ME 2010  Dynamics & Statics  Summer 2014  
Dillard 202

Dr. S.B. Biggers, Professor of Mechanical Engineering and Engineering Mechanics  
102-D Fluor Daniel Bldg., 656-0139, biggers@clemson.edu

Text: Biggers, 4th ed (Pearson Custom Printing), Learning Exercise Package (Campus Copy Shop). You should have the Biggers text, the Learning Exercises package, and calculator with you during each class with you so you can make notations, do in-class work, etc. Also, you must have your i>clicker with you each day for use in daily quizzes.

Course Objectives: This course is designed to provide students with the opportunity to
  1. learn the basic principles of equilibrium of static rigid bodies, and the kinematics and kinetics of dynamic rigid bodies,
  2. develop the ability to formulate and solve problems in a simple and logical manner using free-body, kinetic, and kinematic diagrams based on vector or scalar methods as appropriate, and
  3. work individually and in teams to communicate thought processes in a clear and understandable manner through use of sketching, consistent mathematical notation, orderly display of solutions, and written descriptions when helpful.

Student Learning Outcomes: Students who are successful in this course will demonstrate:
  1. an understanding of the fundamental principles of statics and dynamics by properly selecting and applying governing equations in problem solving,
  2. the ability to interpret, simplify, and model given engineering problem situations,
  3. the ability to develop governing equations of statics and dynamics of rigid bodies, applying proper boundary and loading conditions,
  4. the ability to use analytical and numerical methods to arrive at solutions to the governing equations, and
  5. the ability to work as individuals and as members of a small team to conduct engineering analysis and to communicate the results in a professional manner.

Prerequisites: You must have completed PHY 1220, MTHSC 1060 and 1080 with a C or better and must have completed or be co-enrolled in and PHY 1240, ENGR 1410, EG 2080, MTHSC 2060. ME 2010 is a prerequisite to ME 3070 (Introduction to Mechanical Systems), ME 2040 (Mechanics of Materials), ME 3080 (Fluid Mechanics), and several technical electives. ME students must earn a C or better in ME 2010 to proceed to the above courses.

In terms of topics that are prerequisite for this course, you are expected to be competent in the following: geometry, trigonometry, solving systems of linear algebraic equations, systems of units, computational accuracy, integration, differentiation, sketching to communicate. If you have weakness in any of these areas, seek outside help to eliminate the weakness before it becomes an impediment to your learning in this course. These topics will not be reviewed in this course.

Attendance: You are expected to attend every class except due to illness or official required University business. Interviews for COOP positions, visits to job fairs, etc. are optional and not required. So do not expect to be excused from class for such activities. Rather schedule them at other times. If you must miss a class, see a fellow student and bring yourself up to speed. Although there is no “credit” purely for attendance, there will be in-class work, including group work and individual quizzes that will all contribute to your grade. Therefore, absences will be obvious and your team members will be at a disadvantage when doing group work without you. If you miss a class for any reason, there is no opportunity to make-up that missed in-class work.
In-class Decorum: You are encouraged to discuss statics and dynamics during in-class work times, but you are expected to pay quiet attention when your instructor is speaking. When your instructor is speaking, those sitting at tables with back to instructor should turn to face the instructor. No tobacco products of any kind are acceptable for us in the class room. You may bring a drink or snack if you clean up afterward. If you are too sleepy to stay awake in class, you should remain at home in bed where you can sleep comfortably!

Technology: You must bring your i>clicker and extra batteries to class each day. Please put your name on your clicker where it is easy to see. Without your clicker or with dead batteries, you will not be able to answer the in-class questions and there is no make up for clicker quizzes. Answers on paper will not be accepted if you forget your clicker or bring your roommate’s by mistake. You will need your calculator in most classes, so be sure you have it. You will need to bring your laptop ONLY on the last day of class and one class to be announced. Use of laptops during class is strictly prohibited unless specifically requested by your instructor. No cell phones, I-pods, PDAs, or texting devices are allowed to be turned on in any class, including testing. Such devices used in class may be collected at the option of the instructor.

Academic Integrity: The University policy states: “As members of the Clemson University community, we have inherited Thomas Green Clemson’s vision of this institution as a “high seminary of learning.” Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.”

“When, in the opinion of a faculty member, there is evidence that a student has committed an act of academic dishonesty, the faculty member shall make a formal written charge of academic dishonesty, including a description of the misconduct, to the Associate Dean for Curriculum in the Office of Undergraduate Studies. At the same time, the faculty member may, but is not required to, inform each involved student privately of the nature of the alleged charge.”

You may, and are encouraged to, work in study groups to do homework but you may not simply copy another student's work. Using old HW solutions or Learning Exercise worksheets is not allowed. Copying on tests or quizzes will result in immediate failure of the course and prosecution as required by the University. In-class group work is an obvious exception where discussion and cooperative work is expected and required.

Supplemental Instruction: SI is not supported in the summer. However I should be able to deal with any questions during the class.

Office Hours:
If you need to meet, please email me ahead of time and expect to choose a time soon after class is over.

Important Dates:  
5/15/14    Last day to add a class 
5/19/14    Last day to withdraw from a class without a W 
6/5/14    Last day to withdraw from a class without a final grade. 
6/19/14    Final exam

E-mail: E-mail will be used to deliver important or urgent information throughout the semester. You are responsible for checking your mail for such information. Forwarding to Hotmail and Yahoo accounts that get overloaded might cause you to miss important information.
**BlackBoard:** Your BB web page will be used to post your schedule with HW assignments and reading assignments, HW solutions, updates to our class schedule, etc. Sample tests and test solutions will also be found there. Everything posted will be in the “Course Documents” folder. You are responsible for checking your BB page for such information.

