E MCH 211, Statics
Online Offering
Course Information

Instructor
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Office Hours
University Park
Mondays and Tuesdays 12:30–1:30 p.m., and Thursdays and Fridays 1:30–2:30 p.m. in 211 EES Bldg, or by appointment.

Online
Mondays and Tuesdays 1:30–2:30 p.m., and Thursdays and Fridays 2:30–3:30 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 (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).

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/AcademicIntegrity.

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>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>0-60</td>
</tr>
<tr>
<td>D</td>
<td>60-70</td>
</tr>
<tr>
<td>C</td>
<td>70-77</td>
</tr>
<tr>
<td>C+</td>
<td>77-80</td>
</tr>
<tr>
<td>B-</td>
<td>80-83</td>
</tr>
<tr>
<td>B</td>
<td>83-87</td>
</tr>
<tr>
<td>B+</td>
<td>87-90</td>
</tr>
<tr>
<td>A-</td>
<td>90-94</td>
</tr>
<tr>
<td>A</td>
<td>94-100</td>
</tr>
</tbody>
</table>

Grade Determination

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

<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>15%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</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 and a final exam. The dates of all the exams can be found on the ANGEL web site for the course. **All exams will be open book and open notes only.** You may not consult the Internet, or any other source than the textbook and your notes when taking exams. **If you do not take the exam on the University Park campus, you are required to video record yourself taking every exam with your web cam or cell phone camera.** 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. The requirements and instructions for creating and sharing the video with me can be found in the document **Instructions for Video Recording During Exams.**

Practice creating a video before the first exam and share it with me if you have any doubt as to whether or not you are creating a suitable video.
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 me 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 me 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**

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.
- **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.
- **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 (this makes it obvious which homework assignments will be dropped since they will be the two with the lowest percentage, regardless of the number of points on the assignment). When computing your final, overall homework grade, the lowest two homework scores will be dropped.

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.

**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.

**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/](http://www.equity.psu.edu/ods/). Instructors should be notified as early in the semester as possible regarding the need for reasonable academic adjustments.