CIVL 202 Statics

Section 01: MWF 0800 – 0850, LeTellier 304
Section 03: MWF 0900 – 0950, LeTellier 209

COURSE INFORMATION

Professor Information.

Professor: Dr. Mostafa Batouli
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Office Hours: MWF 10:00 – 11:50, or by appointment
Please seek additional assistance outside of class.

Open Door Policy:

My students are my priority. You are welcome to knock on my door at any time. Also, you can email me any time and I will respond to your questions/concerns as soon as I can. You are strongly encouraged to seek additional assistance outside of class.

Course Description.

"Co-requisites: MATH 131 and PHYS 221/271. Required of all Civil, Environmental and Mechanical Engineering sophomores. Scalar and vector solutions of problems in statics; resultants, reactions, and equilibrium of forces; analysis of simple trusses; friction; centroids and centers of gravity; and moments of inertia." (The Citadel 2018)

Course Learning Outcomes / Expected Performance Criteria.

0. Recognize the need for and engage in life-long learning.
1. Develop vector representations of forces and moments.
2. Use vector algebra for the formulation and solution of 2-D and 3-D particle equilibrium problems.
3. Use vector algebra for the formulation and solution of 2-D and 3-D rigid body equilibrium problems.
4. Solve problems in dry sliding friction.
5. Calculate centroids of areas and work with distributed forces.
6. Calculate the moment of inertia of areas.

Required Materials.

- An NCEES-approved calculator (http://ncees.org/exams/calculator/).
  Only NCEES-approved calculators will be permitted during exams.
- Gridded engineering paper for homework submissions.
- Textbook
  - Hibbeler, R. C. (2015). *Engineering Mechanics: Statics*. Pearson, Hoboken.
  - Other editions are acceptable.

POLICIES

CitLearn and Email.

By departmental policy, all students must check their Citadel email account for messages and course announcements from the Department Head and faculty more than twice a week.

CitLearn functions as the repository for class announcements, information, and homework. However, students must keep good records and interact with the professor about grades and feedback; CitLearn's grading features will remain unused.

Academic Support.

The Citadel endeavors to create an institutional climate where all students thrive. A student with a disability should contact Dr. Jane Warner in 103 Thompson Hall at 843-953-6877 to schedule an appointment. Any student with approved accommodations should present accommodation letters to the professor as soon as possible.

Exams.

Students may not use any electronic device during exams with the exception an NCEES-approved calculator. Students may not exchange calculators during graded events. Failure to follow exam policies will result in the professor collecting the exam for a grade of zero.

On August 10, 2017, the CEE faculty jointly developed and unanimously approved the following requirements for day and evening class operations on exam days:

1. A faculty member will be present in the classroom during the exam.
2. Students may not access their book bag during an exam.
3. Cell phones will remain inaccessible during exams even if a student temporarily leaves the classroom.
4. Headphones are not permitted.

Attendance.

"Absences, whether excused or unexcused, in excess of 20% of the meetings of a particular course can, at the discretion of the professor, result in a grade of "F" in the course" (The Citadel 2017). Attendance is normally taken at the beginning of the class period as part of the Plickers reading quiz. If late for class, the student must inform the professor of his or her presence.

Professional Practice.

Students will meet professional practice expectations including professional demeanor and work ethic, consistent daily preparation, commitment to learning and fulfilling obligations, and engagement in classroom activities.

Attendance and note taking is *the* way to obtain the course notes. If absent, students may acquire notes from their classmates. Students must bring their Plickers card, textbook, abridged *FE Reference Handbook* (*FERH*) (NCEES 2013), notes, note-taking material, and calculator to every class. Colored pencils and a straight edge can help with emphasis and clarity; board notes will typically be color coded (black, blue, red, green, purple). Meaningful note creation (not class transcription) effectively engages long-term memory; "I'm writing it down to remember it now" (Field Notes 2017).

