1. CEE 4360 (5360) – Advanced Topics in Structural Concrete Design

2. Course credit hours: 3
   Contact hours per week: 3
   Credit category: Engineering Topics (Significant Design)

3. Course coordinator: R. Craig Henderson

4. Textbook: ACI 318 – Building Code Requirements for Structural Concrete

   Supplemental materials: Jack C. McCormac, Wiley, *Design of Reinforced Concrete*, latest edition.

5. Course information:

2020 Catalog description	Special topics in the design of concrete structures. Footings, retaining walls, slabs, and prestressed concrete.
Prerequisite(s)	CEE 4320
Course type	Selected Elective

6. Course instructional outcomes:

Course Outcome No.	Course Outcome (CO)	ABET Student Outcome
CO1	Analyze and design footings subjected to axial load and moment	1, 2
CO2	Analyze and design walls and slabs subjected to pressure loads	1, 2
CO3	Analyze and design cantilever retaining walls, including a. calculation of lateral earth pressures b. stability check of the wall c. structural design of stem, base, key (if required)	1, 2
CO4	Understand prestressed concrete analysis and design concepts	1
CO5	Analyze and design prestressed concrete beams	1, 2

   ABET criterion 3 Student Outcomes addressed by this course:

SO No.	Student Outcome (SO)
3.1	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
3.2	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

7. Course topics:
   1. Review of flexure, shear and axial loads on beams and columns (15%)
   2. Analysis and design of slabs and walls (15%)
   3. Analysis and design of footings subjected to axial load and bending (20%)
   4. Analysis and design of cantilever retaining walls (25%)

5. Introduction to Prestressed Concrete Analysis and Design (25%)

Program criteria (curriculum) addressed by this course:

1. Apply knowledge of mathematics through differential equations, calculus-based physics, chemistry, and at least one additional area of basic science
2. Analyze and solve problems in at least four technical areas appropriate to civil engineering
3. Design a system, component, or process in at least two civil engineering contexts

8. Additional topics, assignments, or requirements for dual-level (4000/5000) course:
   Grad students are expected to develop digital tools (typically using MathCad, Excel, or Visual BASIC) for automating the design process for reinforced concrete structures and elements.

9. Date: 01/20/2020