

HANDBOOK FOR GRADUATE STUDENTS

IN

# CIVIL ENGINEERING

2018 - 2019



DEPARTMENT OF CIVIL ENGINEERING

UNIVERSITY OF KENTUCKY

LEXINGTON, KENTUCKY 40506-0281

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## **FORWARD**

This handbook is intended to acquaint prospective, new, and continuing graduate students with the opportunities and requirements for graduate study and graduate degrees in the Department of Civil Engineering at the University of Kentucky. This handbook supplements the Graduate School Bulletin and the general University Catalog, with which students should also become familiar. For additional information, or explanation of matters that may remain unclear, please contact Tim Taylor the Director of Graduate Studies, Department of Civil Engineering, University of Kentucky, Lexington, KY 40506-0281. Phone: (859) 257-5937 or Email: [tim.taylor@uky.edu](mailto:tim.taylor@uky.edu). All applications for graduate study at the University of Kentucky Graduate School must be submitted online. Detailed information can be found at <http://www.gradschool.uky.edu/> and <http://www.engr.uky.edu/ce/>.

August 14, 2018

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## **SECTION I: GENERAL PROCEDURES**

### **1. Classification of Students**

Currently, the Graduate School classifies students in one of two categories: Post-Baccalaureate Students, or Degree Seeking Students.

#### **a. Post-Baccalaureate Students**

Students who hold a baccalaureate degree and wish to pursue graduate study without a degree objective, and students who do not fulfill the entrance requirements of the Graduate School or of the Department, may apply for admission as Post-Baccalaureate Students. Admission to this status may be granted to an applicant who (1) demonstrates promise but has not qualified for admission to a degree program, or (2) intends not to complete a degree program. Only nine (9) hours of courses taken as a Post-Bac student at UK may be counted toward a graduate degree if the students wish to switch his/her status to regular admission. All such courses must be completed with a grade of "B" or better. The Director of Graduate Studies and the Dean of the Graduate School must approve all transfers of credit hours to a graduate program (see Transfer of Credit, Section II-2b).

#### **b. Degree Students - Conditional Admission**

A student who wishes to pursue a higher degree, but who, for one or more of the reasons listed below, is temporarily ineligible for regular admission status, may be recommended to the Graduate School by the Director of Graduate Studies for admission to the degree program in Conditional Status:

- (1) Missing transcripts or other requirements for admission, such as diplomas or certificates.
- (2) Temporary waiver of the Graduate Record Examination (to be presented before the end of the first semester of enrollment in Graduate School).
- (3) Deficiencies of undergraduate courses in civil engineering.
- (4) Temporary ineligibility for regular admission status because a prerequisite degree has not yet been officially awarded.
- (5) Graduating University of Kentucky seniors lacking no more than six (6) hours for graduation; the consent of the Dean of the College of Engineering and the Dean of the Graduate School and approval of the Director of Graduate Studies is necessary. Such students may take no more than twelve (12) credit hours and must complete the undergraduate degree during the semester in which they are enrolled in Graduate School in the provisional status.

A student may remain in provisional status for a maximum of one semester or up to twelve (12) hours, whichever comes earlier. After this time, the student's work will be reviewed. Within 30 days into the following semester, and on recommendation of the Director of Graduate Studies, the student will be moved to regular admission status, or removed from the graduate program. A recommendation for granting provisional admission is entirely at the discretion of the Director of Graduate Studies.

#### **c. Degree Students - University Scholars Program**

The University Scholars Program in Civil Engineering is a combined BSCE-MSCE program for the most gifted and highly motivated students currently enrolled in our undergraduate program. It offers the students the opportunity and challenge of integrating their undergraduate and graduate courses of study into a single, continuous program, leading to both degrees (also see Sections I-2 and II-1c).

#### **d. Degree Students - Regular Students**

Regular degree students must satisfy all requirements for admission and be accepted by the Graduate School, and Civil Engineering program.

## **2. Admissions Requirements for Degree Students**

Applicants seeking admission to the Graduate programs in Civil Engineering as regular students must have been awarded a baccalaureate degree from an engineering (not engineering technology) program, accredited by the Engineering Accreditation Commission of Accreditation Board for Engineering and Technology (ABET/EAC), or equivalent agency. Engineering Technology degree holders will not be admitted. Also, students must have an undergraduate grade point average (GPA) of at least 2.8 on a 4.0 scale, a combined verbal and quantitative scores of GRE as follows: 300 for Master's and 315 for Ph.D. degree applicants. Scores on the analytical portion of GRE are not considered. The University Scholars applicants to the MSCE program are exempt from taking the GRE. An applicant whose native language is other than English must score at least 550 (paper-based TOEFL), 213 (computer-based TOEFL), 80 (internet-based TOEFL), or 6.5 (IELTS).

Applicants who have been awarded bachelor degrees in fields other than engineering, such as physical sciences, should contact the Director of Graduate Studies for consultation. These students may be able to get admitted to the CE graduate program; however, they should be aware that they may not be able to obtain a Professional Engineer (PE) license with their MSCE. Students with an undergraduate major other than Civil Engineering must also take undergraduate remedial courses (see Section I-3e), and consult with the appropriate Board of Registration regarding their licensing prospects.

Students seeking admission to the University Scholar Program may apply for entry to the program after completing at least 90 credit hours of the undergraduate Civil Engineering curriculum including all UK Core requirement courses. No less than 30 of these credit hours must be in CE prefix courses. The students must also have an overall undergraduate GPA no less than 3.2, and a GPA no less than 3.5 for all CE prefix courses at the time they apply for admission to the program. The GRE requirement is exempt for students in the University Scholar Program for admission to the MSCE program but not the Ph.D. program. Many fellowship applications also require the GRE scores as an evaluation component. This program is only available to the currently enrolled undergraduates on the University of Kentucky campus. (Also see Section I-1d)

## **3. Activities Prior to Admission**

### **a. Information on Available Programs**

Inquiries about available programs should be addressed to the Director of Graduate Studies, Department of Civil Engineering. In addition to the application forms for admission and financial aid, information on Graduate Study and Research in Civil Engineering is available to potential applicants at <http://www.engr.uky.edu/ce/>.

### **b. Graduate Record Examination**

All applicants for admission as regular students must submit scores on the aptitude portions (verbal and quantitative) of the regular Graduate Record Examination (GRE). Applications to take the GRE must be submitted approximately three weeks to the date of the Examination, and the results of the Examination are available in approximately six weeks. Inquiries should be addressed to the Thomson Prometric Test Center (2573 Richmond Rd Suite 260, Lexington, KY 40509, Phone: 859-268-3338), or to the Educational Testing Service in Princeton, New Jersey ([www.ets.org](http://www.ets.org)).

To be admitted, applicants must have a combined verbal and quantitative scores as follows: 1000 (New GRE: 300) for Master's, and 1100 (New GRE: 315) for Ph.D. degree applicants. GRE scores on the analytical portion are not considered. Applicants without GRE scores or with GRE scores less than the required minimum may be admitted conditionally if permission is received from the Director of Graduate Studies, and if it is approved by the Dean of



the Graduate School. Such students must then take the GRE and obtain at least the minimum passing score, or earn a GPA 3.0 or better after completing at least 9 credit hours during their first semester on campus, or they will be dropped from the program.

c. Test of English as a Foreign Language

An applicant whose native language is other than English must submit scores from the Test of English as a Foreign Language (<http://www.ets.org/toefl>). The minimum acceptable score is at least 550 (paper-based TOEFL) or 213 (computer-based TOEFL) or 80 (internet-based TOEFL) or 6.5 (IELTS).

d. Application for Admission

Applicants for admission as regular students who reside in the United States, must submit complete applications with accompanying materials on-line (<http://www.research.uky.edu/gs/ProspectiveStudents/Admission.html>) At least three months before the beginning of the semester in which the applicant intends to begin graduate work. Applicants from outside the United States must apply by March 15 for Fall admission, and August 15 for the Spring semester. At the time of the application, the applicant must have an official copy of the GRE scores, and two complete sets of official transcripts from all institutions of higher learning previously attended (including the University of Kentucky), sent directly from the issuing offices to the Graduate School Admissions Office (106 Gillis Building, Lexington, KY 40506-0033). Sending the original application materials directly to the CE Department will only delay the admission process.

Applications for admission to the Graduate School as a University Scholar should also complete additional forms; (available at the CE office, as well as on-line), which must be approved by the Director of Graduate Studies, the Associate Dean of Undergraduate Studies as well as the Dean of Graduate School. The application for the University Scholars program should be submitted before entering the senior year.

Applications for admission to the Graduate School as a post-baccalaureate student should be on file in the Graduate School Admissions Office at least 30 days in advance of the registration date of the semester in which the student plans to enroll.

Post-baccalaureate students who wish to apply for a graduate program must have a minimum 3.0 grade-point average on all work attempted as post-baccalaureate students. Application to the program should be made to the Graduate School Admissions Office by the calendar deadlines. Post-baccalaureate students have one month after the start of a semester to be admitted to a degree program in the Graduate School. After this time a student must wait until the following semester. Permission to enter any graduate class as a post-baccalaureate student will be granted only if the student meets the prerequisites and if space is available.

e. Non-CE Background

Students whose undergraduate program was not in Civil Engineering should be aware that they must take some undergraduate remedial courses prior to graduating, in order to meet the minimum background expected of graduate Civil Engineers. These remedial course hours will not count towards fulfilling graduate credit hour requirements.

The list of remedial courses or equivalent courses as determined by the Director of Undergraduate Studies consists of the following:

- MA113, MA114, MA213, & MA214
- PHY231 & PHY232, lab optional
- CHE 105 & CHE107
- EM221, EM302, and ME 220 or EM 313

- Civil Engineering electives: Four (4) courses to be decided by the student's advisory committee. These four courses should be selected in at least three (3) among the following civil engineering areas: civil engineering materials, construction engineering and management, environmental engineering, geotechnical engineering, hydraulics and water resources engineering, structural engineering, and transportation engineering.

Depending on their GRE scores, students may be admitted provisionally to the graduate program while completing remedial courses. Students must obtain a grade of "C" or better in all remedial courses to maintain provisional acceptance. Equivalent courses can also be used to satisfy these requirements; for PhD students, equivalency can be established based upon the advisory committee's recommendations.

Graduate students admitted under this option should also understand that satisfying the above requirements might not fulfill the Professional Engineering registration requirements in Kentucky or other states. Listed below are the minimal ABET/EAC degree requirements. A student who completes these requirements may request a waiver from the state in which they are seeking licensure. Graduate students who complete the minimal ABET/EAC requirements and the master's degree requirements may be supported in their petition to waive the ABET/EAC degree requirement by the Department of Civil Engineering. If such a waiver petition is successful, the student will be permitted to take the Fundamentals in Engineering/Engineer in Training (FE/EIT) exam. Passing the FE/EIT exam allows the engineer-in-training to take the Professional Practice exam.

f. ABET/EAC Professional Components

(1) General

(a) *One year of a combination of college level mathematics and basic sciences (some with experimental experience) appropriate to the discipline.*

(b) *One and one-half years of engineering topics, to include engineering sciences and engineering design appropriate to the student's field of study*

(c) *A general education component that complements the technical contents of the curriculum and is consistent with the program and institution objectives.*

(2) Civil Engineering (in review for possible revision/expansion of requirements)

(a) *Proficiency in mathematics through differential equations, probability and statistics, calculus-based physics, and general chemistry.*

(b) *Proficiency in a minimum of four recognized major civil engineering areas.*

(c) *Ability to conduct laboratory experiments and to critically analyze and interpret data in more than one of the recognized major civil engineering areas.*

(d) *Ability to perform civil engineering design by means of design experiences integrated throughout the professional component of the curriculum.*

(e) *Understanding of professional practice issues such as: procurement of work; bidding versus quality based selection processes; how the design professionals and the construction professionals interact to construct a project; the importance of professional licensure and continuing education; and/or other professional practice issues.*

g. Application for Financial Aid

The UK Graduate School's web site lists numerous financial support opportunities, and all qualified students are encouraged to apply. Applications for fellowships and/or Assistantships should be submitted on the required forms to the Graduate School Admissions Office before February 1 of the year in which admission is desired. A limited amount of funding is available through the Department of Civil Engineering (see Sections I-9, and I-10).