Students may not use music or video players during class. Analogue note taking is strongly preferred. *The use of an electronic device for non-class activities will result in a deduction of 1% from the final grade per infraction with or without warning.*

ASSIGNMENTS AND GRADING

Table 1 shows the learning activities used to determine final grades based on a standard scale (A ≥ 90%, B ≥ 80%, C ≥ 70%, D ≥ 60%, F < 60%). Students requesting grade reevaluation must submit a written request by email no later than the next period clearly stating the reasons for the desired reevaluation.

Throughout the semester the professor may collect student work to support ABET accreditation efforts. The professor may keep the original and return a copy of the graded work to the student.

Table 1. Grading Distribution

Expected Performance Criteria	% of Grade
Plickers Quizzes	15%
Individual Homework	15%
Three Exams (17% each)	50%
Final Exam	20%
Total	100%

Reading and Plickers Quizzes.

Engineers must increase their understanding of a topic through reading. In the professional world, the engineer must read, interpret and apply various policy documents and codes. The professor will expect students to have read the narrative and summaries from the assigned reading (see Appendix C) before class. Prior preparation and an attempt at author-directed learning will make class time and professor-directed learning much more effective. The assigned reading addresses additional topics not covered in class.

Please see the following books on author-directed learning:

Adler, M. J., and Doren, C. V. (1972). *How to Read a Book: The Classic Guide to Intelligent Reading*. Touchstone, New York.

Piper, J., and Noll, M. A. (2011). *Think*. Crossway, Wheaton, Ill.

Regular Plickers quizzes at the beginning of class will evaluate the depth of student reading and assess student mastery of previous material. Students should be able to identify keywords from the reading assignment, the concepts the key words represent, and respond accordingly to simple true/false and multiple-choice questions.

Individual Homework.

Homework is *for the student*, for his or her learning, practice and assessment. Many of the homework problems represent intentionally-challenging, real world problems. Working engineers and engineering students must practice problem formulation, problem solving, and solution documentation. Therefore, a proper solution format is required (see Appendix A). Students may work together on homework assignments to *gain additional understanding*. More than any other academic activity, continuous practice of concepts establishes long-term mastery. Students should consider the assigned homework as the minimum required practice.

Please see the following book on problem formulation, solving, and documentation:

Polya, G., and Conway, J. H. (1945). *How to Solve It: A New Aspect of Mathematical Method.* Princeton University Press, Princeton, NJ.

Supplemental Instruction (SI) and extra-credit problems

During the normal school year, an upperclassman will offer supplemental instruction (SI) outside of the class time. The SI instructor can provide help studying and on homework. Students may receive extra credit on their homework grade by submitting special SI problems worked at the SI sessions. SI times will be announced when they are set.

If SI is not held during the semester, the professor will post SI problems to CitLearn. Students should work the extra problems, get help from each other or the professor, identify the correct solution, and submit the problems with homework assignments for extra credit.

Honor code, cheating and plagiarism

"A cadet does not lie, cheat, or steal, nor tolerate those who do" (The Citadel 2018). Society places its trust in engineers to ensure public safety. Accordingly, neither the Citadel Honor Code nor the engineers Code of Ethics will tolerate any form of cheating (ASCE 2017; NSPE 2007). Any evidence of direct copying of homework assignments may result in an honor violation; therefore, students should not share homework.

Homework documentation

All homework must be properly documented. Students must document any help received from supplemental instruction, classmates, reference books, or the internet. Information from the course textbook (equations and outlines of procedures), class notes, or the professor is considered immediately available to all students and requires no documentation. For written homework, insert documentation at the point the help was received, stating who and what assistance was provided.

Homework solutions

The use of solutions during homework attempts is strongly *discouraged*. Relying on solutions from previous classes, the textbook, or the internet will result in poor performance during the exams. Never-the-less, if published solutions reveal errors, subsequent corrections require proper documentation.

