Graduate Council Curriculum Committee
September 23, 2020
2:30 p.m., Zoom

Agenda

1. Welcome and call to order

2. Review of minutes from September 9, 2020

3. General business

4. Course and Program proposals

5. Adjournment

Members and Administrators of the Graduate Council Curriculum Committee
Elsie Olan, Chair, College of Community Innovation and Education
Terrie Sypolt, Vice Chair, University Libraries
Bruce Caulkins, College of Graduate Studies
J. Marla Toyne, College of Sciences
Gergana Vitanova, College of Arts and Humanities
Art Weeks, College of Engineering and Computer Science
Jihe (Jackie) Zhao, College of Medicine
Francisco Guido-Sanz, College of Nursing
Axel Schülzgen, College of Optics and Photonics
Olga Molina, College of Health Professions and Sciences
Alex Rubenstein, College of Business Administration
Wei Wei, Rosen College of Hospitality Management
TBD, Graduate Student Association
Laurie von Kalm, College of Sciences, Administrator
Joellen Edwards, College of Nursing, Administrator
Ali Gordon, College of Engineering and Computer Science, Administrator
Jim Moharam, College of Optics and Photonics, Administrator
Lynn Hepner, College of Arts and Humanities, Administrator
Devon Jensen, College of Graduate Studies, Administrator
Glenn Lambie, College of Community Innovation and Education, Administrator
Saleh Naser, College of Medicine, Administrator
Linda Rosa-Lugo, College of Health Professions and Sciences, Administrator
Sevil Sonmez, College of Business Administration, Administrator
Alan Fyall, Rosen College of Hospitality Management, Administrator

Graduate Council Curriculum Committee
September 23, 2020
2:30 p.m., Zoom

1. College of Medicine

College of Medicine course additions

1. MDC 7002 Transition to Core Clerkships
2. MDE 8603 Non-Clinical Advanced Surgery Elective
3. MDR 8570 Orthopaedic Research Elective

2. College of Engineering and Computer Science

College of Engineering and Computer Science course revisions

1. EMA 6130 Advanced Phase Transformations in Materials
   - Name change from "Phase Transformation in Metals and Alloys" to "Advanced Phase Transformations in Materials" to reflect advanced concepts suitable primarily for graduate student audience. There is an undergraduate class in the MSE Department, named Phase Transformations in Materials (EMA4125).

2. CGN 5617 Infrastructure Systems Optimization and Identification
   - Name change from "Intelligent Infrastructure Management" to "Infrastructure Systems Optimization and Identification". This update it needed as it may be confused with CCE 5006 (Project Management)

College of Engineering and Computer Science program revisions

1. Digital Forensics MS
   - Changes to program description
   - Add restricted elective courses
   - Delete elective course ESI 5219: Engineering Statistics
   - Move elective course "CIS 6206: Electronic Discovery for Digital Forensics Professionals" from Group B (criminal justice) to Group C (legal study).
   - Remove the equipment fee. Intend to use open-source or free software for course teaching. Separate Fee form will be reviewed at a later meeting.
   - Remove priority admission deadline, add Summer term admission
   - Change application requirement "Three letters of recommendation" to "Letters of recommendation (encouraged but not required)".

2. Civil Engineering MS, Smart Cities Track
   - Add elective course CAP 5738

3. Civil Engineering MS, Structural and Geotechnical Engineering Track
   - Update Program description
   - Changes to required and elective courses

4. Civil Engineering MS, Water Resources Engineering Track

   - Add more course options to required courses

   - Update Program description and Curriculum description

5. Civil Engineering MSCE
   - Adding course options to multiple areas

6. Environmental Engineering MSEnvE
   - Changes to program description
   - Revisions to course requirement, pre-reqs, elective course, application requirements language

7. Environmental Engineering PhD
   - Revision to Program Description
   - Add and remove elective courses

College of Medicine - Grad Course Addition - MDC 7002 Transition to Core Clerkships

2021-2022 Graduate Course New

General Catalog Information

Read before you begin

1. TURN ON help text before starting this proposal by clicking ⓘ in the top right corner of the heading.

2. FILL IN all fields required marked with an *. You will not be able to launch the proposal without completing required fields.

3. LAUNCH proposal by clicking ▶ in the top left corner.

Course additions must be accompanied by a course syllabus and rationale. Departments must also submit an electronic syllabus to the college curriculum person.

Please note: If your proposal is for a new split level course, do not complete this form. Please complete the 2021-2022 Graduate Course Split-Level Class form.

Proposal Type:*
> Grad Course Addition

College:*
> College of Medicine

Unit / Department / College:*
> College of Medicine M.D. Program

For the **Full Title** box below, please type the course information in the following format: Prefix, Course Number, and Title. For example: IDS 6000 Creative Education

Full Title:* MDC 7002 Transition to Core Clerkships

Course Instructor (Must be Approved Graduate Faculty/Scholars):* Martin Klapheke, MD

Department Chair Phone Number:* 407-266-1100

Dept Chair Email:* Pep@ucf.edu

Originators of New Course Proposals are responsible for designating the new course number. Instructions can be found at https://graduatecouncil.ucf.edu/curriculum-committee/ The file is Course Number Guide in the Other Resources section of this webpage. New Course forms submitted with a 5/6/7 XXX designation will not be accepted.

Please note: State Course Numbering System reviewers have the right to change the course number during their review. Please check back to your proposal after State review to verify the course number.

Prefix:*	MDC		Number:* 7002

Course Title:* Transition to Core Clerkships

30 Character Abbreviation:* Transition to Core Clerkships

Course Type:* ⚪ Graduate Course   ⦿ Medicine (MD) Course

Course Description (25 word limit)* This 12-week rotation is intended to give M3 students an in-depth transition to the core clerkships, building clinical knowledge and skills that will be directly applicable in the clinical settings of each clerkship.

Grading Scheme:* Satisfactory/Unsatisfactory

Prerequisite(s): Completion of the M2 year.

Corequisite(s):

Credit Hour Information

As part of UCF's accreditation with SACSCOC, we are required to have a formal model of credit hour designations. The following chart provides a general framework for faculty to use as they make course proposals. The elements will help faculty to better determine the credit hour designation for a course and help the institution with a standard approach in this determination.

<u>**Credit Hour Design Options**</u>

Credit Hour	1	1	1
(Formal) Instruction Time - Class Hours or Online Module, etc.	1	1	1
Lab/Studio/Field work	0	1	2
Out-of-Class (homework, course readings, group work, online posts, etc)	2	1	0
Total Course Engagement	3	3	3

Any combination of these elements that extend beyond the 3 hours of Total Course Engagement, could be considered a 2 credit hour class. The course should try to maintain a 1:3 ratio.

1 Credit hours = 3 hours of Total Course Engagement

2 Credit hours = 6 hours of Total Course Engagement

3 Credit hours = 9 hours of Total Course Engagement

4 Credit hours = 12 hours of Total Course Engagement

Please note the Out-of-Class hours will not appear in the graduate catalog. This field is for information only.

For further review, please see the SACSCOC definition: **http://www.sacscoc.org/pdf/081705/Credit%20Hours.pdf**

Credit Hours:* 16

Instruction Time:* 8

Lab/Studio/Field Work Hours:* 0

Out-of-Class Hours:* 8

Total Engagement Hours:* 28.3/week

Variable Credit (0-99):

NOTE: In determining if a course is repeatable for credit, the concept is that the content is the same, but the student experience with that content will be different each time it is taken.

For a repeatable course, indicate in the syllabus what will remain the same and what will change when the course is repeated.

Repeat for credit?*	◯ Yes ⦿ No

If yes, indicate the total times the course may be used toward completion of the degree.	

Term of Offering

When will the course be offered?*	☐ Odd Fall ☐ Even Fall ☐ Odd Spring ☐ Even Spring ☑ Odd Summer ☑ Even Summer ☐ Every Semester ☐ Occasional

Intended Utilization of Course

The course will be used primarily as:*	⦿ Required Course ◯ Elective Course

Materials and Supply Fee

New Materials and Supply Fees?*	◯ Yes ⦿ No

If yes, also complete the 2021-22 Graduate Materials and Supply Fee form.

Justification for Course Addition

What is the rationale for adding this course?*	Due to restrictions on students participating in clinical duties because of COVID-19, this course will replace the first 3 months of clinical requirements for the M3 year and will include topics that are typically spread out over the course of the year.

What grad programs/tracks require or recommend this course for graduation?	MD

What will be the source of students?*	M3 students

What is the estimated annual enrollment?*	120

Possible duplications and conflicts with other departments or colleges should be discussed with appropriate parties. Please detail any discussions you have had or attach relevant documents like email threads in the Attachment List Section.

Course Syllabus Policy

The University of Central of Florida has established guidelines as it relates to the form and structure of all course syllabi. An effective syllabus provides an overview of the purpose of a course, outlines course requirements, and defines expectations for student performance. Faculty members are responsible for developing course content and selecting pedagogical approaches for their courses. Leveraging this policy to develop them will provide a consistent approach for presenting essential information that supports learning and ensures that UCF is in compliance with the standards set forth by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) and other accrediting bodies.

To this end, each syllabus should include the following required elements:

> Information from the official Schedule of Classes
> Instructor and/or GTA contact information
> Explicit, public description of the course
> Student learning outcomes
> Sequence of course activity
> Assessment and grading procedures
> Course Materials and Resources
> Core policy statements
>
> > Academic integrity statement including definition(s) of and consequences for academic misconduct
> > Statement directing students needing accommodations to work with faculty and with Student Accessibility Services to ensure equal access to educational activities
> > Statement regarding emergency procedures and campus safety, encouraging students to be aware of their surroundings and familiar with actions to take in various types of emergencies
> > Statement regarding accommodations for active duty military students

Full details of the syllabus policy can be found at: **https://policies.ucf.edu/documents/4-403.pdf**

Policy Statements to copy/paste can be found at: **https://fctl.ucf.edu/teaching-resources/course-design/syllabus-statements/**

Course Syllabus Policy*	☑ I have aligned this syllabus per the UCF syllabus policy.

Attachment List

Please attach any required files by navigating to the Proposal Toolbox and clicking 🔲 in the top right corner.

Check*	☑ I have completed all relevant parts of the form.

Attached*	☑ I have attached a course syllabus and rationale.

Support from involved units that no duplication exists	☐ Duplication support materials attached

University of Central Florida
College *of* Medicine

S E L E C T I V E / E L E C T I V E / A C T I N G - I N T E R N S H I P   P R O P O S A L   F O R M

Please complete entire form. All fields are required

Proposal Date: 4/14/2020
Course Title: Transition to Core Clerkships
Department/Specialty: Multidisciplinary, representing all the Core Clerkship disciplines
Brief Description (25 words maximum): This 12-week rotation is intended to give M3 medical students an in-depth transition to the core clerkships, building clinical knowledge and skills that will be directly applicable in the clinical settings of each clerkship.

Primary Preceptor Supervising Students: Martin Klapheke MD
Office Location: COM 406H
Email: Martin.Klapheke@ucf.edu
Office Phone: 407-266-1183

Please indicate course type (select one): ☐M3 Clerkship Selective ☐M3 Clerkship Elective

☐M4 Clerkship Elective (4 wks) ☐M4 Clerkship Elective (2 wks) ☐M4 Clerkship Elective (2 or 4 wks)

☐M4 Clerkship Acting-Internship (4 wks)

☒Other This is a new required 12-week course for students beginning their M3 year.

Location:
- **Location to Report on first day:** Online and Zoom
- **Reporting Time:** 8:00am
- **Contact Person** (for information/ scheduling)**:** Ms. Morayma Cubero
- **Contact Phone and e-mail:** 407-266-1119, Morayma.Cubero@ucf.edu

Which blocks will this rotation be offered during the academic year? The typical M4 academic year is June 1 – April 30. Please select which months you can offer this course to students. We will verify this information on a yearly basis. ☐June ☐July ☐August ☐September ☐October ☐November ☐December ☐January ☐February ☐March ☐April
> **Please note for M3 rotations the schedule is different. You will be contacted by one of the M3 coordinators regarding the M3 course schedule.*

What is the number of students per rotation block? All (approximately 120) beginning M3 students

Prerequisites (check all that apply):
☐Completion of M2 ☐Completion of M3 ☒Consent of Instructor
☐Completion of Core Clerkship in   ☒Other: Students entering the M3 year, even if completion of remediation from M2 is still pending.
Length of program (weeks): Other
Estimated total contact hours/week: Varies, but approximately equal to or more than 10 hours/week of direct contact; thus, 25% of course time.
Estimated % of time - Inpatient: N/A
Estimated % of time - Outpatient: N/A
Estimated % of time – Indirect contact time (independent study or online course work: 75%

Estimated patient volume: What is the estimated number of patients/week for whom the student will have some responsibility, e.g., intakes/week N/A **follow-ups/week** N/A
On-call schedule: N/A
Weekend duties: N/A
For non-patient care rotations, describe the typical learning activities and responsibilities of the student: Independent completion of online clinical training modules; online quizzes; completion of assigned clinical exercises; participation in Zoom meetings with instructors; LCTs; some clinical skills sessions.
Describe the expected level of supervision of students by faculty and residents: N/A

Goals of the Rotation: Specify the anticipated clinical conditions the student will encounter, and the clinical knowledge, and examination and procedural skills the student will be expected to learn: This rotation is designed to provide medical students with insights into the specialty of M3 Core Clerkships**.**

  This 12-week rotation is intended to give M3 medical students an in-depth transition to the core clerkships, building clinical knowledge and skills that will be directly applicable in the clinical settings of each clerkship. The rotation will include teaching by many different disciplines (including all the core clerkship disciplines). Because of the COVID-19 pandemic precautions, especially early in the rotation, teaching will consist of independent completion of online modules—including working through cases--associated quizzes, and assigned clinical exercises. There will be frequent Zoom meetings with the faculty to answer questions and review the completed exercises and quizzes. If COVID-19 precautions allow, the later parts of the rotation will include face-to-face sessions and live patient interviews.

