

1. CEE 3030 – Civil Engineering Materials
2. Course credit hours: 3  
Contact hours per week: 4  
Credit category: Engineering Topics
3. Course coordinator: L. K. Crouch
4. Textbooks: Portland Cement Association, *Design and Control of Concrete Mixtures*, Sixteenth Edition, 2016

Supplemental materials: *Hot-mix Asphalt Materials, Mixture Design and Construction*, Roberts, Kandhal, Brown, Lee and Kennedy, National Center for Asphalt Technology, Third Edition, 2009.

5. Course information:

2020 Catalog description	Characteristics and uses of aggregates, Portland cement, concrete and bituminous materials for highways and other major engineering works.
Prerequisite(s)	CEE 3110
Course type	Required

6. Course instructional outcomes:

Course Outcome No.	Course Outcome (CO)	ABET Student Outcome
CO1	Perform aggregate calculations such as gradation analysis, dry-rodded unit weight, absorption, abrasion resistance, and aggregate weight – volume relations	1, 3, 6
CO2	Demonstrate a basic understanding of Portland cement ASTM types and their applications	1
CO3	Calculate PCC air content, unit weight, yield, and gravimetric air content	1, 3, 6
CO4	Perform calculations to determine PCC compressive strength, flexural strength, tensile strength, and modulus of elasticity	1, 3, 6
CO5	Design basic PCC mixtures via ACI mix design methods	1
CO6	Demonstrate a basic understanding of HMA materials	1
CO7	Perform HMA volumetric calculations such as VMA, asphalt absorption, and percent air voids	1
CO8	Demonstrate a basic understanding of HMA mixture design and related calculations	1

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
3.3	An ability to communicate effectively with a range of audiences
3.6	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

7. Course topics:

1. Aggregate property evaluation and significance (25%)
2. Properties and design of Portland cement concrete (35%)
3. Bituminous materials/design of hot-mix asphalt (25%)
4. Other common construction materials (15%)

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. Conduct experiments in at least two technical areas of civil engineering and analyze and interpret the resulting data

8. Additional topics, assignments, or requirements for dual-level (4000/5000) course:

N/A

9. Date: 01/29/2020