Additionally, applications for departmental assistantships should be submitted to Suzy Wampler (e-mail: [suzy.wampler@uky.edu](mailto:suzy.wampler@uky.edu), phone: 859-257-4858) by March 15 for Fall admissions and November 15 for Spring

admissions. The application form can be found at the end of this Handbook (Appendix B) or downloaded on-line (<https://www.engr.uky.edu/ce/files/2014/01/Assistantship-Application.docx>).

#### **4. Activities Following Admission but before Beginning of Class Work**

##### **a. Assignment of a Faculty Advisor**

The Director of Graduate Studies serves as the initial advisor to each student majoring in Civil Engineering during the first semester. However, it is very important for the graduate student to work very closely with a faculty advisor in his/her area of interest as soon as possible. In consultation with the student's advisor, the student should form an advisory committee by the second semester in compliance with the Graduate School rules.

##### **b. Program Planning**

Before or immediately upon arrival on campus, all students should begin to plan their detailed programs of study in consultation with the Director of Graduate Studies and their faculty advisor. Such planning at this early stage is rather informal and subject to future modification. If a complete program cannot be worked out at this time, the courses to be taken during the first semester should be selected, while the student is working on getting the rest of the course plan approved by the student's advisor.

##### **c. Classification and Registration**

New and readmitted students register during the week prior to the start of classes. See *Schedule of Classes* on-line (<http://www.uky.edu/registrar/scheduling>) for dates and deadlines. New students are informed of the dates at the time of acceptance. Continuing students who failed to priority register as well as new and readmitted students who applied after the deadline, must late register during the first week of classes.

#### **5. Activities after Enrollment**

##### **a. Proposed Program**

All graduate students, in consultation with their designated faculty advisors, should prepare and obtain approval for a proposed program. This should be accomplished as early as possible in the student's program, and in no case later than the advance registration for the second semester of graduate studies. The primary purpose of this effort is to help all students precisely define their educational objectives, and to assure that they are fully aware of University and departmental degree requirements. In addition, it serves to commit the department to what it considers to be an acceptable program for each student. It should be emphasized that the academic work plan can, and often will, be changed as the student progresses.

##### **b. Priority Registration**

Priority registration is for continuing students only. Current students must priority (advance) register; failure to do so incurs a penalty for late registration. This rule applies to students in post-baccalaureate status as well as to students in degree programs. All students are assigned a three-day registration window. Before registering graduate students should obtain approval of their proposed schedule from their advisor. The advance registration period provides a good opportunity for periodic reevaluation of the student's program of instruction.

##### **c. Current Student Information**

At the beginning of each semester, all graduate students should update their advisors regarding course and research progress, as well as plans for future.

##### **d. Readmission**

A student, who does not enroll for a semester during an academic year, must apply to the Graduate School for readmission by the stated deadline before subsequent enrollment will be permitted.

A student who has been inactive for a regular semester, but who is in good academic standing and has been enrolled in a graduate program within the previous three regular semesters, may request and will be granted full readmission by the Graduate School.

A student who is admitted to a graduate program, but unable to matriculate in the specified term, may request a one year deferment. Depending on the circumstances, the CE Department may or may not grant such a deferment.

e. Incomplete Grades

All incomplete grades must be removed from the student's record before scheduling the Final Examination and the awarding of a degree. Removal may be accomplished in two ways:

- (1) Complete the requirements for the course and receive a letter grade.
- (2) Provide the Dean of the Graduate School with letters from the student's advisor or the Committee Chair and the Director of Graduate Studies, stating that the incomplete course is no longer part of the student's program.
- (3) An incomplete grade "I" will automatically be changed to a failing grade "E" if not removed/changed within a year from the date when the grade was assigned.

f. Repeat Option

A student may repeat a graduate course and count only the second grade as part of the graduate grade point average. This action will be initiated by petition of the Director of Graduate Studies to the Graduate Dean and may be done only once in a particular degree program.

g. Scholastic Probation

When students have completed 9 or more semester hours of graduate course with a GPA of less than 3.0, they will be placed on scholastic probation and are subject to dismissal from the program. Students will have one full-term semester or the equivalent (9 hours) to remove the scholastic probation by attaining a 3.0 GPA.

h. Admission to Candidacy

Regular admission to a master's degree program constitutes admission to candidacy for that degree. Admission to candidacy for the Ph.D. degree is automatically granted when the student passes the Qualifying Examination.

i. Application for Degree

To be eligible for a degree, the student must file an application at the Graduate School within 30 days before the semester in which he or she expects to graduate (15 days in the summer session). The student must obtain the application forms from the Graduate School's web site.

j. Time Limits for Degrees

**Masters Degree.** Activities used to satisfy degree requirements must be completed within **eight years** preceding the proposed date of graduation. Extensions of time will be considered by the Graduate Council only upon written recommendation by the student's advisor and endorsed by the Director of Graduate Studies.

**Doctoral Degree.** All degree requirements for the doctorate must be completed within **five years** following the semester or summer session in which the candidate successfully completes the Qualifying Examination. In the event that all degree requirements are not met during the five-year period, degree candidates who provide evidence of the likelihood of completing the degree during an extension of time may be granted such an extension by the Graduate Council. Requests will be considered only upon written recommendation of the student's advisor and endorsed by the Director of Graduate Studies. Upon favorable review, **an extension of no more than five years** may be granted. NOTE: The Graduate School may require the student to take and pass a second Qualifying Exam.

## 6. Course Load

a. Regular Semester

- (1) A full-time student is one enrolled in nine or more semester hours of work.
- (2) The maximum load permitted during any semester is 15 semester hours (16 semester hours for University Scholars).
- (3) Full-time graduate assistants, whose services to the University require approximately 20 hours per week, may take no more than ten credit hours per semester.
- (4) The maximum load for part-time graduate assistants varies with the number of working hours. (See Section IV-4c)
- (5) Persons holding full-time working or professional assignments, whether employed by the University or not, may take no more than six credit hours per semester. Under certain circumstances, students may petition for a waiver of this rule by submitting letters of support from their employers and academic advisors.

b. Summer Term

Summer graduate course offerings are limited, and students are encouraged to consult with their advisor about their summer course plans.

**7. Program and Course Offerings**

a. Civil Engineering Specialties Available in the Graduate Program

All common Civil Engineering specialties may be studied in the Department, most up to the Ph.D. level. There are basically eight broad areas of graduate study and research in the Department:

Civil Engineering Materials	Hydraulics & Water Resources Engineering
Constructions Engineering/Management	Structural Engineering
Environmental Engineering	Transportation Engineering
Geotechnical Engineering	

b. Course Descriptions of Graduate Courses Offered in the Department

500-level courses may be taken by graduate as well as undergraduate students. However, graduate students will be required to complete additional work, or be subjected to a tougher grading policy.

CE 508 Design and Optimization of Construction Operations (3, F)

The course critically examines repetitive operations that occur from project to project and the deterministic approached used to design and optimize their effectiveness. Scientific techniques used to field measure the efficiency of construction operations are also examined. The primary metrics used to optimization include cost, schedule, and sustainability. Prereq: CE 303, CE 381, and engineering standing.

CE 509 Control of the Construction Project (3, F)

This course investigates the principles and practices for the control of budget and schedule for construction projects. Topics studied include: estimating construction costs and developing a project budget, planning construction operations and developing a project schedule, documenting and reporting of project progress and spending, and the management of change of contract amount, contract time, and contract scope of work. Prereq: CE 303, CE 403/508 (co-requisite), and engineering standing or consent of instructor.

CE 517 Boundary Location Principles (3, Sp)

Procedures for locating or relocating the boundaries of real property; records searching, technical aspects of field work, preparation of descriptions and survey reports, land data systems, legal aspects, special problems. Prereq: CE 211 and engineering standing or consent of instructor.

CE 525 Civil Engineering Applications of Geographic Information System (3)

CE 525 focuses on GIS as a tool in civil engineering. The terms and concepts related to Geographic Information Systems are introduced. The management of spatial databases, particularly those related to civil engineering, is covered. Students will collect data using a global positioning system (GPS) and be introduced to the concepts of photogrammetry and satellite imagery. Students will be required to use the GIS ArcView software to solve a specific individual spatial problem that they propose based on several civil engineering databases available to them. Prereq: Engineering standing and one of the following: CE 331, CE 341, or CE 471G.

CE 531 Transportation Systems Operations (3, F)

Analysis of transportation infrastructure problems through diagnostic study of existing transportation systems operations with emphasis on capacity and safety objectives. Engineering practice oriented toward open-ended solutions. Prereq: CE 211, CE 331, and engineering standing.

CE 533 Railroad Facilities Design and Analysis (3, Sp)

Principles of railroad location, construction, rehabilitation, maintenance, and operation with emphasis on track structure design and analysis, bridges and bridge loading, drainage considerations, track geometry effects, and operating systems analysis. Prereq: CE 331, CE 381, CE 382; concur: CE 471G and engineering standing.

CE 534 Pavement Design, Construction and Management (3, F)

Design, analysis, construction and management of flexible and rigid pavements, stresses and strains, pavement materials, subgrade soil stabilization; bases and subbases, quality control, drainage, pavement type selection and pavement management. Prereq CE 381 or concur: CE 471G and engineering standing.

CE 539 Transportation Systems Design (3, Sp)

Introduction to the processes and procedures for transportation systems design. Policy design, functional design and sizing, operation and schedule design, location and geometric design, supporting structures design as they individually and collectively affect the efficacy of transportation systems. Written and oral presentation of student projects will be required. Lecture, three hours; laboratory, three hours per week. Prereq: CE 211 or CE 331.

CE 541 Intermediate Fluid Mechanics (3, F)

Application of basic fluid mechanics to problems of importance to civil engineering practice. This includes flow measuring, closed conduit flow and pipe networks, open channel flow, turbomachinery (pumps), hydraulic structures, culvert flow. Prereq: CE 341, CS programming course, and engineering standing or consent of instructor (Same as BAE 541).

CE 542 Introduction to Stream Restoration (3, S)

The course will introduce the principles of fluvial geomorphology for application in restoring impaired streams. Topics will include channel formation processes (hydraulics/hydrology), stream assessment and survey procedures, the Rosgen stream classification system, channel evolution, reference reaches, regional curve development, sediment transport, in-stream structures, restoration options for incised channels, vegetation stabilization and riparian buffer development, natural channel design methodology, and evaluation and monitoring techniques. Prereq: CE 341 (or equivalent) and engineering standing or consent of instructor (Same as BAE 532).