  Online didactics for Core Clerkships for all 120 students as a group: Psychiatry, Neurology, OB-GYN, Pediatrics, IM/FM, Surgery. Emphasis on integration of these fields whenever possible, e.g., co-teaching sessions by FM and Psychiatry on pain management and opioids. There will be inclusion of a focus on Diagnostic Excellence

Learning Objectives: Please group these under the following headings:

Patient care: Click box to agree to statement below
☐The medical student is expected to provide patient care that is compassionate, appropriate, and effective for the promotion of health, prevention of illness, and treatment of disease.
☐Other:

Medical Knowledge: The medical student is expected to demonstrate medical knowledge relevant to each core clerkship discipline, as well as the application of this knowledge to patient care: The student will obtain and develop medical knowledge in the following areas:
- The student will gain medical knowledge and learn diagnostic skills important for success in the core clerkships through completion of online didactics for all core clerkship disciplines: Psychiatry, Neurology, OB-GYN, Pediatrics, IM/FM, Surgery. Online didactics in Radiology and Dermatology will also be included. There will also be a focus on Diagnostic Excellence, High Value Care, and Oral Presentation Skills.

Practice Based Improvement: The medical student is expected to be able to demonstrate the ability to investigate and evaluate their care of patients and to continuously improve care based on constant self-evaluation and life-long learning.

Interprofessional and Communication Skills: The medical student is expected to demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.
-

Professionalism: The medical student is expected to demonstrate behaviors that reflect a commitment to continuous professional development, ethical practice, understanding and sensitivity to diversity and a responsible attitude toward their patient, their profession, and society.

-

Systems Based Practice: The medical student is expected to demonstrate an awareness of and responsiveness to the larger context of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

-

Learning Activities: Specify the level of the student's clinical responsibilities, e.g., admissions, daily rounds, weekly conferences, case presentations, literature review, other projects: The rotation will include teaching by many different disciplines (including all the core clerkship disciplines). Because of the COVID-19 pandemic precautions, especially early in the rotation, teaching will consist of independent completion of online modules—including working through cases--associated quizzes, and assigned clinical exercises. There will be frequent Zoom meetings with the faculty to answer questions and review the completed exercises and quizzes. If COVID-19 precautions allow, the later parts of the rotation will include face-to-face sessions and live patient interviews.

Required textbooks and articles: Each discipline will utilize the vast textbook and journal resources, and extensive online databases of the UCF COM HSL library.

How will the student's performance be assessed?
  How/when will formative feedback be given?: Click box to agree to the statement below.
    ☐ The medical student will be evaluated by his/her engagement in the entire learning opportunity including presentations, preparedness for clinic, and participation in educational conferences. There will be a formal feedback session at mid-term and at the end of the rotation. Feedback for continuous improvement will be provided throughout the rotation.
    ☒ Other: Formative feedback will be provided to students during the frequent Zoom meetings with instructors, especially regarding their level of active participation in discussion sessions.

  Summative evaluation: Click the box to agree to the statement below.
    ☐ A final written evaluation will be provided at the end of the rotation. All evaluations will be completed electronically via an online evaluation system.
    ☒ Other: Students will be graded on frequent quizzes and assigned learning exercises (e.g., write-ups of case assessments and treatment plans. Each Clerkship Director will determine a Pass/Fail grade on their component of the course and will forward this and specific quiz performance, etc. to Dr. Klapheke, who will calculate a final Pass/Grade grade for the overall course. (See syllabus for more information on the grading rubric.

Name of Sponsoring Preceptor: Martin Klapheke MD
Date: 4/14/2020

* Email the completed form to ken.staack@ucf.edu as a **word document**. We will reach out to you if we need additional information and to inform you of the status of your course proposal.

Signature of Clerkship Director_____ Date _____

Signature of Assistant Dean of Medical Education_____ Date_____

Curriculum Committee Chair_____ Date___4/20/20_____

COM Dean_____ Date_4 . 20 . 20

College of Medicine - Grad Course Addition - MDE 8603 Non-Clinical Advanced Surgery Elective

2021-2022 Graduate Course New

General Catalog Information

Read before you begin

1. TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

2. FILL IN all fields required marked with an *. You will not be able to launch the proposal without completing required fields.

3. LAUNCH proposal by clicking ▶ in the top left corner.

Course additions must be accompanied by a course syllabus and rationale. Departments must also submit an electronic syllabus to the college curriculum person.

Please note: If your proposal is for a new split level course, do not complete this form. Please complete the 2021-2022 Graduate Course Split-Level Class form.

Proposal Type: *
> Grad Course Addition

College: *
> College of Medicine

Unit / Department / College: *
> College of Medicine M.D. Program

For the **Full Title** box below, please type the course information in the following format: Prefix, Course Number, and Title. For example: IDS 6000 Creative Education

Full Title: * MDE 8603 Non-Clinical Advanced Surgery Elective

Course Instructor (Must be Approved Graduate Faculty/Scholars): * Andrew Taitano, MD.

Department Chair Phone Number: * 407-266-1100

Dept Chair Email: * Pep@ucf.edu

Originators of New Course Proposals are responsible for designating the new course number. Instructions can be found at https://graduatecouncil.ucf.edu/curriculum-committee/ The file is Course Number Guide in the Other Resources section of this webpage. New Course forms submitted with a 5/6/7 XXX designation will not be accepted.

Please note: State Course Numbering System reviewers have the right to change the course number during their review. Please check back to your proposal after State review to verify the course number.

Prefix:*		Number:*	8603
MDE			

Course Title:*	Non-Clinical Advanced Surgery Elective

30 Character Abbreviation:*	Advanced Surgery Elective

Course Type:*	○ Graduate Course ● Medicine (MD) Course

Course Description (25 word limit)*	Remote surgery elective comprised of operative videos, independent study, and web-based meetings, encompassing the core competencies of surgery and elective material in a sub-specialty.

Grading Scheme:*	Satisfactory/Unsatisfactory

Prerequisite(s):	Completion of the M2 year.

Corequisite(s):	

Credit Hour Information

As part of UCF's accreditation with SACSCOC, we are required to have a formal model of credit hour designations. The following chart provides a general framework for faculty to use as they make course proposals. The elements will help faculty to better determine the credit hour designation for a course and help the institution with a standard approach in this determination.

Credit Hour Design Options

Credit Hour	1	1	1
(Formal) Instruction Time - Class Hours or Online Module, etc.	1	1	1
Lab/Studio/Field work	0	1	2
Out-of-Class (homework, course readings, group work, online posts, etc)	2	1	0
Total Course Engagement	3	3	3

Any combination of these elements that extend beyond the 3 hours of Total Course Engagement, could be considered a 2 credit hour class. The course should try to maintain a 1:3 ratio.

1 Credit hours = 3 hours of Total Course Engagement

2 Credit hours = 6 hours of Total Course Engagement

3 Credit hours = 9 hours of Total Course Engagement

4 Credit hours = 12 hours of Total Course Engagement

Please note the Out-of-Class hours will not appear in the graduate catalog. This field is for information only.

For further review, please see the SACSCOC definition: **http://www.sacscoc.org/pdf/081705/Credit%20Hours.pdf**

Credit Hours:* 6

Instruction Time:* 0

Lab/Studio/Field Work Hours:* 0

Out-of-Class Hours:* 6

Total Engagement Hours:* 30/week

Variable Credit (0-99):

NOTE: In determining if a course is repeatable for credit, the concept is that the content is the same, but the student experience with that content will be different each time it is taken.

For a repeatable course, indicate in the syllabus what will remain the same and what will change when the course is repeated.

Repeat for credit?*	○ Yes ● No

If yes, indicate the total times the course may be used toward completion of the degree.	

Term of Offering

When will the course be offered?*	☐ Odd Fall ☐ Even Fall ☑ Odd Spring ☑ Even Spring ☑ Odd Summer ☑ Even Summer ☐ Every Semester ☐ Occasional

Intended Utilization of Course

The course will be used primarily as:*	○ Required Course ● Elective Course

Materials and Supply Fee

New Materials and Supply Fees?*	○ Yes ● No

If yes, also complete the 2021-22 Graduate Materials and Supply Fee form.

Justification for Course Addition

What is the rationale for adding this course?*	M4 students are required to take 5 months of elective rotations. This will be an additional option.

What grad programs/tracks require or recommend this course for graduation?	

What will be the source of students?*	M4 students

What is the estimated annual enrollment?*	120

Possible duplications and conflicts with other departments or colleges should be discussed with appropriate parties. Please detail any discussions you have had or attach relevant documents like email threads in the Attachment List Section.

Detail Discussion	

Course Syllabus Policy

The University of Central of Florida has established guidelines as it relates to the form and structure of all course syllabi. An effective syllabus provides an overview of the purpose of a course, outlines course requirements, and defines expectations for student performance. Faculty members are responsible for developing course content and selecting pedagogical approaches for their courses. Leveraging this policy to develop them will provide a consistent approach for presenting essential information that supports learning and ensures that UCF is in compliance with the standards set forth by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) and other accrediting bodies.

To this end, each syllabus should include the following required elements:

> Information from the official Schedule of Classes
> Instructor and/or GTA contact information
> Explicit, public description of the course
> Student learning outcomes
> Sequence of course activity
> Assessment and grading procedures
> Course Materials and Resources
> Core policy statements
>
>> Academic integrity statement including definition(s) of and consequences for academic misconduct
>> Statement directing students needing accommodations to work with faculty and with Student Accessibility Services to ensure equal access to educational activities
>> Statement regarding emergency procedures and campus safety, encouraging students to be aware of their surroundings and familiar with actions to take in various types of emergencies
>> Statement regarding accommodations for active duty military students

Full details of the syllabus policy can be found at: **https://policies.ucf.edu/documents/4-403.pdf**

Policy Statements to copy/paste can be found at: **https://fctl.ucf.edu/teaching-resources/course-design/syllabus-statements/**

Course Syllabus Policy*	☑ I have aligned this syllabus per the UCF syllabus policy.

Attachment List

Please attach any required files by navigating to the Proposal Toolbox and clicking in the top right corner.

Check*	☑ I have completed all relevant parts of the form.

Attached*	☑ I have attached a course syllabus and rationale.

Support from involved units that no duplication exists	☐ Duplication support materials attached

University of Central Florida
College *of* Medicine

SELECTIVE/ELECTIVE/ACTING-INTERNSHIP PROPOSAL FORM

Please complete entire form. All fields are required

Proposal Date: 3/27/2020
Course Title: Non-Clinical Advanced Surgery Elective
Department/Specialty: Surgery
Brief Description (25 words maximum): Remote surgery elective comprised of operative videos, independent study, and web-based meetings, encompassing the core principles of surgery and elective material in a chosen subspecialty.

Primary Preceptor Supervising Students: Andrew A. Taitano, M.D., F.A.C.S.
Office Location: UCF College of Medicine, Health Sciences Campus at Lake Nona, 6850 Lake Nona Blvd., Suite 412, Orlando, FL 32827-7408
Email: Andrew.Taitano@ucf.edu, katherine.newsum@ucf.edu
Office Phone: For Katherine Newsum: 407-266-1342; For Dr. Taitano: 727-398-6661, x14956 (ask Tammi to connect you)

Please indicate course type (select one): ☐M3 Clerkship Selective

☒M4 Clerkship Elective (4 wks) ☐M4 Clerkship Elective (2 wks) ☐M4 Clerkship Elective (2 or 4 wks)

☐M4 Clerkship Acting-Internship (4 wks)

☐Other Click here to explain why your course does not align with the previous course choices.

Location:
- **Location to Report on first day:** Zoom meeting (email with meeting ID will be sent prior to start of rotation).
- **Reporting Time:** Time will be coordinated based on student and instructor availability prior to start of rotation.
- **Contact Person** (for information/ scheduling): Dr. Andrew Taitano, Katherine Newsum
- **Contact Phone and e-mail:** For Dr. Taitano: 727-398-6661, x14956 (ask Tammi to connect you), Andrew.Taitano@ucf.edu; For Katherine Newsum: 407-266-1342, katherine.newsum@ucf.edu

Which blocks will this rotation be offered during the academic year? The typical M4 academic year is June 1 – April 30. Please select which months you can offer this course to students. We will verify this information on a yearly basis. ☒June ☒July ☐August ☐September ☐October ☐November ☒December ☒January ☒February ☐March ☒April
   Please note for M3 rotations the schedule is different. You will be contacted by one of the M3 coordinators regarding the M3 course schedule.
What is the number of students per rotation block? Minimum of 4, Maximum of 30

Prerequisites (check all that apply):
☒Completion of M2 ☒Completion of M3 ☐Consent of Instructor
☐Completion of Core Clerkship in Click here to enter text.   ☐Other: Click here to enter text.
Length of program (weeks): 4 weeks
Estimated total contact hours/week: 30

Estimated % of time - Inpatient: 0%
Estimated % of time - Outpatient: 0%
Estimated % of time – Indirect contact time (independent study or online course work: 100%
Estimated patient volume: What is the estimated number of patients/week for whom the student will have some responsibility, e.g., intakes/week 0 **follow-ups/week** 0
On-call schedule: None.
Weekend duties: None.
For non-patient care rotations, describe the typical learning activities and responsibilities of the student: Students will be responsible for assigned independent study work each week, which includes but is not limited to: operative videos from the Journal of Medical Insight, landmark research articles, textbook chapters, podcasts, and various sources regarding both "soft-skills" for surgeons and historical examples of surgical practice and education. Students will also be responsible to prepare for and attend scheduled web-based student-led journal clubs, student presentation sessions, and specialty-specific discussion sessions that will occur three to four times weekly and as needed. Lecture/presentation based sessions will include all students in the course. Discussion based sessions will be divided into small groups consisting of at least 4 and no more than 7-8 students to facilitate active participation.
Describe the expected level of supervision of students by faculty and residents: The majority of student time during the course will be spent on independent curriculum-directed study. Supervision by faculty will occur during web-based journal clubs and student presentation sessions multiple times per week. Faculty will be available for guidance, formative feedback, and mentorship throughout the course.

Goals of the Rotation: Specify the anticipated clinical conditions the student will encounter, and the clinical knowledge, and examination and procedural skills the student will be expected to learn: This rotation is designed to provide medical students with insights into the specialty of Surgery.

