**Civil Engineering**

**Doctor of Philosophy (Ph.D.) Degree**

**DEGREE INFORMATION**

**Priority Admission Application Deadlines:**

**Fall:** February 15

**Spring:**  October 15

**Summer:**  February 15

International applicant deadlines:

<http://www.grad.usf.edu/majors>

**Minimum Total Hours:** 78 post-bachelor’s

**Level:** Doctoral

**CIP Code:** 14.0801

**Dept. Code:** EGX

**Major/College Codes:** ECE EN

**Approved:** 1982

**Concentrations:**

Engineering for International Development (EFD)

Environmental Engineering (EVE)

Geotechnical Engineering (GTL)

Materials Engineering and Science (MTL)

Structures Engineering (STR)

Transportation Engineering (TPT)

Water Resources (WRS)**CONTACT INFORMATION**

**College:** Engineering

**Department:** Civil and Environmental Engineering

**Contact Information:** [www.grad.usf.edu](http://www.grad.usf.edu/)

**MAJOR INFORMATION**

The Ph.D. degree is awarded in recognition of demonstrated scholarly competence and ability to conduct and report original and significant research in Civil Engineering.

The field of Civil Engineering has long been known for its breadth and ability to adapt to the new technological needs of society. The traditional areas of public works, such as highways, bridges, water supply, building design, and wastewater treatment, remain very important. In addition, the modern area of managing the environment, including sustainable development, has been included in the Civil Engineering domain. Graduates of the major are prepared for careers in academia, with public agencies, or with private industry, including firms involved in planning, design, research and development, or regulation.

Ph.D. students may work in any of the areas of Civil Engineering, including Engineering Mechanics, Environmental Engineering, Geotechnical Engineering, Pavement Engineering, Materials Engineering and Science, Structures Engineering, Transportation Engineering and Planning, and Water Resources Engineering.

**Major Research Areas:**

Civil Engineering, including Engineering Mechanics, Environmental Engineering, Geotechnical Engineering, Pavement Engineering, Materials Engineering and Science, Structures Engineering, Transportation Engineering and Planning, and Water Resources Engineering.

The department has a high bay structures laboratory, which includes an MTS 250 kip testing machine. There are also well-equipped environmental, soils, pavement and hydraulics laboratories. These laboratories include equipment for water and air quality analysis, bench and pilot scale reactor studies, field instrumentation for environmental and water resources studies, constant rate of stress consolidometer, triaxial units, and Superpave testing equipment.

**ADMISSION INFORMATION**

Must meet University requirements (see Graduate Admissions) as well as requirements for admission to the major, listed below.

* + - * Undergraduate GPA ≥ 3.3 preferred
			* GRE with preferred minimum scores of V 150 (45th percentile), Q 159 (75th percentile), and AW 4.0 (55th percentile)
			* TOEFL (International applicants only) 79 (550 paper based exam) or IELTS 6.5
			* Resume provided at the time of application.
			* Three (3) letters of reference provided at the time of application
		- Statement of Purpose provided at the time of application
		- Exceptions made on a case-by-case basis where warranted.

**CURRICULUM REQUIREMENTS**

**Total Program Hours: 78 hours minimum post-bachelor’s**

 **48 hours minimum post-master’s**

Core requirement – 2 hours

Concentration/primary area of study – 15 hours

Electives – 33 hours

Dissertation – 20 hours

Other course requirement – 8 hours

**Core Requirement 2 hours**

CGN 6945 2 Graduate Research Methods

An additional 48 credit hours of coursework are required. The following requirements apply to the 48 credit hours of additional coursework:

* At least 15 credit hours must be in the student’s primary area of study (see also Concentration Requirements, below). These 15 credit hours must be structured coursework, i.e., may not include thesis credits or independent study.
* Up to 30 credit hours from a previously completed Master’s degree may be applied, pending course-by-course evaluation, approved by the Department, the College, and the Office of Graduate Studies. However, no more than 6 credits of Master’s Thesis may be applied to meet the coursework requirement.
* No more than 9 credit hours of Independent Study may be applied to meet the coursework requirement.
* Directed research and/or dissertation credits may not be counted towards the coursework requirement.

**Concentration Requirements - 15 hours minimum**

The Department supports Ph.D. concentration areas in

Engineering for International Development (EFD)

Environmental Engineering (ENV)

Geotechnical Engineering (GTL)

Materials Engineering and Science (MTL)

Structures Engineering (STR)

Transportation Engineering (TPT)

Water Resources (WRS).

Students may select from one of these concentrations, or may select no concentration.

**Engineering for International Development ( EFD )**

This concentration acknowledges coursework and international field experience in the area of engineering for international development that considers issues of sustainable development, water, sanitation, and health (WaSH), gender and society. This graduate concentration requires: 2) coursework in global health, applied anthropology (medical, environmental, and development), and Water, Sanitation, Hygiene (WaSH) engineering, 2) a development-focused research component; and 3) a long-term overseas field experience in sustainable development as a WaSH engineer, which in most cases will form part of the basis of the student’s dissertation. The international field experience allows a student to remain enrolled as a full-time student (with zero-tuition/fees) and gain development experience serving with the Peace Corps and non-governmental Development Organizations. Graduates are competitive for employment in the global WaSH development field.