CE 546 Fluvial Hydraulics (3, F)

Rainfall physics, principles of erosion on upland areas and construction sites, stable channel design in alluvial material, mechanics of sediment transport, river mechanics, reservoir sedimentation. Prereq: CE 461G, ME 330 and engineering standing (Same as BAE 536).

CE 547 Watershed Sedimentation (3, F)

The course objective is to gain an understanding of watershed sedimentation including: (1) erosion and sediment transport processes in a watershed and the mechanisms by which the processes are initiated, developed, and worked towards equilibrium; (2) measurement of the sediment budget for a watershed using sediment fingerprinting and sediment loading data; and (3) prediction of sediment loading in watersheds with different human disturbances using hydrologic-based modeling tools. Specific emphasis will be placed on the use of natural carbon and nitrogen isotopic tracer measurements within sediment fingerprinting as a data-driven approach to measure sediment loading from different sources in a watershed. In order to fulfill the course objective, the instructor will use traditional classroom learning as well as field and laboratory components of the course in order that students can participate in hands-on learning. Prereq: CE 461G (Pre- or Co-requisite or equivalent). (Same as BAE 547)

#### CE 549 Engineering Hydraulics (3, Sp)

Analysis of flow in closed conduits and natural and artificial open channels. Design of hydraulic structures. Prereq: CE 541 and engineering standing, or consent of instructor. (Same as BAE 545)

#### CE 551 Water and Wastewater Treatment Engineering (3, Sp)

This course examines the scientific and engineering aspects of water and wastewater treatment. Conventional water treatment processes such as rapid mixing, flocculation, sedimentation, filtration, and disinfection as well as biological processes for wastewater treatment are analyzed. Sustainable alternative treatment techniques are also discussed. Prereq: CE 341, CE 351, and engineering standing or consent of instructor.

#### CE 553 Environmental Consequences of Energy Production (3, F)

This course will introduce the relationship of energy, pollution control technology, and the environment. The scientific and engineering aspects of energy production are examined and the associated environmental problems and control technologies are discussed. Prereq: CHE 105, MA 214, and engineering standing or consent of instructor (Same as EGR 553)

#### CE 555 Microbial Aspects of Environmental Engineering (3, F)

Environmental microbiology for engineering students with emphasis on microbially mediated chemical cycles, microbial ecology, and industrial microbiology. Prereq: CHE 105 and 107, engineering standing or consent of instructor.

#### CE 579 Geotechnical Engineering (3, Sp)

Application of principles of soil mechanics and mechanics of materials to the analysis and design of foundation and earth retentions systems. Review of soil properties and subsurface exploration, analysis and design of shallow foundations, including settlement and bearing capacity of spread footings; analysis and design of deep foundations including both pile foundations and drilled shafts; introduction to lateral earth pressure concepts, design of concrete retaining structures, and mechanically stabilized earth wall. Lecture 3 hours. Prereq: CE471G or equivalent.

#### CE 581 Civil Engineering Materials - II (3, Even Spring)

Design, evaluation, and construction of materials including portland cement concrete and hot mix asphalt (HMA). Advanced topics related to high performance concrete and asphalt materials are covered in this course. Prerequisite: CE 381.

#### CE 584 Design of Timber and Masonry Structures (3, F)

Current and historic design methods of buildings and their components using wood, wood products, bricks, and concrete blocks. Prereq: Courses in steel and reinforced concrete design at the senior level, or consent of instructor. (Same as ARC 584.)

#### CE 585 Civil Engineering Failures (3, Sp)

Fundamentals of failure investigation and forensic engineering; Failure types and mechanisms; Case studies and discussions on various constructed facilities. Prereq: CE 382 and engineering standing or consent of instructor.

CE 586 Prestressed Concrete (3, Sp)

Fundamental basis and underlying principles for the analysis and design of prestressed concrete. Working stress and ultimate strength design methods, full and partial prestressing. Design for shear and torsion, deflection, crack control, and long-term effects, and prestress losses. Composite beams, continuous beams, slabs, short and slender columns, precast structures and their connections. Prereq: CE 486G and engineering standing.

CE 589 Design of Structural Systems (3, Sp)

Building codes, design loads, computerized structural analysis and design, gravity and lateral system design, structural system descriptions and selection considerations, and structural contract documents. Prerequisites: CE 486 and CE 487.

Lecture, three hours; laboratory, three hours per week. Prereq: CE 486G, CE 487G and engineering standing or consent of instructor; Coreq: CE 579.

CE 599 Topics in Civil Engineering (Subtitle required) (1-6)

A detailed investigation of a topic of current significance in civil engineering such as: design of small earth dams, man and the environment, drilling and blasting, scheduling construction operations, construction equipment and methods, traffic safety, optimum structural design, environmental impact analysis, systems analysis in civil engineering, motor vehicle noise and its control. May be repeated to a maximum of eight credits but only four credits can be earned under the same title. A particular topic may be offered at most twice under the CE 599 number. Prereq: Variable; given when topic is identified; plus engineering standing.

**Prerequisite for Graduate Work:** Students desiring to take any of the following courses should have a thorough working knowledge of chemistry, physics, and mathematics. Alternatively, a candidate must hold a bachelor's degree in civil engineering or its equivalent, and must enroll as a graduate or post baccalaureate student.

CE 602 Construction Project Management (3, Sp)

Administration of construction companies and projects, organization, economics, material management, productivity models, labor and equipment tracking, quality control and managerial accounting. Construction labor relations, claims and construction financing are also discussed. Prereq: CE 508, CE 509, or consent of instructor.

CE 605 New Engineering Enterprises (3, Sp)

The course covers the theory and actual practices of organization, management and operation of engineering companies. Primary emphasis on construction companies; however, the principles apply to most service oriented engineering companies. Students will be required to do several independent exercises related to establishing an engineering company. Prereq: graduate standing in engineering, or consent of instructor.

CE 608 Building Information Modeling for Construction (3, Sp)

The course focuses on advanced information systems used to control and predict project performance (cost and schedule) in construction. Building Information Modeling is examined as a systems approach of integrating design and construction for the benefit of developing construction work packages, 4D simulations, clash detection, trade coordination, and status visualization. Pre-req: CE 509 and enrollment in the Graduate School or consent of the instructor.

CE 621 Introduction to Finite Element Analysis (3, Sp)



Theoretical, conceptual, and computational aspects of the finite element method are developed. Development of the element relationships, element calculations, and assembly of the finite element equations are covered. Both one- and two-dimensional finite element problems are considered. One-dimensional problem areas include elastic deformation, heat conduction, fluid flow, electrostatics, groundwater flow, mass transport, beams on elastic foundations, etc. Two-dimensional problem areas include Poisson's equation, viscous incompressible flow, plane elasticity, and bending of elastic plates. Prereq: MA 432G, MA 537, or consent of instructor.

#### CE 631 Urban Transportation Planning (3)

A detailed review of the transportation planning process; inventory methodologies; trip generation, distribution and assignment with associated mathematical models and theories; prediction of future travel; land and use models; modal split; developing and testing proposed systems; simulation. Prereq: STA 381, or 681 or equivalent statistics course, or consent of instructor.

#### CE 633 Air Transport Engineering (3)

Planning location and design of airports, STOL ports, and heliports. Air traffic operations, performance and control as related to facility requirements. Role of governmental agencies. Prereq: CE 531 or consent of instructor.

#### CE 634 Traffic Characteristics (3)

Vehicle operating characteristics; driver, pedestrian and roadway characteristics as they individually, and collectively as traffic stream characteristics, are related to the planning design and operation of highway facilities. Prereq: CE 531 and STA 381, or consent of instructor.

#### CE 635 Highway Safety (3)

A detailed review of the impacts of safety considerations on highway design and planning, focusing on the highway environment, its users (both vehicles and drivers) and their interactions. The role of special interest groups (trucking industry, insurance agencies) is also examined. Prereq: CE 539 or consent of instructor.

#### CE 642 Open Channel Flow (3, S)

The hydraulics of free surface flow including such topics as uniform flow, varied flow, unsteady flow, the hydraulic jump flow transitions, spillways and channel delivery. Prereq: CE 341 (same as BAE 642).

#### CE 643 Mechanics of Sediment Transport (3, F Even year)

The overall course objective is to understand and model sediment transport processes in turbulent rivers. To meet this broad objective, turbulence and sediment processes will be taught including derivation of all relevant equations, either fundamentally or using dimensional analysis, and deterministic and stochastic modeling approaches will be discussed. Experimental advances will also be discussed throughout the course. Prereq: CE 341 (same as BAE 643).

#### CE 652 Biological Processes for water Quality Control (3, Sp., Odd year)

Principles and applications of environmental biotechnology for water quality control. Process microbiology and kinetics for various water and wastewater treatment processes. Prereq: CE 351 or consent of instructor (same as BAE652).

#### CE 653 Water Quality in Surface Waters (3, Sp., Even year)

Principles of surface water quality modeling and control. Analysis of dispersion, advection, natural aeration, biological oxidation and photosynthesis; their effects on the physical, chemical, and biological quality of waters in streams, lakes, reservoirs, estuaries and other surface waters. Prereq: CE 351, or consent of instructor (Same as BAE 653).

CE 655 Water Sanitation and Health (3, Sp)

Prevention of water-related diseases by appropriate supply and sanitation practices with designs applicable to small systems and rural areas of developing nations. Prereq: Previous college-level courses in chemistry and/or biology, CE 351, or consent of instructor (Same as CPH 790).

CE 662 Stochastic Hydrology (3, Sp)

Hydrologic random variables and probability distributions. Statistical measures, development and use of Monte Carlo simulations in the generation of precipitation fields. Statistical tests of hydrologic data. Point frequency and regional frequency analysis. Analysis of hydrologic time series. Long-term trend, harmonic analysis of periodicity, auto correlation, spectral analysis. Correlation and regression analysis. Linear stochastic models. Introduction to stochastic processes in hydrology, real-time hydrologic forecast (Kalman filter), pattern recognition, and stochastic differential equations. Prereq: MA 214, CE 461G or equivalent (Same as BAE 662).

CE 664 Watershed Management (3, Sp., Even year)

This course provides an overview of the scientific principles and management strategies used to effectively manage the physical, chemical, biological and social resources within a watershed so as to improve and sustain the integrity of the watershed system. The course will examine watershed management from both a scientific/engineering perspective as well as from a social science/policy perspective. Examples of effective watershed management will be drawn from cases studies in Kentucky and the United States. Students will be provided with an introduction to those spatial data sets, computer software, and methods currently used in watershed management practice. Pre-req: BAE437 or CE461G or an equivalent course in hydrology, or consent of instructor.

CE 665 Water Resources Systems (3, Sp., Odd year)

Application of systems analysis, mathematic modeling, and optimization in water resources management and design. Solution of engineering problems found in water supply, water quality, urban drainage, and river basin development and management by use of linear, non-linear, and dynamic programming models. Prereq. or concur: CE 421 and CE 569 or consent of instructor same as BAE 665).

CE 671 Advanced Soil Mechanics (3, F)

Detailed study of engineering properties and mechanical behavior of soil materials and their main applications in geotechnical engineering practice. Specific topics include the use of elastic theory in stress and displacement solutions to geotechnical engineering; exact and numeric techniques for the analysis for consolidation and compressibility theories; general shear behavior of cohesive and cohesionless soils, conventional laboratory and field strength tests, and critical state soil mechanics theory of soil strength; and basic principles of unsaturated soil mechanics. Prereq: CE 471G or consent of instructor.

