

CE 29700: BASIC MECHANICS – I (STATICS)

School of Civil Engineering
Purdue University

Instructor: Arun Prakash
E-mail: arunprakash@purdue.edu
Office Hours: (*) 4119, Civil Engineering building
 Monday 10:00am – 12:00pm & Wednesday 2:30pm-4:30pm;
 Or email for an appointment.

TAs: Benjamin Wickboldt
E-mail: ben.wickboldt@gmail.com
Office Hours: (*) 4129 Civil Engineering building
 Tuesday 10:00am-12:00pm & Thursday 1:00pm-3:00pm
 Or email for an appointment.

*See Class Webpage for updated information: <http://www.itap.purdue.edu/tlt/blackboard/>

Lecture Time and Location: M-W-F: 1:30pm - 2:20pm, Room 172, Wetherill Lab.

Course Description:

Statics of particles, Rigid bodies, Equivalent systems of forces, Equilibrium, Centroids and centers of gravity, Trusses, Frames, Machines, Friction, Area moments of inertia, Principle of Virtual Work.

Prerequisites:

- At least one of [may be taken concurrently]: **Multivariate Calculus:** MA-26100, MA-27100, MA-17200, MA-17400, MA-18200, MA-26300

AND

- At least one of: **Modern Mechanics:** PHYS-17200, (PHYS-16200 AND PHYS-16300)

Grading Basis:

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|----------------|-------------|--|
| • Homework | 20% | |
| • Midterm - 1 | 20% | 6:30-7:30pm, Monday, September 28, 2009, RHPH 172. |
| • Midterm - 2 | 20% | 6:30-7:30pm, Tuesday, November 10, 2009, RHPH 172. |
| • Final Exam | 40% | TBA |
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| • Total | 100% | • Bonus 5%
(in class assignments, attendance, office hours) |

Students should notify the instructor about conflicts with the scheduled exams allowing sufficient time to verify the conflict and arrange an alternate time. Make-up exams for absences will **not** be given except under extremely unavoidable situations.

Required Text Book:

- Vector Mechanics for Engineers: Statics*, by **Beer & Johnston**, (Beer, Johnston, Mazurek and Eisenberg), **9th Edition**, McGraw Hill, 2010.

Other Recommended Text Books:

- Engineering Mechanics: Statics and Dynamics*, by **J. L. Meriam & L. G. Kraige**,
- Engineering Mechanics: Statics and Dynamics*, by **A. Bedford & W. Fowler**,
- Engineering Mechanics: Statics and Dynamics*, by **R. C. Hibbeler**,
- Engineering Mechanics: Statics and Dynamics*, by **D. McGill and W.W. King**,
- Engineering Mechanics: Statics and Dynamics*, by **I. H. Shames**

