Point Loma Nazarene University

EGR 215 – Engineering Mechanics 3.0 Units Fall 2016

Professor: Christopher Gabler
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Office Hours: MW 2:00 – 3:30 pm; T 2:30 – 3:30 pm; R 9:00 – 10:15 am; or by appointment.

Meeting Times:
Lecture: MWF 12:15 – 1:10 pm (Room RS 219)

University Mission: Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission:
The Physics and Engineering Department at PLNU provides strong programs of study in the fields of Physics and Engineering. Our students are well prepared for graduate studies and careers in scientific and engineering fields. We emphasize a collaborative learning environment which allows students to thrive academically, build personal confidence, and develop interpersonal skills. We provide a Christian environment for students to learn values and judgment, and pursue integration of modern scientific knowledge and Christian faith.

Textbook: ***Vector Mechanics for Engineers (Statics)*** 10th edition, by Beer, Johnston, Mazurek. The 10th edition is the book available in the book store. The 11th was initially posted, either text is satisfactory.

(Optional:
"ConnectPlus Access Card - Statics" for online homework.
"Connect Plus" Website: http://connect.mheducation.com/class/c-gabler-fall-2016-mwf-1215--110)
NOT REQUIRED for the course.

Class Enrollment: It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

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Attendance:
Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.
Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance in the Undergraduate Academic Catalog.

Course Description: Statics of particles and rigid bodies as applied to engineering design. Topics include vector algebra, forces, moments and couples, conditions of equilibrium, friction, and virtual work.

Prerequisite(s): PHY 241.
Engineering Mechanics is a sophomore-level calculus-based course with emphasis on mechanical engineering. The course deals with vectors and forces where objects are not moving. That is, this course is about "static" conditions. To succeed in the course and to go on to become a competent engineer, one needs to practice solving as many problems as one can handle. So, you need to practice doing problems on a regular basis!

Course Learning Outcomes: This course supports the overall learning objectives of the physics and engineering programs in building your ability to develop an understanding of the fundamental principles of physics and of engineering (LO1), and to apply physical principles, mathematical reasoning, and computational techniques to solve real-world problems (LO2)

1. Students will be able to apply their technical knowledge to solve problems in engineering mechanics.
2. Students will be able to speak about their work with precision, clarity and organization.
3. Students will be able to write about their work with precision, clarity and organization.
4. Students will collaborate effectively in teams.
5. Students will be able to identify, locate, evaluate, and effectively and responsibly use and cite information for the task at hand.

Reading Assignments: Reading will be assigned for each lecture. You should complete the reading assignment and go over all the sample problems in the reading before coming to lectures. This will help you gain a better understanding of the material and effectively participate in group problem solving in class.

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Homework: Reading assignments will be given in regards to chapter and topic, reading quizzes will be given in class to take the place of the eonnect.mheducation.com online resources.
You are strongly encouraged to discuss with your classmates but submit your own work. The homework assignments will be automatically submitted on the due date to encourage everyone to keep up with the course material. If more time is needed please let me know and I can extend your due date.

Tests: There will be three closed-book tests given in class. Partial credit will be given for correct reasoning at any step of a problem, but only if it is communicated clearly enough for me to understand. For problems that call for solution or explanation, no credit will be given for an answer alone; the method or reasoning must also be shown. You must take ALL the tests in order to pass the class.

Policy for missed exams: Unless you have express written permission from me long before the date of the exam to take the exam on another day, there will be no makeup exams for this course.

Participation: You are expected to attend all scheduled classes as we will break into small groups and solve problems together in class. Excessive absence (more than 20%) will result in de-enrollment, according to university policy.

Final Grade: The points you receive during the course are weighted accordingly:

Component	Weight
Homework	20 %
Tests	40 %
Reading Quizzes/Quizzes	20 %
Final Exam	20 %

Final Grades – The grade you earn in this course is roughly based on the following scale: 100%-90% A, 90%-88.0% A-, 88%-85% B+, 85%-81% B, 81%-78% B-, 78%-75% C+, 75%-70% C, 70%-68% C-, 68%-65% D+, 65%-61% D, 61%-57% D-. The points you receive during the course are weighted accordingly: in-class quizzes and homework: 35%, exams (4): 40%, final exam: 25%.

Final Exam: Date and Time: The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student. The **Final Exam** date for this class is **Friday, December 16, 2016 – 10:30-1:00 p.m.**

Credit Hour: In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 3 unit class delivered over 15 weeks.

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PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information. For more details see the PLNU catalog: http://catalog.pointloma.edu/content.php?catoid=24%navoid=1581#Academic_Accomodations

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

FERPA POLICY

In compliance with federal law, neither PLNU student ID nor social security number should be used in publicly posted grades or returned sets of assignments without student written permission. This class will meet the federal requirements by (Note: each faculty member should choose one strategy to use: distributing all grades and papers individually; requesting and filing written student permission; or assigning each student a unique class ID number not identifiable on the alphabetic roster.). Also in compliance with FERPA, you will be the only person given information about your progress in this class unless you have designated others to receive it in the "Information Release" section of the student portal. See Policy Statements in the (undergrad/ graduate as appropriate) academic catalog.

