

ENGR 3132

Strength of Materials Lab

Instructor: Daniel Kuemmerle, PE

Course Syllabus –



KENNESAW STATE
UNIVERSITY

Course Description:

Strength of Materials investigates how structures in our world (beams, columns, trusses, etc.) respond to loads. Will the beam break? How much will the rod stretch under tension? If the material does not break, how much does it deform? How do engineers know how structures will perform—because they understand the mechanics of the materials they are using—because they have performed tests on the materials to understand how they behave.

In this lab, we will place various engineering materials under various types of load and see how these materials respond.

Instructor:

Daniel Kuemmerle, PE

Lecturer

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Phone: 470-578-5079

Office location: L-115

Class Time and Location:

ENGR 3132 Section 01: Monday 9:30am – 12:15pm

ENGR 3132 Section 07: Tuesday 2:00pm – 4:45pm

Room: Q-135

Credit Hours:

0-3-1 (Lecture-Lab-Total Credit Hours)

Required or Elective:

This course is required for all civil, construction, mechatronics, and mechanical engineering majors.

Required Course Materials:

- *Kennesaw State University Civil & Construction Engineering Strength of Materials Lab Manual*
PDF available as a download from the course D2L website.
- Safety Glasses (you cannot be in the laboratory without them, and if you do not have any, you will have to leave).
- Closed-toed shoes

Textbook Required:

There is no textbook for the lab. However, you might find the textbook from the ENGR 3131 lecture helpful if you have it. There is a required lab manual available for free download on the course's D2L site.

Co-requisite:

ENGR 3131 – *Strength of Materials* lecture

You must register for a strength of materials lecture ENGR 3131 along with ENGR 3132, or have previously taken ENGR 3131. The lecture is a separate course, and you must register for the lecture separately. Having the same instructor for the lab and the lecture is not required.

Learning Outcomes:

Upon completion of this course, you will be able to:

1. Perform standard mechanical testing such as tensile test, torsion test, beam bending test, and buckling test.
2. Develop and utilize the stress-strain diagrams for determining the mechanical properties of various materials.
3. Utilize extensometer and strain gauge in stress/strain analysis
4. Utilize data acquisition hardware/software for mechanical testing
5. Prepare calculations and data analysis to determine material properties.

Course Outcome Measures and Assessment:

Measures and assessment of the outcomes will be made by:

1. Lab Notebook
2. Lab Worksheets
3. Lab reports
4. One mid-term quiz
5. One final quiz
6. End of term peer evaluation survey
7. Course and instructor evaluation at the end of the semester to provide student feedback on the quality of the course and effectiveness of the instructor.

Grading:

1. Lab Notebook: 10% (Individual Grade)
 2. Worksheets non-lab report experiments (Individual Grade): 10%
 3. Lab Reports: 40% (Group Grade)
 4. Attendance: 10% (Individual Grade)
 5. Professionalism/Participation: 10% (Individual Grade)
 6. Midterm quiz: 10% (Individual Grade)
 7. Final quiz: 10% (Individual Grade)
- The grade scale is: $A \geq 90.0\%$; $80.0\% \leq B < 90.0\%$; $70.0\% \leq C < 80.0\%$; $60.0\% \leq D < 70.0\%$; $F < 60.0\%$

Lab Attendance Policy:

Attendance is required for all lab experiments unless you are ill or officially excused by me (such as a result of official, documented participation in a university function). In the case of unavoidable absences, you are responsible for making up the lab during a different lab section that week. Contact me in advance of your absence, and I can help you arrange that with another lab section led by me or a different instructor (see my lab schedule at "Class Time and Location" above). Even when you arrange to attend a different lab section, please understand that you are work with your normal group (with their data) to write the report. Missed lab experiments without a written excuse approved by me will result in no credit for that individual's lab report grade and a reduction in points towards the attendance grade. Please note that, to be in the laboratory during experiments, you must have and be wearing your safety glasses. You cannot participate without them, and you will not get credit for attendance.