CE 672 Landfill Design (3, Every third semester)

This course deals with the geotechnical aspects of landfills for the disposal of municipal solid waste. Since landfill design is driven by state and federal regulations, time is taken to review these regulations. Landfills are evaluated as engineered systems consisting of multiple components. Each component is investigated individually, and methods are developed to predict and quantify the performance of these components so that appropriate materials, design criteria, and construction methods can be selected to assure that the landfill will function with minimal environmental impact. Prereq: CE 471G. (Same as BAE 672.)

CE 673 Stability of Earth Slopes (3, Sp Even Year)

Review of shear strength principle including laboratory and field tests for shear strength and shear strength of unsaturated soils; theoretical and practical aspects of infinite slopes, block analysis, method of slices, effective and total stress analysis, analysis of unsaturated slopes, commercial software packages for slope stability analysis,

probabilistic analysis of slope stability problems, rapid drawdown, and slope failure mitigation. Prereq: CE 471G or consent of instructor.

CE 676 Groundwater and Seepage (3, Every third semester)

Permeability and capillary flow in soils, mathematical theory of flow through porous media. Flow through anisotropic, stratified and composite sections. Solution by flow net, conformal mapping and numerical methods. Seepage toward wells. Dewatering and drainage of soils. Prereq: CE 471G or consent of instructor.

CE 679 Geotechnical Earthquake Engineering (3, Sp)

Deterministic and probabilistic seismic hazard assessment. Field and laboratory measurement of the dynamic properties of soil and rock. Predicting the dynamic properties of soil and rock. Calculation of seismic site response. Analysis of cyclic behavior and liquefaction potential in soils. Slope stability analysis under dynamic loading Prereq: CE 471G.

CE 681 Advanced Civil Engineering Materials (3, Spring Odd Year)

Fundamental aspects of mechanical behavior of civil engineering materials. Rheology and fracture of asphalt and Portland cement concrete materials. Prereq: CE 381.

CE 682 Advanced Structural Analysis (3, F)

Theory and application of energy principles for plane and space frame solutions based on matrix methods of structural analysis. Prereq: CE 382 or consent of instructor.

CE 684 Slab and Folded Plate Structures (3, Sp)

Design and analysis of reinforced concrete floor slabs and folded plate roofs. Elastic and inelastic methods. Prereq: CE 482 or CE or consent of instructor.

CE 686 Advanced Reinforced Concrete Theory (3, F)

Background and origin of modern reinforced concrete design procedures and codes. Comparison of American and foreign methods of analysis. Review of current research and projection to anticipated future changes in design and construction practices. Prereq: CE 486G, or consent of instructor.

CE 687 Advanced Steel Design (3, Sp)

Strength of structural steel columns, including asymmetry and slender compression elements. Flexural strength of slender plate girders. Shear strength with and without post-buckling strength. Frame stability. Steel connections. Floor vibration serviceability. Prereq: CE 487 or consent of instructor.

CE 699 Topics in Civil Engineering (Subtitle required) (1-6)

An advanced level presentation of a topic from one of the major areas of civil engineering such as construction, geotechnics, structures, transportation, environmental engineering or water resources. May be repeated to a maximum of twelve (12) credits, but not more than four credits may be earned under the same subtitle. Course with a given subtitle may be offered not more than twice under this number. Prereq: Variable; given when topic identified; graduate standing.

CE 748 Master's Thesis Research (0)

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed. No tuition payment required.

CE 767 Dissertation Residency Credit for Doctoral Degree (2)

Prereq: post qualifying examination or during the semester when the qualifying examination is scheduled.

CE 768 Residence Credit for Master's Degree (1-6)

May be repeated to a maximum of 12 hours. Not counted as coursework hours, Tuition payment required.

CE 779 Advanced Geotechnical Engineering (3, Spring Odd Year)

Advanced study of the theoretical and practical aspects the design of foundation and earth retentions systems. Specific topics include the and design of shallow foundations including bearing capacity of layered soils and settlement; analysis of mat foundations; analysis and design of deep foundations including both vertical and lateral loads on single piles, pile load testing, and pile group actions; analysis and design of tiebacks and anchor. Prereq: CE 579 or consent of instructor.

CE 782 Dynamics of Structures (3, F Odd Year)

Review of methods of analysis of simple structural systems. Effects of wind, earthquake, traffic and machinery loads. Matrix methods for complex dynamic structural systems, random vibrations of structures. Prereq: CE 682 or consent of instructor.

CE 784 Shell Structures (3, Fall Even Year)

Introduction to the theory of elasticity, straight and circular beams and plates, analysis and design of steel and reinforced concrete shell structures, including domes, barrel shells, hyperbolic paraboloids and cylindrical tanks. Prereq: CE 682 or consent of instructor.

CE 790 Special Research Problems in Civil Engineering (1-6)

Individual work on some selected problems in one of the various fields of civil engineering. May be repeated to a maximum of nine credits. Prereq: Consent of the chairperson of the department.

CE 791 Special Design Problems in Civil Engineering (1-6)

Individual work on some selected problems in one of the various fields of civil engineering. May be repeated to a maximum of nine credits. Prereq: Consent of the chairperson of the department.

#### c. Faculty Members and their Specialties

Whitney Blackburn-Lynch, Lecturer; Water Resources

Gail M. Brion, Professor and Director of Undergraduate Studies; Environmental Engineering

Sebastian Bryson, Hardin-Drnevich-Huang Associate Professor; Geotechnical Engineering

Mei Chen, Associate Professor; Transportation Engineering

Richard Cheeks, Part-Time Instructor; Engineering Ethics

Adam Clark, Adjunct Assistant Professor, Transportation

Joe Crabtree, Adjunction Assistant Professor; Transportation

Gabe Dadi, Assistant Professor; Construction Engineering and Management

Brad Davis, Associate Professor; Structural Engineering

Greg Erhardt, Assistant Professor; Transportation Engineering

James Fox, Raymond-Blythe Professor; Water Resources Engineering

Hans Gesund, Professor; Structural Engineering

Mariant Gutierrez-Soto, Assistant Professor; Structural Engineering

Clark Graves, Adjunct Assistant Professor; Transportation

Eric Green, Part-time Instructor, Transportation

Issam E. Harik, Raymond-Blythe Professor; Structural Engineering

Michael Kalinski, Professor; Geotechnical Engineering

Kamyar C. Mahboub, Lawson Professor; Materials Engineering

Lindell E. Ormsbee, Raymond-Blythe Professor; Water Resources Engineering  
Kelly Pennell, Associate professor; Environmental Engineering  
Jerry G. Rose, Post-Retirement Professor Emeritus; Materials Engineering and Transportation Engineering  
Todd Saladin, Part-time Instructor; Survey  
Nick Stamatiadis, Raymond-Blythe Professor; Transportation Engineering  
Reginald Souleyrette, Commonwealth Chair Professor and CE Department Chair; Transportation Engineering  
Tim Taylor, Terrell-McDowell Endowed Chair of Construction Engineering and Project Management, Director of Graduate Studies  
Yi-Tin Wang, Professor; Environmental Engineering  
Samantha Wright, Lecturer; Computer Graphics Surveying.  
Scott A. Yost, Associate Professor; Water Resources

d. Core Courses

For each Specialty area in Civil Engineering, there are certain civil engineering core courses, which are strongly recommended for those students who are interested in that area. These courses are listed as follows:

**Civil Engineering Materials**

CE 534 Pavement Design, Construction and Management  
CE 581 Civil Engineering Materials - II  
CE 681 Advanced Civil Engineering Materials

**Construction Engineering and Management**

CE 508 Design and Optimization of Construction Operations  
CE 509 Control of the Construction Project  
CE 602 Construction Administration  
CE 605 New Engineering Enterprises  
CE 608 Building Information Modeling for Construction

**Environmental Engineering**

CE 551 Water and Wastewater Treatment Engineering  
CE 553 Environmental Consequences of Energy Production  
CE 555 Microbial Aspects of Environmental Engineering  
CE 652 Biological processes for Water Quality Control  
CE 653 Water Quality in Surface Waters  
CE 655 Water Sanitation and Health

**Geotechnical Engineering**

CE 579 Geotechnical Engineering  
CE 671 Advanced Soil Mechanics  
CE 672 Landfill Design  
CE 676 Groundwater and Seepage  
CE 679 Geotechnical Earthquake Engineering  
CE 673 Stability of Earth Slopes  
CE 779 Advanced Geotechnical Engineering

**Hydraulic Engineering**

CE 541 Intermediate Fluid Mechanics  
CE 542 Introduction to Stream Restoration  
CE 547 Watershed Sedimentation

- CE 549 Engineering Hydraulics
- CE 641 Mechanics of Liquid Flow in Pipes
- CE 642 Open Channel Flow
- CE 643 Mechanics of Sediment Transport

### **Structural Engineering**

- CE 584 Design of Timber and Masonry Structures
- CE 586 Prestressed Concrete
- CE 589 Design of Structural Systems
- CE 621 Introduction to Finite Element Analysis (or ME 501)
- CE 682 Advanced Structural Analysis
- CE 686 Advanced Reinforced Concrete Theory
- CE 687 Advanced Steel Design
- CE 782 Dynamics of Structures (or ME 513)

### **Transportation Engineering**

- CE 531 Transportation Systems Operations
- CE 533 Railroad Facilities Design and Analysis (odd years only)
- CE 534 Pavement Design, Construction and Management
- CE 539 Transportation Systems Design
- CE 631 Urban Transportation Planning
- CE 633 Air Transport Engineering
- CE 634 Traffic Characteristics
- CE 635 Highway Safety

### **Water Resources**

- CE 662 Stochastic Hydrology
- CE 664 Watershed Management
- CE 665 Water Resources Systems
- CE 667 Stormwater Modeling

## **8. Course Scheduling**

Most of the graduate courses in Civil Engineering are not offered every semester. Some are offered once a year and others once every two years. A student that does not take a course when it is offered may not have the opportunity to take that course later. This dilemma can be overcome by carefully planning the program well in advance. Listed below are the CE graduate courses, grouped according to the semesters in which they are offered.