ENV 6510 Sustainable Development Engineering

A minimum of 1 course (3 credits) from the following applied anthropology courses:

ANG 6766 3 Research Methods in Applied Anthropology

ANG 6730 3 Socio-cultural Aspects of HIV/Aids

ANG 6469 3 Selected Topics: Health, Illness, and Culture

A minimum of 1 course (3 credits) from the following global public health courses:

PHC 6764 3 Global Health Principles and Contemporary Issues

PHC 6761 3 Global Health Assessment Strategies

3 additional credit hours of graduate level coursework in international development engineering or closely related areas.

Students engaged in full-time global training and/or service as part of the EFD concentration (e.g., in the U.S. Peace Corps, with a non-governmental organization, UNESCO-IHE, or equivalent) may register for CST 6990 for 0 credit hours while in their country of service/research.

**ENVIRONMENTAL ENGINEERING (EVE) - 15 hours**

ENV 6002 3 Physical Chemical Principles of Environmental Engineering

EES 6107 3 Biological Principles of Environmental Engineering

ENV 6666 3 Aquatic Chemistry

At least one course from the following:

ENV 6617 3 Green Engineering for Sustainability

CGN 6933 3 Selected Topics: Resilient Infrastructure

ENV 6510 3 Sustainable Development Engineering

Additional 3 credit hours of coursework in Environmental Engineering

**GEOTECHNICAL ENGINEERING (GTL) - 15 hours**

CEG 5115 3 Foundation Engineering

CES 6118 3 Finite Element Analysis

Additional 9 graduate level credit hours of coursework in Geotechnical Engineering or closely related areas

**MATERIALS ENGINEERING AND SCIENCE (MTL) - 15 hours**

At least 2 courses (6 credit hours) from the following list:

CGN 6933  3 Selected Topics: Advanced Concrete Construction Materials

CGN 6720 3 Electrochemical Diagnostic Techniques

CES 6010 3 Structural Life Prediction

EMA 5326 3 Corrosion Control

EMA 6510 3 Characterization of Materials

Additional 9 graduate level credit hours of coursework in Materials Engineering and Science or closely related areas

**STRUCTURES ENGINEERING (STR) - 15 hours**

1 course (3 credit hours) from the following list of courses:

CES 6706 3 Advanced Concrete

CES 6835 3 Design of Masonry Structures

CES 5715C 3 Pre-stressed Concrete

1 course (3 credit hours) from the following list:

CES 6118 3 Applied Finite Elements

CES 6230 3 Advanced Structural Mechanics

CES 6144 3 Advanced Structural Analysis

CES 5209 3 Structural Dynamics

EGN 6333 3 Continuum Mechanics

Additional 9 graduate level credit hours of coursework in Structures Engineering or closely related areas

**TRANSPORTATION ENGINEERING (TPT) - 15 hours**

TTE 5205 3 Traffic Systems Engineering

TTE 5501 3 Transportation Planning and Economics

TTE 6507 3 Travel Demand Modelling or CGN 6933 Selected Topics: Statistical and Econometric Methods

Additional 6 graduate level credit hours of coursework in Transportation Engineering or closely related areas

**WATER RESOURCES (WRS) - 15 hours**

A minimum of 4 courses (12 credit hours) from the following list:

CWR 6235 3 Free Surface Flow
CWR 6239 3 Waves and Beach Protection
CWR 6305 3 Urban Hydrology
CWR 6534 3 Coastal and Estuary Modeling
CWR 6535 3 Hydrologic Models

CWR 6105 3 Vadose Zone Hydrology
CGN 6933 3 Selected Topics: Groundwater Hydraulics

CGN 6933 3 Selected Topics: Advanced Computational Fluid Mechanics

GLY 6836 3 Numerical Modeling of Hydrogeologic Systems

GLY 6827C 4 Advanced Hydrogeology

CWR 6820 3 Coastal Waves and Structures

CWR 6538 3 Advanced Hydrologic Modeling

Additional 3 graduate level credit hours of coursework in Water Resources or closely related areas

**Electives - 33 hours**

Graduate level electives are selected in consultation with the student’s major research advisor and/or advisory committee

**Qualifying Exam**

Doctoral students are expected to pass a qualifying examination no later than the semester following the completion of 48 credits of coursework beyond a bachelor’s degree. At minimum, the exam will include a written dissertation proposal and oral defense by the dissertation committee. A written exam in the area of concentration may also be required. Poor performance on the qualifying exam based on the judgment of the committee may result in the student failing the exam. If a student does not pass on the first attempt, he/she may request in writing to repeat the exam. Students who fail the Qualifying examination the second time will be dismissed by the Major.

**Dissertation Requirements - 20 hours minimum**

CGN 7980 20 Dissertation

A minimum of 20 credits of dissertation, an approved PhD dissertation, and a dissertation defense are required. Students may not sign up for dissertation credits until they have defended their proposal and advanced to candidacy (see Qualifying Exam, above).

**Additional Requirements - 9 hours minimum**

Nine (9) credits of additional graduate level coursework, dissertation, or directed research are required.

**Publication Requirement**

Students must have at least one paper accepted to a peer-reviewed journal or peer-reviewed conference based on their research carried out during their doctoral studies at USF.

**COURSES**

[http://ugs.usf.edu/course-inventory](http://www.ugs.usf.edu/sab/sabs.cfm)  or <http://www2.eng.usf.edu/cee/graduate/gradautecourses.htm>