Course Title: EMCH 211 "Statics"
Section: 001
Credits: 3
Class Meeting: MWF 8:00 – 8:50, Room 1 Bookstore Building
Text and Material: Materials online for this course: Textbook available at http://adaptivemap.ma.psu.edu, all other materials available through ANGEL.

Instructor: Dr. Jacob Moore, Assistant Professor of Mechanical Engineering
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Phone: (717) 749-6209
Website: http://www.personal.psu.edu/jpm46
Office Location: 7 Bookstore Building
Office Hours: Monday 9-11 AM, Thursday 10AM - 12PM, or by appointment

Course Overview:
This course is the first of the engineering mechanics course sequence. In this course, students will learn to analyze both single and multiple body systems that are in static equilibrium. Students will learn to identify forces and moments acting on these systems, draw free body diagrams of these systems, determine the equilibrium equations for these systems, and finally solve for unknown forces using these equations.

Course Learning Objectives:
Upon successfully completing this course students will be able to...

- Identify bodies and structures in static equilibrium.
- Identify and model different types of forces including gravitational forces, normal forces, frictional forces, and tension in cables.
- Model bodies and structures in equilibrium through the use of free body diagrams.
- Solve for unknown forces and moments acting on these bodies or structures by identifying and solving the equilibrium equations.
- Determine the centroid or center of mass and moment of inertia for various bodies and cross sections.
- Apply appropriate methodologies when solving for unknown forces or moments in multiple body systems.
**Course Policies:**

**Attendance:**
- Students are expected to attend all classes except in cases of extenuating circumstances. Attendance may be recorded to report to the registrar’s office; however, it will not count as part of your course grade.
- Class will begin promptly at 8:00 and students are expected to be present and ready to begin class at that time.
- Students should contact the instructor before class for any pre-scheduled absences. In the case of an illness or another unexpected reason for absence, the student should contact the instructor as soon as possible.
- It is the responsibility of the student to determine what activities and assignments were missed in the case of any missed classes or significant tardiness. This can be done by contacting the instructor. Not all assignments may be made up in the case of non-university sanctioned excuses for absence.

**Homework Assignments:**
- All homework assignments will be graded according to the mastery grading system. For details on this system, see the section on “Mastery Assignment Grading”.
- All assignments and due dates will be documented on ANGEL (https://cms.psu.edu). Though assignments may be introduced in class, students are expected to consult the documentation on ANGEL for more complete guidance for the assignments.
- All assignments are due at the beginning of class on the listed due date. Assignments may be dropped off with the instructor in class. Late assignments will not be accepted without prior consent of the instructor.
- Students are encouraged to work in groups, however, students are expected to complete and submit their own original work.

**Labs:**
- Labs will be done in teams of two (three only if absolutely necessary).
- Time will be allotted to work on the labs in class, but students may need to work beyond that time to complete the assignment. All due dates and guidelines for the lab are listed in the syllabus.
- Each team will submit a single report and each student in the team will receive the same grade except in instances where it is apparent that the work load was unequally distributed.
- Any student that has a team member that they feel is not sufficiently contributing to the project is encouraged to address the issue with the instructor.

**Tests:**
- Tests will be conducted during the class periods indicated on the schedule unless otherwise noted in class. Because of this the tests will be limited to the regular 50 minute time period. Time starts at the beginning of class regardless of when the student shows up.
• Tests will be closed book, but students will be allowed to bring one page (front and back) of notes to each test and 3 pages (front and back) for the final. Students may also be given access to computer tools such as Matlab during some exams.

• The tests will consist of two main sections:
  o The basics section will cover the fundamentals of the topics covered in class and consist of a combination of multiple choice and open response style questions. Students will be expected to answer all the questions in this section.
  o The challenge section will cover more complex topics and may string various topics together. This section will consist entirely of open response style questions and students will be expected to choose and solve a subset of the questions.

General Conduct:
• Students are expected to act professionally during all class related activities and meetings. Inappropriate behavior or language during any class activities will not be tolerated.

Mastery Assignment Grading:
The purpose of having assignments in this class is to help students learn the material and mastery the skills covered in the course. Students are expected to show mastery of the material through complete and correct solutions to the homework assignments, though it is understood that this may not happen the first time students attempt to solve a problem. To match this expectation, the following process will be used to grade all homework assignments unless otherwise noted.

1. Students will be given a weekly assignment with a number of homework problems on the material covered in class. Students must complete all problems to the best of their abilities, completely document all of their work, and turn in their work by the assigned due date.

2. Within one week, the instructor will grade and return the assignment. Each problem will have one of three marks on it, indicating the whether or not the instructor feels the problem was mastered.
   • M (Mastered): Indicating that the student completely and correctly answered the problem.
   • NM (Not Mastered): Indicating that the student did not completely and correctly answer the problem. This will be accompanied by comments from the instructor indicating any mistakes or missing information that the instructor has identified.
   • X (Not Attempted): Indicating that the instructor felt that the student did not make a reasonable attempt at answering the problem.

3. All problems that were marked NM (Not Mastered) can be redone and resubmitted within one week of being returned. Problems may not be resubmitted more than one week after being returned (due dates will be printed on the assignments). All problems resubmitted will be regraded and just as the original assignment was. The new marks for each problem will replace the previous marks the student received. Resubmissions should be written on a separate sheet and must be stapled to the front of the original assignment and any previous resubmissions.
The whole problem must be written out again unless the instructor has marked a “continue from here” point in the previous submission.

4. Problems can be resubmitted as many times as needed so long as the problem is marked NM.

5. The last day of classes will be the last day to resubmit any assignment. After this date, no more resubmissions will be accepted.