- This rotation is designed to provide medical students with knowledge and insights into the core principles of care of the surgical patient, the historical and contemporary practice of surgery, and key topics in selected surgical specialties including vascular surgery, orthopedic surgery, gynecologic surgery, urologic surgery, plastic surgery, head/neck surgery, neurosurgery, and ophthalmology. Emphasis will be given to awareness and development of skills and attributes necessary for lifelong learning, education of others, teamwork, and leadership.

Learning Objectives: Please group these under the following headings:

Patient care: Click box to agree to statement below
☐The medical student is expected to provide patient care that is compassionate, appropriate, and effective for the promotion of health, prevention of illness, and treatment of disease.
☒Other: Due to the non-clinical basis of this course, direct patient care is not a component. Topics and principles that promote compassionate and effective patient care are included and disucssed.

Medical Knowledge: The medical student is expected to demonstrate medical knowledge relevant to Surgery and Surgical Subspecialties, as well as the application of this knowledge to patient care: The student will obtain and develop medical knowledge in the following areas:
- Basic science principles of surgery
- Evaluation of preoperative risk and perioperative risk mitigation practices
- Bedside management of surgical patients
- Core topics in general and trauma surgery
- Emergency and "do-not-miss" topics in all surgical subspecialties
- In-depth topics in surgical subspecialty of the student's choice

Practice Based Improvement: The medical student is expected to be able to demonstrate the ability to investigate and evaluate their care of patients and to continuously improve care based on constant self-evaluation and life-long learning.
- Demonstrate and improve ability to efficiently utilize resources for self-directed learning
- Develop and maintain a willingness to learn from both peers and mentors/faculty
- Identify areas for improvement in one's knowledge acquisition, developing habits conducive to life-long learning

Interprofessional and Communication Skills: The medical student is expected to demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.
- Collaborate on shared topics with fellow students and faculty who have widely varying surgical interests
- Actively participate in small-group, specialty-specific discussions amongst students and faculty
- Develop presentation skills and journal club participation skills through web-based meetings

Professionalism: The medical student is expected to demonstrate behaviors that reflect a commitment to continuous professional development, ethical practice, understanding and sensitivity to diversity and a responsible attitude toward their patient, their profession, and society.
- Students will display continuous professional development through excellent time-management skills, punctual attendance in all conferences, and detailed and thoughtful preparation for all group discussion sessions and student presentations. Students will demonstrate respect for all religious and cultural beliefs, adhere to principles of confidentiality, and recognize and identify areas of improvement in personal and in peer performance.

Systems Based Practice: The medical student is expected to demonstrate an awareness of and responsiveness to the larger context of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.
- Students will demonstrate an awareness and responsiveness to the larger context of healthcare through completion of assigned reading topics. Students will demonstrate competence in using multimedia platforms for learning and collaboration. Students will become familiar with landmark studies in surgery and understand the historical and sociopolitical context of these studies.

Learning Activities: Specify the level of the student's clinical responsibilities, e.g., admissions, daily rounds, weekly conferences, case presentations, literature review, other projects: Students will participate in web-based journal clubs, student presentation sessions, and specialty-specific discussions at a frequency of three-to-four times per week. Students will be required to present articles, give presentations on surgical topics, and actively participate in their respective specialty's discussions with both peers and faculty. Students will also be responsible for independent learning with assigned operative videos, textbook chapters, research articles, and more.

Required textbooks and articles: See curriculum. Primary sources include but are not limited to:
Schwartz's Principles of Surgery, 11e. Brunicardi, F. Charles. Access Medicine Sabiston Textbook of Surgery, 20e. Townsend, Courtney M. ClinicalKey https://www.uptodate.com/home https://jomi.com/index https://mastersurgery.com/category/all-videos/

How will the student's performance be assessed? (All M4 Electives and Acting Internships are P/F Grading):
How/when will formative feedback be given?: Click box to agree to the statement below.
☒ The medical student will be evaluated by his/her engagement in the entire learning opportunity including presentations, preparedness for clinic, and participation in educational conferences. There

will be a formal feedback session at mid-term and at the end of the rotation. Feedback for continuous improvement will be provided throughout the rotation.

☐ **Other:** Click here to enter information regarding how the student will receive formative feedback.

Summative evaluation: Click the box to agree to the statement below.

☒ A final written evaluation will be provided at the end of the rotation. All evaluations will be completed electronically via an online evaluation system.

☐ **Other:** Click here to enter information regarding how the student will receive a summative evaluation.

Name of Sponsoring Preceptor: Andrew A. Taitano, M.D., F.A.C.S.
Date: 3/27/2020

* Email the completed form to ken.staack@ucf.edu as a **word document**. We will reach out to you if we need additional information and to inform you of the status of your course proposal.

Signature of Clerkship Director_____ Date _____

Signature of Assistant Dean of Medical Education *MKleghle nd* Date **3.27-20**

Curriculum Committee Chair_____ Date ___4/20/20___

COM Dean _____ Date 4.20.20

College of Medicine - Grad Course Addition - MDR 8570 Orthopaedic Research Elective

2021-2022 Graduate Course New

General Catalog Information

Read before you begin

1. TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

2. FILL IN all fields required marked with an *. You will not be able to launch the proposal without completing required fields.

3. LAUNCH proposal by clicking ▶ in the top left corner.

Course additions must be accompanied by a course syllabus and rationale. Departments must also submit an electronic syllabus to the college curriculum person.

Please note: If your proposal is for a new split level course, do not complete this form. Please complete the 2021-2022 Graduate Course Split-Level Class form.

Proposal Type:*	Grad Course Addition

College:*	College of Medicine

Unit / Department / College:*	College of Medicine M.D. Program

For the **Full Title** box below, please type the course information in the following format: Prefix, Course Number, and Title. For example: IDS 6000 Creative Education

Full Title:*	MDR 8570 Orthopaedic Research Elective

Course Instructor (Must be Approved Graduate Faculty/Scholars):*	Thomas Kean, PhD.

Department Chair Phone Number:*	407-266-1100	**Dept Chair Email:***	Pep@ucf.edu

Originators of New Course Proposals are responsible for designating the new course number. Instructions can be found at https://graduatecouncil.ucf.edu/curriculum-committee/ **The file is Course Number Guide in the Other Resources section of this webpage. New Course forms submitted with a 5/6/7 XXX designation will not be accepted.**

Please note: State Course Numbering System reviewers have the right to change the course number during their review. Please check back to your proposal after State review to verify the course number.

Prefix:*	MDR		Number:*	8570

Course Title:*	Orthopaedic Research Elective

30 Character Abbreviation:*	Ortho Research Electie

Course Type:*	○ Graduate Course ● Medicine (MD) Course

Course Description (25 word limit)*	This course will highlight some of the challenges, approaches, and current research in orthopaedic medicine.

Grading Scheme:*	Satisfactory/Unsatisfactory

Prerequisite(s):	Completion of the M2 year.

Corequisite(s):	

Credit Hour Information

As part of UCF's accreditation with SACSCOC, we are required to have a formal model of credit hour designations. The following chart provides a general framework for faculty to use as they make course proposals. The elements will help faculty to better determine the credit hour designation for a course and help the institution with a standard approach in this determination.

<u>**Credit Hour Design Options**</u>

Credit Hour	1	1	1
(Formal) Instruction Time - Class Hours or Online Module, etc.	1	1	1
Lab/Studio/Field work	0	1	2
Out-of-Class (homework, course readings, group work, online posts, etc)	2	1	0
Total Course Engagement	3	3	3

Any combination of these elements that extend beyond the 3 hours of Total Course Engagement, could be considered a 2 credit hour class. The course should try to maintain a 1:3 ratio.

1 Credit hours = 3 hours of Total Course Engagement

2 Credit hours = 6 hours of Total Course Engagement

3 Credit hours = 9 hours of Total Course Engagement

4 Credit hours = 12 hours of Total Course Engagement

Please note the Out-of-Class hours will not appear in the graduate catalog. This field is for information only.

For further review, please see the SACSCOC definition: <u>**http://www.sacscoc.org/pdf/081705/Credit%20Hours.pdf**</u>

Credit Hours:*	6

Instruction Time:*	0

Lab/Studio/Field Work Hours:*	3

Out-of-Class Hours:*	3

Total Engagement Hours:*	3

Variable Credit (0-99):	24/week

NOTE: In determining if a course is repeatable for credit, the concept is that the content is the same, but the student experience with that content will be different each time it is taken.

For a repeatable course, indicate in the syllabus what will remain the same and what will change when the

For a repeatable course, indicate in the syllabus what will remain the same and what will change when the course is repeated.

Repeat for credit?*	◯ Yes ⦿ No

If yes, indicate the total times the course may be used toward completion of the degree.	

Term of Offering

When will the course be offered?*	☐ Odd Fall ☐ Even Fall ☐ Odd Spring ☐ Even Spring ☐ Odd Summer ☐ Even Summer ☐ Every Semester ☑ Occasional

Intended Utilization of Course

The course will be used primarily as:*	◯ Required Course ⦿ Elective Course

Materials and Supply Fee

New Materials and Supply Fees?*	◯ Yes ⦿ No

If yes, also complete the 2021-22 Graduate Materials and Supply Fee form.

Justification for Course Addition

What is the rationale for adding this course?*	M4 students are required to take five months of elective rotations. This will be an additional option.

What grad programs/tracks require or recommend this course for graduation?	N/A

What will be the source of students?*	M4 students

What is the estimated annual enrollment?*	12

Possible duplications and conflicts with other departments or colleges should be discussed with appropriate parties. Please detail any discussions you have had or attach relevant documents like email threads in the Attachment List Section.

Detail Discussion	

Course Syllabus Policy

The University of Central of Florida has established guidelines as it relates to the form and structure of all course syllabi. An effective syllabus provides an overview of the purpose of a course, outlines course requirements, and defines expectations for student performance. Faculty members are responsible for developing course content and selecting pedagogical approaches for their courses. Leveraging this policy to develop them will provide a consistent approach for presenting essential information that supports learning and ensures that UCF is in compliance with the standards set forth by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) and other accrediting bodies.

To this end, each syllabus should include the following required elements:

> Information from the official Schedule of Classes
> Instructor and/or GTA contact information
> Explicit, public description of the course
> Student learning outcomes
> Sequence of course activity
> Assessment and grading procedures
> Course Materials and Resources
> Core policy statements
>
>> Academic integrity statement including definition(s) of and consequences for academic misconduct
>> Statement directing students needing accommodations to work with faculty and with Student Accessibility Services to ensure equal access to educational activities
>> Statement regarding emergency procedures and campus safety, encouraging students to be aware of their surroundings and familiar with actions to take in various types of emergencies
>> Statement regarding accommodations for active duty military students

Full details of the syllabus policy can be found at: **https://policies.ucf.edu/documents/4-403.pdf**

Policy Statements to copy/paste can be found at: **https://fctl.ucf.edu/teaching-resources/course-design/syllabus-statements/**

Course Syllabus Policy* ☑	I have aligned this syllabus per the UCF syllabus policy.

Attachment List

Please attach any required files by navigating to the Proposal Toolbox and clicking 🗔 in the top right corner.

Check* ☑	I have completed all relevant parts of the form.

Attached* ☑	I have attached a course syllabus and rationale.

Support from involved units that no duplication exists ☐	Duplication support materials attached

University of Central Florida
College *of* Medicine

Please complete entire form. All fields are required

Proposal Date: 3/16/2020
Course Title: Orthopaedic Research
Department/Specialty: Internal Medicine/Musculoskeletal tissue research
Brief Description (25 words maximum): Musculoskeletal disorders represent one of the greatest healthcare challenges of today. In order to achieve a world free of musculoskeletal limitations, significant research efforts must be expended. This course will highlight some of the challenges, approaches and current research in orthopaedic medicine.

Primary Preceptor Supervising Students: Thomas Kean, PhD
Office Location: Burnett School of Biomedical Sciences (BSBS 341), 6900 Lake Nona Blvd, Orlando, FL 32827
Email: Thomas.Kean@ucf.edu
Office Phone: 407-266-7006

Please indicate course type (select one): ☐M3 Clerkship Selective

☒M4 Clerkship Elective (4 wks) ☐M4 Clerkship Elective (2 wks) ☐M4 Clerkship Elective (2 or 4 wks)

☐M4 Clerkship Acting-Internship (4 wks)

☐Other Click here to explain why your course does not align with the previous course choices.

Location:
- **Location to Report on first day:** Students should contact Kerri Drylie for instructions
- **Reporting Time:** 10AM
- **Contact Person** (for information/ scheduling): Kerri Drylie
- **What facilities will you use for your clinical rotations: There is no clinical rotation**
- **Contact Phone and e-mail:** Kerri.Drylie@ucf.edu

Which blocks will this rotation be offered during the academic year? The typical M4 academic year is June 1 – April 30. Please select which months you can offer this course to students. We will verify this information on a yearly basis. ☐June ☐July ☐August ☐September ☐October ☐November
☒December ☐January ☐February ☐March ☒April
> *Please note for M3 rotations the schedule is different. You will be contacted by one of the M3 coordinators regarding the M3 course schedule.*

What is the number of students per rotation block? 6

Prerequisites (check all that apply):
☐Completion of M2 ☐Completion of M3 ☒Consent of Instructor
☐Completion of Core Clerkship in Click here to enter text.   ☐Other: Click here to enter text.
Length of program (weeks): 4 weeks
Estimated total contact hours/week: 24
Estimated % of time - Inpatient: 0%
Estimated % of time - Outpatient: 0%

Estimated % of time – Indirect contact time (independent study or online course work: 50%
Estimated patient volume: What is the estimated number of patients/week for whom the student will have some responsibility, e.g., intakes/week n/a **follow-ups/week** n/a
On-call schedule: n/a
Weekend duties: n/a
For non-patient care rotations, describe the typical learning activities and responsibilities of the student: Click here to enter text.
Describe the expected level of supervision of students by faculty and residents: Click here to enter text.