Lab Notebook:

This can be in electronic or paper form, but each student will keep a handwritten record of the day's experiment. This includes handwriting all information pertinent to the lab experiment and subsequent calculations for worksheets and/or reports. All measured dimensions, input values, including other data written on the board. When results are hand written on the board, these shall be recorded here, but when large data files are generated by the computer, only the specimen dimensions and other input values as noted on the board and lab manual.

These Lab Notebooks must be signed by the lab instructor prior to leaving the lab that week.

Worksheets:

For experiments that do not require group reports, each individual student shall submit a “worksheet.” The requirements for these worksheets will vary by experiment. The requirements for each worksheet are discussed in the Lab Manual. The worksheets should always contain all measured dimensions, and input and output values, and all required graphs and comparisons and discussions. There is often not a provided worksheet form, per se. Instead, the layout of the worksheet is often left up to the student. Unless directed otherwise, each group shall submit its lab report as a single file PDF uploaded to the D2L “Assignments” folder by the due date and time listed in D2L.

Lab Reports & Lab Groups:

Technical lab reports are an important part of this course. There will be a written lab reports required for several of the lab experiments conducted. Students will be assigned to lab groups, which will in turn conduct the experiments. Each lab group will then produce a group written report, which describes the experiments and the findings. Unless directed otherwise, each group shall submit its lab report as a PDF uploaded to the D2L “Assignments” folder by the due date and time listed in D2L.

Lab Report Guidelines:

- **The lab report shall be a single file of PDF format**, named in the following naming convention: Lab [X]_[Course Section #]_[Group #], where [X] refers to the experiment number, [course section #] refers to the KSU course section number particular to your section of ENGR 3132, and the [Group #] refers to the group number assigned to your group by me.
- **Cover page requirements:** Include the names of all group members on the title page of the report. Below this, complete a “Group Member Contributions” section. After each member’s name, briefly state all work performed by this member, both during the physical experiment as well as any work in generating the report. If a group member is not listed or has no contributions listed, the group member will get no credit for the lab report grade.
- The lab reports shall be written in accordance with the “Preparation of Laboratory Reports” section of the Lab Manual.
- Please note the grading rubric provided in the lab manual. I will be using it to grade your lab reports. It spells out the report expectations.
- Be sure that the work is your own, and that the reference material is given proper credit. Otherwise, you are plagiarizing.
- The reports are due as PDF uploads to D2L by the time and date listed in the D2L assignment or as directed by me. Late lab reports will not be accepted.

End of Term Peer Evaluation Survey

Prior to taking the final exam, each student will be asked to complete a survey where he/she evaluates the effectiveness of the other group members concerning teamwork, participation, work ethic, and communication. Writing technical papers, like many other aspects of engineering, is often a group exercise, and this survey is used to help measure your ability to function in a group setting. I will review these completed surveys and determine a portion of your “Professional/Participation” grade item. The remainder of this grade item is assigned based upon my direct observations.

Quiz Policy:

Quizzes will be administered online through D2L Brightspace, but I reserve the right to administer quizzes during class time if needed. It is your responsibility to ensure that the required technology (such as your computer) is functional during the availability window of the quiz. You should also check that D2L Brightspace is not down for maintenance during the desired quiz taking window. It is strongly recommended not to wait until the very end of the quiz open window to attempt to take an quiz.

Make-up Policy for Quizzes:

There will be no make-up quizzes under any circumstances, except medical reasons. Provide me with a letter from your medical doctor. If your absence is excused, then I reserve the right to have you either make up the quizzes, or to have other quizzes/assignments weighted more heavily to make up for the missing points.

