REQUIRED AND ELECTIVE COURSES

2015-2016

DEPARTMENT OF CIVIL AND ARCHITECTURAL ENGINEERING AND CONSTRUCTION MANAGEMENT

CIVIL ENGINEERING GRADUATE PROGRAM

1. FOCUS AND SPECIALTY AREAS

The Graduate Program in Civil Engineering offers a choice between two focus areas, namely Infrastructure Design and Infrastructure Systems. Each of the focus areas allow the student to choose among several specialties. The Infrastructure Design area contains the Geotechnical Engineering and the Structural Engineering specialty tracks. The Infrastructure Systems contains the Construction Engineering and Management, the Pavement Engineering, and the Transportation Engineering specialty tracks. Each of the specialty areas are subject to a set of requirements, including core and elective courses.

The following course requirements are for MS students. PhD students will select their courses in consultation with their advisor to ensure that they can successfully complete their research, and to prepare them for the PhD qualifying exam.

2. FOCUS AREA ON INFRASTRUCTURE DESIGN

This section contains the list of required and elective classes to be taken for the two specialty areas within Infrastructure Design: Geotechnical Engineering and Structural Engineering.

2.1. Geotechnical Engineering

A total minimum of 30 semester credit hours is required for graduation with a MS degree. Of these, a minimum of 20 semester credit hours of academic classwork is required in the Geotechnical Engineering specialty area. Of these, in turn, 11 credit hours are core classes, and the additional 9 can be chosen among a list of elective classes. The remaining minimum 10 credit hours to meet the requirement for graduation must be taken as CVE 7092 as part of the thesis work.

2.1.1. Core Requirements

The required core classes for this specialty are the following (11 semester credit hours):

- CVE 7005 and CVE 7006 Graduate Seminar
- CVE 6081 Foundation Engineering*
- CVE 7061 Consolidation and Settlement
- CVE 7062 Shear Strength and Slope Stability

*If the student has taken CVE6081 as part of his/her undergraduate degree at the University of Cincinnati, a suitable substitute will be identified in conjunction with his/her advisor.

2.1.2. Elective Courses

The elective classes for this specialty are as follows (choose at least 3 classes in consultation with the advisor):

- CVE 6082 Reinforced Concrete Design of Shallow Foundations*
- CVE 7010 Risk and Reliability
- CVE 7011 Structural Mechanics
- CVE 7012 Finite Element Analysis

- CVE 7081 Theory and Design of Concrete Structures I
- CVE 7085 Metal Structures Theory and Design I
- CVE 6063 Principles of Pavement Engineering*
- CVE 6067 Advanced Pavement Engineering*
- 15 GEOL 7001C Geomorphic Processes**
- 15 GEOL 6004 Glacial Geology**
- 15 GEOL 6008C Clay Mineralogy**
- 15 GEOL 6024 Geohydrology and Introduction to Groundwater Modeling**
- 15 GEOL 6016C Surface Processes and Site Characterization**

*Available only if class has not been previously taken as part of an undergraduate degree at the University of Cincinnati

** Must secure permission to take out-of-college class before registering for each class.

In consultation with their advisor, students may also choose other elective courses from other specialty areas.

2.2. Structural Engineering

A total minimum of 30 semester credit hours is required for graduation with a MS degree. Of these, a minimum of 20 semester credit hours of academic classwork is required in the Structural Engineering specialty area. Of these, in turn, 14 credit hours are core classes, and the additional 6 can be chosen among a list of elective classes. The remaining minimum 10 credit hours to meet the requirement for graduation must be taken as CVE 7092 as part of the thesis work.

