Graduate Curriculum Approval Form
Changes to Degree Programs

Degree *(i.e. M.A., Ph.D., etc.):*	PhD
Name of Program *(e.g. Biology)*	Civil Engineering
Program CIP Code	14.0801
Name of Concentration(s) *(e.g. Botany)*	
Proposed Effective Term *(e.g. Spring 2015)*	Fall 2017
Faculty Contact	Sarina Ergas
Email	sergas@usf.edu

APPROVALS	Name	Signature	Action	Date
Dept. Chair	Manjriker Gunaratne		☒ Approve ☐ Not approved ☐ Comments attached	01/05/17
School Committee Chair (if applicable)			☐ Approve ☐ Not approved ☐ Comments attached	
College Committee Chair			☐ Approve ☐ Not approved ☐ Comments attached	
College Dean/ Associate Dean	Sanjukta Bhanja	Sanjukta Bhanja	☒ Approve ☐ Not approved ☐ Comments attached	1/13/17
Concurrence*	Dept: Chair:		☒ Not Applicable ☐ Concurs ☐ Doesn't concur ☐ Comments attached	
Grad Council	☐ Approve ☐ Not approved ☐ Tabled ☐ Comments	Graduate Studies	☐ Approve ☐ Disapprove	

1. **Summary of Changes – Select all that apply:**

☐ Change Admission Deadlines *(no other changes)*

☐ Change Admissions to "fall admissions only" *(no other changes)*

☐ Change from Regular to Direct Receipt Admissions *(no other changes)*

☐ Change from Direct Receipt to Regular Admission *(no other changes)*

☐ Change Admission Requirements

☒ Change Degree Program Requirements (including Concentration requirements)

☒ Update Course Numbers in Program Listing (i.e. from Selected Topics to Permanent Numbers) *(no other changes)*

☐ Other – please specify:

2. Briefly - Why are these changes necessary or desired? Four changes are requested at this time:

1) **Add Engineering for International Development to PhD program in CE**: this program has been popular for MSCE students and several of our PhD students have requested this opportunity. WE currently have one student carrying out work that would qualify for this concentration in Ethiopia and past students have done dissertation research that would qualify in Mali, the Dominican Republic, Madagascar, and Bolivia.
2) **Increase number of credits for graduate research methods**: instructors have found that additional contact hours are needed to effectively teach this course. Electives/Directed research hours have been decreased by 1 credit to keep the total hours required at 78.
3) Changes in courses for Water Resources concentration courses due to new faculty hires.
4) Updates on course numbers/titles.

3. **Attach the current Catalog Copy, with the requested revisions shown using Track Changes.** If the only change is to the Admission Deadline revised Catalog Copy is not required– just specify the change below. All other changes require Catalog Copy.

Once College has approved, scan and email this Approval Form, and the revised Catalog Copy in Word to Graduate Studies by the deadline posted online http://www.grad.usf.edu/graduate-council.php . For questions, contact cdh@usf.edu

CIVIL ENGINEERING PROGRAM

Doctor of Philosophy (Ph.D.) Degree

DEGREE INFORMATION

Program Admission Deadlines:

Fall:	February 15
Spring:	October 15
Summer:	February 15

Minimum Total Hours:	78 post-bachelor's
Program Level:	Doctoral
CIP Code:	14.0801
Dept. Code:	EGX
Program (Major/College):	ECE EN
Approved:	1982

Concentrations:
Environmental Engineering (ENV)
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

PROGRAM 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 program 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.

Accreditation:
Accredited by the Commission on Colleges of the Southern Association of College and Schools.

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 listed below.

Program Admission Requirements

- 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.

DEGREE PROGRAM REQUIREMENTS

Total Program Hours: **78 hours minimum post-bachelor's**
~~48 hours minimum~~

post-master's
Core requirement – ~~1~~2 hours
Concentration/primary area of study – 15 hours
Electives – 33 hours
Dissertation – 20 hours
Other course requirement – ~~9~~8 hours

Core Requirement ~~1~~2 hour
CGN 6945 ~~1~~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 and transfer, 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: 1) 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 Peace Corps and Nongovernmental 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 Health, Illness and Culture

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

PHC 6764 3Global Health Principles & Contemporary Issues
PHC 6761 3Global Health Assessment Strategies

3 additional credit hours of 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 nongovernmental organization, UNESCO-IHE, or equivalent) may register for CST 6990 for 0 credit hours while in their country of service/research.

ENVIRONMENTAL ENGINEERING (ENV) - 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:

~~CGN 6933~~ENV 6617 3 Green Engineering for Sustainability
CGN 6933 3 ~~Green~~Resilient Infrastructure~~ for Sustainable Communities~~
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 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 Concrete Construction Materials
CGN 6720 3 Electrochemical Diagnostic Techniques
~~CGN 6933~~CES 6010 3 Structural Life Prediction
EMA 5326 3 Corrosion Control
EMA 6510 3 Characterization of Materials

Additional 9 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
~~CGN 6933~~CES 6230	3	Advanced Structural Mechanics
~~CGN 6933~~CES 6144	3	Advanced Structural Analysis
CES 5209	3	Structural Dynamics
EGN 6333	3	Continuum Mechanics

Additional 9 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 Statistical & Econometric Methods

Additional 6 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
CGN 6933	3	Vadose Zone Hydrology
CGN 6933	3	Groundwater Hydraulics
CGN 6933	3	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
CGN 6933	3	Advanced Numerical Methods
CGN 6933	3	Global Sustainability
CGN 6933	3	Ecological Engineering

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

Electives - 33 hours

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 Program.

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 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 or http://www2.eng.usf.edu/cee/graduate/gradautecourses.htm