Methods of Communicating:

D2L shall be considered the primary method of communication from me, and you should check D2L regularly. You can ask questions and ask for clarification by e-mail, in class, or by visiting me during office hours or by appointment. <http://d2l.kennesaw.edu>

Electronic Communications:

The University provides all KSU students with an “official” email account with the address “students.kennesaw.edu.” As a result of federal laws protecting educational information and other data (see the following section entitled “FERPA,” **this is the sole email account you should use to communicate with me or other University officials.**

Response Timeframe:

Grading of assignments may take up to a week. I will try to respond to any discussions, comments, and questions within 24 hours. However, I may not be available during the weekend or while I am on vacation or on official trip.

Readings, Preparation, and Participation:

Read over the lab manual pages pertaining to the week’s experiment prior to the lab meeting, so that you are familiar with the experiment. Your participation in the various lab activities will be noted in the participation grade.

Discussion/Dispute of individual Graded Items:

Students have one week after receiving a grade for a graded item (assignment, quiz, etc.) to discuss/dispute it with the instructor. After that, the grade stands as assigned.

Course Schedule:

The schedule below is a guideline only. Lab experiment dates might change due to scheduling issues or equipment issues. I will provide information about changes to this schedule through class discussion, email, or D2L. Note that this schedule is setup by week. The dates shown are the Monday of the week. Work this schedule with your actual day and time of lab for that week. Additionally, important dates are listed in ***bold italics***.

Week # Week of TOPIC

Week #	Week starting on:	Topic
1	1/6	No lab this week
2	1/13	Syllabus review, safety instruction, group selection, Lab 1: Normal and Shear Strength of Materials.
3	1/20	No lab this week
4	1/27	Lab 2: Poisson's Ratio Test
5	2/3	Lab 3: Axial Tension Test
6	2/10	No lab this week
7	2/17	Midterm Quiz (covering Labs 1 – 3) through D2L. Do <u>not</u> report to Q-135.
8	2/24	Lab 4: Torsion Test
9	3/2	No Lab this week
10	3/9	Lab 5: Fatigue Test
11	3/16	Lab 6: Pressure Vessel Test
12	3/23	Lab 7: Beam Bending and Deflection Test
13	3/30	No lab this week
14	4/6	Lab 8: Column Buckling
15	4/13	No lab this week
16	4/20	Final Quiz (covering Labs 4- 8) through D2L. Do <u>not</u> report to Q-135.

Other Important Dates:

1/10: Last day to drop/add classes

1/20: Holiday

2/26: Last day to withdraw from courses without academic penalty

3/28 – 4/3: Spring break

4/20: Last day to withdraw from courses with a WF.

4/27: Last day of classes

****Note that the Final Quiz is prior to formal final exams week. The final exam will be administered online during the normal lab meeting time. This will conclude the lab work for the semester.***

Policies:

