

Technical College of the Lowcountry
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EGR 194 STATICS AND STRENGTH OF MATIERIALS

Course Description

This course covers external and internal forces in structures and/or machines, including conditions of equilibrium, systems of force, moments of inertia and friction. It also covers the stress and strain relationships in materials.

4 Cr (4 lec/pres, 0 lab, 0 other)

Course Focus

The course introduces the action and reaction of forces both within and outside of a body. Upon completion of this course, the student should have an understanding of, equilibrium, free-body diagrams, two- and three-dimensional force systems, stress-strain relationships, shear and moment diagrams, elementary truss and frame analysis, centroids and centers of gravity, friction, and moments of inertia. The purpose is to develop a fundamental understanding of engineering theory.

Text and References

Burns, Thomas, **Applied Statics and Strength of Materials**, 2nd ed., Delmar Centgage Published: 2010
ISBN 978-1-4354-1331-3

Course Goals

The following list of course goals will be addressed in the course. These goals are directly related to the performance objectives.

1. Discuss right angle trigonometry
2. Review the science of mechanics
3. Discuss units in mechanics
4. Understand the development of forces
5. Distinguish between scalars and vectors
6. Perform vector addition using trapezoid rule
7. Perform vector addition using triangle rule
8. Resolve vectors into rectangular components
9. Compute resultant of rectangular components
10. Compute moments
11. Analyze parallel force systems
12. Solve non-concurrent force systems
13. Review load paths
14. Review force couples
15. Understand equilibrium of a rigid body

16. Draw appropriate free body diagrams
17. Calculate reactions at supports
18. Perform truss force analysis with method of joints
19. Use method of sections in truss analysis
20. Find zero force truss members
21. Analyze frame forces
22. Calculate coulomb friction
23. Resolve friction forces at supports
24. Review wedge forces
25. Calculate the first moment of area of shapes
26. Resolve distributed forces into resultants
27. Calculate the second moment of area
28. Understand parallel axis theorem
29. Determine moment of inertia in composite bodies
30. Compute polar moments of inertia
31. Describe the radius of gyration
32. Compute normal stress
33. Compute shear stress
34. Review stress concentrations
35. Determine strain
36. Determine the modulus of elasticity
37. Study Poisson's ratio
38. Predict axial deformation
39. Report thermal stress
40. Determine the Bulk Modulus
41. Compute torsion
42. Determine torsional rotation
43. Find shaft power
44. Examine internal forces in beams
45. Compute beam shear force
46. Determine beam internal moments
47. Use graphical methods to determine shear diagrams
48. Use graphical methods to determine moment diagrams
49. Review shear and moment diagrams in continuous beams
50. Determine bending stresses in a shape
51. Compute shearing stresses in a shape
52. Calculate beam deflections with standard formulas
53. Review the effects of combined stresses

Student Contributions

The student is expected to be prepared for class and to be in class on time.

Test materials are weighed heavily in favor of lecture materials.

The student will complete all assignments.

All cell phones and pagers must be silenced during class.

Course Evaluation

The grade scale is as follows:

90 – 100 =	A
80 – 89 =	B
70 – 79 =	C
60 – 69 =	D
Below 60 =	F

Course grades will be determined from the following weighting scheme:

Attendance/Notebook Review/Homework completion	20%
Homework sharing	10%
Quizzes	50%
Final	20%

Course Schedule

The class meets for 1 lecture for 3.33 hours per week.

ADA Statement

The Technical College of the Lowcountry provides access, equal opportunity and reasonable accommodation in its services, programs, activities, education and employment for individuals with disabilities. To request disability accommodation, contact the counselor for students with disabilities at (843) 525-8228 during the first ten business days of the academic term.

Academic Misconduct

There is no tolerance at TCL for academic dishonesty and misconduct. The College expects all students to conduct themselves with dignity and to maintain high standards of responsible citizenship.

It is the student's responsibility to address any questions regarding what might constitute academic misconduct to the course instructor for further clarification.

The College adheres to the Student Code for the South Carolina Technical College System. Copies of the Student Code and Grievance Procedure are provided in the *TCL Student Handbook*, the Division Office, and the Learning Resources Center.

Attendance

The College's statement of policy indicates that students must attend ninety percent of total class hours or they will be in violation of the attendance policy.

- Students not physically attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
- Students taking an online/internet class must sign in **and** communicate with the instructor within the first ten calendar days from the start of the semester to indicate attendance in the class. Students not attending class during the first ten calendar days from the start of the semester must be dropped from the class for NOT ATTENDING.
- Reinstatement requires the signature of the division dean.

In the event it becomes necessary for a student to withdraw from the course **OR if a student stops attending class, it is the student's responsibility to initiate and complete the necessary paperwork.** Withdrawing from class may have consequences associated with financial aid and time to completion.

When a student exceeds the allowed absences; the student is in violation of the attendance policy. The instructor **MUST** withdraw the student with a grade of "W", "WP", or "WF" depending on the date the student exceeded the allowed absences and the student's progress up to the last date of attendance *or* under extenuating circumstances and at the discretion of the faculty member teaching the class, allow the student to continue in the class and make-up the work. This exception must be documented at the time the allowed absences are exceeded.

Absences are counted from the first day of class. There are no "excused" absences. All absences are counted, regardless of the reason for the absence.

- A student must take the final exam or be excused from the final exam in order to earn a non-withdrawal grade.

A copy of TCL's **STATEMENT OF POLICY NUMBER: 3-1-307 CLASS ATTENDANCE (WITHDRAWAL)** is on file in the Division Office and in the Learning Resources Center.

Hazardous Weather

In case weather conditions are so severe that operation of the College may clearly pose a hardship on students and staff traveling to the College, notification of closing will be made through the following radio and television stations: WYKZ 98.7, WGCO 98.3, WGZO 103.1, WFXH 106.1, WWVW 106.9, WLOW 107.9, WGZR 104.9, WFXH 1130 AM, WLVH 101.1, WSOK 1230 AM, WAEV 97.3, WTOC TV, WTGS TV, WJWJ TV, and WSAV TV. Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. www.tcl.edu/textalert.asp

Emergency Text Message Alert

Students, faculty and staff are highly encouraged to opt in to the Emergency Text Message Alert System. Participants receive immediate notification of emergency events and weather cancelations via text messaging on their cell phones. Participants can also opt in to receive non-emergency news and announcements. Go to www.tcl.edu. On the homepage, click on "emergency TextAlert at TCL" and fill out the form or go to www.tcl.edu/textalert.asp

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