Missouri University of Science and Technology  
Department of Civil, Architectural & Environmental Engineering

CE / ArchE 5220 – Spring 2018  
ADVANCED CONCRETE STRUCTURES DESIGN

INSTRUCTOR:  
Dr. Lesley H. Sneed, P.E., F.ACI  
Associate Professor and Stirrat Faculty Scholar  
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Class Meetings:  
TTh 8:00 – 9:15am  
BCH 213

Office Hours:  
TTh 10:00am-11:00pm or by appointment

Textbooks:  
2. Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary (ACI 318R-14)

Other References: (Not required)  

COURSE DESCRIPTION
The design of structural concrete systems into a final integrated structure. Two-way slabs, long columns, connections, and discontinuity regions, deflections and cracking of beams and slabs, ACI design criteria, and similar type problems of interest to the student. Use of the computer as a tool to aid in the design will be emphasized.

Prerequisites
CE/ArchE 3220 with a grade of C or better.

Prerequisite Requirement Verification.
All students are required to meet the prerequisite requirement(s) for this course. If you are reading this statement and you have not met the prerequisite requirement(s) for this course, you must either (1) drop this course immediately (please notify the instructor if you do this), or (2) arrange to meet with the instructor to provide an explanation for why you should be allowed to remain in this course. The course instructor will be performing a pre-requisite verification check in the near future. If the instructor determines that you have not met the pre-requisite requirement(s) for this course and have not provided a suitable explanation as to why you should remain in the course, the instructor will drop you from this course.

COURSE OBJECTIVES
The overall course objective is to provide an advanced engineering practice-oriented design course. This course aims to enrich and expand knowledge and understanding of the principles and mechanics of reinforced concrete (RC) learned in the undergraduate course (CE/ArchE 3220) and to introduce advanced topics such as design of slab systems, long columns, and disturbed regions/connections. In addition, practical design of structural members is implemented using the ACI 318-14 code.

COURSE REQUIREMENTS
Lectures
The purpose of the lectures is to introduce the basic mechanics of RC, to apply them to the design and analysis or RC members, to relate them to ACI design philosophy and provisions, and to work related problems. While the behavior of an RC beam will be briefly reviewed, the emphasis is placed on covering advanced topics contained in the textbook. It is the responsibility of each student to grasp the subject matter and to work related problems.

Not all of the assigned material in the textbook will be covered during the lectures, and additional material that is not contained in the textbook may be presented during lectures. Students will be responsible for material presented in both the lectures and the assigned reading.

For students enrolled in the distance section of the course, lectures will be archived by Missouri S&T Distance and Continuing Education at http://dce.mst.edu. In accordance with University policy, archived lectures are available only to the students enrolled in the distance section of the course.

Class Attendance
Class attendance IS REQUIRED. Attendance will be monitored by the instructor. University policy for dropping students from the class roster that do not attend will be enforced. If an emergency arises in which you cannot attend class, please notify the instructor ahead of time, by email or phone, such that arrangements can be made for any missed handouts or homework assignments.

Homework
Homework will be assigned on a regular basis and collected as designated by the instructor. Homework must be neat and organized. Homework problems will be presented on engineering computation paper, single side only. Students should restate the problem statement using a straight edge and place a box around the final answer(s). Points will be deducted from homework assignments that are not presented in this manner. Collective work is permitted, but individual submission of homework is required. Homework assignments will be due at the beginning of the lecture on the day it is due. Late homework will not be accepted. Homework assignments will be collected in class from the on campus students. Distance students may submit their homework assignments either by email with an electronic file (pdf or similar) of the assignment and “CE 5220 Advanced Concrete Structures Design HW #” in the email subject header (preferred option) or by fax to the attention of Dr. Lesley Sneed at 573/341-4729.

Examinations
Two regular exams during the semester and a comprehensive final exam will be scheduled for this course. Missed exams will count as zero. Exams cannot be made up except under very unusual circumstances approved prior to the scheduled exam date by the instructor, and in which case, a special comprehensive exam will be administered during the final exam week.

ACI 318-14 Code Requirements
Students are required to have a hard copy of the ACI 318-14 code for this course. Sharing of codes during exams will not be permitted. Codes are available for purchase from the ACI website. ACI Student Members are eligible to purchase a single copy at the student rate (student membership is free of charge):
**GRADING SYSTEM**

Course grades will consist of the following components:

- Homework Assignments 24%
- Two Mid-term Exams (25% each) 50%
- Final Exam 25% *
- Participation 1%

Grading Scale: A=90-100%; B=89-80%; C=79-70%; D=69-60%; F<60%.