**Reading:** There will be a reading assignment to be completed prior to attending each class. On some days, the lectures will be quite short and will only highlight the material you have read and clear up possible questions on the material. This will allow time for more in-class activities in which your learning can be guided in real-time. Therefore, **careful, critical, and timely reading of your book is essential to your success.** Make notes and questions in your book when something is not clear. Follow up with these either in class or out of class. The book provides a number of question in red font you should attempt to answer as you read.

**Optional Reading and Example Problem Sources:** Although the textbook has all the required reading content, if you want an alternative wording and presentation, you have access to this in your online Pearson website. Log on using the access code you received with your textbook. Click on “Student Study Pack”. Then mouse over the chapter numbers to find the one you want (the chapter numbers are very different from the Biggers text) and click on it. Then click on the “Review questions” for the selected chapters to find alternative textual material along with some questions to test your reading comprehension. The answers are also available. Be aware, the language and symbols will be different, as they are in any two textbooks. You will have to do your own interpretation of the new terminology. If you want additional example problems, click on the “Problems Bank with Extra Solutions” button for the selected chapter. Finally, the University library has nearly every text book every written on statics and dynamics and this resource is of course available to anyone who wants an additional source of example problems and/or presentation of certain material.

**Homework:** HW problems will be assigned nearly every class and they should be completed before the next class. The HW problems will be taken primarily from the Bedford and Fowler text books. The problems are available to you on your online site and in a few cases are also posted on BB with some additional questions added. Some students like to copy and paste the HW wording and art on their solutions. This sets a stage for well organized HW solutions. The assigned problems are merely representative problems. Solutions to all assigned problems will be placed on your BB web page. There is very strong correlation between good HW solutions and success on tests and the course. Of course, HW score is meaningless if you choose to copy someone else’s work or a solution found by search the internet, or just glance over the provided solutions. At each test, you will bring your collected papers for your instructor to examine. Up to 2% on your final grade will be allotted to your HW although no papers will be graded and corrected for accuracy. HW will be checked for completeness at other times at the discretion of your instructor. HW is a very big part of your learning experience. No student can be successful in the course without a concerted effort on the HW.

**In-Class Questions:** Very short answer questions will be given in most classes through the semester. These will be either at the start of class, the end of class, or during class. They will be given to ensure that you are doing the required reading prior to class and are paying full attention to the material being discussed in class. These questions will be primarily individual efforts, but in some cases you will be asked to answer after group or table discussion. You will enter answers to parts of these activities using your i>clicker. Combined with the learning exercise participation, they will account for 15% of your total grade. If you miss a class for any reason, forget your iclicker, or pick the wrong iclicker, you will miss the possible points for that day.

**Learning Exercises:** You will purchase the work pack of exercises at the “Campus Copy Shop” in Rubin Square downtown. These are primarily problem solving activities, most of which will be done in
class. They are an important step in your learning process. They follow reading and listening in class and they precede doing the HW. Some of these are identified in your text as bold italic red type though the numbers may be different. These will be team activities. The reason for our round tables is to encourage discussion and collaboration. Students who do not interact with their colleagues in these learning activities are almost always unsuccessful in the class. However, each of you may be asked to enter answers to selected parts of these activities individually using your i>clicker. These in-class activities will contribute to your grade as they are reflected in your clicker scores. Those not participating fully in the in-class work will be noted and downward adjustments will be made to your clicker quiz scores.

**Tests:** There will be two tests as shown on the schedule. Testing will be done in the regular class period. Clarity and completeness of your work including sketches, formulation, notation, definitions, and solution process will be required. If your work is not clearly communicated, it is worthless. Any tests missed for other than a documented illness or family emergency or for official required (not optional) University business will be recorded with a zero grade. No other course can excuse you from any requirements of this class for any reason (field trip, concert, practice, etc.). A grade adjustment will be recorded only in the exceptional cases mentioned above. Any instance of cheating on a test will result in failure of the class and a formal charge of academic dishonor will be pursued. Each test will contribute 25% to your total grade.

**Final Exam:** There will be a comprehensive final exam. No exemptions will be given. (33%)

**Grading:** Course grades will be assigned as follows: A=90-100, B=80-89, C=70-79, D=60-69, F=0-59. No curving will be done based on class average. However, **if** you have taken all the tests, have been diligent in doing HW (at least 80% completed), and have good attendance (at least 80% based on clicker data), the lowest one of your test grades will be reduced to 15% and your final exam will be increased to 43% if this is to your advantage. No make up tests will be given. There will be no “extra credit” work.

**Equation Sheet for Tests:** For each test, you may create with your own hand and bring one 8.5” by 11” sheet (using both sides) with you. Using a copy of a sheet prepared by other students is not allowed. You may create a new sheet for each test, or simply add to your earlier sheet, but only one sheet is allowed while taking any test or final exam. The sheet can include any facts, equations, definitions, reminders, drawings, etc. with the exception of worked out examples or HW problems. Inclusion of the latter tends to lead students into thinking that they will be able to find a similar example on the test and simply change numbers. Doing this is always a very bad practice, and we will avoid it.