ENTC 3408.001 – Strengths of Materials

Spring 2016

A. COURSE INFORMATION

Course number/section: ENTC 3408.001
Class meeting time: TR 11:00-12:15 PM
Class location: EN 101
Course Website: TAMUCC BlackBoard
Lab meeting time: MW 1:00 – 2:50 pm
Lab location: EN 118

B. INSTRUCTOR INFORMATION

Instructor: Andrew Conkey Ph.D.
Office location: EN 210
Office hours: MW 11:00-12:00, TR 2:00 to 3:30 pm by appointment too via email (use your islander email account) (subject to change once meeting times are set for departmental duties)
Telephone: 361-825-2559
e-mail: andrew.conkey@tamucc.edu
Appointments: By e-mail (use your islander email)

C. COURSE DESCRIPTION

Concepts in strength of materials, stress, strain; torsion; deformation under load; direct, shear, and combined stresses; shear and moment diagrams; mohr’s circle; stress concentrations, bending stresses and torsional shear stresses, deflection in beams and shafts; columns, connections, and pressure vessels.

D. PREREQUISITES AND COREQUISITES

Prerequisites
ENTC 2325 - Statics and ENTC 2410 - Materials Science

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
ISBN: 978-1-4987-2591-0

Supplies
None

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

By the end of this course, students should be able to:
1) describe basic concepts in strength of materials
2) describe design properties of materials
3) calculate and design for direct stress, deformation
4) calculate and design for torsional shear stress and torsional deformation
5) calculate and design for shearing forces and bending moments in beams
6) calculate centroids and moments of inertia of areas
7) calculate and design for stress due to bending
8) calculate and design for shearing stresses in beams
9) calculate and design for deflection of beams
10) apply Mohr’s circle to a 2-dimensional element

G. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>5 %</td>
</tr>
<tr>
<td>Quizzes (every week/except exams)</td>
<td>15 %</td>
</tr>
<tr>
<td>Exam 1 (about Feb 25th)</td>
<td>20 %</td>
</tr>
<tr>
<td>Exam 2 (about Apr 5th)</td>
<td>20 %</td>
</tr>
<tr>
<td>Exam 3/Final (May 10th)</td>
<td>25 %</td>
</tr>
<tr>
<td>Lab Component</td>
<td>15 %</td>
</tr>
</tbody>
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H. COURSE CONTENT/SCHEDULE(Tentative)

<table>
<thead>
<tr>
<th>Week</th>
<th>Days/Date</th>
<th>Topic</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan 21</td>
<td>Course Intro and Basic Concepts in Strength of Materials (Chpt 1)</td>
<td></td>
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<tr>
<td>2</td>
<td>Jan 26 &amp; 28</td>
<td>Intro continued &amp; Design Properties of Materials (DPM) (Chpt 2)</td>
<td>HW, Quiz</td>
</tr>
<tr>
<td>3</td>
<td>Feb 2 &amp; 4</td>
<td>DPM continued and Direct Stress, Deformation, and Design (DSDS) (Chpt 2 &amp;3)</td>
<td>HW, Quiz</td>
</tr>
<tr>
<td>4</td>
<td>Feb 9 &amp; 11</td>
<td>DSDS (Chapt 3)</td>
<td>HW, Quiz</td>
</tr>
<tr>
<td>5</td>
<td>Feb 16 &amp; 18</td>
<td>Torsional Shear Stress and Torsional Deformation (TSSTD) (Chapt 4)</td>
<td>HW, Quiz</td>
</tr>
<tr>
<td>6</td>
<td>Feb 23 &amp; 25</td>
<td>Review and Exam 1</td>
<td>HW, Exam 1</td>
</tr>
<tr>
<td>7</td>
<td>Mar 1 &amp; 3</td>
<td>Shearing force and Bending moments in beamsCentroids and area moment of inertia cont. (Chapt 5 &amp; 6)</td>
<td>HW, Quiz</td>
</tr>
<tr>
<td>8</td>
<td>Mar 08 &amp; 10</td>
<td>Bending stresses in beams and Shear stress (SSBMS) (Chapt 7 &amp; 8)</td>
<td>HW, Quiz</td>
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<tr>
<td>9</td>
<td>Mar 22 &amp; 24</td>
<td>SSBMS cont. (Chapt 7 &amp;8 ) S</td>
<td>HW, Quiz,</td>
</tr>
<tr>
<td>10</td>
<td>Mar 29 &amp; 31</td>
<td>Combined stress &amp;Mohr’s circle (Chapt 10)</td>
<td>HW, Quiz</td>
</tr>
<tr>
<td>11</td>
<td>Apr 5 &amp; 7</td>
<td>Review and Exam 2</td>
<td>HW, Exam 2</td>
</tr>
<tr>
<td>12</td>
<td>Apr 12 &amp; 14</td>
<td>Deflection of beams (Chapt 9)</td>
<td>HW, Quiz</td>
</tr>
<tr>
<td>13</td>
<td>Apr 19 &amp; 21</td>
<td>Deflection of beams (Chapt 9)</td>
<td>HW, Quiz,</td>
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<tr>
<td>14</td>
<td>Apr 26 &amp; 28</td>
<td>Thin walled pressure vessels and other design applications (Chapt 12)</td>
<td>HW, Quiz,</td>
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<tr>
<td>15</td>
<td>May 3</td>
<td>Review</td>
<td>Quiz, Review</td>
</tr>
<tr>
<td>FE</td>
<td>May 10th</td>
<td>FINAL EXAM (11:00a.m. to 1:30 p.m.)</td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor and posted on Blackboard Announcements. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.
I. **COURSE POLICIES**