Cutoffs may be slightly lower, but will **not** be higher.

*A score of less than 50% on the Final Exam will result in a failing grade, regardless of previous performance.

Partial credit will be given on exams and coursework as determined by the instructor / grader and is not open to discussion. Any errors in adding points, marking something wrong that is actually correct, etc. should be brought to the attention of the instructor / grader.

**STUDENT ACADEMIC DISHONESTY**

Academic honesty is essential for the intellectual life of the University and for your continued academic and professional development and growth. As your instructor and a licensed Professional Engineer, I have a very high standard for academic honesty in all your work for this class. You as a student in this class have an obligation to adhere to that high standard.

A. *Should a case of academic dishonesty arise during the course of the semester, I shall do the following:*

1) *I shall assign a failing grade to the work in question for each student engaged in the dishonest work submittal. This specifically means that the person(s) sharing their work so that another person may claim ownership is held equally responsible and accountable for the same breach of trust;*

2) *I shall refer the incident to both the department Chair and to the Vice Provost for Undergraduate and Graduate Studies as required in Section 200.010 of the Collected Rules and Regulations of the University of Missouri.*

B. By enrolling in this course and receiving this syllabus, whether in printed or electronic format, you are certifying knowledge of Sections 200.010 (Standard of Conduct) and 200.020 (Rules of Procedures in Student Conduct Matters) in the Collected Rules and Regulations of the University of Missouri and are pledging to abide by them. If you have not yet read these Sections, please do so. They may be found at:

   [https://www.umsystem.edu/ums/rules/collected_rules/programs/ch200](https://www.umsystem.edu/ums/rules/collected_rules/programs/ch200)

C. By enrolling in this course and receiving this syllabus, whether in printed or electronic format, you are certifying knowledge of the Honor Code developed and endorsed by the Missouri S&T Student Council. If you have not yet read the Honor Code, please do so. It can be found at this link:

   [http://stuco.mst.edu/honor-code/](http://stuco.mst.edu/honor-code/)

**BUILDING EGRESS**

Please familiarize yourself with building egress routes as indicated on the website [http://designconstruction.mst.edu/floorplan/](http://designconstruction.mst.edu/floorplan/). These routes have been developed as part of the campus’ response to the request of the Governor's Security Task Force.

**DISABILITY SUPPORT SERVICES**

If you have a documented disability and anticipate needing accommodations in this course, you are strongly encouraged to meet with me early in the semester. You will need to request that the Disability Services staff send a letter to me verifying your disability and specifying the
accommodation you will need before I can arrange your accommodation. Information about Disability Support Services can be found at [http://dss.mst.edu](http://dss.mst.edu).

**TITLE IX**

Missouri University of Science and Technology is committed to the safety and well-being of all members of its community. US Federal Law Title IX states that no member of the university community shall, on the basis of sex, be excluded from participation in, or be denied benefits of, or be subjected to discrimination under any education program or activity. Furthermore, in accordance with Title IX guidelines from the US Office of Civil Rights, Missouri S&T requires that all faculty and staff members report, to the Missouri S&T Title IX Coordinator, any notice of sexual harassment, abuse, and/or violence (including personal relational abuse, relational/domestic violence, and stalking) disclosed through communication including but not limited to direct conversation, email, social media, classroom papers and homework exercises.

Missouri S&T’s Title IX Coordinator is interim chief diversity officer Neil Outar. Contact him (naoutar@mst.edu; (573) 341-6038; Temporary Facility A-1200 N. Pine Street) to report Title IX violations. To learn more about Title IX resources and reporting options (confidential and non-confidential) available to Missouri S&T students, staff, and faculty, please visit [http://titleix.mst.edu](http://titleix.mst.edu).

**BEST WISHES FOR A SUCCESSFUL SEMESTER!**
Item | TOPIC
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1. | Review of Reinforced Concrete Beams
2. | Behavior of Reinforced Concrete Beams
3. | Slab Systems
4. | Slender Columns
5. | Column-Slab Connections
6. | Design of Disturbed Regions
7. | Structural Walls
8. | Design for Torsion