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EGR 215 Engineering Mechanics Course Outline & Class Schedule (Tentative)

Professor Christopher Gabler

Rohr Science 209, 619-849-2356, 858-345-8762, cgabler@pointloma.edu

Office Hours: MW 2:00 –3:30 pm, T 2:30-3:30 pm, R 9:00-10:15 am and by appointment

Week	*Date*	*Chapter & Topic or emphasis*	*Chapters, sect., pages*
Week	08/30	Class Intro	
	08/31	Intro. Mechanics: Statics of Particles	Ch 1, sections 1.1 – 1.6
1		Problem solving steps	Pages 1-1
	09/02	Statics of Particles, Forces	Ch 2, sections 2.1 – 2.6
		Addition and resolution of forces	Pages 16-30
		Problem samples	
Week	09/05	**No Class**: **Labor Day**	**No Class**
2	09/07	Rectangular Components	Ch 2, 2.7-2.8
	09/09	Forces, Free Body Diagrams	Ch 2, sect. 2.9 – 2.11
		Equilibrium of a Particle, Forces in Space	Pages 39-66, 2.9-2.14
Week	09/12	Forces and Equilibrium in Space	Section 2.15
3		Problem samples	
	09/14	Chapter 3: Rigid Bodies, forces, moments	Ch 3, sections 3.1 - 3.6
	09/16	Vector Product, Moment of Force about	Pages 82-96, 3.6-3.8

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Week	09/19	Moment of Force about a point	Ch 3, sections 3.8
4	09/21	Scalar Product, Moment of Force	Ch 3, section 3.9-3.11
		Force about an axis	Pages 96-110
	09/23	Couples, Systems of Forces	Ch 3, sect. 3.12 - 3.16
		Force Couple Systems	Pages 110-125
		Equivalent system of forces	
Week	09/26	Couples and Forces Couple Systems	Ch 3, sect. 3.17 - 3.20 Pages 120 – 128
5		Sample problems	
	09/28	Couples and systems	Ch 3, sect. 3.17-3.20
	09/30	Chapter 4: Equilibrium of Rigid Bodies	Ch 4, sections 4.1 – 4.4
Week	10/03	Free-body diagrams, Equilibrium in	Pages 161 - 166
6		Two dimensions	
	10/05	**EXAM #1**	**CH 1-3**
	10/07	Equilibrium in Two Dimensions	Ch 4, sections 4.5 – 4.7
		Rigid Body Equilibrium	
		Equilibrium of Two-Force and 3-force	Pages 166-191
Week	10/10	Indeterminate Reactions; Partial Constraints Three-Force Body,	Section 4.6-4.7

	10/12	Two & Three-Force Body,	Section 4.8
7	10/14	Equilibrium in Three Dimensions	Ch 4, section 4.9

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Week	10/17	Equilibrium in Three Dimensions	Ch 4, section 4.9
		Problem samples	Pages 210-215
8	10/19	Reactions for a 3-D Structure	4.8-4.9
		Free-body practice problems	
	10/21	**FALL BREAK, No Class**	**No Classes**
Week	10/24	Chapter 5: Distributed Forces: Centroids	Ch 5, section 5.1-5.3
		Centroids and First Moments of Areas and Lines	
9	10/26	Centroids and First Moments of Areas and Lines	Section 5.3
	10/28	Centroids by Integration using	Ch 5, sections 5.6
		Revolution, sample problems	
Week	10/31	Theorem of Pappus-Guldinus	Ch 5, sections 5.7-5.8
		Distributed loads on beams	
10	11/02	Centroids of Volumes	Ch 5, sections 5.10
		Sample problems	
	11/04	Centroids of Volumes	Sections 5.10-5.11
Week	11/07	Trusses: Analysis of Trusses	Ch 6, section 6.1
11	11/09	Simple Trusses, Method of Joints	sections 6.1-6.4
	11/11	**EXAM #2**	**CH 4-5**

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Week	11/14	Joints Under Special Loading Conditions	Ch 6, section 6.5
12	11/16	Other Truss Analysis	Ch 6, section 6.6-6.7
		Trusses by Method of Sections	
	11/18	Analysis using frames	Ch 6, section 6.8-6.10
		Analysis of Frames	Pages 303-315
Week	11/21	Analysis of Machines	Ch 6, section 6.12
13	11/23	**No Class**: **Thanksgiving Holiday (Wednesday)**	
	11/25	**No Class: Thanksgiving Holiday (Friday)**	
Week	11/28	Review of Chapter Six	Ch 6, 6.1 – 6.12
14	11/30	Chapter 8: Laws of Friction	Ch 8, 8.1-8.4
		Dry Friction: Static, Kinetic	
	12/02	**EXAM #3**	**CH 6, some of CH 8**
Week	12/05	Chapter 9: Distributed Forces	Ch 9, 9.1 – 9.5
15		Moment of Inertia of Areas	
	12/05	Moment of Inertia, Integration	Ch 9, 9.3 – 9.5
		Polar Moment of inertia, radius of	
		Gyration	
	12/09	Review, Class Summary	
Week			

16	12/16	**Friday** - **FINAL EXAM Cumulative Test (Mandatory)**
		10:30 – 1:00 p.m.

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