Grading scheme

Homework grading by problem focusses on effort, completeness, and timeliness. Each homework problem can earn up to 10 points (100%). The grade is composed of 70% based on a *complete* homework attempt and 30% on *self-assessment* of the homework attempt. Each problem will be collected twice:

1. *Initial Homework Attempt:*
   A CitLearn submission of homework before the solution posts.
   Each problem will be evaluated based on *effort* and *completeness* for 70%. A homework missing any sections, appropriate diagrams, or a good faith effort at the solution in the required homework format (Appendix A) will receive no credit. Problems must be uploaded as PDF documents. Free document scanning apps available for smart phones include Genius Scan, Microsoft Lens, and Dropbox. The Daniel Library also has document scanners available for use.
2. *Homework Self-Assessment:*
   A hard-copy submission of self-assessed homework after the solution posts.
   The remaining 30% will be awarded for submitting a hard copy of the *complete* and *self-assessed* homework problem. The professor will provide a minimum of 36 hours for homework assessment. An incomplete hard-copy problem will receive no additional credit.
   - Assessment should provide clear documentation of corrections made in a different color.
   - A minimum of a check mark in a different color next to the correct answer is required.

Typically, five potential grades can be earned.

- 100% An on-time, complete, CitLearn-submitted initial homework attempt
  with an on-time, hard-copy homework self-assessment:
  70% for attempt + 30% for assessment
- 70% An on-time, complete, CitLearn-submitted initial homework attempt
  without an on-time, hard-copy self-assessment:
  70% for attempt + 0% for assessment
- 60% An on-time, hard-copy homework self-assessment
  without an on-time, complete, CitLearn-submitted initial homework attempt:
  30% for attempt + 30% for assessment
- 30% A hard-copy homework self-assessment on Amnesty Day
  without an on-time, CitLearn or hard-copy submission:
  0% for attempt + 30% for corrections
- 0% All other homework submissions:
  0% for attempt + 0% for assessment

Exams.

Exams are *for the professor* to evaluate student understanding. All exams must be taken on the assigned day. Prior to exams, the best prepared student will read the text before class, actively participate in class, do the homework, and assess the homework, *i.e.* master the course material as it is covered. Prior to the exam, the professor will provide a practice exam, very similar in format and content to the actual exam. Solutions will not be released for the practice exam; students should work together, seek help during SI, and meet with the professor to discuss and clarify any questions. Practice exams will not be collected or graded but are key to favorable exam performance.

Any scheduling exceptions must be approved by the professor in advance. Exceptions will be granted only for reasons beyond the control of the student. Only NCEES-approved calculators will be permitted during exams (see Required Materials). Students may use a professor-provided abridged version of the NCEES *FE Reference Handbook* during exams. Exams will be returned for review during class but recollected at the end of class.

Three, 50minute, in-class exams will be administered. Students should meet with the professor outside of class to resolve questions before and after exams.

The 180minute, final exam will be cumulative. Students must submit all homework and assignments by Amnesty Day in order to take the final exam for full credit.

Amnesty Day

Late assignments will not be accepted. However, on Amnesty Day (typically the last day of class) *previously un-submitted*, *complete,* and *self-assessed* assignments may be submitted for 30% credit. Furthermore, students who have not submitted all regular homework by Amnesty Day may not be permitted to take the final exam.

Disclaimer

The course schedule is a plan. The professor reserves the right to make changes in the schedule. Students will be notified accordingly.

Cancelation of lectures

- Extreme weather conditions as announced by the University’s emergency system are considered reasons to cancel the class, and all deliverables due on that day will be postponed to a date to be announced.
- If the instructor cannot attend a class, another faculty member will cover the contents of the session. All deliverables (assignments, exam, etc.) will remain intact.

Right to Revise

The instructor reserves the right to modify, solely at his discretion, the course content, and the number, format, and due dates of exams, assignments, quizzes, or projects as well as their weights that will be used to determine the final grade.

REFERENCES

Adler, M. J., and Doren, C. V. (1972). *How to Read a Book: The Classic Guide to Intelligent Reading*. Touchstone, New York.