6. Each student’s course homework grade will be the number of problems the student has marked as mastered over the total number of problems assigned to the class.

**Services for 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 Disability Coordinator, Kendra Sites, located on the first floor of the General Studies Building in the Student Success Center. She can be reached at 749-6045 or kmw24@psu.edu. For further information regarding the Penn State Office of Disability Services, please visit their web site at www.equity.psu.edu/ods/. Instructors should be notified as early in the semester as possible regarding the need for reasonable academic adjustments.

**Academic Support Center:**
The Academic Support Center provides academic and skill building support for all students. If you are having difficulty in any of your classes, or with academic skills, contact the Academic Support Center.
E-mail: ASC-Helps@psu.edu
Call: (717) 749-6046
Schedule a Tutoring Appointment: http://www.psu.mywconline.com
Stop by: 1st floor of the General Studies Building

**Academic Integrity:**
All students are expected to act with civility, 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 own efforts. An environment of academic integrity is requisite to respect for self and others and a civil community.

Academic integrity includes a commitment to not engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty include cheating or copying, plagiarizing, submitting another persons' work as one's own, using Internet sources without citation, fabricating field data or citations, "ghosting" (taking or having another student take an exam), stealing examinations, tampering with the academic work of another student, facilitating other students' acts of academic dishonesty, etc.

Students charged with a breach of academic integrity will receive due process and, if the charge is found valid, academic sanctions may range, depending on the severity of the offense, from F for the assignment to F for the course.
The University’s statement on academic integrity, from which the above statement is drawn, is available at http://www.psu.edu/dept/oue/aappm/G-9.html

Grading Policy:
Your grade will depend on your homework assignments as well as the four course exams (The three section exams and the final). Grades will be distributed as follows:

- Homework Assignments 20%
- Labs 20% (2 labs, each 10%)
- Exam 1 20% *
- Exam 2 20% *
- Exam 3 20% *
- Final Exam 20% *

*Your lowest exam grade will be dropped.

Final letter grade will be assigned as follows:

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>94 - 100</td>
<td>A</td>
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<tr>
<td>90 – 93.99</td>
<td>A-</td>
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<tr>
<td>87 – 89.99</td>
<td>B+</td>
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<tr>
<td>83 – 86.99</td>
<td>B</td>
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<tr>
<td>80 – 82.99</td>
<td>B-</td>
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<tr>
<td>75 – 79.99</td>
<td>C+</td>
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<tr>
<td>70 – 74.99</td>
<td>C</td>
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<td>60 – 69.99</td>
<td>D</td>
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<td>below 60</td>
<td>F</td>
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<tr>
<td>Week of</td>
<td>Topic</td>
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<tr>
<td>8/24</td>
<td>M - Course Introduction and Equilibrium Introduction&lt;br&gt;W - Forces as Vectors and Vector Math&lt;br&gt;F - Equilibrium in Concurrent Force Systems</td>
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<tr>
<td>8/31</td>
<td>M - Gravitation, Normal, and Tensile Forces&lt;br&gt;W - Equilibrium in Concurrent Force Systems (3D)&lt;br&gt;F - Moments (Scalar Calculation)</td>
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<tr>
<td>9/7</td>
<td>M – No Class, Labor Day&lt;br&gt;W – Moments (Vector Calculations)&lt;br&gt;F – Couples</td>
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<tr>
<td>9/21</td>
<td>M – Review for Exam&lt;br&gt;W – Exam 1&lt;br&gt;F – Statically Equivalent Systems</td>
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<tr>
<td>9/28</td>
<td>M – Equivalent Force Couple Systems&lt;br&gt;W – Distributed Forces and the Equivalent Point Load&lt;br&gt;F – Centroids (2D) via Integration</td>
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<td>10/5</td>
<td>M – Centroids (2D) via Composite Parts&lt;br&gt;W – The Equivalent Point Load via Composite Parts&lt;br&gt;F – Centroids (3D) via Integration</td>
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<tr>
<td>10/12</td>
<td>M – Centroids and Center of Mass (3D) via Composite Parts&lt;br&gt;W – Review for Exam&lt;br&gt;F – Exam 2</td>
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<tr>
<td>10/19</td>
<td>M – Structures and Two Force Members&lt;br&gt;W – Trusses and the Method of Joints&lt;br&gt;F – Method of Joints (cont.)</td>
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<tr>
<td>10/26</td>
<td>M – Matrix Equations&lt;br&gt;W – Lab 1 (Large Trusses in Matlab)&lt;br&gt;F – Lab 1 (Large Trusses in Matlab)</td>
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<tr>
<td>11/2</td>
<td>M – Method of Sections&lt;br&gt;W – Method of Sections (cont.)&lt;br&gt;F – Frames and Machines</td>
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<tr>
<td>11/9</td>
<td>M – Frames and Machines (cont.)&lt;br&gt;W – Frames and Machines (cont.)&lt;br&gt;F – Lab 2 (Bottle Capper Analysis)</td>
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<tr>
<td>11/16</td>
<td>M – Lab 2 (Bottle Capper Analysis)&lt;br&gt;W – Review for Exam&lt;br&gt;F – Exam 3</td>
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<td>11/23</td>
<td>No class, Thanksgiving Break</td>
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<td>11/30</td>
<td>M – Dry Friction&lt;br&gt;W – Slipping vs. Tipping&lt;br&gt;F - Wedges and Screws</td>
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<td>12/7</td>
<td>M – Bearing Friction and Disk Friction&lt;br&gt;W – Belt Friction&lt;br&gt;F – Review for Final</td>
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<tr>
<td>12/14</td>
<td>Finals Week</td>
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