Goals of the Rotation: Specify the anticipated clinical conditions the student will encounter, and the clinical knowledge, and examination and procedural skills the student will be expected to learn: This rotation is designed to provide medical students with insights into the specialty of orthopaedic research. Orthopaedic research, addressing the musculoskeletal limitations experienced across the breadth of society, encompasses many tissues and conditions. This course will focus on the current clinical approaches in cartilage, bone, tendon and muscle. Orthopaedic implants are successful in improving quality of life by re-establishing mobility and reducing pain. Due to an increasingly aging population and awareness of new technologies, better implants and therapies are desired. Tissue engineering, smart and customized, 3D printed implants all have potential to improve patient outcomes.

Course Guiding Questions:

1. What are the current orthopaedic treatments for cartilage, bone, tendon and muscle?
2. How are we falling short?
3. What is the role of orthopaedic research in patient care?
4. What are the current approaches under research?
5. How do we evaluate that research?
6. What are the next steps?

Course Goals:

1. Cartilage disease and trauma: current approaches and those under research

2. Bone fracture, disease, trauma, large segmental defects: current approaches and those under research

3. Tendon trauma and disease: current approaches and those under research

4. Muscle trauma and disease: current approaches and those under research

5. To provide an environment in which students can can share their ideas in group discussions and learn presentation skills

6. To enable students to make informed decisions about applications of orthopaedic research/products in their future practice

Learning Objectives: Please group these under the following headings:

Patient care: Click box to agree to statement below
☐The medical student is expected to provide patient care that is compassionate, appropriate, and effective for the promotion of health, prevention of illness, and treatment of disease.

☒Other: n/a

Medical Knowledge: The medical student is expected to demonstrate medical knowledge relevant to the use of orthopaedic research, as well as the application of this knowledge to patient care: The student will obtain and develop medical knowledge in the following areas:
This module will train students in the main areas of orthopaedic research. We will delineate current clinical approaches to trauma and diseases of the musculoskeletal system, tissue engineering, biomaterial, physiotherapy and pharmaceutical research, integration of those approaches and the future of clinical orthopaedics.

1. Introduction to orthopaedic research: current status, challenges and opportunities

   Cartilage, bone, tendon, muscle what are they, why does they fail and how do we treat it?
   Bone, fractures, co-morbidities, large defects and trauma: current approaches and challenges
   Tendon and ligament: injury and disease, current treatments and challenges
   Muscle: trauma and disesase, current approaches and challenges

2. Evaluating research

   What stage is it at? bench, in vivo, translational, clinical trial
   What is the quality? controls, repeats, replicates, mechanism, statistics
   How well does it address the problem(s)? mechanical/structural, mobility, pain, inflammation, repair

2. Imaging and assessment, surgical tool development

   MRI, ultrasound, arthroscopy, x-ray and CT: advantages, disadvantages and appropriate use
   Developments in imaging, surgical tools and their application to new therapies

3. Engineering of implants, cells, tissues, biomaterials and composites: Bone/cartilage

   Implants: total joint replacement: past, present and future. 3D printing and bioprinting.
   Engineering cells: cells as responsive drug depots, diagnositcs, transient modifications, FDA challenges
   Tissue engineering: what can we make, how and why, FDA challenges
   Biomaterial engineering: an implant that isn't inert, guiding tissue regeneration in vivo
   Biocomposite implants: synergy between materials and cells, where are we?

4. Engineering of implants, cells, tissues, biomaterials and composites: Tendon and ligament

   Implants: collagen, autograft, allograft. 3D printing and bioprinting.
   Engineering cells: tenocyte differentiation, transient modifications, FDA challenges
   Tissue engineering: what can we make, how and why, FDA challenges
   Biomaterial engineering: an implant that isn't inert, guiding tissue regeneration in vivo
   Biocomposite implants: synergy between materials and cells, where are we?

When combined the course broadly covers orthopedic research with a deep dive into musculoskeletal treatment, assessing current, developmental and future technologies. We will teach principals of orthopaedic treatment approaches, why they're used and some of the current research being done to improve patient outcomes.

Practice Based Improvement: The medical student is expected to be able to demonstrate the ability to investigate and evaluate their care of patients and to continuously improve care based on constant self-evaluation and life-long learning.

The principals of research evaluation are a core component of this course. This will aid medical students to get the most they can from life-long learning opportunities.

Interprofessional and Communication Skills: The medical student is expected to demonstrate interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and health professionals.

Patients can self-diagnose, find the latest research and the next big thing but often lack understanding or appreciation of what stage the research is at. As part of this course students will be expected to discuss recent articles, news and put it in context for a 'patient'.

Professionalism: The medical student is expected to demonstrate behaviors that reflect a commitment to continuous professional development, ethical practice, understanding and sensitivity to diversity and a responsible attitude toward their patient, their profession, and society.

Student presentation of research perspective and context is expected to be professional, courteous and accessible to a patient.

Systems Based Practice: The medical student is expected to demonstrate an awareness of and responsiveness to the larger context of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.

n/a

Learning Activities: Specify the level of the student's clinical responsibilities, e.g., admissions, daily rounds, weekly conferences, case presentations, literature review, other projects: No clinical responsibilities. The students will be given an assignment on a current/recent news or journal article. They will build a brief, patient oriented, video presentation centered around the use of orthopaedic research for this medical problem or disease connected to a key concept covered in the class (20% of grade). At the end of the course, they will integrate their findings and forecasts to write a term paper that demonstrates their acquired knowledge. The term paper makes up 20% of their grade. The purpose of this activity is to engage students in professional literature search, paper writing and seminar presentation. In addition to scientific questions, they will be also be trained how to improve their presentation skills. For participation in reviewing and commenting, they will be assigned to a group. As a group, they will review each other's work, make comments, and respond to comments. This ensures that they will also learn how to serve as a reviewer.

Required textbooks and articles: Weekly materials will be provided within the slides and whiteboard. Additionally, students will search UCF library resources and the web as part of their assignments. They will also hold Q/A sessions during the course. The books: General Orthopaedics and Basic Science https://link.springer.com/book/10.1007%2F978-3-319-92193-8#toc and Musculoskeletal Research and Basic Science https://link.springer.com/book/10.1007%2F978-3-319-20777-3

How will the student's performance be assessed?

How/when will formative feedback be given?: Click box to agree to the statement below.

☐ The medical student will be evaluated by his/her engagement in the entire learning opportunity including presentations, preparedness for clinic, and participation in educational conferences. There will be a formal feedback session at mid-term and at the end of the rotation. Feedback for continuous improvement will be provided throughout the rotation.

☒ Other: 1) Midterm: The midterm is 20% of their grade; 2) Assignments (see Learning Activities section): The assignments (video presentation and term paper) are 50% of their grade; 3) Final: The final is 30% of their grade. Also, the final summative grade will be Pass/Fail.

Summative evaluation: Click the box to agree to the statement below.

☒ A final written evaluation will be provided at the end of the rotation. All evaluations will be completed electronically via an online evaluation system.

☐ **Other:** Click here to enter information regarding how the student will receive a summative evaluation.

Name of Sponsoring Preceptor: Thomas Kean
Date: 3/17/2020

* Email the completed form to ken.staack@ucf.edu as a **word document**. We will reach out to you if we need additional information and to inform you of the status of your course proposal.

Signature of Clerkship Director _____ Date _____

Signature of Assistant Dean of Medical Education _M Klzphle aD_ Date _4-14-20_

Curriculum Committee Chair _____ Date _4/20/20_

COM Dean _____ Date _4 . 70 . 20_

College of Engineering and Computer Science - EMA 6130 Advanced Phase Transformations in Materials

2021-2022 Graduate Course Revision

General Catalog Information

Read before you begin

1. TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

2. FILL IN all fields required marked with an *. You will not be able to launch the proposal without completing required fields.

3. LAUNCH proposal by clicking ▶ in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after the proposal is launched.**

Course revisions must be accompanied by a course syllabus and rationale. Departments must also submit an electronic syllabus to the college curriculum person.

Proposal Type:	**Grad Course Revision**

College:*	**College of Engineering and Computer Science**

Unit / Department / College:*	**Department of Materials Science and Engineering**

IMPORT COURSE NOW! Please use the Import feature to import the course information from the Catalog by clicking ⬇ in the top left corner of the form. Do **not** type the course prefix and code.

Prefix:*	EMA	**Code:*** 6130

Course Title:* Advanced Phase ~~Transformation~~ Transformations in ~~Metals and Alloys~~ Materials

30 Character Abbreviation:* PHASE TRANSFORM METALS& ALLOY

Full Title:* EMA 6130 Advanced Phase Transformations in Materials

Course Instructor (Must be Approved Graduate Faculty/Scholars): Parag Banerjee

Department Chair Phone Number:* 407-882-1455

Dept Chair Email:* sudipta. seal@ucf. edu

Complete the remaining required fields and LAUNCH this proposal by clicking ▶ in the top left corner! Do not begin revisions until **after** launch. Course revisions before launch will not be tracked.

Course Description:* Principles of thermodynamics, kinetics, and phase diagrams for the understanding of diffusion and diffusionless phase transformations in ferrous and non-ferrous alloys.

Prerequisite(s): EMA 5104 and EMA 5106 or C. I.

Corequisite(s):

Does this proposal include revisions to prerequisites?*

Activity Log
+ No

○ Yes ◉ No

Grading Scheme:

Credit Hour Information

As part of UCF's accreditation with SACSCOC, we are required to have a formal model of credit hour designations. The following chart provides a general framework for faculty to use as they make course proposals. The elements will help faculty to better determine the credit hour designation for a course and help the institution with a standard approach in this determination.

Credit Hour Design Options

Credit Hour	1	1	1
(Formal) Instruction Time - Class Hours or Online Module, etc.	1	1	1
Lab/Studio/Field work	0	1	2
Out-of-Class (homework, course readings, group work, online posts, etc)	2	1	0
Total Course Engagement	3	3	3

Any combination of these elements that extend beyond the 3 hours of Total Course Engagement, could be considered a 2 credit hour class. The course should try to maintain a 1:3 ratio.

1 Credit hours = 3 hours of Total Course Engagement

2 Credit hours = 6 hours of Total Course Engagement

3 Credit hours = 9 hours of Total Course Engagement

4 Credit hours = 12 hours of Total Course Engagement

Please note the Out-of-Class hours will not appear in the graduate catalog. This field is for information only.

For further review, please see the SACSCOC definition: **http://www.sacscoc.org/pdf/081705/Credit%20Hours.pdf**

Credit Hours:* 3

Instruction Time:* 3

Lab/Studio/Field Work Hours:* 0

Out-of-Class Hours:* **6**

Total Engagement Hours:* ~~3~~ **9**

NOTE: For a repeatable course, indicate in the syllabus what will remain the same and what will change when the course is repeated. Also indicate who approves content before a course is repeated.

Repeat for credit?	Activity Log
	+ **No**
	○ Yes ● No

If yes, indicate the degree program name and the total times the course may repeated.	

If the course you are revising is a split-level class, please note this revision form will only impact the graduate side of the course. The undergraduate component of the course should be revised through the Undergraduate Curriculum Committee. As a reminder, the graduate syllabus should clearly demonstrate more advanced subject matter, expectations, and rigor.

Split-Level Class:*	Activity Log
	+ **No**
	○ Yes ● No

List undergraduate split-level course:	

Term of Offering

When will the course be offered?	Activity Log
	↘ **Occasional**
	☐ Odd Fall ☐ Even Fall ☐ Odd Spring ☐ Even Spring ☐ Odd Summer ☐ Even Summer ☐ Every Semester ☑ Occasional

Intended Utilization of Course

The course will be used primarily as:	Activity Log
	+ **Elective Course**
	○ Required Course ● Elective Course

Justification for Course Revision

What is the rationale for revising this course?*	**I would like to change the title of the course to,** **Advanced Phase Transformations in Materials** **NOTE: There is an undergraduate class in the MSE Department, named: Phase transformations in materials (EMA4125).** **-Therefore the proposed name change" Advanced Phase transformations in materials (EMA 6130) ", reflects advanced concepts suitable primarily for graduate student audience.** **-Further, the naming convention (use of the word "Advanced") and nomenclature is consistent to reflect this change.**
What grad programs/tracks require or recommend this course for graduation?	**This is an elective course**
If not a major requirement, what will be the source of students?	**Engineering, Physics, Chemistry, Nano, CREOL**
What is the estimated annual enrollment?	**10**

Possible duplications and conflicts with other departments or colleges should be discussed with appropriate parties. Please detail discussion you have had or attach relevant documents like email threads in the Attachment List Section.

Detail Discussion	

Course Syllabus Policy

The University of Central of Florida has established guidelines as it relates to the form and structure of all course syllabi. An effective syllabus provides an overview of the purpose of a course, outlines course requirements, and defines expectations for student performance. Faculty members are responsible for developing course content and selecting pedagogical approaches for their courses. Leveraging this policy to develop them will provide a consistent approach for presenting essential information that supports learning and ensures that UCF is in compliance with the standards set forth by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) and other accrediting bodies.

To this end, each syllabus should include the following required elements:

Information from the official Schedule of Classes
Instructor and/or GTA contact information
Explicit, public description of the course
Student learning outcomes
Sequence of course activity
Assessment and grading procedures
Course Materials and Resources
Core policy statements

Academic integrity statement including definition(s) of and consequences for academic misconduct
Statement directing students needing accommodations to work with faculty and with Student Accessibility Services to ensure equal access to educational activities
Statement regarding emergency procedures and campus safety, encouraging students to be aware of their surroundings and familiar with actions to take in various types of emergencies
Statement regarding accommodations for active duty military students

Full details of the syllabus policy can be found at: **https://policies.ucf.edu/documents/4-403.pdf**

Policy Statements to copy/paste can be found at: **https://fctl.ucf.edu/teaching-resources/course-design/syllabus-statements/**

Course Syllabus Policy*	☑ I have aligned this syllabus per the UCF syllabus policy.

Attachment List

Please attach any required files by navigating to the Proposal Toolbox and clicking ⬚ in the top right corner.

Check	**Activity Log**
	+ I have completed all relevant parts of the form.
	☑ I have completed all relevant parts of the form.

Attached

> **Activity Log**
>
> **Emily Stettner**
>
> ✛ **I have attached a course syllabus and rationale.**

☑ I have attached a course syllabus and rationale.