ASCE. (2017). *Code of Ethics*. American Society of Civil Engineers, Reston, VA.

Field Notes. (2017). "From Seed." text/html, <https://fieldnotesbrand.com/from-seed> (Dec. 11, 2017).

Hibbeler, R. C. (2015a). *Engineering Mechanics: Statics & Dynamics*. Pearson, Hoboken.

Hibbeler, R. C. (2015b). *Engineering Mechanics: Statics*. Pearson, Hoboken.

NCEES (Ed.). (2013). *FE Reference Handbook*. National Council of Examiners for Engineering and Surveying, Clemson, S.C.

NSPE. (2007). *Code of Ethics for Engineers*. National Society of Professional Engineers, Alexandria, VA.

Piper, J., and Noll, M. A. (2011). *Think: The Life of the Mind and the Love of God*. Crossway, Wheaton, Ill.

Polya, G., and Conway, J. H. (1945). *How to Solve It: A New Aspect of Mathematical Method*. Princeton University Press, Princeton, NJ.

The Citadel. (2018). *Catalogue*. The Citadel: The Military College of South Carolina, Charleston, SC.

APPENDIX A. Mandatory Homework Structure

Neat, well-organized, and useful homework requires effort. Each complete homework problem must contain the structure and information required for understanding the context, scope, process, calculations, and reasonableness of the solution. For simple problems, writing the solution may take longer than solving the problem.

Engineers check their work and the work of others; therefore, calculations must be clear, thorough, and presentable. Industry and consulting engineers need new graduates capable of solving problems *and* producing acceptable engineering calculations. A solution should read like a textbook example problem with pertinent details and text explaining the analysis, steps, equations, etc.

The professor will review homework submissions and may make suggestions for improvement. However, disorderly, poorly formatted homework will be returned without a grade. Students must follow the instructions listed below and the format shown on the next page.

Additional homework requirements.

- Materials
  - Work in pencil.
  - Write on $8.5\text{in.} \times 11\text{in.}$ engineering paper.
  - Use a straight edge, compass, and/or protractor as required to draw diagrams.
  - Staple multi-page submissions together.
- Presentation
  - Include no more than one problem per page.
    - Number pages per problem if more than one page is needed.
  - Each problem should have a neatly drawn figure(s).
    - Figures should be large enough to be easily read.
    - Variables should appear on figures.
    - Variables should be described using words and symbols
  - Write legibly, in clear, easy-to-read print.
    - Completely erase any extraneous material.
    - No crossed-out material should appear on the solutions.
    - Leave blank lines between steps, providing space for correction, assessment and comment.
- Organization using Homework Format (next page).

Homework Format.

Submittal Date CIVL 202, Problem #, Page #/# Student Name

Problem #:

Statement: Briefly describe the problem.

Given: Identify known values. Symbolically note all the given information; include necessary figures.

Find: Identify unknown values. State the desired result(s) using words and symbols.

Procedure: Briefly outline the general approach to solve the problem and identify appropriate fundamental concepts.

Solution: Write out in detail the formulation of the solution following the outlined procedure. Text and figures must be neat and professional. Show all the pertinent details of the solution approach.

- The solution should begin with an appropriate diagram
- From the diagram write the general equation(s) symbolically.
- Simplify the equation(s) explaining simplifications.
- Populate the simplified symbolic equations with physical quantities represented numerically with units.
- Calculate the final answer, round to appropriate significant figures, and determine the final units.
- Consider and describe the reasonableness of the results.

Answer: Copy those variables identified in the *Find* section and calculated in the *Solution* section.

- Confirm the reasonableness of the answer.
- Check the answer with other sources.
- If there is a discrepancy, go back and rethink the analysis.
- Do not attempt to reverse engineer the correct answer; consult with peers, the SI instructor and/or the professor as needed to identify mistakes.

APPENDIX B. Course Learning Outcomes and Associated Learning Objectives (L.O.)

