Course Policies, Expectations, & Objectives

Instructor

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Note that the lecture recordings are provided by Dr. Gary Gray.

Required Textbook

Gary L. Gray, Francesco Costanzo, and Michael E. Plesha (2013) *Engineering Mechanics: Dynamics*, **2nd Edition**, McGraw-Hill Higher Education, New York, NY (ISBN: 978-0-07-338030-8). The web site for the book is http://www.mhhe.com/pgc2e. (Links to an external site.)Links to an external site.

Prerequisites

The prerequisite for EMCH 212 is MATH 141 (Calc II) and EMCH 211 or 210 (statics). If you have not had these prerequisite, please contact Prof. Harris as soon as possible. In particular, each student is expected to have a working knowledge of the material covered in all prerequisite courses, which includes, but is not limited to:

- Geometry and trigonometry, including the laws of sines and cosines, direction cosines, and the like.
- Vector calculus. Vectors in 2- and 3-space, inner products, and vector products.
- Statics. How to draw correct free body diagrams, find force and moment equilibrium, write friction laws, and find support reactions. Equivalent force systems. Moments of inertia.
- Differential and integral calculus. How to differentiate and integrate most simple functions (e.g., polynomials, sine, cosine, exponentials, logarithms, and combinations of these functions); apply simple sequences and series; and apply the chain rule to both differentiate and integrate functions.

You are also expected to devote sufficient time to master the course material. It is unreasonable to expect that good performance can be achieved without study. Since I would expect students to spend at least 150 hours on this course during a 15 week semester (that does not include time spent preparing for exams), you should expect to spend that much time during the six week summer session.

I expect students to watch all the lecture videos, do all the assigned reading, and complete all assigned homework.

Description

EMCH 212 is an introductory course in *dynamics*, which is the science of *motion*. In this course we will develop the ability to analyze engineering problems concerning the motion of objects and the system of forces acting on them. The solution of these problems requires the use of very few basic principles. We will develop and/or improve our engineering problem solving skills (think before beginning the solution, ask what principles apply, and critically judge our results), our visualization skills (e.g., free body diagrams), and our understanding of basic physical principles of dynamics.

Course Objectives

EMCH 212 is intended to achieve the following educational objectives:

- Acquire a working knowledge of basic vector calculus and to apply it to the description of kinetic and kinematic quantities such as forces, moments, position, velocity, and acceleration.
- Apply calculus to relate position, velocity, and acceleration to one another.
- Model the types of mechanical systems considered in a first course in dynamics using free body diagrams (FBDs) of particles and rigid bodies (i.e., to graphically display the relevant system of forces and moments acting on these bodies) by writing their governing equations of motion. These models may be applicable at either a specific instant in time and/or point in space or they may be applicable over a range of time and space. In general, only two-dimensional motion will be modeled.
- Apply algebra, trigonometry, calculus, and elementary differential equations, to the solution of the equations of motion.
- Apply the work-energy principle to relate the energy of a mechanical system to its spatial configuration variables (i.e., position variables).
- Apply the impulse-momentum principle to relate the momentum of a mechanical system to the system of forces applied to it.

Academic Integrity

The Department of Engineering Science and Mechanics at The Pennsylvania State University considers academic training to be apprenticeship for practice in the professions. Students are expected to demonstrate a code of moral integrity and ethical standards commensurate with the high expectations that society places upon professional practice. Accordingly, it is the policy of the department to maintain the highest standard of academic honesty and integrity.

The University defines academic integrity as the pursuit of scholarly activity in an open, honest and responsible manner. All students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts (refer to Senate Policy 49-20 (Links to an external site.)Links to an external site.). Dishonesty of any kind

will not be tolerated in this course. Dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor (this includes, for example, copying solutions from the solution manual or Chegg), or tampering with the academic work of other students. Students who are found to be dishonest will receive academic sanctions and will be reported to the University's Office of Student Conduct for possible further disciplinary sanctions (refer to Senate Policy G-9 (Links to an external site.)Links to an external site.).
A student charged with academic dishonesty will be given oral or written notice of the charge by the instructor. A student contesting such a charge may seek redress through informal discussions with the instructor(s), department head or college dean. If the instructor believes that the infraction is sufficiently serious to warrant referral to the Office of Conduct Standards (Links to an external site.)Links to an external site., or if the instructor awards a final grade of F in the course because of the infraction, the student and instructor will be afforded formal due process procedures governed by Penn State Senate Policy 49-20 (Links to an external site.)Links to an external site.. Policy 49-20 and procedures can be found in the document "Policies and Rules for Undergraduate Students (Links to an external site.)Links to an external site." issued annually by the Senate Office and available through each student's home department or college dean's office. See more Academic Integrity policy information from the College of Engineering at http://www.engr.psu.edu/AcademicIntegrity (Links to an external site.)Links to an external site..