Administration Use Only

Catalog Ownership:

> **Activity Log**
>
> **Emily Stettner**
>
> ↳ **Department of Materials Science and Engineering**

Department of Materials Science and Engineering

Course OID

Course Type

> **Activity Log**
>
> **Emily Stettner**
>
> ↳ **Materials Engineering**

Materials Engineering

Status

> **Activity Log**
>
> **Emily Stettner**
>
> ↳ **Active-Visible**

◉ Active-Visible ○ Inactive-Hidden

PeopleSoft

Academic Organization

Academic Group

Career

Print in Catalog

Effective Date

EMA 6130 – Advanced Phase Transformations in Materials

Monday and Wednesday 10:30-11:45 AM, BA1 – O216A
Instructor: Professor Parag Banerjee, parag.banerjee@ucf.edu
Office: Research I, Room 207, Phone: 407-823-0190

Course Description:
Phase transformations is a phenomenon by which structure and hence, properties of materials can be tuned to match the needs of specific engineering applications. What principles govern phase transformations? The objective of this course is to use concepts in thermodynamics and kinetics to describe and understand the fundamental basis of phase transformations in materials. The course is divided into two parts. In Part I, concepts in thermodynamics, phase diagrams, diffusion, nucleation and their effects on kinetics will be discussed. In Part II, many of the important phase transformations will be discussed. These include melting, nucleation and growth, spinodal decomposition, martensitic transformation and phase transitions in nanomaterials. At the end of this course, students will have the necessary tools to study, analyze and understand phase transformations in a broad swathe of materials subject to a wide range of processing conditions.

Learning Outcomes:
The learning outcomes are twofold. First, students will develop an understanding of the thermodynamic driving forces for phase transformations in materials. Second, they will develop an understanding for the kinetic effects which govern phase transformations. The overarching framework for this understanding is based on statistical mechanics and a strong emphasis on modeling phase transformation behavior in its most fundamental i.e., atomistic form. The unified approach of theory and modeling will allow one to apply the principles learnt above to studying materials including metals and alloys, ceramics, polymers in their bulk, thin film and *nano* forms.

Text Book: Phase Transitions in Materials, Brent Fultz, First Edition, Cambridge University Press, ISBN: 9781139991094

Course Load: The course will consist of two to three homework problems given every week, 2 midterms and a final take home exam. Additionally, you will be required to do a term paper/ simulation project based on a specific topical area provided by the instructor, or suggested by you and in consultation with the instructor.
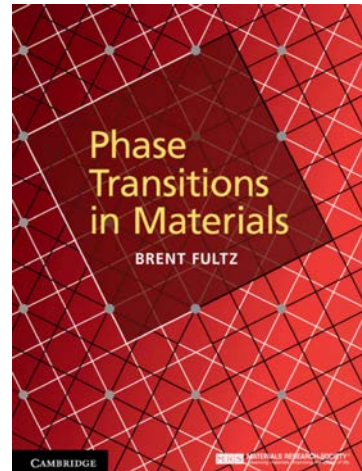
Homeworks	=	50 points
Midterm 1	=	10 points
Midterm 2	=	10 points
Final	=	10 points
Term project / paper	=	20 points
Total	=	100 points

<u>5 points awarded extra for picking a simulation project.</u>

Tentative schedule of classes:

Lecture #	Day	Notes	Topic	Chapter
1	Monday, January 6, 2020		Introduction	Chapter 1
2	Wednesday, January 8, 2020		Phase Diagrams	Chapter 2
3	Monday, January 13, 2020		Phase Diagrams	Chapter 2
4	Wednesday, January 15, 2020		Diffusion	Chapter 3
5	Monday, January 20, 2020	MLK Day		
6	Wednesday, January 22, 2020		Diffusion	Chapter 3
7	Monday, January 27, 2020		Nucleation	Chapter 4
8	Wednesday, January 29, 2020		Nucleation	Chapter 4
9	Monday, February 3, 2020		Diffusion + Nucleation on Phase Transformation	Chapter 5
10	Wednesday, February 5, 2020		Diffusion + Nucleation on Phase Transformation	Chapter 5
11	Monday, February 10, 2020		Midterm 1	
12	Wednesday, February 12, 2020		Melting	Chapter 10
13	Monday, February 17, 2020		Melting	Chapter 10
14	Wednesday, February 19, 2020		Melting	Chapter 10
15	Monday, February 24, 2020		Transformations involving precipitates and interfaces	Chapter 11
16	Wednesday, February 26, 2020		Transformations involving precipitates and interfaces	Chapter 11
17	Monday, March 2, 2020		Transformations involving precipitates and interfaces	Chapter 11
18	Wednesday, March 4, 2020		Spinodal Transformation	Chapter 12
	Monday, March 9, 2020	Spring Break		
	Wednesday, March 11, 2020	Spring Break		
19	Monday, March 16, 2020		Midterm 2	
20	Wednesday, March 18, 2020		Spinodal Transformation	Chapter 12
21	Monday, March 23, 2020		Spinodal Transformation	Chapter 12
22	Wednesday, March 25, 2020		Diffusionless Transformation	Chapter 15
23	Monday, March 30, 2020		Diffusionless Transformation	Chapter 15
24	Wednesday, April 1, 2020		Diffusionless Transformation	Chapter 15
25	Monday, April 6, 2020		Thermodynamics of nanomaterials	Chapter 16
26	Wednesday, April 8, 2020		Thermodynamics of nanomaterials	Chapter 16
27	Monday, April 13, 2020		Thermodynamics of nanomaterials	Chapter 16
28	Wednesday, April 15, 2020		Extra topics / individual presentations	-
29	Monday, April 20, 2020		Extra topics / individual presentations	-
	Monday, April 27, 2020	10:00 am - 12:50 pm	Final Exam	

GRADING:

The grading scale will be:

		Course Philosophy:
90 - 100	A	
80 - 89	B	Lectures will be a combination of notes written on the whiteboard
70 - 79	C	and in-class practice problems for students to solve. So please
60 – 69	D	do get your calculators to class. At times, we will put up pptx to
< 60 %	F	

NOTE: An "I" grade will not be given simply to avoid a failing grade. If you feel you cannot pass the course, please withdraw by the appropriate deadline. show a diagram / complex schematic etc. All lectures, homework problems will be available on WebCourses. Solutions will be put up once all homeworks have been turned in.

Key – consistency in this class will yield high grades. Do well in your homeworks!