### a. Courses Offered Every Semester

- CE 599 Topics In Civil Engineering (subtitle is required)
- CE 699 Topics in Civil Engineering: (subtitle is required)
- CE 748 Master's Thesis Research
- CE 749 Dissertation Research
- CE 768 Residence Credit For Master's Degree
- CE 769 Residence Credit For Doctor's Degree
- CE 790 Special Research Problems In Civil Engineering
- CE 791 Special Design Problems In Civil Engineering

### b. Courses Offered Every Fall Semester

CE 508 Design and Optimization of Construction Operations  
CE 509 Control of the Construction Project  
CE 531 Transportation Systems Operations  
CE 534 Pavement Design, Construction and Management  
CE 541 Intermediate Fluid Mechanics  
CE 546 Fluvial Hydraulics  
CE 547 Watershed Sedimentation  
CE 553 Environmental Consequences of Energy Production  
CE 555 Microbial Aspects of Environmental Engineering  
CE 584 Design of Timber and Masonry Structures  
CE 643 Mechanics of Sediment Transport (3, F)  
CE 671 Advanced Soil Mechanics  
CE 682 Advanced Structural Analysis  
CE 686 Advanced Reinforced Concrete Theory

c. Courses Offered in Fall Semester of Odd Year

CE 634 Traffic Characteristics  
CE 782 Dynamics of Structures

d. Courses Offered in Fall Semester of Even Year

CE 784 Shell Structures  
CE 643 Mechanics of Sediment Transport

e. Courses Offered Every Spring Semester

CE 517 Boundary Location Principles  
CE 525 Civil Engineering Applications of Geographic Information System  
CE 533 Railroad Facilities Design and Analysis  
CE 539 Transportation Systems Design  
CE 542 Introduction to Stream Restoration  
CE 549 Engineering Hydraulics  
CE 551 Water and Wastewater Treatment Engineering  
CE 579 Geotechnical Engineering  
CE 586 Prestressed Concrete  
CE 589 Design of Structural Systems  
CE 602 Construction Administration  
CE 605 New Engineering Enterprises  
CE 608 Building Information Modeling for Construction  
CE 621 Introduction to Finite Element Analysis (or ME 501)  
CE 635 Highway Safety  
CE 642 Open Channel Flow  
CE 655 Water Sanitation and Health  
CE 662 Stochastic Hydrology  
CE 684 Slab and Folded Plate Structures  
CE 687 Advanced Metal Structures

f. Courses Offered in Spring Semester of Odd Year

CE 517 Boundary Location Principles  
CE 581 Civil Engineering Materials II  
CE 642 Open Channel Flow

CE 653 Water Quality in Surface Waters  
CE 665 Water Resources Systems  
CE 779 Advanced Geotechnical Engineering

g. Courses Offered in Spring Semester of Even Year

CE 518 Advanced Surveying  
CE 652 Biological processes for Water Quality Control  
CE 664 Watershed Management  
CE 681 Advanced Civil Engineering Materials  
CE 673 Stability of Earth Slopes

h. Courses Offered Periodically

CE 631 Urban Transportation Planning  
CE 633 Air Transport Engineering  
CE 634 Traffic Characteristics  
CE 641 Mechanics of Liquid Flow in Pipes  
CE 667 Stormwater Modeling

i. Courses Offered Every Third Semester

CE 672 Landfill Design  
CE 676 Groundwater and Seepage  
CE 679 Geotechnical Earthquake Engineering

## 9. Graduate Student Fellowships

Civil Engineering graduate students may qualify for several types of fellowships as described below. All fellowship holders must register as full time graduate students. All fellowships normally carry with them partial or full tuition support. Students fully supported by fellowships are not permitted to work outside the University.

a. Department Fellowships:

CSX, Durr, Garver, Nichols, Raymond-Terrell, Vaughn-Melton, Walker, Dean Fellowships, and Lauderdale Fellowships. These fellowships are highly competitive and they are intended to support Graduate Students, preferably outstanding Ph.D. students. These Fellowships may be renewed on an annual basis. To be considered for one of these CE Graduate Fellowships, the student must be nominated by his/her faculty advisor. For further information about UK Civil Engineering, applicants may access <http://www.engr.uky.edu/ce/>. The application form may be found at: <http://www.engr.uky.edu/ce/files/2018/01/Assistantship-Application-fillable.pdf> or at the end of this Handbook.

b. College of Engineering Fellowships

Varying types of graduate student aid are available from the college of engineering. Contact Ms. Monica Mehanna ([monica.mhhanna@uky.edu](mailto:monica.mhhanna@uky.edu)) regarding college wide funding for engineering graduate students.

c. Graduate School Fellowships

Various types of fellowships are also available from the Graduate School of the University of Kentucky. Information can be found at: <http://gradschool.uky.edu/fellowships-0>

## 10. Special Fellowships and Scholarships



Graduate Assistantships are available at the Kentucky Water Resources Research Institute through an Interdisciplinary Program in Environmental Systems. The students are encouraged to contact the Kentucky Water Resources Research Institute: [http://www.uky.edu/WaterResources/students/college\\_scholarship.php](http://www.uky.edu/WaterResources/students/college_scholarship.php)

## **SECTION II. MASTERS PROGRAM**

### **1. Program Options**

The Masters of Science in Civil Engineering (MSCE) program offers students a wide variety of program options for advanced Master study. It can accommodate students continuing directly from an undergraduate degree program, as well as experienced practitioners. Students can choose to follow broadly diversified programs encompassing several areas of Civil Engineering, or they can focus on one area and pursue it in considerable depth. MSCE study programs can be set up to permit emphasis on practical design and construction applications, or to follow theoretical or experimental research topics to the frontiers of present knowledge. Students admitted into the UK MSCE have two options for completing a Master of Science in Civil Engineering (MSCE) degree. These options are as follows:

#### **a. MSCE Program Plan-A (24 Hour Plus a Thesis)**

For the Master of Science in Civil Engineering (MSCE) degree Plan A, a minimum of 24 credit hours of graduate course work and a thesis are required to fulfill degree requirements. While working on their theses, students may register for a total of 6 credit hours of CE 768, but it is not mandatory. Independent work taken as CE 790 or CE 791, may not count as credit towards thesis research work. At least 12 credit hours must be at the 600 or 700 levels, and 2/3 of the coursework must be in CE prefix courses. A member of the Graduate Faculty must actively supervise the Thesis. All graduate students are strongly encouraged to consult with their academic advisors regarding their degree plan options during their first semester at UK.

#### **b. MSCE Program Plan-B (30 Hour Non-Thesis Option)**

For the Master of Science in Civil Engineering (MSCE) degree Plan B, a minimum of 30 credit hours of graduate course work are required, including at least 3 credit hours of independent work. The requirement for independent work may be satisfied by either taking an approved curriculum of courses which contain integral independent study components totaling a minimum of 3 credit hours, or by completing at least three credit hours of CE 790 and/or CE 791.

**Option B1:** Students choosing this non-thesis option will have to complete a minimum of 30 credit hours of graduate course work, including three hours of CE 790 or CE 791. At least 15 credit hours must be at the 600 or 700 levels, and 2/3 of the coursework must be CE classes.

**Option B2:** Students choosing this non-thesis option will have to complete a minimum of 30 credit hours of graduate course work. These courses must have at least three hours of embedded independent study hours. The list of such courses is provided in the UK-CE Graduate Handbook, which may be found on-line. At least 15 credit hours must be at the 600 or 700 levels, and 2/3 of the coursework must be in CE prefix courses.

Students who wish to complete the independent work requirement by choosing from an approved curriculum of courses containing integrated independent study components, shall present a plan of study which satisfies this requirement, and all other Graduate School requirements, to the Director of Graduate Studies for approval no later than the end of the first semester of graduate studies.

The requirement for all independent work must be satisfied under the direction of one faculty member (for students choosing a CE 790 and/or CE 791), or several faculty members (for students following an approved curriculum of courses). The student’s advisor(s) shall assign, monitor, and evaluate the student's work as part of the specific course.

All students must pass a Final Examination as specified by the rules of the Graduate School. The MSCE Final Exam may include written and oral components. The content and style of the Final Exam, and the evaluation of the student's performance, are the responsibility of a Graduate Faculty Committee appointed by the Dean of the Graduate School. The students are encouraged to consult their advisors regarding the content and format of the exam. There is no foreign language requirement for the MSCE degree.

**List of Graduate-Level Courses with Independent Work Component**

<u>Course</u>	<u>Independent Work Component</u>	<u>Course</u>	<u>Independent Work Component</u>
CE 508	0.5 hour	CE 551	0.5 hour
CE 509	0.5 hour	CE 553	0.5 hour
CE 602	0.5 hour	CE 555	1.0 hour
CE 531	0.5 hour	CE 653	0.5 hour
CE 533	0.5 hour	CE 655	1.0 hour
CE 534	1.0 hour	CE 560	0.5 hour
CE 539	1.0 hour	CE 660	0.5 hour
CE 631	1.0 hour	CE 662	0.5 hour
CE 633	1.0 hour	CE 665	1.0 hour
CE 634	1.0 hour	CE 667	1.0 hour
CE 635	1.0 hour	CE 581	1.0 hour
CE 541	0.5 hour	CE 586	0.5 hour
CE 542	0.5 hour	CE 589	1.0 hour
CE 547	0.5 hour	CE 681	1.0 hour
CE 549	1.0 hour	CE 682	0.5 hour
CE 546	0.5 hour	CE 686	1.0 hour
CE 641	0.5 hour	CE 687	1.0 hour
CE 642	0.5 hour	CE 782	1.0 hour
CE 643	0.5 hour	CE 784	0.5 hour

**c. University Scholars Combined BS-MS Program**

Students in the University Scholars Program may follow any of the MSCE options listed in this section for the regular MSCE program. However, the students in the University Scholars Program are allowed to “double count” up to nine (9) hours of their 500-level courses from their undergraduate BSCE classes at UK toward their MSCE. The USP students must apply to this program at least one semester prior to taking first “double count” course. The USP application forms are available at the CE office, and the students must file an amended application to report a change of “double count” courses if their schedules change.

**2. Residence Requirements**

**a. On-Campus Residence**

A minimum of 21 semester hours must be earned while in residence on the Lexington campus of the University of Kentucky.

b. Transfer of Credits

With the approval of the faculty advisor, the Director of Graduate Studies, and the Dean of the Graduate School, a student may transfer up to nine (9) semester hours of graduate credits, provided that the grades earned were A or B. Such credits may be earned (1) as a student in another graduate program at the University of Kentucky, (2) as a post-baccalaureate graduate student at the University of Kentucky, or (3) as a graduate student at another accredited graduate school. In the event a student offers credits in more than one of these categories, the total to be credited toward the degree still may not exceed nine (9) hours. In no case will independent work, research, Thesis or Dissertation credit hours completed as a part of degree requirements for one program be considered to satisfy requirements of a subsequent master's program.

c. Correspondence Work

No graduate credit is given for courses taken by correspondence.

### 3. Course Requirements

a. Program Approval

The faculty advisor, when appointed, and the Director of Graduate Studies must approve each student's course program.

b. Deficiencies

A student may not be able to immediately begin a full graduate program leading to the MSCE degree; it may be necessary for the student to satisfy prerequisites omitted in his or her undergraduate curriculum. The faculty advisor and the Director of Graduate Studies determine the deficiencies. Such remedial work will not earn credit toward fulfilling degree requirements.

c. Requirements by Course Numbering

No 800- or 900-level courses, or the courses offered by the Civil Engineering Department which are numbered below 500, may be credited toward the MSCE degree.

Candidates for the MSCE degree may credit the following toward degree requirements:

- (1) Any 500-, 600-, or 700-level course; and
- (2) Any 400G-level course offered by a department other than Civil Engineering.
- (3) 800- or 900-level course approved by the Graduate School with special request.

In addition, at least 2/3 of the minimum requirements for the master's degree must be in regular courses.

d. Requirements for CE Area

At least two-thirds of the minimum coursework requirements for the MSCE degree must be completed in CE prefix courses. The Director of Graduate Studies and the Dean of the Graduate School can waive this requirement upon recommendation of the faculty advisor.

e. Grades

The MSCE will be awarded only if the student has attained a grade point average (GPA) of at least 3.0 on all work taken as a graduate student and all work carrying graduate credit. When students have completed 12 or more semester hours of graduate course work with a cumulative GPA less than 3.00, they will be placed on scholastic probation. Students will have one full-time semester or the equivalent (9 hours) to remove the scholastic probation by attaining a 3.00 (overall) average. If probation is not removed, the student will be subject to dismissal from the Graduate School. In this situation, the Dean of the Graduate School will consult with the DGS prior to undertaking the dismissal action.