Grading

All grades are determined by performance, which is evaluated using objective standards rather than standards based on a notion of average class performance (i.e., I do not grade on a curve). Each grade will be based on a scale of 100 percent. Letter grades will be determined according to the following table.

F	D	C	C+	B–	B	B+	A–	A
0–60	60–70	70–76	76–80	80–83	83–87	87–90	90–94	94–100

Grade Determination

The final overall percentage used to determine your grade will be determined according the weightings in the following table.

Category	Percent of Grade
Midterm Exams (2)	25% each
Homework	20%
Final Exam	30%

Canvas (Penn State's Course Management System)

Canvas is Penn State's online course management system. It will contain, in part:

- all the lecture videos and slides
- all the homework assignments
- homework solutions
- old exams to help you study
- and more

Since all announcements sent to the class will be sent from Canvas, it is important that you properly configure Notification Preferences in Canvas to alert you (options include email, text message, push notification, and more) to all announcements.

Exams

There will be two exams during the semester and a final exam. The dates of all the exams can be found in your Calendar and in Modules. ***All exams will closed book and closed notes—you are only allowed the equation sheet I provide when you take an exam.***If you do take the exam on campus, we will arrange a time and place for you to take the exam on campus for each exam. All off-campus students are required to use Examity to take their exams. You should ensure that your computer and network are capable to run this service prior to the exam day. Please ensure that you review the Examity information and the Student Quick Guide.

For students using Examity (that would be nearly all of you):

- Read the resources in the two links in the paragraph above
- Schedule your exams at a time that is good for you using Examity (do this in advance so you can save a few bucks)
- Make sure your computer and network are working well before exam day

In the event you are unable to take one of the scheduled exams, ***no makeup exam will be administered unless all of the following conditions are met***:

1. **Legitimate Reason**
   The missed exam is due to circumstances beyond your control (e.g., illness, family emergency, or a university-sponsored activity).
2. **Prior Notification**
   It is your responsibility to notify Prof. Harris prior to the time at which you are scheduled to start the exam if you are unable to take the exam (this may be done by phone or by email). If circumstances prevent you from contacting Prof. Harris directly, then you must notify the ESM Office at (814) 865-4523.
3. **Verification**
   Sufficient information must be provided so that your claim can be verified.

If you miss an exam and are unable to satisfactorily fulfill each of the above three conditions, then you will receive a zero for that exam.

Homework

Homework problems are assigned from G. L. Gray, F. Costanzo, and M. E. Plesha (2013) *Engineering Mechanics: Dynamics*, **2nd Edition**, McGraw-Hill Higher Education. If you are accessing the text and problems electronically using an e-book or *Connect*, make sure that you are working the problems from *Dynamics* and not Statics. Accidentally working the Statics problems will result in zero credit for that assignment.

Each problem on each homework assignment will be worth 5 points and will be graded according to the following rubric.

- **0 pts**: Essentially nothing is there. Maybe just a couple of equations and a picture of a giraffe.
- **1 pt**: The problem has been restated accurately and completely, including knowns and unknowns.
- **2 pts**: The component system(s) have been chosen and drawn, along with the FBD or FBDs, if necessary.
- **3 pts**: The balance laws, and/or the kinematic equations have been stated.
- **4 pts**: The problem has been solved incompletely or completely and is not correct.
- **5 pts**: The problem has been solved completely and is substantially correct.

All homework assignments are weighted equally. That is, a 15 point assignment counts just as much as a 35 point assignment in your overall grade. When computing your final, overall homework grade, ***the lowest two homework scores will be dropped***.

There will be two homework assignments per week that are due on the day and time indicated for each assignment. Late homework will not be accepted without prior permission from Prof. Harris. Homework submitted by email will not be accepted.

Announcements

All information I send to the class will be sent through Canvas.

If you have an administrative question, first read this Syllabus and the Announcements on Canvas. If the information you need is ***not*** contained in any of those sources, then you may contact Prof. Harris or one of the TAs with your inquiry.

Since homework in this course is equation and diagram intensive, if you email us with a question, please include a legible scan of your attempt at the problem in question.

Students with Disabilities

Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact Student Disability Resources (SDR), which is located in room 116 Boucke Building at 814-863-1807(V/TTY). For further information regarding SDR, please visit their web site at http://equity.psu.edu/student-disability-resources (Links to an external site.)Links to an external site.. Instructors should be notified as early in the semester as possible regarding the need for reasonable academic adjustments.