- **Course Withdrawal Policy:** Please refer to the KSU catalog for specific information regarding course withdrawal. Students are solely responsible for managing their enrollment status in a class; nonattendance does not constitute a withdrawal.
- **Grade Dispute/Appeal:** Final grade dispute/appeal must be submitted within a week of the final exam. The procedure has been outlined in the KSU website that can be accessed via the link at http://www.kennesaw.edu/registrar/policies/grade_appeals.php.
- **Computer Use:** Much of the course materials, quizzes, assignments, and communication will be through D2L Brightspace. It is the student's responsibility to stay current with D2L content. In the classroom, laptop/handheld computers may be used as long as it is not distracting to other students.
- **Cell Phones:** All communication devices must be turned off or to silent mode in the laboratory. The use of cell phones or other communication devices is disruptive, and is therefore prohibited during class.
- **Instructor's Absence or Tardiness:** If the instructor is late in arriving to class, you must wait 20 minutes after the start of class before you may leave without being counted absent, or you must follow any written instructions the instructor may give you about an anticipated absence or tardiness.
- **What is Plagiarism?** KSU defines Plagiarism as the practice of taking someone else's work or ideas and passing them off as one's own. When unaware or uncertain on how properly to cite a particular source, please do not neglect to add the citation — KSU considers not doing so as plagiarism. If you have questions on how to cite your work, please contact me immediately! For more information, please refer to the "Plagiarism Policy" under the *Policies* section of this syllabus.
- **Student Rights and Responsibilities:** Students of KSU are entitled to an environment that is conducive to learning and individual growth. To this end, students enrolling at KSU assume a responsibility to abide by the policies and regulations expressed in this section. By doing so, students may fulfill their responsibilities and enjoy the exercise of their own rights while also respecting the rights of others. Information about the student rights and responsibilities can be found at <http://catalog.kennesaw.edu/content.php?catoid=27&navoid=2263>
- **Statement on Publication of Course Materials:** Some lecture slides, course notes, or assignments used in this course may be the property of the textbook publisher or other third parties. All other course material, including but not limited to slides developed by the instructor(s), the syllabus, assignments, course notes, course recordings (whether audio or video) and examinations or quizzes are the property of the University or of the individual instructor who developed them. Students are free to use this material for study and learning, and for discussion with others, including those who may not be in this class, unless the instructor imposes more stringent requirements. Republishing or redistributing this material, including uploading or linking the material it to web sites, violates the rights of the copyright holder and is prohibited. There are civil and criminal penalties for copyright violation. Publishing or redistributing this material in a way that might give others an unfair advantage in this or future courses is may subject you to penalties for academic misconduct.
- **Policy Changes:** Information contained in the course syllabus may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Institutional Policies

Federal, BOR, & KSU Course Syllabus Policies: Information contained in the links below constitutes the Federal, BOR, and KSU course syllabus policies and procedure. These policies are updated on the Academic Affairs Website annually.

- Academic Affairs - Federal, BOR, & KSU Policies
(http://curriculum.kennesaw.edu/resources/federal_bor_ksu_student_policies.php)
- Academic Affairs - KSU Student Resources for Syllabus
(http://curriculum.kennesaw.edu/resources/ksu_student_resources_for_course_syllabus.php)

- **Academic Integrity Statement:** Every KSU student is responsible for upholding the provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. Section 5c of the Student Code of Conduct addresses the university's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Department of Student Conduct and Academic Integrity (SCAI), which includes either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement. See also KSU Student Code of Conduct (<https://web.kennesaw.edu/scai/content/ksu-student-code-conduct>).
- **Electronic Communication:** The University provides all KSU students with an "official" email account with the address "students.kennesaw.edu" or "kennesaw.view.usg.edu" (in D2L). As a result of federal laws protecting educational information and other data, this is the sole email account you should use to communicate with your instructor or other University officials.

Contacts to get Help:

- D2L Technical Support, go to <https://d2lhelp.view.usg.edu/> or call 678-915-HELP
- D2L Brightspace website at <https://kennesaw.view.usg.edu/d2l/login>
- KSU Help Desk Phone Number: (678) 915-HELP (4357).
- KSU Distance Learning at <http://distancelearning.kennesaw.edu/support/content-tools.php>
- KSU UITS at <http://uits.kennesaw.edu/>
- Accessibility policy of all technologies:
<https://softchalkcloud.com/lesson/serve/jV10GKPfztZwQn/html>
- Additional Resources
- Remote access to Library Resources at <http://www.kennesaw.edu/library/DI/dl.html>
- You can find The USG Copyright Policy at <http://www.usg.edu/copyright/>
- [Other help for student success at http://sss.kennesaw.edu/](http://sss.kennesaw.edu/)
- Academic support services and student services at (<http://kennesaw.edu/currentstudents.php>)
- KSU CETL Thank a Teacher at <http://cetl.kennesaw.edu/thank-a-teacher>
- The KSU Writing Center helps students in all majors improve their writing. Experienced, friendly writing assistants help with topic development, revision, research, documentation, grammar, and more. For more information or to make an appointment, visit writingcenter.kennesaw.edu or stop by English Building, Room 242 (Kennesaw campus) or Johnson Library, Room 121 (Marietta campus).