A graduate student may elect to repeat a graduate course and count only the second grade as part of the graduate grade point average. A graduate student may exercise the Repeat Option only once. The student must file a Repeat Option Form in the office of the Dean of the Graduate School (<http://www.research.uky.edu/gs/Forms/RepeatOption.pdf>). The original grade does not figure in to the GGPA. A request to exercise the repeat option must be made prior to graduation from the program. The repeat option cannot be used to remove an "E" grade assigned as the result of an academic offense.

f. Transfer from Other Graduate Degree Programs

Students currently enrolled in other graduate degree programs at the University may transfer to the MSCE program with the approval of the Director of Graduate Studies. All requirements and procedures stipulated herein shall apply to such students. A maximum of nine (9) credit hours may be transferred provided that the grades earned are an A or B using the following form: <http://www.research.uky.edu/gs/Forms/TOCMastersSpecialist.pdf>

#### **4. Thesis Requirements**

Thesis MSCE graduate students who have completed all of their course work, and are working on their MSCE Thesis, may register for "0 credit hour" of CE 748 each semester for a maximum of six semesters. This would keep the student registered full-time for student loan deferment as well as student visa purposes.

The Thesis must be developed under the direction of a full member or associate member of the Graduate Faculty. Before beginning work, an "Independent Graduate Work Initiation Form" must be filled out and filed with the Director of Graduate Studies. The finished thesis must be approved by the Thesis director, the Director of Graduate Studies, the examining committee, and the Graduate School, and must be in conformity with instructions prepared by the Graduate School entitled, "Instruction for the Preparation of Thesis and Dissertations." ([http://www.research.uky.edu/gs/CurrentStudents/theses\\_prep.html](http://www.research.uky.edu/gs/CurrentStudents/theses_prep.html)).

#### **5. Independent Work Courses - CE 790 and CE 791**

CE 790, "Special Research Problems in Civil Engineering", and CE 791, "Special Design Problems in Civil Engineering", may each be taken for up to 6 credit hours in a semester, and may be repeated to a total of 9 credit hours each. However, only three (3) hours of CE 790 or 791 may be counted toward a Plan-B MSCE degree. Prior to registering for such a course, the student must obtain the approval of the faculty advisor and of the Director of Graduate Studies. Prior to the beginning of the semester or the summer session in which the student has registered for the course, the student must also file an "Independent Graduate Work Initiation Form" with the Director of Graduate Studies. The form is attached as Appendix C of this Handbook or can be downloaded online at <https://www.engr.uky.edu/ce/files/2014/01/Grad-Independent-Study.docx>.

## 6. Final Examination

Each student is required to take a Final Oral Examination for the MSCE degree. This Examination is administered by an examining committee appointed by the Dean of the Graduate School upon recommendation of the Director of Graduate Studies. The examining committee consists of at least three faculty members. All committee members must be members of the UK graduate faculty, and at least one must be a full members of the graduate faculty. The Examination is comprehensive and covers the student's entire program including, but not limited to, the Thesis or independent work reports. The Final Examination must be scheduled with the Graduate School at least two weeks prior to the date of the Examination. The Final Examination is given no earlier than the beginning of the semester in which the degree is to be awarded and no later than eight days before the last day of classes of that semester. The committee may pass or fail the student by a majority vote. In case of a tie vote, the student fails. In the event of failure, the committee may recommend to the Graduate School the conditions under which a second Examination may be administered. In so far as it is practicable, the same examining committee shall give the second exam. A third Examination is not permitted.

To be eligible to receive a degree, students must submit an on-line "Application for Degree" form via: <https://myuk.uky.edu/irj/portal>. Applications must be received in the Graduate School within 30 days of the start of the semester in which the student expects to complete their work (or within 15 days of the start of Summer Session II).

### a. For the 24 Hour Plus Thesis MSCE Option (Plan A):

- (1) Submit Thesis to the advisor and the Director of Graduate Studies in final draft form, and request that they certify it to the Graduate School as satisfying all the Graduate School requirements except for pagination.
- (2) File an on-line request ([http://www.research.uky.edu/cfdocs/gs/MastersCommittee/Student/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/MastersCommittee/Student/Selection_Screen.cfm)) for scheduling the MSCE Final Exam. The request must be made at least two weeks prior to the anticipated date of the Examination. Pay particular attention to the Graduate School deadlines.
- (3) Submit the Thesis to the examining committee at least one week prior to the Final Examination.
- (4) Take the Final Examination.
- (5) Modify the Thesis as required by the examining committee.
- (6) Submit the Thesis in final form to the Graduate School by the required date prior to the end of the semester ([http://www.research.uky.edu/gs/CurrentStudents/theses\\_prep.html](http://www.research.uky.edu/gs/CurrentStudents/theses_prep.html)).

### b. For the 30 Hour, Non-Thesis MSCE Option (Plan B):

- (1) File an on-line request for scheduling the MSCE Final Exam ([http://www.research.uky.edu/cfdocs/gs/MastersCommittee/Student/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/MastersCommittee/Student/Selection_Screen.cfm)). The request must be made at least three weeks prior to the anticipated date of the Examination. Pay particular attention to the Graduate School deadlines.
- (2) Submit report(s) resulting from individual work courses (e.g. CE 790 and/or CE 791) to the faculty advisor, the Director of Graduate Studies, and the examining committee at least one week prior to the date of the Final Examination. If the degree is a "Plan-B MSCE - course-only" option, the student must properly document the list of classes with imbedded independent hours totaling a minimum of three hours.
- (3) Take the Final Examination.

## **7. Graduation Fees**

There are no graduation fees. However if a thesis is being submitted, a thesis fee must be paid at the Billings and Collection Office about six weeks prior to graduation (see the Graduate School calendar).

## **8. Concurrent Degree Programs**

Concurrent enrollment for degree purposes in more than one graduate program is permitted only with the approval of the student's graduate adviser(s), all program DGSs involved, and the Dean of the Graduate School. No more than nine (9) hours of coursework may be common to concurrent degree programs.

## **9. Certificate Programs**

CE graduate students may pursue a graduate certificate by completing an integrated group of additional courses that is designed to have a very clear and focused academic topic or competency as its subject area. Information regarding graduate certificates can be found on-line (<http://www.engr.uky.edu/programs/certificates/> and [http://www.research.uky.edu/gs/CurrentStudents/grad\\_cert.html](http://www.research.uky.edu/gs/CurrentStudents/grad_cert.html)).

## **SECTION III: THE DOCTOR OF PHILOSOPHY (Ph.D.) PROGRAM**

### **1. Course Requirements**

There is no minimum number of credit hours for the Ph.D. The number of courses required varies, depending on the background of the student and the topic of the student's research. Ph.D. students are required to complete 36 hours of coursework to meet residency requirements. Ph.D. students with a Master's degree typically received 18 hours of coursework credit toward the 36 hour requirements. Generally, at least one year of full-time course work (or equivalent) at University of Kentucky beyond a master's degree will be required before the student is allowed to take the Qualifying Examination.

### **2. Major Professor**

A Major Professor, heading an Advisory Committee, guides the student's Ph.D. work. The purpose of this committee is to give continuity of direction and counsel, and provide intellectual stimulation, from the earliest days of residence through the completion of the doctorate.

The Director of Graduate Studies, or the DGS's designee, may serve as a temporary advisor to a beginning graduate student. The Director of Graduate studies, or the DGS's designee performs advisory functions until the Major Professor and the Advisory Committee are appointed, normally by the end of the first semester. The Major Professor then assumes primary advisory functions and chairs the Advisory Committee. The Major Professor serves as the Dissertation Director. The Advisory Committee provides advice to the student and sets specific course and research requirements (within the applicable rules), which the student must meet in pursuit of a doctorate degree. With the consent of the committee, the student must file an on-line request ([http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm)) to the UK Grad School to form the committee. The Dean of the Graduate School, upon the advice of the Director of Graduate Studies, appoints the Major Professor and Advisory Committee.

### **3. Advisory Committee**

The Advisory Committee has a core of four members. In the Civil Engineering Department this core normally consists of the Major Professor as Chair, one or two other members from the CE Department, and at least one representative from outside of CE Department. All members of the core must be members of the Graduate Faculty of the University of Kentucky and three (including the Major Professor) must possess full Graduate Faculty status. Additional faculty members may serve as members of the Advisory Committee. The core of the

Advisory Committee must be kept at its full complement throughout the graduate career of the individual student. Thus, in the event of a vacancy on the Committee (occasioned by resignation, faculty leave, or inability to serve), an appropriate replacement must be made prior to the making of any Committee decision.

All decisions of the Advisory Committee are by majority vote of appointed Graduate Faculty members. Advisory Committee decisions must be reported promptly to the Director of Graduate Studies who will be responsible for transmitting them to the Dean of the Graduate School.

In addition to advising and program course and research planning, the Advisory Committee administers the Qualifying Examination, supervises the preparation of the Dissertation, and serves as the Examining Committee that administers the Final Examination and approves the Dissertation.

#### **4. Changes in Membership of Advisory Committee**

While the composition of the Advisory Committee should be relatively stable over its lifetime, changes may occur.

##### **a. Changes in Students Interest or Emphasis**

Given the early date of selection of the advisory committee, students may wish to change the Major Professor or any other member of the Advisory Committee. Such action requires consultation between the student, the Major Professor, the affected faculty members, and the Director of Graduate Studies. If the advisory committee has been formally appointed, the approval of the Dean of the Graduate School is also necessary.

##### **b. Faculty Resignations From Committee**

Faculty members, who find that they are making little contribution, or who develop other priorities, may resign from the advisory committee. In such cases, the student, in consultation with the Major Professor and the Director of Graduate Studies, may suggest a replacement. A new committee form must be filed (on-line) with the Graduate School by the student.

##### **c. Faculty Turnover and Leave**

In the event that a faculty member resigns from the University or goes on leave, the position on the advisory committee must be filled by an appropriate replacement. In such a case, a new committee form must be filed (on-line) with the Graduate School by the student. Should a faculty member's temporary leave fall between essential meetings of the advisory committee, replacement is not necessary. Also, special arrangements can be made for a committee member on-leave, particularly a Chair, to conduct some of the duties from remote; replacement is not necessary if such arrangements can be made.

#### **5. Language Requirements**

There is no foreign language requirement.

#### **6. Qualifying Examination**

The Graduate School requires that all Ph.D. students must take a Qualifying Examination in order to verify that they have sufficient understanding of, and competence in, their fields to become candidates for the degree. This Examination is prepared and administered by the student's Advisory Committee. The exam is taken after the Committee feels that the student has completed all necessary course work, and is ready to devote his/her full effort to the Dissertation. The request to schedule the Qualifying Examination should be submitted on-line ([http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm)) at least two weeks prior to the date of the examination.

The Qualifying Examination usually consists of two components: written, and oral parts. The written part is usually scheduled first and administered by each member of the Advisory Committee individually. This is followed by an oral part in which all members participate at the same time.

The committee makes the pass or failure decision by a majority vote. A tie vote means failure. The Director of Graduate Studies must report the results of the Examination to the Graduate School within ten days of its conclusion. If the result is failure, the Committee determines the conditions to be met before another Examination may be given. The minimum time between Examinations is four months. A second Examination must be taken within one year after taking the first Qualifying Examination. A third Examination is not permitted.