Late submission policy: Late homeworks are not usually acceptable. For every day past the due date, you will lose 25% of the grade for that homework. However, if there are circumstances that prevent you from submitting on time, please talk to the instructor well ahead of time or let him know as soon as is possible, via email. Accommodations and exceptions can be made.

~~~~~~~~~~~~~~~~ **University of Central Florida, Core Syllabus Statements**~~~~~~~~~~~~~~~~~~~~~~~~

Academic Integrity:
Students should familiarize themselves with UCF's Rules of Conduct at <https://scai.sdes.ucf.edu/student-rules-of-conduct/>. According to Section 1, "Academic Misconduct," students are prohibited from engaging in

1. Unauthorized assistance: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.
2. Communication to another through written, visual, electronic, or oral means: The presentation of material which has not been studied or learned, but rather was obtained through someone else's efforts and used as part of an examination, course assignment, or project.
3. Commercial Use of Academic Material: Selling of course material to another person, student, and/or uploading course material to a third-party vendor without authorization or without the express written permission of the university and the instructor. Course materials include but are not limited to class notes, Instructor's PowerPoints, course syllabi, tests, quizzes, labs, instruction sheets, homework, study guides, handouts, etc.
4. Falsifying or misrepresenting the student's own academic work.
5. Plagiarism: Using or appropriating another's work without any indication of the source, thereby attempting to convey the impression that such work is the student's own.
6. Multiple Submissions: Submitting the same academic work for credit more than once without the express written permission of the instructor.
7. Helping another violate academic behavior standards.
8. Soliciting assistance with academic coursework and/or degree requirements.

Responses to Academic Dishonesty, Plagiarism, or Cheating
Students should also familiarize themselves with the procedures for academic misconduct in UCF's student handbook, *The Golden Rule* <https://goldenrule.sdes.ucf.edu/>. UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and respond to academic misconduct when necessary. Penalties for violating rules, policies, and instructions within this course can range from a zero on the exercise to an "F" letter grade in the course. In addition, an Academic Misconduct report could be filed with the Office of Student Conduct, which could lead to disciplinary warning, disciplinary probation, or deferred suspension or separation from the University through suspension, dismissal, or expulsion with the addition of a "Z" designation on one's transcript.
Being found in violation of academic conduct standards could result in a student having to disclose such behavior on a graduate school application, being removed from a leadership position within a student organization, the recipient of scholarships, participation in University activities such as study abroad, internships, etc.
Let's avoid all of this by demonstrating values of honesty, trust, and integrity. No grade is worth compromising your integrity and moving your moral compass. Stay true to doing the right thing: take the zero, not a shortcut.

Course Accessibility: The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need access to course content due to course design limitations should contact the

professor as soon as possible. Students should also connect with Student Accessibility Services (SAS) <http://sas.sdes.ucf.edu/> (Ferrell Commons 185, sas@ucf.edu, phone 407-823-2371). For students connected with SAS, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential course access and accommodations that might be necessary and reasonable. Determining reasonable access and accommodations requires consideration of the course design, course learning objectives and the individual academic and course barriers experienced by the student. Further conversation with SAS, faculty and the student may be warranted to ensure an accessible course experience.

Campus Safety Statement: Emergencies on campus are rare, but if one should arise during class, everyone needs to work together. Students should be aware of their surroundings and familiar with some basic safety and security concepts.

- In case of an emergency, dial 911 for assistance.
- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Students should make a note of the guide's physical location and review the online version at <http://emergency.ucf.edu/emergency_guide.html>.
- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, students may need to access a first-aid kit or AED (Automated External Defibrillator). To learn where those are located, see <https://ehs.ucf.edu/automated-external-defibrillator-aed-locations>.
- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to <https://my.ucf.edu> and logging in. Click on "Student Self Service" located on the left side of the screen in the toolbar, scroll down to the blue "Personal Information" heading on the Student Center screen, click on "UCF Alert", fill out the information, including e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.
- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video (<https://youtu.be/NIKYajEx4pk>).

Campus Safety Statement for Students in Online-Only Courses
Though most emergency situations are primarily relevant to courses that meet in person, such incidents can also impact online students, either when they are on or near campus to participate in other courses or activities or when their course work is affected by off-campus emergencies. The following policies apply to courses in online modalities.

- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to <https://my.ucf.edu> and logging in. Click on "Student Self Service" located on the left side of the screen in the toolbar, scroll down to the blue "Personal Information" heading on the Student Center screen, click on "UCF Alert", fill out the information, including e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.

Deployed Active Duty Military Students

Students who are deployed active duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make related arrangements.

Make-Up Assignments for Authorized University Events or Co-curricular Activities

Students who represent the university in an authorized event or activity (for example, student-athletes) and who are unable to meet a course deadline due to a conflict with that event must provide the instructor with documentation in advance to arrange a make-up. No penalty will be applied. For more information, see the UCF policy at <https://policies.ucf.edu/documents/4-401.pdf>

Religious Observances

Students must notify their instructor in advance if they intend to miss class for a religious observance. For more information, see the UCF policy at <http://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALJan19.pdf>.

University-Wide Face Covering Policy for Common Spaces and Face-to-Face Classes
To protect members of our community, everyone is required to wear a facial covering inside all common spaces including classrooms (https://policies.ucf.edu/documents/PolicyEmergencyCOVIDReturnPolicy.pdf. Students who choose not to wear facial coverings will be asked to leave the classroom by the instructor. If they refuse to leave the classroom or put on a facial covering, they may be considered disruptive (please see the Golden Rule for student behavior expectations). Faculty have the right to cancel

class if the safety and well-being of class members are in jeopardy. Students will be responsible for the material that would have been covered in class as provided by the instructor.

Notifications in Case of Changes to Course Modality

Depending on the course of the pandemic during the semester, the university may make changes to the way classes are offered. If that happens, please look for announcements or messages in Webcourses@UCF or Knights email about changes specific to this course.

COVID-19 and Illness Notification

Students who believe they may have a COVID-19 diagnosis should contact UCF Student Health Services (407-823-2509) so proper contact tracing procedures can take place.

Students should not come to campus if they are ill, are experiencing any symptoms of COVID-19, have tested positive for COVID, or if anyone living in their residence has tested positive or is sick with COVID-19 symptoms. CDC guidance for COVID-19 symptoms is located here: (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html)

Students should contact their instructor(s) as soon as possible if they miss class for any illness reason to discuss reasonable adjustments that might need to be made. When possible, students should contact their instructor(s) before missing class.

In Case of Faculty Illness

If the instructor falls ill during the semester, there may be changes to this course, including having a backup instructor take over the course. Please look for announcements or mail in Webcourses@UCF or Knights email for any alterations to this course.

Course Accessibility and Disability COVID-19 Supplemental Statement

Accommodations may need to be added or adjusted should this course shift from an on-campus to a remote format. Students with disabilities should speak with their instructor and should contact sas@ucf.edu to discuss specific accommodations for this or other courses.

College of Engineering and Computer Science - Grad Course Revision - CGN 5617 Infrastructure Systems Optimization and Identification

z2020-2021 Graduate Course Revision

General Catalog Information

Read before you begin

1. TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

2. FILL IN all fields required marked with an *. You will not be able to launch the proposal without completing required fields.

3. LAUNCH proposal by clicking ▶ in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after the proposal is launched.**

Course revisions must be accompanied by a course syllabus and rationale. Departments must also submit an electronic syllabus to the college curriculum person.

Proposal Type:*
Grad Course Revision

College:*
College of Engineering and Computer Science

Unit / Department / College:*
Department of Civil, Environmental, and Construction Engineering

IMPORT COURSE NOW! Please use the Import feature to import the course information from the Catalog by clicking ⬇ in the top left corner of the form. Do **not** type the course prefix and code.

Prefix:*
CGN

Code:* 5617

Course Title:* Infrastructure Systems Optimization and Identification

30 Character Abbreviation:* Infras Sys Opt and Id

Full Title:* CGN 5617 Infrastructure Systems Optimization and Identification

Course Instructor (Must be Approved Graduate Faculty/Scholars):	

Department Chair Phone Number:*	4078232841

Dept Chair Email*	M.Aty@ucf.edu

Complete the remaining required fields and LAUNCH this proposal by clicking ▶ in the top left corner! Do not begin revisions until **after** launch. Course revisions before launch will not be tracked.

Course Description:*	This course covers the advanced mathematical programming techniques that are useful for civil infrastructure planning, operations, and maintenance with increasing infrastructure connectivity and data availability.

Prerequisite(s):	STA 3032, CGN 3405, Basic programming skills, or C.I.

Corequisite(s):	

Does this proposal include revisions to prerequisites?*	◯ Yes ⦿ No

Grading Scheme:	

Credit Hour Information

As part of UCF's accreditation with SACSCOC, we are required to have a formal model of credit hour designations. The following chart provides a general framework for faculty to use as they make course proposals. The elements will help faculty to better determine the credit hour designation for a course and help the institution with a standard approach in this determination.

Credit Hour Design Options

Credit Hour	1	1	1
(Formal) Instruction Time - Class Hours or Online Module, etc.	1	1	1
Lab/Studio/Field work	0	1	2
Out-of-Class (homework, course readings, group work, online posts, etc)	2	1	0
Total Course Engagement	3	3	3

Any combination of these elements that extend beyond the 3 hours of Total Course Engagement, could be considered a 2 credit hour class. The course should try to maintain a 1:3 ratio.

1 Credit hours = 3 hours of Total Course Engagement

2 Credit hours = 6 hours of Total Course Engagement

3 Credit hours = 9 hours of Total Course Engagement

4 Credit hours = 12 hours of Total Course Engagement

Please note the Out-of-Class hours will not appear in the graduate catalog. This field is for information only.

For further review, please see the SACSCOC definition: **http://www.sacscoc.org/pdf/081705/Credit%20Hours.pdf**

Credit Hours:*	3
Instruction Time:*	3
Lab/Studio/Field Work Hours:*	0
Out-of-Class Hours:*	0
Total Engagement Hours:*	3

NOTE: For a repeatable course, indicate in the syllabus what will remain the same and what will change when the course is repeated. Also indicate who approves content before a course is repeated.

Repeat for credit? ◯ Yes ⦿ No

If yes, indicate the degree program name and the total times the course may repeated.	

If the course you are revising is a split-level class, please note this revision form will only impact the graduate side of the course. The undergraduate component of the course should be revised through the Undergraduate Curriculum Committee. As a reminder, the graduate syllabus should clearly demonstrate more advanced subject matter, expectations, and rigor.

Split-Level Class:*	◯ Yes ⦿ No

List undergraduate split-level course:	

Term of Offering

When will the course be offered?	☐ Odd Fall ☑ Even Fall ☐ Odd Spring ☑ Even Spring ☐ Odd Summer ☐ Even Summer ☐ Every Semester ☐ Occasional

Intended Utilization of Course

The course will be used primarily as:	⦿ Required Course ◯ Elective Course

Justification for Course Revision

What is the rationale for revising this course?*	Change Course Title for CGN 5617 to: Infrastructure Systems Optimization and Identification
	This update it needed as it may be confused with CCE 5006 (Project Management)

What grad programs/tracks require or recommend this course for graduation?	

If not a major requirement, what will be the source of students?	

What is the estimated annual enrollment?	

Possible duplications and conflicts with other departments or colleges should be discussed with appropriate parties. Please detail discussion you have had.

Detail Discussion

Course Syllabus Policy

The University of Central of Florida has established guidelines as it relates to the form and structure of all course syllabi. An effective syllabus provides an overview of the purpose of a course, outlines course requirements, and defines expectations for student performance. Faculty members are responsible for developing course content and selecting pedagogical approaches for their courses. Leveraging this policy to develop them will provide a consistent approach for presenting essential information that supports learning and ensures that UCF is in compliance with the standards set forth by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) and other accrediting bodies.

To this end, each syllabus should include the following required elements:

> Information from the official Schedule of Classes
> Instructor and/or GTA contact information
> Explicit, public description of the course
> Student learning outcomes
> Sequence of course activity
> Assessment and grading procedures
> Course Materials and Resources
> Core policy statements
>
> > Academic integrity statement including definition(s) of and consequences for academic misconduct
> > Statement directing students needing accommodations to work with faculty and with Student Accessibility Services to ensure equal access to educational activities
> > Statement regarding emergency procedures and campus safety, encouraging students to be aware of their surroundings and familiar with actions to take in various types of emergencies
> > Statement regarding accommodations for active duty military students

Full details of the syllabus policy can be found at: **https://policies.ucf.edu/documents/4-403.pdf**

Course Syllabus Policy* ☑ I have aligned this syllabus per the UCF syllabus policy.

Attachment List

Please attach any required files by navigating to the Proposal Toolbox and clicking 🗋 in the top right corner.

Check ☐ I have completed all relevant parts of the form.

Attached ☐ I have attached a course syllabus and rationale.

CGN 5617 Syllabus

CGN 5617: INFRASTRUCTURE SYSTEMS OPTIMIZATION AND IDENTIFICATION

Department of Civil, Environmental and Construction Engineering

College of Engineering and Computer Science

Number of Credit Hours: 3

Course Information

- Term: Spring, 2020
- Course Number & Section: CGN 5617
- Course Name: Intelligent Infrastructure Management
- Credit Hours: 3
- Class Meeting Days: Monday and Wednesday
- Class Meeting Time: 1:30 PM – 2:45 PM
- Class Location: Room BA1 O216A
- Course Modality: P (face-to-face)

Instructor Information

- Instructor: Dr. Zhaomiao (Walter) Guo
- Office Location: Research 1, 150J
- Office Hours: TR 10:30 AM – 11:45 AM or by e-mail
- Email: **guo@ucf.edu (mailto:guo@ucf.edu)**
- Phone: 407-823-6215

Teaching Assistants

- GTA(s): XXX
- Office Location: XXX
- Office Hours: TR 2:00 PM – 4:00 PM or by e-mail
- Email: XXX@knights.ucf.edu

Enrollment Requirements

Course Prerequisites:

STA 3032 - Probability and Statistics for Engineers

CGN 3405 - Applied Numerical Methods for Civil Engineering

Basic programming skills; Students will be required to write their own computer programs.

Course Co-requisites: NA

Course Description

The objective of this course is to provide students with an overview of infrastructure management concepts, principles, modeling techniques, and practice. The focus is on optimization and statistical methods with increasing infrastructure connectivity and data availability, and their application to planning, operations, inspection, performance prediction and maintenance & rehabilitation (M&R) decision making for the management of civil infrastructure systems.

Course Materials and Resources

Required Materials/Resources

- Lecture slides/notes will be made available electronically via Webcourses.

Other Reference/Resources

- Hudson W.R., Haas R. and Uddin W., Infrastructure Management, McGraw-Hill, 1997
- Pindyck R. and Rubinfeld D., Econometric Models and Economic Forecasts, McGraw-Hill
- Hillier F. and Lieberman G., Introduction to Operations Research, Edition, McGraw-Hill
- R. Bellman and R. Kalaba, Dynamic Programming and Modern Control Theory, Academic Press, 1965.
- J.R. Birge and Francois Louveaux, Introduction to Stochastic Programming, Springer Verlag, New York, 1997.

Student Learning Outcomes

- Master the basic multi-stage operations research approach for planning/operation/maintenance of infrastructure systems
- Develop an operations research foundation for future coursework in civil engineering

Course Activities

- Three problem-oriented homework assignments. The objective of these assignments is to assist in the learning of course material, so discussion of assignments among students is encouraged. But each student is required to submit his/her own written answers/codes before class in the due date.
- In-class mid-term exam
- One final project, including writing of a term paper and in-class presentation. The objective of the term paper is to investigate a topic of interest in the area of infrastructure systems management by

using the approaches learnt in this course. Students may work in groups or individually.

Make-up Exams and Assignments

Per university policy, you are allowed to submit make-up work (or an equivalent, alternate assignment) for university-sponsored events, religious observances, or legal obligations (such as jury duty). If this participation conflicts with your course assignments, I will offer a reasonable opportunity for you to complete missed assignments and/or exams. The make-up assignment and grading scale will be equivalent to the missed assignment and its grading scale. But such requests are strongly discouraged and will be accommodated only when prior permission from the instructor has been sought adequately in advance and/or sufficient evidence has been provided.

Assessment and Grading Procedures

Assignment	Percentage of Grade
