

MAE 214 SOLID MECHANICS
North Carolina State University
Department of Mechanical and Aerospace Engineering

Instructor: Dr. Jon Ryu (jryu@ncsu.edu)
Office Hours: MW 11:00 – 11:45 PM (Zoom)

Text: Mechanics of Materials-Connect 8th Edition, Beer, Johnston, DeWolf & Mazurek, McGraw Hill; Access code is available from online NCSU bookstore ISBN: 9781260403824/1260403823

Prerequisites: Grade “C” or better in MAE 206

Course Outcomes:

Through the study of MAE 214 the student will be able to:

- i. Apply linear elastic material laws to calculate deformations of deformable bodies;
- ii. Integrate deformable body concepts with static equilibrium to solve statically indeterminate problems;
- iii. Model simple beams;
- iv. Design a structural component including the concept of factor of safety;
- v. Interpret two dimensional stresses and strains using coordinate transformations;
- vi. Calculate maximum normal/shear stresses and strains;
- vii. Model thin walled pressure vessels.

| Weeks | Topics |
|--------------|-------------------------------|
| 1 | Ch 1, 2 |
| 2 | Ch 3-5 (no class on 7/4, 7/5) |
| 3 | Ch 5-7 |
| 4 | Midterm Exam (Ch 1-6), Ch 7-9 |
| 5 | Ch 9-10, Final Review |
| Final | 6/18 10:30 – 11:55 |

Policies:

Academic integrity. Students should refer to the University policy on academic integrity found in the Code of Student Conduct (found at http://www.ncsu.edu/policies/student_services/student_discipline/POL11.35.1.php). It is the instructor's understanding and expectation that the student's signature on any test or assignment means that the student contributed to the assignment in question (if a group assignment) and that they neither gave nor received unauthorized aid (if an individual assignment). Authorized aid on an individual assignment includes discussing the interpretation of the problem statement, sharing ideas or approaches for solving the problem, and explaining concepts involved in the problem. Any other aid would be unauthorized and a violation of the academic integrity policy. Any computer work submitted must be completed on your own personal computer or from your own eos account to avoid confusion about the origin of the file, and no sharing of files in any way is allowed. All cases of academic misconduct will be submitted to the Office of Student Conduct. Students found guilty of academic misconduct will be subject to, at a minimum, a zero on the assignment in question, up to a zero for that course component (e.g. a zero for the homework portion of the final grade), or a failing grade in the course, depending on the nature of the violation. In addition, if you are found guilty of academic misconduct in the course, you will be on academic integrity probation for the remainder of your years at NCSU and may be required to report your violation on future professional school applications. It's not worth it!

- **Homework Assignment.** Homework will be assigned once a week. Students will submit homework through MGH CONNECT website. Internet-based e-learning platform (CONNECT) will provide feedback immediately after the submission. There will be homework due in the last week of class.
- **Late assignment.** Late assignments will receive a percentage deduction of 10% per day.
- **Exams.** There will be two tests and one final exam.
- **Test and homework grading.** If you believe that an error was made in grading the homework, you should write a short justification of your claim and attach it to the original homework assignment (or test) in question. Submit the written justification and original work by email to TA or instructor. The TA will review your submission and respond to you directly. The "statute of limitation" for submitting such claims is one week after the homework or test is returned.
- **Missed tests and exams.** If you miss a test or exam with either a justifiable excuse or prior instructor approval, you will take a makeup test at a designated time on the final exam day. The makeup exam will be fair but comprehensive (covering all the course material) and challenging. Only one missed test can be made up. *Note: if you show up to take a test, you must take the grade – you cannot decide mid-way through to walk out and take the makeup exam.*
Examples of anticipated situations where a student would qualify for an excused absence are:
 - a. The student is away from campus for an official university function, e.g., to participate in a professional meeting or as part of a judging team or athletic team. These students would typically be accompanied by a University faculty or staff member.

- b. Required court attendance as certified by the Clerk of Court.
 - c. Religious observances as verified by Parents & Constituent Services (515-2441). Email confirmation is required. For more information about a variety of religious observances, visit the Diversity Calendar.
 - d. Required military duty as certified by the student's commanding officer.
- **Communication.** Email is the primary communication tool. Use [MAE214] in the head of the email subject. Questions and answers that benefit everyone will be replied to the class group email without consent from the original sender of the message. Use language appropriate for formal communication and maintain a professional relationship in the email with the instructor, TA, grader, and peer.
 - **Calculation of course grade.** A weighted average grade will be calculated as follows:
 - Attendance = 10% (Attendance will be called at the beginning of the class)
 - Homework = 20%
 - Pop-quiz = 10%
 - Midterm exam 1 = 15%
 - Midterm exam 2 = 15%
 - Final exam = 30%

| Score | ≥97 | 92-96.9 | 89-91.9 | 82-88.9 | 77-81.9 | 72-76.9 | 67-71.9 | 62-66.9 | 60-61.9 | < 60 |
|-------|-----|---------|----------|---------|----------|---------|----------|---------|---------|------|
| Grade | A+ | A | A- or B+ | B | B- or C+ | C | C- or D+ | D | D- | F |

If you fall into one of the “gray areas” (A- or B+, B- or C+, C- or D+), your grade will be determined by (i) whether your performance has improved or remained consistent (higher grade) or gotten worse, especially on the final exam (lower grade); (ii) class room activities (e.g. quiz participation).

Note: We do not curve grades in this course. It is theoretically possible for everyone in the class to get an A (or an F). Your performance depends only on how you do, not on how everyone else in the class does. It is therefore in your best interest to help your classmates within the limits of the academic integrity policy.

- **Students with disabilities.** Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with Disability Services for Students at 1900 Student Health Center, Campus Box 7509, 515-7653. http://www.ncsu.edu/provost/offices/affirm_action/dss/ For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation.