibrium for Particles in Three Dimensions (2) Rigid Bodies and Moments in Two Dimensions (2) Free Body Diagrams and Equilibrium for Two-Dimensional Rigid Bodies (3) Moments in Three Dimensions (1) Free Body Diagrams and Equilibrium in Three Dimensions (2) Friction (4) Distributed Forces (1) Centroids (2) Moments of Inertia (3) Fluid Statics (2) Beams (1) Beams: Shear and Bending (3) Trusses (3) Frames & Machines (3) Review (3) Exams (3)

Books: Required: Vector Mechanics for Engineers: Statics, by Beer and Johnston, (any edition)
Course pack: available from Lulu.com or from the bookstore

Grading System and Percentage Contribution

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Activities and Grade Breakdown: • Daily Grades (10%): intro quiz* and class participation. 39 grades, bottom four replaced with top four checkpoint quizzes. • Computer-graded homework* (10%): 41 quiz grades, three attempts each with highest grade recorded. No drops or makeups. • On-paper homework* (15%): project and 37 homework grades. Lowets four homeworks are dropped. Group project counts as 5 homework grades and cannot be dropped. • 3 midterm exams* (14% each): closed book, FE-approved calculator & scratch paper allowed. Exams are administered in Moodle with a proctor. Exam dates: Jan 27, Feb 28, Mar 27 • Final exam* (23%): common final for all MAE 206 students, Tuesday, Apr 28, 6-9 pm Fewer than 8 absences may be accrued before students are not automatically eligible to to take the final.

AMU Grading system and scale

The grading system used at Adam Mickiewicz University, whose name is abbreviated as AMU or UAM, is as follows:

Tests, exams, homework assignments grading scale

5 100%-91%
4+ 90%-86%
4 85%-76%
3+ 75%-71%
3 70%-60%
2 59% and less

This translates into the following ECTS (European internationally recognized system) grading scale:

ECTS Grade	AMU grade	Definition
A	5.0	EXCELLENT – outstanding performance with only minor errors
B+	4+ / 4.5	VERY GOOD – above the average standard but with some errors
B	4.0	GOOD – generally sound work with a number of notable errors
C+	3+ / 3.5	SATISFACTORY – fair but with significant shortcomings
C	3.0	SUFFICIENT – performance meets the minimum criteria
F	2.0	FAIL – considerable further work is required

Hours: 3 Lecture hours hour per week.

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#	DAY	TOPIC	HW ASSIGNMENT
1		The Problem-Solving Process (S1.1); Units of Measure (S1.2)	[Math Skills Assessment (online)]
			S1.2:1,3,7,10
2		What is a Particle (S2.1); Forces in a Plane (S2.2)	S2.2: 12,13,1,3,4,5,14,17,18
3		Forces in a Plane (S2.2)	S2.2:20,22,25,27,29,32
4		Equilibrium of a Particle (S2.3)	S2.3:1,7,9,10,13,19,30,33,36,39
5		Equilibrium of a Particle (S2.3); Review	
6			
7		What is a Rigid Body (S3.1); Moments in a Plane (S3.2)	S3.2:1,2,6,11,12,14,18
8		Moments in a Plane (S3.2)	S3.2:19,22,25,27,33,34
9		Moment in Space (S3.3)	S3.3:1,2,3,12,14,16,18,19,21
10		Equilibrium of a Rigid Body (S3.4)	S3.4:1,3,5,8,13,15,18,21,22,28,30,32, 38,40,44,46,47
11		Equilibrium of a Rigid Body (S3.4); Review	
12			
13		What is a Mechanical Force? (S4.1)	S4.1:115,116,120,122,129,132,148
14		Composite Bodies and Bodies of Revolution (S4.6)	S4.6:291,293,298,303,308,311,316,317, 326, 337, 340,341
15		Simple Beams (S4.2)	S4.2:152,153,157,167,169,173,174,182
16		Simple Beams (S4.2)	S4.2:185,186,188,191,194,196
17		Simple Beams (S4.2)	S4.2:203,204,206,207
18		Simple Beams (S4.2)	S4.2: 209,217,219,220
19		Fluid Forces (S4.4); Friction Forces (S4.5)	S4.4:268,274,281 S4.5:1,3,4,7,11,16,19,36
20		Friction Forces (S4.5)	S4.5:63,68,72,78
21		Review	
22			
23		What is a Structure (S5.1); Trusses (S5.2)	S5.2:2,4,8,12,17,18 Assign Projects
24		Trusses (S5.2); Computer Analysis (S5.5)	S5.2:20,25,31,37,39 S5.2:49,55,61
25		MATLAB Tutorial (SII.1)	SII.1:2,4
26		Frames (S5.3); Mechanisms (S5.4)	S5.5: 1,4,6,10
27		Classification of Bodies (S6.1); Calculating Integrals of Simple Bodies (S6.2); Translated Coordinates (S6.3)	S6.2:7 S6.3:1,5,8,13,16
28		Rotated Coordinates (S6.4); Composite Bodies (S6.5)	S6.4:2,7,8 S6.5:6,7,15,17
29		Review	Projects Due

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