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Class Meeting	Day	Date	Text Sections	Subject	Assignment Number	Due Date	Homework Problems
1	M	8/24/09	Ch 1, 2.1-2.3	Introduction and basic principles, Vectors	1	8/28	
2	W	8/26/09	2.4-2.8	Forces, Rectangular components	2	8/31	
3	F	8/28/09	2.9-2.11	Particle equilibrium, free body diagram	3	9/2	
4	M	8/31/09	2.12-2.15	Forces in space, Equilibrium in space	4	9/4	
5	W	9/2/09	3.1-3.8	Rigid Bodies, Transmissibility, Moments,	5	9/9	
6	F	9/4/09	3.1-3.8	Vector Cross Product; Moment Components			
	M	9/7/09		LABOR DAY - NO CLASS			
7	W	9/9/09	3.9-3.11	Moments, Scalar & Triple Product	6	9/14	
8	F	9/11/09	3.12-3.16	Moment about an axis; Force couples	7	9/16	
9	M	9/14/09	3.17-3.21	Equivalent systems of forces	8	9/18	
10	W	9/16/09	4.1-4.5	Equilibrium, Free Body Diagrams (FBD)	9	9/21	
11	F	9/18/09	4.1-4.5	Equilibrium, Free Body Diagrams (FBD)	10	9/23	
12	M	9/21/09	4.6-4.7	Special cases: Two and Three force bodies	11	9/25	
13	W	9/23/09	4.8-4.9	Three dimensional equilibrium			
14	F	9/25/09	4.8-4.9	Three dimensional equilibrium	12	10/2	
15	M	9/28/09	1.1-4.9	REVIEW			
	M	9/28/09	1.1-4.9	Midterm Exam #1 - 6:30-7:30pm, RHPH 172.			
16	W	9/30/09	5.1-5.5	Center of gravity; Centroids of areas & lines	13	10/5	
17	F	10/2/09	5.1-5.5	First moments of areas & lines; Composition	14	10/7	
18	M	10/5/09	5.6-5.7	Centroids by integration	15	10/9	
19	W	10/7/09	5.8-5.9	Beams and submerged surfaces	16	10/14	
20	F	10/9/09	5.10-5.12	Centroids of volumes			
	M	10/12/09		OCTOBER BREAK - NO CLASS			
21	W	10/14/09	6.1-6.6	Trusses; Method of joints	17	10/19	
22	F	10/16/09	6.1-6.6	Trusses; Method of joints	18	10/21	
23	M	10/19/09	6.7-6.8	Trusses by method of section	19	10/23	
24	W	10/21/09	6.7-6.8	Trusses by method of section	20	10/26	
25	F	10/23/09	6.9-6.11	Frames	21	10/28	
26	M	10/26/09	6.9-6.11	Frames	22	10/30	
27	W	10/28/09	6.12	Machines	23	11/2	
28	F	10/30/09	6.12	Machines	24	11/4	
29	M	11/2/09	7.1-7.2	Beams – Internal forces	25	11/6	
30	W	11/4/09	7.3-7.6	Beams – Shear & Bending moment			
31	F	11/6/09	7.3-7.6	Beams – Shear & Bending moment	26	11/13	
32	M	11/9/09	1.1-7.6	REVIEW			
	T	11/10/09	1.1-7.6	Midterm Exam #2 - 6:30-7:30pm, RHPH 172.			
33	W	11/11/09	8	Friction	27	11/16	
34	F	11/13/09	8	Friction	28	11/18	
35	M	11/16/09	8	Friction	29	11/20	
36	W	11/18/09	9	Moment of Inertia	30	11/23	
37	F	11/20/09	9	Moment of Inertia			
38	M	11/23/09	9	Moment of Inertia	31	11/30	
	WF	11/25-27		THANKSGIVING - NO CLASS			
39	M	11/30/09	10	Virtual Work	32	12/4	
40	W	12/2/09	10	Virtual Work	33	12/7	
41	F	12/4/09	10	Virtual Work	34	12/9	
42	M	12/7/09	10	Virtual Work			
43	W	12/9/09	Open	REVIEW			
44	F	12/11/09	Open	REVIEW			
				FINAL EXAM			

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Homework Policy:

- Homework problems will be assigned from the textbook and posted on the CE 297 web page.
- Homeworks will be due at the **beginning** of class on the due date.
- Engineering paper should be used, **one side only**.
- Each problem should begin on a **new page**.
- Diagrams must be drawn **neatly** using a straight edge.
- Work should be presented in a **logical sequence**.
- Each set should be **stapled** and separate from other sets. Folding and tearing the corner to assemble the pages is **not** acceptable. All problems from a set must be handed in at the same time.
- Fifty percent will be deducted for homework that is one lecture late. No credit will be given for homework that is more than one lecture late.
- **Solutions** will be posted on the CE 297 web page one lecture after the due date.
- The lowest three homework scores for the term will be dropped from the final score.

Academic Integrity

- All work (assignments and exams) that you submit must be strictly **your own work**.
- Obtaining solutions from any external source or another student's homework or sharing your homework with another student is absolutely **not** allowed. Giving and receiving help on **concepts** is allowed and encouraged.

Classroom conduct

- Attendance is expected in all lectures.
- Cell phones must be switched off. Talking, texting or any other use is **not** allowed.
- Arriving late, leaving early, leaving & reentering the class in the middle of a lecture must be avoided.
- Ask questions:
 - **How** does this work?
 - **Why** is this so?
 - Could you please explain again ...
- Sit up front and pay attention!