E MCH 211
Course Information

Instructor
Dr. Gary L. Gray
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Engineering Science & Mechanics
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Office Hours
University Park
Mondays 4:00–5:30 p.m. and Thursdays 4:00–5:30 p.m. at the Starbucks on S. Garner St., or by appointment.
Online
Mondays 7:30–8:30 p.m. and Thursdays 7:30–8:30 p.m., or by appointment.

Textbook

Prerequisites
The prerequisite for E MCH 211 is MATH 141. If you have not had this prerequisite, please contact me 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.
- Differential and integral calculus. How to differentiate and integrate most simple functions (e.g., polynomials, sine, cosine, exponentials, logarithms, and combinations of these 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 approximately 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 attempt all assigned homework.
Description

Engineering Mechanics is that engineering science that relates forces and moments to the motion (deformation, acceleration, velocity) of bodies. The understanding of such concepts is essential to those who wish to design efficient engineering components ranging from a bridge to a wing strut to a robot arm to the motherboard of a computer. Statics, which is the study of engineering structures in force equilibrium, is the foundation course in which three stems are constructed: Dynamics (E MCH 212) for motion; Strength of Materials (E MCH 213) for deformation and failure criteria for solids; and Fluid Mechanics. Mechanics courses are founded on modeling engineering components via the Free Body Diagram, applying the equations of motion, then solving for the particular set of boundary conditions appropriate to the expected situation.

Course Objectives

Statics will provide you with the tools and guidance to allow you to master the use of equilibrium equations and Free Body Diagrams (FBD's) to solve real engineering problems. You should leave this class with the ability to logically approach a variety of static engineering problems, to translate a physical situation into an analytic model, and to use various mathematical tools to solve for desired information. Detailed learning objectives can be found at the end of this document.

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. Please see the Council of Academic Deans statement describing academic integrity at http://www.psu.edu/provost/integrity.htm.

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). 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, 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).

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, 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. Policy 49-20 and procedures can be found in the document "Policy and Rules for Students" 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/FacultyStaff/AcademicIntegrity/.

Professor Judith A. Todd  
P. B. Breneman Department Head Chair  
Developed Fall 2002

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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A's</td>
<td>85+</td>
</tr>
<tr>
<td>B's</td>
<td>70+</td>
</tr>
<tr>
<td>C's</td>
<td>55+</td>
</tr>
<tr>
<td>D</td>
<td>40+</td>
</tr>
<tr>
<td>F</td>
<td>below 40</td>
</tr>
</tbody>
</table>

For example, a student with a final average between 70 and 85% will be guaranteed at least some sort of B (i.e., B-, B, or B+).

Grade Determination

<table>
<thead>
<tr>
<th>Category</th>
<th>Percent of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exams (3)</td>
<td>60%</td>
</tr>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

ANGEL (Penn State's Course Management System)
ANGEL is Penn State's online course management system. It will contain, in part:

- all the lecture videos and slides
- all the homework assignments
- this document
- a record of all email I send to the class
- homework solutions

Since all email sent to the class will be sent from ANGEL, it is important that you properly configure My Settings in your ANGEL account so that your email goes where you want it to go.

Exams
There will be three exams during the semester. The dates of the three exams can be found on the ANGEL web site for the course. All exams will be open book only. You may not consult your notes, the Internet, or any other source (including the provided equation
sheet) than the textbook when taking exams. *I reserve the right to require you to video record yourself taking any one of the exams with your web or cell phone camera while you are taking it.*

In the event you are unable to attend 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 me prior to the exam if you are unable to attend (this may be done in person, by phone, or by email). If circumstances prevent you from contacting me directly, then you must notify the ESM Office at (814) 865-4523, prior to 4:00 p.m. on the day of the exam.

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**

The homework assignments will be graded entirely based on effort. You will receive 0, 1, 2, or 3 points for each problem on each homework assignment.

1. Essentially nothing is there --- maybe just a few equations and no FBD.
2. A few relevant equations are written and an FBD is attempted.
3. You have started the problem and worked part way to a solution, but have not completed the solution.
4. It may be completely wrong, but a reasonable and *complete* attempt has been made to solve the problem.

All homework assignments are weighted equally. That is, a 15 point assignment counts just as much as a 33 point assignment in your overall grade. When computing your final, overall homework grade, **the lowest two homework scores will be dropped.**

**IMPORTANT:** Because homework is graded based on effort, do not confuse perfect scores on the homework with perfect understanding of the material. You should always compare your solutions with those posted to ANGEL after the homework is due.

Homework will be assigned and collected twice per week. The homework will be due on Tuesdays and Fridays at 11:00 p.m. EDT. You will scan your homework and upload it to our dropbox on ANGEL. Late homework will not be accepted. I will drop your lowest homework grade.
Email

All the email I send to the class will also be posted to ANGEL under the Lessons tab in a link entitled Email Sent to the Class.

If you have an administrative question, first read this Course Information & Syllabus and the email sent to the class that is on ANGEL. If the information you need is not contained in any of those sources, then you may email me with your inquiry.

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

I will be communicating with you frequently this semester via email. Unless I am replying to a message sent to me via a non-Access account, email will only be sent to your Penn State Access account. While many students forward their email from their Access account to other accounts (e.g., Gmail), I will not accept as an excuse for not having received a message that one of these service providers was not working.

Note to 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 the Office for Disability Services, ODS located in room 116 Boucke Building at 814-863-1807(V/TTY). For further information regarding ODS, please visit their web site at http://www.equity.psu.edu/ods/. Instructors should be notified as early in the semester as possible regarding the need for reasonable academic adjustments.