2.2.1. Core Requirements

The required core classes for this specialty are the following (14 semester credit hours):

- CVE 7005 and CVE 7006 Graduate Seminar
- CVE 7011 Structural Mechanics
- CVE 7081 Theory and Design of Concrete Structures I
- CVE 7085 Metal Structures Theory and Design I
- CVE 7088 Structural Dynamics

2.2.2. Elective Courses

The elective classes for this specialty are as follows (choose at least 2 classes in consultation with the advisor):

- CVE 7010 Risk and Reliability
- CVE 7012 Finite Element Analysis
- CVE 7013 Advanced Topics in Finite Element Analysis
- CVE 7082 Theory and Design of Concrete Structures II
- CVE 7086 Metal Structures Theory and Design II
- CVE 7089 Earthquake Engineering
- CVE 6021 Bridge Engineering*

- CVE 6058 Design of Wood and Masonry Structures*
- CVE 6081 Foundation Engineering*
- CVE 6082 Reinforced Concrete Design of Shallow Foundations*

*Available only if class has not been previously taken as part of an undergraduate degree at the University of Cincinnati

In consultation with their advisor, students may also choose other elective courses from other specialty areas.

3. FOCUS AREA ON INFRASTRUCTURE SYSTEMS

This section contains the list of required and elective classes to be taken for the three specialty areas within Infrastructure Systems: Construction Engineering and Management, Pavement Engineering, and Transportation Engineering.

3.1. Construction Engineering and Management

A total minimum of 30 semester credit hours is required for graduation with a MS degree. Of these, a minimum of 20 semester credit hours of academic classwork is required in the Construction Engineering and Management specialty area. Of these, in turn, 11 credit hours are core classes, and the additional 9 can be chosen among a list of elective classes. The remaining minimum 10 credit hours to meet the requirement for graduation must be taken as CVE 7092 as part of the thesis work.

3.1.1. Core Requirements

The required core classes for this specialty are the following (11 semester credit hours):

- CVE 7005 and 7006 Graduate Seminar
- CVE 6036 Value Engineering and Constructability*
- CVE 6038 Leadership/Decision Making*
- CVE 6044 Construction Law*

*If the student has taken one or more of these classes as part of his/her undergraduate degree at the University of Cincinnati, those classes can be substituted with any of the elective classes listed below.

3.1.2. Elective Courses

The elective classes for this specialty (choose at least 3 classes in consultation with the advisor) can be chosen among the elective classes provided for any of the other specialty areas listed in this document. In consultation with their advisor, students may also choose other elective courses from other specialty areas.

3.2. Pavement Engineering

A total minimum of 30 semester credit hours is required for graduation with a MS degree. Of these, a minimum of 20 semester credit hours of academic classwork is required in the Pavement Engineering specialty area. Of these, in turn, 11 credit hours are core classes, and the additional 9 can be chosen among a list of elective classes. The remaining minimum 10 credit hours to meet the requirement for graduation must be taken as CVE 7092 as part of the thesis work.

3.2.1. Core Requirements

The required core classes for this specialty are the following (11 semester credit hours):

- CVE 7005 and CVE 7006 Graduate Seminar
- CVE 6063 Principles of Pavement Engineering*
- CVE 6067 Advanced Pavement Engineering*

*If the student has taken CVE6063 and/or CVE 6067 as part of his/her undergraduate degree at the University of Cincinnati, suitable substitutes will be identified in conjunction with his/her advisor.

3.2.2. Elective Courses

The elective classes for this specialty (choose at least 4 classes in consultation with the advisor) can be chosen among the elective classes provided for any of the other specialty areas listed in this document. In consultation with their advisor, students may also choose other elective courses from other specialty areas.

3.3. Transportation Engineering

A total minimum of 30 semester credit hours is required for graduation with a MS degree. Of these, a minimum of 20 semester credit hours of academic classwork is required in the Transportation Engineering specialty area. Of these, in turn, 11 credit hours are core classes, and the additional 9 can be chosen among a list of elective classes. The remaining minimum 10 credit hours to meet the requirement for graduation must be taken as CVE 7092 as part of the thesis work.

