

Technical College of the Lowcountry
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CET 242 CONCRETE DESIGN

Course Description

This course covers the design of structural members according to the ACI codes, quality control of concrete and structural inspection.

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

Course Focus

Introduce the student to the design and quality control of concrete mixes, the design of concrete structural members according to the ACI codes, and structural inspection. The course covers concrete placement and testing, and structural design of concrete beams, slabs and columns. The purpose is to develop a basic understanding of concrete as a structural material.

Text and References

Kosmatka, S. H. and Wilson, M. L., **Design and Control of Concrete Mixtures**, 15th edition, Portland Cement Association Published: 2011

Course Goals

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

1. Review and understand concrete lab safety
2. Use appropriate procedure for making concrete specimens
3. Experiment with compressive strength of concrete cylinders
4. Perform concrete slump testing
5. Evaluate slump performance differences
6. Enumerate water to cement ratio difference effects
7. Explain cement hydration reactions
8. Recommend good concrete curing practices
9. Understand compressive strength differences
10. Repeat concrete stress correlations
11. Review concrete permeability differences
12. Review volume stability and crack control
13. Recognize concrete durability issues
14. Review the production of cement
15. Name appropriate cement type for a given application
16. Discuss various supplemental cementitious materials
17. Describe supplemental cementitious materials effects on fresh and hardened concrete
18. Identify appropriate sources of mix water
19. Perform gradation testing on aggregates
20. Identify appropriate aggregate materials
21. Perform aggregate moisture content testing
22. Calculate fineness modulus

23. Calculate specific gravities
24. Discuss appropriate admixture for a given application
25. Summarize effects of enhanced air content
26. Perform air content testing by the pressure method
27. Perform air content testing by volumetric method
28. Employ absolute volume mix design
29. Adjust mix design for aggregate water content
30. Review fiber reinforcement
31. Reiterate ACI strength design load equations
32. Construct mathematical model of concrete flexural stresses
33. Repeat appropriate concrete cover
34. Analyze strain compatibility
35. Predict failure strains in tension reinforcing
36. Determine concrete shear strength
37. Design steel shear reinforcement
38. Recognize concrete column reinforcement
39. Describe stress interaction affects
40. Calculate reinforcing development length
41. Distinguish failure modes in anchor design
42. Interpret concrete surface defects
43. Discuss non-destructive concrete testing methods

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. The student is required to observe and practice all lab safety rules. 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 1 lecture for 2.75 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, WTOG 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