0. Discuss the need for and engage in life-long learning.
    - 0.1. Describe the interdependence of statics with other engineering concepts.
        - 0.1.1. Apply skills from Physics Courses
            - 0.1.1.1. Describe Newton's laws of motion.
            - 0.1.1.2. List basic quantities and classify types of units.
            - 0.1.1.3. Convert values between systems of units using proper significant figures.
        - 0.1.2. Apply skills from mathematics.
            - 0.1.2.1. Resolve lengths of triangle sides using…
                - 0.1.2.1.1. Law of sines and law of cosines.
                - 0.1.2.1.2. Trigonometric functions.
                - 0.1.2.1.3. Similar triangles.
            - 0.1.2.2. Calculate the determinant of a matrix.
            - 0.1.2.3. Solve for unknowns in a system of equations.
            - 0.1.2.4. Calculate definite polynomial integrals.
                - 0.1.2.4.1. Single integrals.
                - 0.1.2.4.2. Double integrals.
    - 0.2. Identify terms and procedures through inspectional and analytical reading.
        - 0.2.1. Inspect the textbook.
        - 0.2.2. Define and classify key terms from mechanics and statics.
        - 0.2.3. Edit the course syllabus.
    - 0.3. Explain problem solving strategy in terms of reality, mental models, and mathematical models.
    - 0.4. Follow written and verbal instructions.

1. Develop vector representations of forces and moments.
    1.1. Vector representations
        1.1.1. Define and differentiate scalar and vector quantities.
        1.1.2. Given a system of two-dimensional (2D) vectors, calculate the magnitude and direction of the resultant by…
            1.1.2.1. Graphically applying the parallelogram law.
            1.1.2.2. Graphically applying the triangle rule.
            1.1.2.3. Analytically applying trigonometry.
        1.1.3. Given a 2D vector, resolve the component vectors by…
            1.1.3.1. Graphically applying the parallelogram law.
            1.1.3.2. Graphically applying the triangle rule.
            1.1.3.3. Analytically applying trigonometry.
        1.1.4. Resolve a three-dimensional (3D) vector into…
            1.1.4.1. Cartesian Vector Notation (CVN).
            1.1.4.2. Direction unit vector and magnitude.
            1.1.4.3. Coordinate direction angles and magnitude.
            1.1.4.4. Transverse and azimuth angles and magnitude.
    1.2. Forces
        1.2.1. Define a resultant force, $\overrightarrow{F_R}$, from applied loads, $\vec{F}$.
        1.2.2. Calculate the resultant force by summing forces…
            1.2.2.1. For a 2D system of force loads.
            1.2.2.2. For a 3D system of force loads.
        1.2.3. Calculate a unit vector, $\hat{\mu}$ from a position vector, $\vec{r}$.
        1.2.4. Calculate a force along a line.
    1.3. Moments
        1.3.1. Define…
            1.3.1.1. A moment, $\vec{M}$.
            1.3.1.2. A free vector.
            1.3.1.3. A force system.
            1.3.1.4. A force/moment couple.
        1.3.2. Calculate a scalar, 2D resultant moment $\overrightarrow{M_R}$ about a point for a force.
        1.3.3. Calculate a 3D Cartesian vector resultant moment about a point for a force by…
            1.3.3.1. The vector method using a cross product.
            1.3.3.2. The scalar method.
        1.3.4. Calculate a resultant moment at a point for a force and moment system.
    1.4. Equivalent Systems
        1.4.1. Define…
            1.4.1.1. A resultant moment from applied loads.
            1.4.1.2. An equivalent system.
        1.4.2. Create an equivalent system by relocating a force using a force and moment couple.
        1.4.3. Calculate the resultant force and moment for force and moment loads.
        1.4.4. Calculate the resultant force and location for force and moment loads.
        1.4.5. Calculate the resultant force and moment (or force and location) for a distributed force, force, and moment loads.