**Attendance/Tardiness**
Roll sheet will be passed out towards the end of class. Showing up and taking the quiz and leaving will not count as attending the class.

**Exams and Quizzes**

**Quizzes:** Quizzes will be closed book, closed notes and will cover concepts, vocabulary, and problems. Material will primarily focus on materials covered in past lecture. Content that is relevant to the learning outcomes could appear on any quiz after it is covered. There may be mini-projects assigned through the term and these will count as a quiz grade. Quizzes may be 5 to 10 minute in length.

**Exams:** Exams will be closed book, closed notes, with use of only of a calculator. Exams will be a combination of concepts, vocabulary, short work out problems, and full work out problems similar to homework. Exams 1 and 2 will be scheduled to be about 50 minutes in length. Exams will be administered at the beginning of the class for the scheduled day. The balance of the class will be lecture on new material.

Concerns with how material was graded for quizzes and exams must be submitted within three class days after quiz or exam was returned. Submittal must have a cover page identifying what is to be reviewed and why the student feels it merits reviewing. This does not apply to quizzes or exams where totaling of points is an issue.

**Late Work and Make-up Exams**

**Homework:** Once homework has been returned, no homework will be accepted. Homework submitted after due date will be reduced by 25%.

**Quizzes/Exams:** Those excuses that fall under university approved will merit a makeup quiz. Missing a quiz due to illness will require evidence from a clinic and will be at discretion of the instructor. Make up exams and quizzes will not be the same as administered to the class.

**Homework Checklist**
Practices as discussed here also apply to exams, especially items 1), 2), and 3).

1) Homework and exam solutions should be submitted in organized, chronological, and neatly presented form. Block lettering is required on solutions.
2) Answers must be clearly presented and boxed. Boxing of just a number is an incomplete answer and will not be awarded points.
3) Appropriate units must be included on all answers. Failure to not include units will result in loss of points.
4) All problems need to be on an engineering paper.
5) At the top-center of each page of homework, write your name, the course number, the assignment number, and date.
6) Pages are to be numbered and stapled.

For further examples, please homework guidelines as provided.
Student Collaboration
Collaboration on homework is encouraged. It can help many of you to understand the ideas better if you explain them to each other. Collaboration to understand problems and concepts is how best to succeed in the working world. However, submitted work must be original and not a blatant copy of another’s work. Also, it is important that the student fully understands the material as there is no collaboration on quizzes or exams.

Electronic Device Use
Neither cell phone nor electronic devices, i.e. smart devices, except engineering calculator are allowed in the class. Students are required to turn off cell phone and all other electronic devices, i.e. smart devices of any nature, before the class starts. This is especially so during exams. No recording of any lectures is allowed without approval of the instructor or as mandated by disability services. Lecture material is protected under copyright rules.

Food, Drinking and Tobacco Use
No food is allowed in class. Drinking is permissible, but user needs to keep area dry, drink discreetly, and do it in a non-distracting way. As per university policy, the use of any tobacco or simulated tobacco product within any university buildings is not allowed.

J. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage their own affairs. Students are viewed as individuals who possess the qualities of worth, dignity, and the capacity for self-direction in personal behavior.
  See Full University Policy at http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course by Friday, April 8th, 2016. No student is eligible to receive a W without completing the official drop process by this deadline. Visit the Office of the University Registrar for the Course Drop Form that must submitted.

- **Grade Appeals (College of Science and Engineering)**
As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.