## **7. Residence Requirement**

### **a. Pre-Qualifying Examination**

The purpose of a Pre-Qualifying Examination residency requirement is to encourage doctoral students to experience contact with the academic community: colleagues, libraries, laboratories, on-going programs of research and inquiry, and the intellectual environment that characterizes a university. Such experience is generally as important as formal class work in the process of intellectual development. While the residency requirement is, by necessity, given in terms of full or part-time enrollment, the intent of the requirement is to ensure that the student becomes fully involved in a scholarly campus life. Generally, a full-time course work for one academic year (18 hours), or equivalent, is the minimum post-masters course requirement for CE Ph.D. student prior to their Qualifying Exam.

### **b. Post-Qualifying Examination**

After passing the qualifying exam, must enroll for 2 hours of CE 767 Dissertation Residency Credit:

- Must remain continuously enrolled in CE 767 every Fall and Spring semester until the Dissertation is defended, and
- Must complete a minimum of two semesters of CE 767 before they can graduate.
- The semester of the qualifying exam may count toward the post-qualifying residency requirement:
- if formal [Request to Schedule the Qualifying Exam](#) is submitted within the first six weeks of the semester, the exam can then be taken at any time during the semester.

## **8. The Dissertation**

Each student must present a Dissertation, which is the result of original research. The Major Professor is the primary source of guidance in the planning and preparation of the Dissertation. However, other members of the Advisory Committee should be involved in the process as well. All core members of the Advisory Committee must read the Dissertation prior to signing the Approval Form. It is the responsibility of the Advisory Committee to make suggestions for any revisions needed before the Final Examination. A majority of the Advisory Committee core members must indicate that the format and substance of the Dissertation are adequate to justify the scheduling of the Final Examination. The Final Examination on the Dissertation may not be scheduled without the signatures of a majority of the Advisory Committee's members on the Dissertation Approval Form. The style and form of the Dissertation must be in conformance with the instructions prepared by the Graduate School. For specific instructions regarding the format of the Dissertation, the student should follow the instructions prepared by the Graduate School entitled, "Instruction for the Preparation of Thesis and Dissertations."

([http://www.research.uky.edu/gs/CurrentStudents/theses\\_prep.html](http://www.research.uky.edu/gs/CurrentStudents/theses_prep.html)).

## **9. Graduation Fees**

There are no graduation fees. Each graduating doctoral student will pay Dissertation fees. Payment will be made at the University Billings and Collections Office. Authorization forms to pay Dissertation fees are issued by the Graduate School.

## **10. Final Examination**

### **a. Composition of Committee**



The Final Examination includes a defense of the Dissertation and may be as comprehensive in the major and minor areas as the Advisory Committee chooses to make it. Prior to the Final Exam, the Committee is augmented with an outside examiner, who is appointed by the Dean of the Graduate School. The Dean of the Graduate School and the President of the University are ex-officio members of all Final Examination committees.

#### b. Scheduling of Examination

The Ph.D. Final Examination is a public event, and its scheduling is published and announced beforehand by UK. Any member of the UK community may attend.

At least four weeks prior to the Final Examination, and following the distribution, by the Major Professor, of the Dissertation to the members of the Advisory Committee, the student files on-line the intent to schedule the Final Exam ([http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection\\_Screen.cfm](http://www.research.uky.edu/cfdocs/gs/DoctoralCommittee/Selection_Screen.cfm)). Then, the Graduate Dean appoints an outside examiner as a core member of the Advisory Committee. The Graduate School will designate the specific time and date of the Final Examination at least two weeks prior to the actual Examination. All members of the Committee except the outside examiner will have had an opportunity to suggest revisions to the Dissertation prior to signing the Dissertation Approval Form. Dissertation revisions must be completed as soon as possible.

The Dissertation Approval Form, along with a typewritten copy of the Dissertation, must be presented to the Graduate School before the Final Examination can be scheduled. The draft of the Dissertation submitted must be complete in content, including all footnotes, tables, figures, and appendices. A full bibliography or set of references must be included as must a title page and abstract. A similar copy must be presented to the outside examiner as soon as the person is appointed.

The Final Examination should be scheduled only during time periods consistent with academic semesters (including the summer term). The Examination must be completed and the results reported no later than eight days before the last day of classes of the semester in which the student intends to receive the degree.

#### c. Procedure

The Final Examination is usually primarily oral, and may last two to four hours, or more. In addition to defending the completed Dissertation, the student is expected to demonstrate an understanding of the discipline of which the Dissertation is a part, an understanding of the context of the Dissertation, and general and specific knowledge of the field of Civil Engineering, its sub-areas, its history, its scientific and mathematical foundations, and its role in society.

Members of the Committee will report the outcome of the Final Examination to the Graduate School immediately upon its completion. In all decisions the majority opinion of the Graduate Faculty members of the Examining Committee prevails. If the Examining Committee is evenly divided, the candidate fails.

In the event of failure, the Examining Committee recommends to the Dean of the Graduate School conditions under which the candidate may be re-examined; that is if a re-examination is deemed appropriate. When conditions set by the Dean have been met, the candidate may be re-examined. Should any vacancies on the committee occur between the two examinations, the Dean of the Graduate School will appoint replacement members. A third Examination is not permitted.

### **11. Submission of Dissertation**

After the Final Examination is passed, the final copy of the Dissertation is prepared and then submitted to the Graduate School along with the signatures of the Advisor and the Director of Graduate Studies. The Dissertation in its final electronic form must be received in the Graduate School within sixty (60) days of the Final Examination. Failure to submit the dissertation within 60 days may result in the student having to be re-examined. Students planning to graduate in the semester in which the Final Examinations are taken, the Dissertation must be presented and accepted by the Graduate School by the last day of that semester.

## **SECTION IV: GUIDELINES FOR ASSISTANTSHIPS**

## **1. Terminology**

Graduate students receiving remuneration through the Department for services rendered, are formally classified either as Teaching Assistants, Research Assistants, or Graduate Assistants, depending on the source of the funds and duties and responsibilities. A Graduate Assistant may take on a combination of teaching and research assignments.

## **2. Responsibilities**

The Director of Graduate Studies makes personnel decisions regarding Teaching Assistants. The principal investigator of the research project makes those decisions regarding Research Assistants. The Chair of the Department must approve all such personnel decisions before they can take effect. Only the Chair of the Department may waive the provisions of these guidelines in individual circumstances.

## **3. Period of Appointment**

### **a. Assistantships (TA, RA)**

(1) When financial projections permit, the appointment period for Assistants may encompass a 9-month interval beginning August 15 and ending May 15 of the following year.

(2) Alternatively, appointments may be made for 4.5 months beginning August 15 and ending December 31 for the fall semester, or beginning January 1 and ending May 15 for the spring semester.

(3) In no event will the appointment period exceed nine months. Summer appointments may be made on a case-by-case basis. Such appointments must be coordinated with the DGS in advance of summer sessions.

(4) All TA and RA positions are subject to a screening process, which includes an orientation. Failure to successfully complete this process, particularly the TA screening, could result in termination of support. All TA and RA, must make themselves available for attending various orientation/training sessions which are conducted by the Graduate School and the CE Department during the 2-week period before the beginning of the classes. Failure to attend these sessions may result in termination of the financial support.

### **b. Absences**

With the exception of legal holidays, graduate and research assistants are expected to provide service throughout the periods of their appointments. Absences during these periods require notification of and approval by the faculty supervisor and the Director of Graduate Studies.

## **4. Service Load**

Under TA, RA rules, a full-time appointment is 20 hours/week, and a part-time appointment is 10 hours/week.

Students who are hired as a Teaching Assistant, or Research Assistant are barred from engaging in any other type of employment on or off campus. Failure to comply with this rule will result in the termination of their UK financial support.

### **a. Teaching Assistants (TA), and Research Assistants (RA)**

(1) During the 9-month academic year, appointments are limited to a maximum of 20 hours per week.

(2) Appointments requiring 40 hours per week of work may be made during all or part of the three summer months on a case by case basis.

(3) During the 9-month academic year, Teaching Assistants must be registered as full-time students. However, if the student has completed all of the course requirements for the degree, the student must enroll in the Zero Credit hours through the DGS (CE 748 for MSCE, and CE 749 for Ph.D., at no cost) for student loan deferment and student visa purposes.

### **b. Service Load for TA/RA**

The service load of all assistants must be in accord with Graduate School limitations based on the amount of course work being simultaneously undertaken and interpreted as follows.

### **Maximum Work Load (Hours per Week) for Reimbursed Services of All Types**

Course Load* Semester Hours	4-week Intersession Work Load	8-week Summer Session Work Load	Regular Session Work Load
15	Not Permitted	Not Permitted	0
14	0	0	0
13	0	0	5
12	0	0	10
11	0	0	15
10	0	0	20
9	0	0	25
8	0	0	30
7	0	4	35
6	0	14	40
5	0	23	40
4	0	32	40
3	14	40	40
2	32	40	40
1	40	40	40

\*May exclude certain courses (such as CE 768, CE 769, CE 790, and CE 791) if the research effort in these courses is part of the work assignment and is simultaneously being used to satisfy degree requirements.

## 5. Selection and Appointment of TA and RA

### a. Application for Assistantships

Any graduate student may apply for an assistantship (TA, RA) by contacting the Director of Graduate Studies. The CE application for financial support is found at the end of this Handbook.

### b. Appointment Criteria

All TA and RA positions are very competitive, and students are selected based upon their qualifications and a matching interest in our CE Department. Additionally, the following special criteria may be applied in ranking the students.

- (1) Students who have been employed on sponsored research projects that terminated before they could reasonably have been expected to complete the work for their degrees will be given first priority.

- (2) Students who have been selected by faculty members for work on sponsored projects for which funding has not yet been received, though it may reasonably be expected to begin during the academic year.
- (3) Graduate students already in the UK CE Department and identified as planning to obtain Ph.D. degrees there, in order of apparent academic merit and promise.
- (4) External applicants for our Ph.D. program, in order of apparent academic merit and promise, but with exceptions, which may be necessary to keep a balance amongst the departmental programs.
- (5) All others, in order of apparent academic merit and promise.

The Director of Graduate Studies along with the Chair's advisory committee will apply these criteria, and will make the necessary judgments. Final approval of all appointments rests with the Department Chair.

## **6. Renewal and Termination of Appointments**

### a. Renewal of Appointment for Graduate and Research Assistants

- (1) Assistantships will not be renewed if academic progress is unsatisfactory.
- (2) Appointments cannot be renewed beyond the end of the academic term in which all degree requirements have been satisfied.
- (3) Appointments cannot be renewed if funding is unavailable.
- (4) Appointments will not be renewed beyond the maximum periods stated in Section IV-6b below.

### b. Maximum Periods of Appointment

- (1) Graduate Assistants working toward Ph.D. degrees: 8 semesters, including any time spent as an Assistant before entering the Ph.D. program.
- (2) Graduate Assistants working toward the MSCE degree: 3 semesters.
- (3) Research Assistants on extramural supported projects working toward Ph.D. degrees: 5 years, including any time spent as an Assistant before entering the Ph.D. program.
- (4) Research Assistants on extramural supported projects working toward the MSCE degree: 2 years.

These limits are imposed to conserve scarce financial resources, and to ensure that students will endeavor to make reasonable progress toward their degrees. They may be waived upon request of the student's Advisor, and with the approval of the Director of Graduate Studies and the Department Chair.