2. Use vector algebra for the formulation and solution of 2D and 3D particle equilibrium problems.
    2.1. Define…
        2.1.1. A force reaction (RXN).
        2.1.2. The Equations of Equilibrium (EoE) for a concurrent force system.
    2.2. For a concurrent force system…
        2.2.1. Draw a Free Body Diagram (FBD) for a concurrent force system.
        2.2.2. Write the EoE from the FBD for a concurrent force system
        2.2.3. Calculate force and moment RXNs for a particle (concurrent) system in equilibrium in…
            2.2.3.1. Two dimensions (2D).
            2.2.3.2. Three dimensions (3D).

3. Use vector algebra for the formulation and solution of 2D and 3D rigid body equilibrium problems.
    3.1. Define…
        3.1.1. A moment RXN.
        3.1.2. A rigid body member (MBR).
        3.1.3. EoE for a force and moment system.
    3.2. For a single rigid body system…
        3.2.1. Draw a FBD for a rigid body force and moment system.
        3.2.2. Write the EoE from the FBD.
        3.2.3. Calculate force and moment RXNs for rigid body system in equilibrium in…
            3.2.3.1. Two dimensions (2D).
            3.2.3.2. Three dimensions (3D).
    3.3. Define and identify…
        3.3.1. Two force members.
        3.3.2. Three force members.
    3.4. Frames, machines, and trusses
        3.4.1. For frames and machines…
            3.4.1.1. Describe their analysis assumptions.
            3.4.1.2. Calculate joint forces.
        3.4.2. For trusses…
            3.4.2.1. Describe their analysis assumptions.
            3.4.2.2. Define and identify zero force members.
            3.4.2.3. Calculate joint forces using Method of Joints.
    3.5. Internal Forces
        3.5.1. Define the "positive beam" sign conventions for…
            3.5.1.1. Normal force.
            3.5.1.2. Shear force.
            3.5.1.3. Bending moment.
            3.5.1.4. Torsion.
        3.5.2. For beams, frames, and machines, calculate internal forces using Method of Sections.
        3.5.3. For trusses, solve for internal forces using…
            3.5.3.1. Method of Joints.
            3.5.3.2. Method of Sections.

4. Solve problems in dry sliding friction.
   4.1. Define…
      4.1.1. Dry friction reactions as…
         4.1.1.1. Normal force, N.
         4.1.1.2. Frictional force, F_{ric}
      4.1.2. Coefficient of static friction, μ_s
      4.1.3. Angle of static friction, φ_s
      4.1.4. The Equation of Friction (EoF).
   4.2. Classify types of dry friction problems as…
      4.2.1. No impending motion (NIM).
      4.2.2. Impending motion at some points (IMSP).
      4.2.3. Impending motion at all points (IMAP).
   4.3. Calculate force and moment RXNs and internal forces for system in equilibrium involving…
      4.3.1. General EoF.
      4.3.2. Screw EoF.
      4.3.3. Belt EoF.

5. Calculate centroids of areas and work with distributed forces.
   5.1. Describe…
      5.1.1. Center of gravity.
      5.1.2. Center of mass.
      5.1.3. Volume centroid.
      5.1.4. Area centroid.
   5.2. Calculate…
      5.2.1. The area centroid of a 2D shape.
      5.2.2. The centroid of a rigid body modeled as an area.
      5.2.3. The centroid of a composite body modeled as an area.
   5.3. Distributed loads
      5.3.1. Describe…
         5.3.1.1. A distributed load.
         5.3.1.2. A tributary area.
         5.3.1.3. A unit width analysis.
      5.3.2. Calculate the resultant force and location for a distributed load.

6. Calculate the moment of inertia of areas.
    6.1. Describe…
        6.1.1. Area moment of inertia.
        6.1.2. Area radius of gyration.
        6.1.3. Mass moment of inertia.
        6.1.4. Mass radius of gyration.
        6.1.5. Product of inertia.
    6.2. Calculate area moment of inertia for…
        6.2.1. Continuous 2D shapes using integration.
        6.2.2. Composite bodies using the Parallel Axis Theorem.
    6.3. Describe product moment of inertia for…
        6.3.1. Continuous 2D shapes.
        6.3.2. Composite bodies using the Parallel Axis Theorem.
    6.4. Describe principle moments of inertia using…
        6.4.1. Analytical equations.
        6.4.2. Mohr’s Circle for moment of inertia.

