MAE 241 - Statics
Fall 2016 Course Syllabus

Credits: 3 Hr
Prerequisite: MATH 155 and Physics 111, both with grades of C at minimum
Textbook: *R. C. Hibbeler*, Engineering Mechanics: Statics, 14th Edition, Pearson Prentice Hall, New Jersey USA, 2016, ISBN: 9780134160689.

Instructors

Course Coordinator: TBD

Section 001 (CRN: 81685), TR 8:00 – 9:15, G102 ESB, **Dr. Bruce Kang:** 739 ESB
(304) 293-3232, E-mail: bruce.kang@mail.wvu.edu, Office Hours: MT 1:00 – 2:00 pm

Section 002 (CRN: 82206), MWF 1:00 – 1:50, G102 ESB, **Dr. Christopher Griffin:** 939 ESB
(304) 293-3386, E-mail: cgriffin@mail.wvu.edu, Office Hours: MW 4:00 - 5:00 pm, T 3:30 – 4:30 pm

Section 003 (CRN: 81018), MWF 4:00 – 4:50, G102 ESB, **Dr. Marvin Cheng:** 753 ESB
(304) 293-6732, E-mail: marvin.cheng@mail.wvu.edu, Office Hours: MW 10:00 – 11:00 am

Section 004 (CRN: 84091), MWF 9:00 – 9:50, G83 ESB, **Dr. Marvin Cheng:** 753 ESB
(304) 293-6732, E-mail: marvin.cheng@mail.wvu.edu, Office Hours: MW 10:00 – 11:00 am

Section 007 (CRN: 82202), MWF 8:00 – 8:50, G39 ESB, **Dr. Alfred Lynam**: Office: 931 ESB
(304) 293-3423, E-mail: aelynam@mail.wvu.edu, Office Hours: TWR 2:00 – 3:00 pm

Educational Objectives

1. Critical Skills. Students must demonstrate **mastery** of the following skills/knowledge to receive a passing grade in this course:
   - Ability to draw complete and correctly labeled Free Body Diagrams of rigid bodies or systems of rigid bodies in static equilibrium;
   - Ability to compute the resultant of any number of concurrent forces in 2- or 3- dimensions;
   - Ability to compute the dot product and cross product of two vectors, and demonstrate understanding of the meaning of the results;
   - Ability to solve particle equilibrium problems in 2- or 3- dimensions;
   - Ability to compute the moment generated by a force about any point in 2-D space; and
   - Ability to find support reactions for truss and frame/machine problems.
2. Competency Skills. Students are expected to demonstrate some level of competency in the following skills. The semester grade will reflect the student's level of achievement of these objectives.
   - Ability to reduce a system of forces acting on a rigid body to a single equivalent force and compute its point of application;
   - Ability to solve rigid body equilibrium problems in 2- or 3-dimensions for statically determinate systems;
   - Ability to compute frictional forces for sliding motion and for belts/pulleys. Ability to solve the tip/slip problem;

- Ability to compute the centroid and the area moment of inertia of 2-D bodies using the method of composite areas;
- Ability to construct shear force and bending moment diagrams for systems of concentrated forces and/or distributed loads acting on statically determinate beams;
- Ability to solve for the internal forces acting on any member of a pin-jointed truss structure or a frame/machine component;
- Ability to find the centroid and area moment of inertia for 2-D shapes by the method of integration; and
- Ability to compute the moment about any axis in 3-D space generated by a force or a system of forces.

Course Grading

Evaluation of student performance will be done using a combination of absolute and relative scales. This means that part of your grade will be based on your demonstration of mastery of certain skills/knowledge. Those skills are listed as the "critical skills" in the Educational Objectives section above. You will not pass this class without demonstrating complete facility with those skills. The remainder of your grade will be based on your level of mastery of the "competency" skills, and to some extent on your performance relative to your peers. Numerical grades will be assigned for homework assignments (**and or quizzes at the discretion of the individual instructor**), tests, and a common final exam, with final semester grades weighted according to the following scale. **Irrespective of your semester scores, you must obtain a minimum of 40% on the common final and a minimum of 60% for the specific critical skill questions on the common final to pass the course (in addition to an overall score of at least 60%).**

1.	Homework/Quizzes:	20%
2.	3 Tests:	45%
3.	Common Final Exam:	35% (must score at least 40% to pass the course)

Semester grades will be assigned according to the standard scale:

A (90 - 100); B (80 - 89); C (70 - 79); D (60 - 69); F: < 60.

Note: Only a simple calculator is allowed during exams, no programmable graphing calculators allowed. Any device (such as smart phone, smart watch, etc.) capable of wireless data communication is also forbidden to use during an exam. This policy will be strictly enforced.

Class Attendance:

Attendance is expected. Individual instructors of the sections will set their own attendance policies. The attendance policy for section 002 is as follows: Students cannot reasonably expect to master the course material without regular attendance at class. The unannounced quizzes will serve as the attendance check throughout the semester. You will **not** have the opportunity to make-up a quiz unless a previous arrangement has been made. You are all adults, and I want to treat you as such. Therefore, it is up to you to decide how important learning the material presented in class is. Make no mistake, if you do not come to class you will not succeed. Students are responsible for all material covered and quizzes taken in class regardless of their attendance.

Policies

- Professional and ethical behavior is expected in class and in carrying out assigned tasks, this includes coming to class on time.
- Disruptive behavior such as reading newspapers, talking, using cell phones or other electronic devices is not permitted in class.
- A make-up test shall be given only if the student can show valid reason to miss the test. This has to be established before the regularly scheduled test. A student is limited to one make-up test for the course.

