

Technical College of the Lowcountry
921 Ribaut Road



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CET 244 STRUCTURAL STEEL DESIGN

Course Description

This course covers the design of beams, columns, floor framing, tension and compression members, and bolted and welded connections according to AISC specifications.

3 Cr (3 lec/pres, 0 lab, 0 other)

Course Focus

The course is designed to introduce the student to the LRFD method of structural steel design. The course will progress through basic structural analysis and load calculations, steel design as a tension member, the design of beams and columns and the basic aspects of connection design.

Text and References

Aghayere, Abi, and Vigil, Jason, **Structural Steel Design: A Practice-Oriented Approach**, 1st edition, Prentice Hall
Published: 2009
ISBN 978-0-13-234018-2

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 steel material properties
2. Repeat hot rolled steel shapes
3. Distinguish structural load paths
4. Compute tributary areas
5. Explain LRFD principals
6. Compute IBC load combinations
7. Interpret steel stress/strain diagram
8. Review ASTM steel specifications
9. Express limit states of tension member design
10. Calculate yielding of gross section
11. Understand net area
12. Calculate fracture of the net section
13. Repeat hole size rules
14. Compute stagger hole benefits
15. Use shear lag reductions
16. Design for block shear
17. Analyze tension rod capacity
18. Repeat Euler buckling formula

19. Use effective column lengths
20. Compute slenderness ratio
21. Determine critical stress
22. Indicate column capacity by calculation
23. Check for compact section
24. Indicate column capacity by AISC tables
25. Analyze braced columns
26. Use AISC alignment charts
27. Develop inelastic column analysis
28. Study second order column effects
29. Design leaning columns
30. Discuss elastic beam analysis
31. Determine plastic beam analysis
32. Compute elastic moment
33. Express plastic moment
34. Derive useable moment by calculation
35. Find useable moment by AISC figures
36. Analyze beam bending coefficient
37. Determine useable beam shear
38. Examine beam deflection
39. Indicate beam column stress limits
40. Examine structural bolts
41. Design bolts for shear
42. Design bolts for tension
43. Discuss bearing design
44. Develop weld symbols
45. Complete weld strength analysis
46. Select connection design by AISC tables
47. Examine bar joist selection
48. Review OSHA rules for steel erection

Student Contributions

Each student will spend approximately 2.5-5 hours per week preparing for class and completing assignments weekly and will be in class on time. Students will complete and turn in assignments as specified. In addition, quizzes are to be completed as assigned. Students will also complete a final exam to demonstrate their knowledge of the material. 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%
Quizzes	60%
Final	20%

Course Schedule

The class meets for 2.75 lecture/presentation hours per week. Course content will be taught in the order that the content goals are presented in the syllabus.

Approved by: Kenneth Flick Developed/Revised: 1/7/2012
Ken Flick, Division Dean for Business/Industrial Division

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 Text Alert at TCL” and fill out the form or go to www.tcl.edu/textalert.asp