Attendance/Participation	5%
Homework	45%
Mid-term	20%
Term Paper	20%
Presentation	10%
Total	100%

I will adopt plus/minus grading system. All grades for the assignments and exams will be posted on webcourses.

Letter Grade	Points
A	93 – 100 points
A-	90 – 92 points
B+	87 – 89 points
B	83 – 86 points

B-	80 – 82 points
C+	77 – 79 points
C	73 – 76 points
C-	70 – 72 points
D+	67 – 69 points
D	63 – 66 points
D-	60 – 62 points
F	59 and below

Course Schedule

Class	Date	Topic	Homework
1	8/21	Course Overview	HW0 Out
2	8/23	Introduction to infrastructure management in smart cities	
	8/24	Life-cycle analysis concept & performance indicators	HW0 DUE
3	8/28	Fundamentals on Mathematical Programming	HW1 Out
4	8/30	Introduction to Dynamic Programming	
5	9/4		

6	9/6	Markov Chain and Markov Decision Processes	
7	9/11		
8	9/13	Joint M&R and Inspection Decision	HW1 DUE
9	9/18		HW2 Out
10	9/20	Infinite Horizon Decision Problems	
11	9/25	System Level Decision Problems	
12	9/27	Fundamentals on Network Modeling	
13	10/2	Traffic Modeling	
14	10/4		
15	10/9	Infrastructure Planning	
16	10/11	In-class midterm exam	
17	10/16	Regression Analysis	
18	10/18		HW2 DUE
19	10/23	Joint Deterioration and Maintenance Models	HW3 Out
20	10/25		
21	10/30	Stochastic Duration Models	
22	11/1		
23	11/6	Stochastic Discrete Deterioration Models	

24	11/8		
25	11/13	Data Truncation and Censoring; Maintenance Effectiveness Models	
26	11/15		HW3 Due
27	11/20	Presentation and Discussion	
28	11/22	Presentation and Discussion	
29	11/27	Presentation and Discussion	
30	11/29	Presentation and Discussion	
	12/6	Term Paper Due Thursday, December 6, 2018, 7:00 AM – 9:50 AM	

Policy Statements

Federal Aid Policy

All faculty members are required to document students' academic activity at the beginning of each course. In order to document that you began this course, please complete the following academic activity by the end of the first week of classes, or as soon as possible after adding the course. Failure to do so will result in a delay in the disbursement of your financial aid.

Complete HW0 posted on Webcourses. (Due: Friday Aug. 24, 2018 11:59pm)

Academic Integrity

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- *Unauthorized assistance*: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.
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- *Multiple Submissions*: Submitting the same academic work for credit more than once without the express written permission of the instructor.
- *Helping another violate* academic behavior standards.

For more information about Academic Integrity, students may consult **The Center for Academic Integrity** **(https://academicintegrity.org/)** .

For more information about plagiarism and misuse of sources, see "**Defining and Avoiding Plagiarism: The WPA Statement on Best Practices** **(http://wpacouncil.org/node/9)** ".

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reasonable.Determining reasonable access and accommodations requires consideration of the course design, course learning objectives and the individual academic and course barriers experienced by the student.

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- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, we may need to access a first aid kit or AED (Automated External Defibrillator). To learn where those items are located in this building, see **http://www.ehs.ucf.edu/workplacesafety.html** **(http://www.ehs.ucf.edu/Workplacesafety)** (click on link from menu on left).
- To stay informed about emergency situations, sign up to receive UCF text alerts by going to **my.ucf.edu** **(http://my.ucf.edu)** and logging in. Click on "Student Self Service" located on the left side of the screen in the tool bar, scroll down to the blue "Personal Information" heading on your Student Center screen, click on "UCF Alert," fill out the information, including your e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.
- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video.
  You CAN Survive an Active Shooter **(https://youtu.be/NIKYajEx4pk)**

(https://youtu.be/NIKYajEx4pk)

Deployed Active Duty Military Students

If you are a deployed active duty military student and feel that you may need a special accommodation due to that unique status, please contact your instructor to discuss your circumstances.

Copyright

This course may contain copyright protected materials such as audio or video clips, images, text materials, etc. These items are being used with regard to the Fair Use doctrine in order to enhance the learning environment. Please do not copy, duplicate, download or distribute these items. The use of these materials is strictly reserved for this online classroom environment and your use only. All copyright materials are credited to the copyright holder.

Third-Party Software and FERPA

During this course you might have the opportunity to use public online services and/or software applications sometimes called third-party software such as a blog or wiki. While some of these could be required assignments, you need not make any personally identifying information on a public site. Do not post or provide any private information about yourself or your classmates. Where appropriate you may use a pseudonym or nickname. Some written assignments posted publicly may require personal reflection/comments, but the assignments will not require you to disclose any personally identity-sensitive information. If you have any concerns about this, please contact your instructor.

College of Engineering and Computer Science - Graduate Program Revision - Digital Forensics MS ▶

2021-2022 Graduate Program Revision/Reactivation

General Catalog Information

This form is to be used to REVISE graduate degree programs, tracks, or certificate programs. If there are tracks being revised or added to a program, one form must be submitted for EACH program and the track(s).

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Select *Program* below.

Program Type: *
- ◉ Program
- ◯ Shared Core

Read before you begin

TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

IMPORT curriculum data from the Catalog by clicking ⬇ in the top left corner.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking ▶ in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after proposal is launched.**

Proposal Type: *
Graduate Program Revision

College: *
College of Engineering and Computer Science

Unit / Department / College: *
Department of Computer Science

Unit(s) Housing Program:
Computer Science

Type of Action: *
- ☑ Program

☐ Track
☐ Certificate

IMPORT PROGRAM NOW! Please use the Import feature to import the program information from the Catalog by clicking ⬇ in the top left corner of the form.

Name of program, track and / or certificate:*	Digital Forensics MS ▶

Are you revising the name of the program, track, or certificate?*	⚪ Yes 🔘 No

Proposed Effective Term / Year:*	Fall 2021

Are you revising the Admissions Requirements of the program?*	🔘 Yes ⚪ No

.

Rationale for revision:	We propose to add several more restricted elective courses in the program. In addition, change/update some phrases in program description, and minor revision of course category on electives (no change to required courses).

Specifically, we make the following changes:

1. Add the following restrictive electives to our program, so students have more choice in learning and completion of the program:

- **CNT 5410L**: Cyber Operation Lab
- **IDC 5602**: Cybersecurity: A Multidisciplinary Approach
- **IDC 6600**: Emerging Cyber Issues
- **IDC 6601**: Behavioral Aspects of Cybersecurity

These courses belong to IST's "Modeling and Simulation of Behavioral Cybersecurity" program, and we have obtained the approval from its Program Director, Dr. Bruce Caulkins.

2. Delete one elective course since it is not closely relevant to the program:

- **ESI 5219**: Engineering Statistics

3. Move the elective course "**CIS 6206**: Electronic Discovery for Digital Forensics Professionals" from Group B (criminal justice) to Group C (legal study). The course is more suitable to the legal study category, and also it provides more courses in Group C for students to take in order to complete this Group C's taking one course requirement.

Also,

1. We want to remove the equipment fee for the program. We intend to use open-source or free software for course teaching. Removing equipment fee will reduce students' financial burden as well.
2. Our program admission is simple, so we don't need a 'priority admission' deadline for admission. In addition, adding Summer term admission will give students flexibility in their application.
3. Change the 'Three letters of recommendation" to "Letters of recommendation (encouraged but not required)".

   Reason: This new change will make MSDF applicants faster and more convenient in their application. I know in the past few years some applicants have trouble to obtain all three reference letters in time to catch application deadline or find three recommenders. In addition, this change will match with the MS in Computer Science program requirement on recommendation letter. |
| **If you will be submitting other revision forms for tracks or course actions, please list** | |

them here:

If you are revising the CIP code, please complete the BOG CIP Change Form and attach it to this proposal. The form is on the Graduate Council Curriculum Committee website under Other Resources at: **https://graduatecouncil.ucf.edu/curriculum-committee/**.

Is the CIP code being updated?	☐ Yes ☑ No

If yes, please provide the new CIP code:	

Complete the remaining required fields and LAUNCH this proposal! Do not begin revisions until **after** launch. Program revisions before launch will not be tracked.

Informational Description Chart- this will import. *	

College: Engineering and Computer Science	**Degree:** MS
Department: Computer Science	**Option:** Thesis, Nonthesis
Program Websites: http://msdf.ucf.edu/	
Graduate Program Handbook	

Revise catalog copy here! After you revise courses, click on the Curriculum Schema button below to revise the catalog copy. Please note: this information is what will flow directly to the graduate catalog. Any attached documents to this proposal will not be used for catalog purposes.

Follow these steps to propose courses to the revised program curriculum:

Step 1

☰ **There are two options for adding courses: "Add Course" and "Import Course." For courses already in the catalog, click on "Import Course" and find the courses needed. For new classes going through a Curriculog Approval Process click on "Add Course"-- a box will open asking you for the Prefix, Course Number and Course Title.**

Step 2

Click on ☰ "View Curriculum Schema." Click on the area/header of the program where you would like to add courses. When you click on "Add Courses" it will bring up the list of courses available from Step 1. Select the courses you wish to add. For removing courses click on the X and proceed.

College of Engineering and Computer Science - Graduate Program Revision - Digital Forensics MS ▶

Program Description

~~The Digital Forensics MS program will consider international applicants only on a case-by-case basis. Please contact the program at czou@cs. ucf. edu to determine eligibility before submitting an official application.~~

The Digital Forensics master's degree is a collaborative effort between various UCF academic departments ~~(Electrical Engineering and Computer~~ **(Computer** Science, Forensic Science of Chemistry, Criminal Justice, and Legal Studies) and the National Center for Forensic Science (NCFS)~~.~~ ~~NCFS is both a national center~~, ~~as part of the National Institute of Justice Forensic Research Network of the Department of Justice, and a state Type II Center. NCFS~~ **which** is based in the UCF College of Sciences as a forensic science research center and is housed in Orlando's Research Park, adjacent to UCF.

The mission of the MSDF degree program is to provide a quality graduate education in science and practices of digital forensics, to prepare the students for digital forensics jobs, and to prepare the students for a lifetime of learning. The objectives of the program include the following:

- To give MSDF graduates the knowledge and skills necessary to participate as an effective team member or team leader in digital evidence investigations
- To prepare MSDF graduates for professional careers in digital forensics examination, forensic tool development, tool verification and validation, security and forensics administration
- To prepare MSDF graduates with the knowledge and skills to pursue advanced studies and research in computer technology or computer crime-related disciplines
- To equip MSDF graduates with the communication skills, both oral and written, to become an effective problem solver as well as an effective communicator as an expert forensic examiner and expert witness

Please note: Digital Forensics (MS) may be completed fully online~~, although not all elective options~~. **Most courses are either online courses** or ~~program prerequisites may be offered~~ **have both in-campus and** online **course sessions**. Newly admitted students choosing to complete this program exclusively via UCF online classes may enroll with a reduction in campus-based fees.

International students (F or J visa) are required to enroll in a full-time course load of 9 credit hours during the fall and spring semesters. Only 3 of the 9 credit hours may be taken in a completely online format. ~~For a detailed listing of enrollment requirements for international students, please visit http://global.ucf.edu/. If you~~ **It could be difficult to satisfy these requirement since many courses in this program only** have ~~questions, please consult UCF Global at 407-823-2337~~ **online format. Please contact Program Cooridnator to discuss possible admission issue**.

UCF is not authorized to provide online courses or instruction to students in some states. Refer to State Restrictions for current information.

Curriculum

The Digital Forensics MS degree is comprised of 30 hours of study beyond the bachelor's degree with required, intensive specialization in topics related to digital forensics. The degree program prepares students, including working professionals, who will pursue the degree on a part-time basis to gain the knowledge and skills required to work as an examiner in the field. The program may also be taken by those who have an interest in scientific applications and research in the field, and who would like to continue to a doctoral degree program or law school after completion.

Total Credit Hours Required: 30 Credit Hours Minimum beyond the Bachelor's Degree

The program offers both a thesis option (6 credit hours) or an opportunity to complete two additional courses (6 credit hours) selected from the Restricted Electives. At least one-half of the credit hours must be at the 6000 level.

Articulation

Undergraduate articulation courses may be required for students with BS and/or MS degrees in fields other than a computer-related field. ~~The articulation courses will be determined by the graduate~~ **If you are not in STEM related BS** program ~~director~~**, you need to show either you have taken some basic CS/IT courses, or have working experience in CS or IT or digital forensics field**. ~~Students without a computer-related degree must be versed~~ **If you want to take some prerequisite courses, you can take two to three of the following courses** in ~~basic computing and~~ **UCF or equivalent courses in other places:**

1. Basic CS knowledge: COP 3502: Computer Science I
2. Basic networking knowledge**: CNT 3004 Computer Network Concepts, or CNT 4703C Design** and ~~skills, including computer (PC) hardware, computer operating systems~~ **Implementation of Computer Communication Networks**, or CNT 4704 Analysis of **Computer Communication Networks**
3. Basic Computer architecture: CDA 3103: Computer Logic and ~~computer networking~~ **Organization**
4. ~~Appropriate job~~ **Programming course, such as: COP 3223C Introduction to Programming with C,** or ~~training-related experience may be a suitable substitution, the suitability of which will be determined by the admissions committee.~~ **COP 3330 Intro to OO Programming with Java**

Courses taken to correct deficiencies cannot be used to satisfy minimum degree requirements. ~~Some advanced elective courses require a programming background, specifically in C and C++, computer architecture, and parallel programming.~~

Required Courses: 12 Credit Hours

CGS 5131 Computer Forensics I: Seizure and Examination of Computer Systems
CHS 5504 Topics in Forensic Science
CIS 6207 The Practice of Digital Forensics
CNT 6418 Computer Forensics II

Restricted Elective Courses: 12 Credit Hours

Computing **and Technology**

Select two courses.

CAP 6133 Advanced Topics in Computer Security and Computer Forensics

CNT 6519 Wireless Security and Forensics

CAP 6135 Malware and Software Vulnerability Analysis

CIS 6386 Operating Systems and File System Forensics

CIS 6395 Incident Response Technologies

EEE 6347 Trustworthy Hardware

CNT 5410L Cyber Operations Lab

IDC 5602 Cybersecurity: A Multidisciplinary Approach

IDC 6600 Emerging Cyber Issues

IDC 6601 Behavioral Aspects of Cybersecurity

Criminal Justice **and Electronic Discovery**

Select one course. **Note: Students can take additional Criminal Justice courses as they fit into a student's research interest and approved Program of Study.**

CCJ 5015 The Nature of Crime

CCJ 5456 The Administration of Justice

CCJ 6074 Investigative and Intelligence Analysis: Theory and Methods

CCJ 6704 Research Methods in Criminal Justice

CCJ 6706 Data Analysis in Criminal Justice I

[After] or

ESI 5219 Engineering Statistics

CJE 6688 Cyber Crime and Criminal Justice

CJL 6568 Law and Social Control

CIS 6206 Electronic Discovery for Digital Forensics Professionals

Forensic Science and Legal Studies **and Electronic Discovery**

Select one course.

CHS 5596 The Forensic Expert in the Courtroom

CHS 5518 The Forensic Collection and Examination of Digital Evidence

PLA 5587 Current Issues in Cyberlaw

CIS 6206 Electronic Discovery for Digital Forensics Professionals

Thesis Option: 6 Credit Hours

The College of Engineering and Computer Science requires that all thesis defense announcements are approved by the student's adviser and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

- CAP 6971 Thesis **6 Credit Hours** **(6 Credit Hours, take 3 credit hours per semester for two consecutive semesters)**

Nonthesis Option: 6 Credit Hours

Students not interested in a thesis can instead ~~enroll in two formal courses (6 credit hours) to fulfill~~ **take one elective course and** the ~~degree requirements~~ **"CDA 6946: Internship" course, or take two electives**. ~~Take two~~ **The** electives ~~(total of 6 credit hours)~~ **can be any courses** from the list of Restricted Electives above**, or the following electives.**

~~Equipment Fee~~

~~Students in the Digital Forensics MS program pay an $82 equipment fee each semester that they are enrolled. Part-time students pay $41 per semester.~~

Independent Learning

The Independent Learning Requirement is met by successful completion of a master's thesis or completing the capstone course CIS 6207.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirement, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- Statement of educational, research, and professional career objectives.
- Résumé.
- ~~Three letters~~ **Letters** of recommendation~~.~~ **(encouraged but not required)**
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation.

Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

~~Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.~~ The GRE is not required for admission into this program.

Application Deadlines

Digital Forensics MS	*Fall Priority	Fall	Spring	Summer
Domestic Applicants	~~Jan 15~~	Jul 1	Dec 1	**Apr 15**
International Applicants				
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Financials

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see the College of Graduate Studies Funding website, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see UCF Graduate Fellowships, which includes descriptions of university fellowships and what you should do to be considered for a fellowship.

Contact Info

Graduate Program

Cliff Zou PhD

Associate Professor

CZou@cs. ucf. edu