Appendix C. Tentative Course Schedule

#	Date	Material Covered	Hibbeler	L.O.
01	08/22	Course introduction, math review		0
02	08/24	Fundamentals, problem solving	1	0.1-0.4
03	08/27	Units, notation, scalars, vectors	1, 2.1	0.1.1, 1.1.1
04	08/29	Forces, vector operations	2.2-3	1.1.2-3
05	08/31	2D Cartesian vectors	2.4-5	1.1.3, 1.2.1-2.1
06	09/03	Working session		
07	09/05	3D vectors	2.5-6	1.1.4, 1.2.2.2
08	09/07	Position vectors, force along a line	2.7-8	1.2.3-4
09	09/10	2D particle FBD and EoE	3.1-3	2.1-2
10	09/12	3D particle EoE	3.4	2.2.3.2
11	09/14	Working session		
12	09/17	Moment of a force	4.1	1.3.1-2
13	09/19	Review		
14	**09/21**	**EXAM 1**		**LO 1.1-2, 2**
15	09/24	Cross product, moment of a force in 3D	4.2-3	0.1.2.2, 1.3.3
16	09/26	Moment of a couple, system of forces and moments	4.4-9	1.3.4; 1.4
17	09/28	Working session		
18	10/01	Center of gravity, mass and body, centroid	9.1	5.1, 5.2.1-2
19	10/03	Composite bodies	9.2	5.2.3
20	10/05	Distributed loads	9.4, 4.9	1.4.5, 5.3
21	10/08	Working session		
22	10/10	Review		
23	**10/12**	**EXAM 2**		**LO 1.3-4, 5**
24	10/15	2D rigid body FBD and EoE	5.1-3	3.1-2
	10/17	**Leadership Day – No Class**		
25	10/19	Frames, two- and three-force members	5.4-5, 6.6	3.3, 3.4.1
26	10/22	Working session		
27	10/24	Internal forces	7.1	3.5.1-2
28	10/26	3D rigid body FBD and EoE	5.6-7	3.2.3.2
29	10/29	Working session		
30	10/31	Review		
31	**11/02**	**EXAM 3**		**LO 3**
32	11/05	Simple trusses, method of joints	6.1-2	3.4.2, 3.5.3.1
33	11/07	Zero-force members (ZFM)	6.3	3.4.2.2
34	11/09	Method of sections	6.4	3.5.3.2
35	11/12	Working session		
36	11/14	Dry friction	8.1-2	4.1-3.1
37	11/16	Friction on screws and belts	8.4-5	4.3.2-3
	11/19-11/23	**Thanksgiving Break – No Class**		
38	11/26	Working session		
39	11/28	Moment of inertia, radius of gyration	10.1, 3	6.1-2.1
40	11/30	Parallel axis theorem, composite bodies	10.2-3	6.2.2
41	12/03	Product of inertia, principle moments of inertia	10.5-6	6.3-4
42	12/05	Review		
Final Exam (Comprehensive)		**Sec. 01: TBA** **Sec. 03: TBA**		

SYLLABUS AGREEMENT AND CO-REQUISITE CERTIFICATION

I hereby acknowledge with my signature below that I agree to the policies contained in this syllabus and certify that I am enrolled in or have completed the following co-requisite courses.

Please check the boxes that apply:

MATH 131 []

PHYS 221/271 []

I hereby certify that I am currently taking or have completed the following mathematics courses.

Please check the boxes that apply:

MATH 131 []

MATH 132 []

MATH 231 []

MATH 234 []

MATH 335 []

Name: ____ Date: __________________________