3.3.1. Core Requirements

The required core classes for this specialty are the following (11 semester credit hours):

- CVE 7005 and 7006 Graduate Seminar
- CVE 6022C Traffic Control and Signal System Design *

or

- CVE 6010C Advanced Traffic Engineering*
- CVE 6024 Highway Engineering and Traffic Safety*
- CVE 6012 Travel Demand Forecasting and Environmental Analysis*

or

- CVE 6008 Transportation Planning and System Evaluation*

*If the student has taken one or more of these classes as part of his/her undergraduate degree at the University of Cincinnati, those classes can be substituted with any of the following elective classes:

3.3.2. Elective Courses

The elective classes for this specialty are as follows (choose at least 3 classes in consultation with the advisor):

- CVE 6063 Principles of Pavement Engineering*
- CVE 7010 Risk and Reliability
- CVE 7074 Traffic Flow Theory and Network Modeling
- CVE 7076 Intelligent Transportation
- 15GEOG 6071C Introduction GIS**, **or**
  15GEOG 6081C Intermediate GIS**
- 23PLAN 6011 Essential Economics for Planners**, **or**
  23PLAN 6012 Policies and Strategies of Regional Economic Development Planning**, **or**
  23PLAN 6071 Introduction to Geographic Information Systems**
- MATH6005 Introduction to Complex Analysis**
- STAT6031 Applied Statistics I**
- CS8021 Pattern Recognition**

*Available only if class has not been previously taken as part of an undergraduate degree at the University of Cincinnati

**Must secure permission to take out-of-college class before registering for each class.

In consultation with their advisor, students may also choose other elective courses from other specialty areas.

NOTE THAT NOT ALL ELECTIVE COURSES ARE OFFERED EVERY YEAR

In consultation with their advisor, students may select some of their elective courses in Construction Engineering, Geology, Hazardous Waste Management, Environmental Engineering, or other departments and colleges but only with permission of their advisor and the Graduate Director. Independent studies in advanced topics may also be arranged. Note that these classes, in addition to the required seminar classes, are limited to a maximum of six (6) credits.

3. COURSE OFFERINGS: 2015-16

The following is a list of classes to be offered in the 2015-16 academic year. Note that this plan is subject to change without notification.

General Courses

20-CVE-7005	CVE Graduate Seminar I	1 cr.	Fall 2015
20-CVE 7006	CVE Graduate Seminar II	1 cr.	Spring 2016
20-CVE-7010	Risk and Reliability	3 cr.	Spring 2016

Construction Engineering & Management

20-CVE-6036	Value Engineering and Constructability	3 cr.	Fall 2015
20-CVE-6044	Construction Law	3 cr.	Fall 2015
20-CVE-6046	MEP Systems for Constructors	3 cr.	Spring 2016
20-CVE-6038	Leadership/Decision Making	3 cr.	Spring 2016
20-CVE-6045	Heavy Highway Estimating	3 cr.	TBA

Geotechnical Engineering

20-CVE-6063	Principles of Pavement Engineering	3 cr.	TBA
20-CVE-6081	Foundation Engineering I	3 cr.	Fall 2015
20-CVE-6067	Advanced Pavement Engineering	3 cr.	TBA
20-CVE-6082	Reinf.Concrete Design of Shallow Foundations	3 cr.	Spring 2016

Pavement Engineering

20-CVE-6063	Principles of Pavement Engineering	3 cr.	TBA
20-CVE-6067	Advanced Pavement Engineering	3 cr.	TBA

Structural Engineering

20-CVE-6085	Advanced Structural Analysis	3 cr.	Fall 2015
20-CVE-7011	Structural Mechanics	3 cr.	Fall 2015
20-CVE-7081	Theory and Design of Concrete Structures I	3 cr.	Fall 2015
20-CVE-7088	Structural Dynamics	3 cr.	Fall 2015
20-CVE-6011	Advanced Strength of Materials	3 cr.	Spring 2016
20-CVE-6021	Bridge Engineering	3 cr.	Spring 2016
20-CVE-7012	Finite Element Analysis	3 cr.	Spring 2016
20-CVE-7082	Design of Concrete Structures II	3 cr.	Spring 2016
20-CVE-7089	Earthquake Engineering	3 cr.	Spring 2016

Transportation Engineering

20-CVE-6012	Travel Demand Forecasting and Env. Anal.	3 cr.	Fall 2015
20-CVE-6022C	Traffic Control	3 cr.	Spring 2016
20-CVE-6045	Heavy Highway Estimating	3 cr.	TBA