### c. Renewal of Assistantships

Assistantships will not be automatically renewed beyond the period of appointment. On an annual basis, applications for renewal must be filed before the last day of advance registration for the semester in which a renewal is desired. The criteria and priorities for renewal will be the same as for new appointments. See Section IV-6 above. Efforts will be made to continue support of students whose service and academic records have been satisfactory. **HOWEVER, RENEWAL OF AN ASSISTANTSHIP CANNOT BE GUARANTEED BEYOND THE INITIAL PERIOD FOR WHICH IT WAS GRANTED.**

## **7. Multiple Sources of Financial Aid/Employment**

A student may simultaneously receive financial aid from multiple sources with the following exceptions:

- (1) Students on trainee-ships or other externally funded programs where funds are available to pay tuition are not eligible for tuition scholarships.
- (2) Students may not receive funds granted for the express purpose of paying tuition, fees, books, supplies, etc. from more than one source.
- (3) Students may not receive support from multiple sources if one of those sources restricts or prevents receipt of support from other sources.
- (4) Students will not be permitted to engage in overload employment that unduly restricts or prevents satisfactory academic development or service to the University. An assistantship will generally not be awarded to an

individual who has adequate support from other sources unless there are no other qualified applicants for a critical position, and/or the individual has particularly unique qualifications.

### **8. Parking Privileges**

Graduate students are automatically eligible for "C" parking permits. Application for "E" permits by Teaching Assistants, Research Assistants, and Graduate Assistants are accepted only upon additional certification by the Chair of the department.

### **9. Holidays, Vacations, and Sick Leave**

Graduate and research assistants are not required to work during legal holidays. However, since they are classified as temporary employees of the University, they are not eligible to receive vacations and sick leave with pay.

### **10. University Health Service and Student Health Insurance**

Full-time graduate students who have paid the health fee have access to University Health Service (Student Health). Part-time and zero or two-credit hour students may access University Health Service by voluntarily paying a health fee or by being seen on a fee-for service basis. Health insurance coverage is provided to all enrolled and degree-seeking graduate students with full-time teaching, research, or graduate assistantships, full-time fellowship recipients, or a combination of these positions.

## **SECTION V: HELPFUL TIPS**

### **1. Admission Process**

The University of Kentucky graduate admission process is managed on-line. All applicants must submit all of their applications material (applications, transcripts, test scores, letters of recommendation etc.) in their original form to the UK Graduate School on-line (<http://www.research.uky.edu/gs/ProspectiveStudents/Admission.html>). Sending original application material to the Civil Engineering Department would only delay the application process. However, the applicants are welcome to send an extra copy of their application material to the Civil Engineering Department for their file. Applicants who are not a graduate of the University of Kentucky are required to submit three letters of recommendation from their former professors and/or employers. The format of these letters should follow a regular business letter format.

### **2. Post-Admission**

After successful admission, the graduate students are responsible for becoming fully familiar with the UK rules and regulations, deadlines, etc. The students must check with the UK Graduate School and UK CE Department regarding attending various mandatory orientation sessions. Failure to attend these orientation/screening sessions may result in cancellation of their financial support. The students must consult the UK course catalog and prepare for on-line registration. The Civil Engineering Department Director of Graduate Studies will be available for consultation during their registration period. However, the students are strongly encouraged to consult with the faculty in their area of interest about their various course options.

### **3. Financial Support**

The application for financial support through the CE Department is provided at the end of this Handbook and can be downloaded on-line (<https://www.engr.uky.edu/ce/files/2014/01/Assistantship-Application.docx>). Additionally, the UK Graduate School advertises financial support opportunities through its web site, and students are encouraged to apply. It is important to note that financial support packages do not automatically renew, and students are responsible for applying for renewal prior to the Graduate School's published deadlines. Finally, all financial supports are contingent upon satisfactory performance and availability of funds.

### **4. Academic Advisory Committee**

All MSCE and Ph.D. students are responsible for selecting an Academic Advisor in their area during their first semester at UK. Often this advisor is the research director who supports the student on a research project. Prior to the end of the second semester, and in full consultation with the academic advisor, the graduate student must form an Academic Advisory

Committee, and report this to the DGS. The students are encouraged to meet with their Committee on a regular basis and update the Committee about their progress.

#### **5. Academic Plan**

In consultation with the Academic Advisory Committee, each graduate student must develop a course plan and a research plan, and discuss a realistic graduation target date with their Advisor.

#### **6. Qualifying Exam (Ph.D. Students Only)**

Once a Ph.D. student nears the completion of the course work, the student must schedule a Qualifying Exam in consultation with the Advisory Committee. Upon successful completion of the Qualifying Exam, the student submits a research proposal to the Advisory Committee. At this point, the Advisory Committee may require the student to take more courses, or permit the student to proceed without additional course. After passing the Qualifying Exam, the Ph.D. student must register for 2 hour of CE 767 every Fall and Spring Semester until graduation.

#### **7. Schedule Final Exam**

All graduate students must file for a degree, and schedule a Final Exam very early in their last semester at UK. Preferably, the graduate students should apply for their degrees one semester in advance of their graduation. All necessary forms and deadlines can be found on the Graduate School's web site (<http://www.research.uky.edu/gs/>).

**APPENDIX - A**  
**CE Graduate Programs:**  
**Learning Outcomes (MSCE and Ph.D.)**

**UK Department of Civil Engineering**  
**MSCE Learning Outcomes**  
**MSCE Program: Mission Statement**

The mission of the University of Kentucky, Department of Civil Engineering Graduate Studies MSCE Program is to:

- 1) provide opportunities for education, research, and service in a scholarly environment to the Commonwealth, the United States, and the global community;
- 2) prepare our students for successful scholarly endeavors; and
- 3) prepare our students for successful professional careers.

**MSCE Program: Objectives**

The objective of our M.S. program is to produce graduates who possess:

- 1) in-depth knowledge of at least one area of civil engineering;
- 2) the ability to successfully complete independent work; and
- 3) the ability to communicate the results of their work.

**MSCE Program: Student Learning Outcomes**

1. A mastery of at least one specialization area of civil engineering.
  - a. Evidence
    - i. Specialization Courses
    - ii. Projects/Papers
    - iii. MSCE Final Exam
2. The ability to perform independent research through coursework or research project.
  - a. Evidence
    - i. MSCE Project/Thesis
    - ii. MSCE Final Exam
3. The ability to communicate the results of their work.
  - a. Evidence
    - i. Publications, Presentations, Patents, Awards
    - ii. MSCE Final Exam

## **UK Department of Civil Engineering Ph.D. Learning Outcomes**

### **Ph.D. Program: Mission Statement**

The mission of the University of Kentucky, Department of Civil Engineering Graduate Studies Ph.D. Program is to:

- 1) Provide opportunities for education, research, and service in a scholarly environment to the Commonwealth, the United States, and the global community;
- 2) prepare our students for successful scholarly endeavors; and
- 3) prepare our students for successful professional careers.

### **Ph.D. Program: Objectives**

The objective of our Ph.D. program is to produce graduates who possess:

- 1) the ability to plan, conduct, complete, and disseminate original research that advances the state of knowledge; and
- 2) the ability to communicate the results of their work through teaching, oral presentation, or publication at an authoritative level.

### **Ph.D. Program: Student Learning Outcomes**

1. A mastery of at least one specialization area of civil engineering.
  - a. Evidence
    - i. Ph.D. Specialization Coursework
    - ii. Projects/Papers
    - iii. Ph.D. Qualifying Exam
    - iv. Ph.D. Final Exam
2. The ability to perform creative and independent research.
  - a. Evidence
    - i. Ph.D. Qualifying Exam
    - ii. Ph.D. Research Proposal
    - iii. Dissertation
    - iv. Ph.D. Final Exam
3. The ability to communicate the results of their work.
  - b. Evidence
    - i. Publications, Presentations Patents, Awards
    - ii. Ph.D. Final Exam



**APPENDIX – B**  
**UK Civil Engineering Department**  
**Graduate Student Financial Support Application**

**UK Civil Engineering Department Graduate Student Financial Support Application**

**Note: All NEW students seeking financial support must complete this form. Only fully completed forms with necessary attachments will be considered. You must have applied and been accepted to Graduate School to be considered for financial assistance by CE Department. Due by March 15 for fall semester & November 15 for spring semester.**

**Section A: Background Information**

**First/Given Name:** \_\_\_\_\_ **Last/Family Name:** \_\_\_\_\_

**Student ID Number:** \_\_\_\_\_

**Local Address** (if no local address, use permanent address):

Street \_\_\_\_\_ Apt # \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

**Email address:** \_\_\_\_\_

**U.S. Citizen/U.S. Permanent Resident:** \_\_\_\_\_ Yes \_\_\_\_\_ No

**Section B: Type of Support Requested** (rank in order of priority)

Teaching Assistant: \_\_\_\_\_ (requires 20 hrs/week of teaching & grading responsibilities)

Research Assistant: \_\_\_\_\_ (requires 20 hours/week of research with an assigned professor)

Academic year in which support is desired \_\_\_\_\_

All TA & RA positions are subject to a screening process, which includes an orientation. Failure to successfully complete this process could result in termination of support. All of these support vehicles are service-based, and portions or all of the support may be subject to various taxes. All support can be terminated due to poor performance.

**Section C: Academic Information**

**Undergraduate GPA** \_\_\_\_\_ **Undergraduate Institution:** \_\_\_\_\_

**Graduate GPA** \_\_\_\_\_ **Graduate Institution:** \_\_\_\_\_

**GRE:** Verbal \_\_\_\_\_ Quantitative \_\_\_\_\_

**TOEFL (International Students):** \_\_\_\_\_

**Degree Seeking:** \_\_\_\_\_MS \_\_\_\_\_ Ph.D

**Primary Area of Specialization/Interest in CE. Choose one:**

- \_\_\_ Construction Engineering and Management (Professors Taylor, Dadi)
- \_\_\_ Environmental (Professors Wang, Pennell, Brion)
- \_\_\_ Geotechnical (Professors Bryson & Kalinski)
- \_\_\_ Materials (Professors Mahboub)
- \_\_\_ Structures (Professors Harik, Davis, Gesund)
- \_\_\_ Transportation (Professors Chen, Stamatiadis & Souleyrette)
- \_\_\_ Water Resources (Professors Yost, Fox & Ormsbee)

**Name of Major Faculty Advisor (if known):** \_\_\_\_\_

**Faculty Advisor's Endorsement Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

(only required if Faculty is aware that you are attending UK)

***A short resume and a study plan with coursework must be attached with this application. Other supporting materials such as letters of recommendation are optional.***

**Section D: Certification**

I, \_\_\_\_\_ (print name) certify that the information provided on this form is accurate and complete. I am aware that any assistance I might receive is subject to the accuracy of the information provided as part of this application.

\_\_\_\_\_  
Applicant's Signature Date

***Return this form and all required documentation to the following address:***

Bettie Berry e-mail: bettie.berry@uky.edu  
University of Kentucky  
Dept. of Civil Engineering  
Lexington, KY 40506-0281, USA  
Phone: 859-257-4858 Fax: 859-257-4404

***Note: Only fully completed forms with necessary attachments will be considered for support.***

***For official use only:***

Type of Support \_\_\_\_\_  
Duration of Initial Support \_\_\_\_\_  
Total Projected Duration of Support \_\_\_\_\_  
Source of Support: \_\_\_\_\_  
Non-Endowment Support Amount: \_\_\_\_\_  
Endowment Support Amount \_\_\_\_\_  
Endowment Account Name: \_\_\_\_\_  
Tuition Support Amount: \_\_\_\_\_  
Name of Faculty Advisor/Contact: \_\_\_\_\_