Homework

Homework will primarily be done using the Mastering Engineering (ME) software/website. In addition to the assigned homework problems, the ME software makes available special tutorial problems and an effectively unlimited number of practice problems for you to use. Success in engineering courses is greatly enhanced by working enough practice problems to insure that you thoroughly understand all of the concepts. Although the homework is only 20% of your grade, it is actually far more important because if you do not do the homework you stand a low chance of performing well on the quizzes and exams.

MasteringEngineering (ME):
Your will need to register for MasteringEngineering by purchasing an access code and then going online to www.masteringengineering.com. You may purchase a code either through the WVU bookstore or online. When you register for ME, you will be asked to enter your access code and to select a course. You will be given a course ID this semester by your section instructor. *(*note*: use your MIX User Name as your Student ID for the system*). Your textbook will be Engineering Mechanics: Statics, 14th edition by Hibbeler. You MUST select the correct text or you have to hassle with getting a credit for your registration number and then register again, so PAY ATTENTION!! For Spring 2016, MAE 241 Section 002, the Mastering Engineering access code is MEGRIFFIN97923.

Academic Integrity

Students are expected to conduct themselves with complete integrity in this and all classes at WVU. In MAE 241 that means the following: you may discuss homework problems and class materials with other students but **consulting or copying the work of another student on an examination or homework is absolutely forbidden.** Active measures will be taken to prevent cheating and to detect it if it is attempted. Students caught cheating will receive a grade of zero for the assignment as a minimum penalty. Any student caught cheating more than once in a semester will receive a grade of *UF* (unforgivable *F*—cannot be expunged from the transcript via D/F repeat).

ABET Outcome

This Course satisfies the following ABET Outcome:

a. **An ability to apply knowledge of mathematics, science, and engineering**;

Adverse Weather Commitment

In the event of inclement or threatening weather, everyone should use his or her best judgment regarding travel to and from campus. Safety should be the main concern. If you cannot get to class because of adverse weather conditions, you should contact me as soon as possible. Similarly, if I am unable to reach our class location, I will notify you of any cancellation or change by 11:00 am (3 hours before class starts), using MIX E-mail Addresses and eCampus to prevent you from embarking on any unnecessary travel. If you cannot get to class because of weather conditions, I will make allowances relative to required attendance policies, as well as any scheduled tests, quizzes, or other assessments.

Social Justice Statement

"The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Accessibility Services (293-6700). For more information on West Virginia University's Diversity, Equity, and Inclusion initiatives, please see http://diversity.wvu.edu."

Important Dates

August 23, Tuesday	Last day to add/drop a class
September 5, Monday	Labor Day Recess: University Closed
October 12 (noon), Wednesday	Mid-semester reports due
October 26, Wednesday	Last day to drop a class
November 19 – 27	Fall Recess: No Classes
December 5, Monday	Last day to do withdraw from the University
December 12, Monday	Final Exam (5-7pm)

MAE 241, Fall 2016 - Tentative Schedule

Week – (Date)	Day	Topics	Text Sections
1 – (8/17)	W	Introduction, Units	Study Chapter 1 and 2.1 – 2.4
	F	2-D Vectors, Unit Vectors	2.5 – 2.6
2 – (8/22)	M	Position Vectors, Force Along a Line	2.7 – 2.8
	W	Dot Product, Example Problems	2.9
	F	2-D Equilibrium	3.1
3 – (8/29)	M	Free-Body Diagram	3.2 – 3.3
	W	3-D Equilibrium	3.4
	F	Example Problems	
4 – (9/5)	**M**	**Labor Day (NO CLASS)**	
	W	Moment of a Force – Scalar, Cross Product	4.1 – 4.2
	F	Moment of a Force – Vector, Principle of Moments	4.3 – 4.4
5 – (9/12)	M	Moment about Specific Axis, Couple	4.5 – 4.6
	W	Equivalent Systems, Reduction of Force-Couple Systems	4.7 – 4.9
	F	Example Problems / Review	
6 – (9/19)	**M**	**Exam 1**	**Chapter 2 – 4**
	W	Rigid Body Equilibrium, FBDs	5.1 – 5.3
	F	Example Problems	
7 – (9/26)	M	Two- and Three-Force Members	5.4
	W	Rigid Body Equilibrium, FBDs	5.5 – 5.7
	F	Example Problems	
8 – (10/03)	M	Trusses: Method of Joints	6.1 – 6.2
	W	Zero-Force Members	6.3
	F	Example Problems	
9 – (10/10)	M	Trusses: Method of Sections	6.4
	W	Frames & Machines	6.6
	F	Example Problems	
10 – (10/17)	M	Review	
	W	**Exam 2**	**Chapters 5 – 6**
	F	Internal Forces	7.1 – 7.2
11 – (10/24)	M	Shear Force and Moment Diagrams	7.2 – 7.3
	W	Friction, Impending Motion	8.1 – 8.2
	F	Example Problems	
12 – (10/31)	M	Example Problems	
	W	Belt Friction	8.5
	F	Belt Examples	
13 – (11/7)	M	Center of Gravity and Mass, Centroid	9.1
	W	Centroid of Composite Bodies	9.2
	F	Review	
14 – (11/14)	**M**	**Exam 3**	**Chapters 7 - 9**
	W	Area Moment of Inertia by Integration	10.1
	F	Parallel-Axis Theorem,	10.2
15 – (11/21)	**M**	**Thanksgiving Break (NO CLASS)**	
	W	**Thanksgiving Break (NO CLASS)**	
	F	**Thanksgiving Break (NO CLASS)**	
16 – (11/28)	M	Radius of Gyration	10.3
	W	Moment of Inertia of Composite Area	10.4
	F	Example Problems	
17 – (12/5)	M	Review	

Final Exam: Monday, December 12, 5-7 pm