Telephone: 407-823-5015

HEC 243

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf. edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Graduate Fellowships

Grad Fellowships

Telephone: 407-823-0127

gradfellowship@ucf. edu

https://funding.graduate.ucf.edu

Graduate Financial Aid

UCF Student Financial Assistance

Millican Hall 120

Telephone: 407-823-2827

Appointment Line: 407-823-5285

Fax: 407-823-5241

finaid@ucf. edu

http://finaid.ucf.edu

Millican Hall 120

Telephone: 407-823-2827

Appointment Line: 407-823-5285

Fax: 407-823-5241

finaid@ucf.edu

http://finaid.ucf.edu

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this revised program, track, or certificate? *
○ Yes ● No

If yes, state the name of the program or track where students are currently enrolled and attach a list of students if possible:

Will students have the option to stay in their existing program, track, or certificate? *
● Yes ○ No

If yes, how will current students be impacted by this change?
There is no impact to current students. What revised in this curriculog proposal is just adding some electives and minor update to course categories.

Future Students

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.
The revision adds some additional elective courses to the program, which will help future students to complete the program and take courses in their preference. Therefore, the change in this proposal will help increase student enrollment and increase student graduation rate.

Year 1

Headcount:

SCHs:

Year 2

Headcount:

SCHs:

Year 3

Headcount:

SCHs:

Indicate likely career or student outcomes upon completion:

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:		Source of funds:

Number of fellowship students (specify fellowship):	

Number of tuition remissions:		Source of funds:

Year 2

Number of assistantship students		Source of funds:

Number of fellowship students (specify fellowship):	

Number of tuition remissions:		Source of funds:

Year 3

Number of assistantship students	**Source of Funds**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*   ⦿ Attached   ○ Not Applicable

Support from involved units that no duplication exists*   ⦿ Attached   ○ Not Applicable

BOG CIP Change Form   ○ Attached   ○ Not Applicable

Administration Use Only

Catalog Ownership: Department of Computer Science

Program OID   9172

Program Type   Master

Degree Type   Master of Science

Status*   ⦿ Active-Visible   ○ Inactive-Hidden

College of Engineering and Computer Science - Graduate Program Revision - Civil Engineering MS, Smart Cities Track ▶ ♦

z2020-2021 Graduate Program Revision/Reactivation

General Catalog Information

This form is to be used to REVISE graduate degree programs, tracks, or certificate programs. If there are tracks being revised or added to a program, one form must be submitted for EACH program and the track(s).

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Select *Program* below.

Program Type:*
- ⦿ Program
- ◯ Shared Core

Proposal Type:*
Graduate Program Revision

Read before you begin

TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

IMPORT curriculum data from the Catalog by clicking 🔽 in the top left corner.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking ▶ in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after proposal is launched.**

College:*
College of Engineering and Computer Science

Unit / Department / College:*

Activity Log

Ana Lucia Salas
✚ **Department of Civil, Environmental, and Construction Engineering**

Department of Civil, Environmental, and Construction Engineering

Unit(s) Housing

Unit(s) Housing Program:

Type of Action:*

- ☐ Program
- ☑ Track
- ☐ Certificate

IMPORT PROGRAM NOW! Please use the Import feature to import the program information from the

Catalog by clicking ⬇ in the top left corner of the form.

Name of program, track and / or certificate:* Civil Engineering MS, Smart Cities Track ▶ ♦

Are you revising the name of the program, track, or certificate?* ○ Yes ⦿ No

---

Proposed Effective Term / Year:* Fall 2021

If you will be submitting other revision forms for tracks or course actions, please list them here:

Is the CIP code being updated?

Activity Log
Emily Stettner
+ No

☐ Yes ☑ No

If yes, please provide the new CIP code:

Rationale for revision:

Additional elective coursework.

CAP ~~5748~~ **5738**

Syllabus attached.

Complete the remaining required fields and LAUNCH this proposal! Do not begin revisions until **after** launch. Program revisions before launch will not be

tracked.

Revise catalog copy here! After you revise courses, click on the Curriculum Schema button below to revise the catalog copy. Please note: this information is what will flow directly to the graduate catalog. Any attached documents to this proposal will not be used for catalog purposes.

Follow these steps to propose courses to the revised program curriculum:

Step 1

☰ **There are two options for adding courses: "Add Course" and "Import Course." For courses already in the catalog, click on "Import Course" and find the courses needed. For new classes going through a Curriculog Approval Process click on "Add Course"-- a box will open asking you for the Prefix, Course Number and Course Title.**

Step 2

Click on ☰ **"View Curriculum Schema." Click on the area/header of the program where you would like to add courses. When you click on "Add Courses" it will bring up the list of courses available from Step 1. Select the courses you wish to add. For removing courses click on the ✘ and proceed.**

Prospective Curriculum*

Track Description

In 2017, FUTURe CITy initiative was launched by the College of Engineering and Computer Science (CECS) and Civil, Environmental, and Construction Engineering (CECE) Department. FUTURe CITy initiative at UCF brings together a group of researchers and educators with a vision to synergistically explore the wide-ranging technological advances towards better serving urban residents. The initiative is a pioneering effort in the state and country. It is geared toward many aspects of CECE including: Smart transportation, Smart and resilient infrastructure, Smart and technological advancements in environmental engineering, and water resources.

The track is designed to help future Civil and Environmental Engineers to learn and adapt to the new challenges in the field of Smart Cities and be prepared for their professional roles through a state-of-the-art education. Elements of the track will bridge some of the gaps with other engineering disciplines and open the door for students to collaborate on research and education that are relevant to the cities of the future.

Curriculum

The Smart City Track in the Civil Engineering MS program is for students with appropriate science or engineering baccalaureate backgrounds. Both thesis and non-thesis options are available with each requiring 30 credit hours. The thesis option requires 3 credit hours of required course work, 9 credit hours of Core courses, 12 credit hours of elective graduate course work exclusive of thesis and research, and a thesis (6 credit hours). The non-thesis option requires 3 credit hours of required course work, 15 credit hours of required graduate Core courses, 12 credit hours of electives, and submission of an end-of-program portfolio. Each student must have an individual program of study approved by his/her faculty committee and have completed all required articulation course work as described below. At least one-half of the required credits must be taken at the 6000 level.

Total Credit Hours Required: 30 Credit Hours Minimum beyond the Bachelor's Degree

Research studies or projects are required in one or more courses. The research study or project will focus on reviewing and analyzing contemporary research or engineering issues in a student's particular specialization within the profession in order to help students acquire knowledge and skills pertaining to research-based best practices in that specialization area.

Prerequisites (Articulation)

There is no specific articulation for graduates with a relevant BS degree. Several courses have specific pre-requisites that are indicated for each course. The structure of the program is flexible so the student can choose his/her own courses by selecting among 15 core courses.

Required Course–3 Credit Hours

Both thesis and nonthesis students must choose this course:

CGN 5341 Interdisciplinary Introduction to Smart Cities' Applications

Core Courses—9 - 15 Credit Hours

Choose a minimum of 9 hours for thesis and 15 hours for non-thesis.

CCE 5220 Sustainable Infrastructure Systems

CEG 6610 Smart Underground Structures: Tunnels and Shafts

CES 6876 Smart City Built Infrastructure

CGN 5617 Intelligent Infrastructure Management

CGN 6342 Modeling Human Behavior with Emerging Data

CGN 6343 Cyber-Physical Systems and Smart Cities

ENV 6128 Smart Air Quality Monitoring and Air Pollution Control

ENV 6533 Smart Water and Wastewater Management

STA 5703 Data Mining Methodology I

TTE 5531 Active Mobility and Technologies: Synergy and Challenges

TTE 5532 Policy Aspects of Smart City Transportation

TTE 6533 Mobility in Smart Cities: Technologies and Application Areas

TTE 6275 Connected and Autonomous Vehicles

TTE 6608 Algorithms and Models for Smart Cities

CGN 5340 Internet of Things: Applications in Smart Cities

Elective Courses—9 Credit Hours

All students, both thesis and non-thesis, are required to take at most 12 credit hours of approved electives. The courses may be from the list above or other courses as approved by the student's adviser. Directed Research (XXX 6918) is not permitted in the MS program of study.

CAP 5415 Computer Vision

CAP 5610 Machine Learning

CAP 5738 Visualization Techniques for Data Analysis

CEN 5016 Software Engineering

CGN 6655 Regional Planning, Design, and Development

EEL 5825 Pattern Recognition and Learning from Big Data

EEL 6026 Optimization of Engineering Systems

EEL 6671 Modern and Optimal Control Systems

EEL 6683 Cooperative Control of Networked Autonomous Systems

EMA 5104 Intermediate Structure and Properties of Materials

EMA 5504 Modern Characterization of Materials

EMA 6626 Mechanical Behavior of Materials

HMG 6449 Smart Travel and Tourism

PAD 5337 Urban Design

PAD 5930 Global Cities

PAD 5356 Managing Community and Economic Development

PAD 6339 Housing Development and Planning

PAD 6387 Transportation Policy

PAD 6716 Information Systems for Public Managers and Planners

STA 5104 Advanced Computer Processing of Statistical Data

STA 5206 Statistical Analysis

STA 5825 Stochastic Processes and Applied Probability Theory

STA 6704 Data Mining Methodology II

STA 6707 Multivariate Statistical Methods

STA 6709 Spatial Statistics

TTE 6270 Intelligent Transportation Systems

TTE 6667 Discrete Choice Modeling in Transportation

URP 6711 Sustainable Transportation Planning

Thesis Option—6 Credit Hours

A successful defense of the thesis is required. In addition, the College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the

college's <u>website</u> and on the university-wide <u>Events Calendar</u> at the College of Graduate Studies website at least two weeks before the defense date.

XXX 6971 Thesis

Nonthesis Option—6 Credit Hours

Nonthesis students must complete at least 6 additional credit hours of electives from either the list above or other courses as approved by the student's adviser.

   Electives **6 Credit Hours**

Portfolio Requirement

Students are required to complete a culminating experience. The culminating experience for nonthesis MS students is submission of an end-of-program portfolio. The portfolio requirements are listed on the CECE website.

Independent Learning

A research or design project serves as the independent learning experience for thesis students. Non-thesis students are required to take at least one of the courses marked with an asterisk (*), denoting an independent learning experience, and submission of an end-of-program portfolio.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the **Admissions** section of the Graduate Catalog. Applicants must **apply online**. All requested materials must be submitted by the established deadline.

Admissions decisions are made on the basis of a complete online application only, and not on the basis of any pre-screening. Prospective applicants who are encouraged to apply to their intended graduate program based on the information provided for their pre-screening are not assured of admission or financial assistance when they submit a complete online application. Although it is possible, it is not likely, that prospective applicants who are discouraged

from formally applying to a graduate program at the pre-screening stage will be admitted if they elect to submit a complete online application anyway.

In addition to the **general UCF graduate application requirements**, applicants to this program must provide:

> One official transcript (in a sealed envelope) from each college/university attended.
> A Bachelor of Science degree in civil engineering or another closely related engineering degree.
> Résumé.
> Statement of educational, research, and professional career objectives.
> Three letters of recommendation.
> Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from **World Education Services (WES)** or **Josef Silny and Associates, Inc.** only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

The GRE is not required, however, taking the GRE is highly recommended for students wishing to pursue a thesis. In order to be considered for any fellowships, a GRE score is required.

The MS degrees in specialized options are designed for students with appropriate baccalaureate backgrounds. Applicants who are applying to the programs without a directly related undergraduate degree should closely check the prerequisites. Additional undergraduate courses may be required.

Application Deadlines

Smart Cities	*Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 1	Dec 1	
International Applicants	Jan 15	Jan 15	Jul 1	
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Financials

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see the College

of Graduate Studies **Funding website**, which describes the types of financial assistance available at UCF and provides general guidance in planning your

graduate finances. The **Financial Information** section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see **UCF Graduate Fellowships**, which includes descriptions of university fellowships and what you should do to be considered for a fellowship.

Contact Info

Graduate Program

Andrew Randall PhD PE

Professor

andrew. randall@ucf. edu

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Engineering II, 211-L

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf. edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Graduate Fellowships

Grad Fellowships

Telephone: 407-823-0127

gradfellowship@ucf. edu

https://funding.graduate.ucf.edu

Graduate Financial Aid

UCF Student Financial Assistance

Millican Hall 120

Telephone: 407-823-2827

Appointment Line: 407-823-5285

Fax: 407-823-5241

finaid@ucf. edu

http://finaid.ucf.edu

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this revised	Activity Log
	Ana Lucia Salas
	+ No

program, track, or certificate? *
  ⚪ Yes 🔘 No

If yes, state the name of the program or track where students are currently enrolled and attach a list of students if possible:

Will students have the option to stay in their existing program, track, or certificate? *

Activity Log
Ana Lucia Salas
➕ **Yes**

🔘 Yes ⚪ No

If yes, how will current students be impacted by this change?

Future Students

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.

Year 1

Headcount:

SCHs:

Year 2

Headcount:

SCHs:

Year 3

Headcount:

SCHs:

Indicate likely career or student outcomes upon completion:

completion:

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:		Source of funds:

Number of fellowship students (specify fellowship):	

Number of tuition remissions:		Source of funds:

Year 2

Number of assistantship students		Source of funds:

Number of fellowship students (specify fellowship):	

Number of tuition remissions:		Source of funds:

Year 3

Number of assistantship students:		Source of funds:

Number of fellowship students (specify fellowship):	

Number of tuition remissions:		Source of funds:

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking **in the top right corner of the form.**

College of Engineering and Computer Science - Graduate Program Revision - Civil Engineering MS, Structural and Geotechnical Engineering Track ►

z2020-2021 Graduate Program Revision/Reactivation

General Catalog Information

This form is to be used to REVISE graduate degree programs, tracks, or certificate programs. If there are tracks being revised or added to a program, one form must be submitted for EACH program and the track(s).

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Select *Program* below.

Program Type: *
- ⦿ Program
- ◯ Shared Core

Proposal Type: *

> **Graduate Program Revision**

Read before you begin

TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

IMPORT curriculum data from the Catalog by clicking 🔽 in the top left corner.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking ▶ in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after proposal is launched.**

College: *

> College of Engineering and Computer Science

Unit / Department / College: *

Activity Log
Ana Lucia Salas
➕ **Department of Civil, Environmental, and Construction Engineering**

> Department of Civil, Environmental, and Construction Engineering

Unit(s) Housing Program:	

Type of Action:*	**Activity Log**
	Ana Lucia Salas
	+ Program
	☐ Program
	☑ Track
	☐ Certificate

IMPORT PROGRAM NOW! Please use the Import feature to import the program information from the Catalog by clicking ⬇ in the top left corner of the form.

Name of program, track and / or certificate:*	Civil Engineering MS, Structural and Geotechnical Engineering Track ▶

Are you revising the name of the program, track, or certificate?*	◯ Yes ⦿ No

Proposed Effective Term / Year:*	Fall 2021

If you will be submitting other revision forms for tracks or course actions, please list them here:	

Is the CIP code being updated?	☐ Yes ☑ No

If yes, please provide the new CIP code:	

Rationale for revision:

Reason: Updated information for the program

REMOVE ALL OF TRACK DESCRIPTION -ADD:

The Structural and Geotechnical Engineering track in the Civil Engineering MS program focuses on the engineering, anaysis, design, and construction of the built infastructure. The track emphasizes on both: the above-ground engineering (primarily structures), the below-ground engineering (primarily geotechnical), as well as the interaction between the two systems. The program's course work focuses on structural analysis and design, mechanics and materials, foundations, characterization of soils and geomaterials, and computational modeling in structural and geotechnical engineering. Faculty research interests include geotechnical studies of subsuface conditions, soil characterization and testing, pavement design, retaining structures, structural dynamics, nonlinear structural analysis and software development, reinforced and structural dynacis, nonlinear structural analysis and software development, reinforced and prestressed concrete design, bridge engineering and pavements. Students co mpleting the program find positions in consulting firms, design companies, construction and construction-related industries, in city, county, state, and federal government agencies, and academic institutions. The program has ptotential ties to professional licensure or certification in the field. For more information on how this program may prepare you in that regard, please visit https://apq.ucf.edu/licensure-programs/.

Remove& Add from "PREREQUISITES (ARTICULATION)":

ADD to Geotechnical Engineering:

-6 Credit Hours from any CEG 5xxx or 6xxx course

REMOVE from Geotechnical Engineering:

-TTE 5835-PAVEMENT ENGINEERING-3 CREDIT HOURS

-CGN 5506-ADVANCED PAVEMENT AND CIVIL ENGINEERING MATERIALS-3 CREDIT HOURS

ADD to Structural Engineering:

-6 Credit Hours from any CES 5xxx or 6xxx course

REMOVE FROM "ELECTIVE COURSES: 12 CREDIT HOURS":

ALL Constructing Engineering and Management courses

ADD:

-Any CEG 5xxx or CEG 6xxx course

-Any CES 5xxx or CES 6xxx course

-TTE 5835-Pavement Engineering-3 Credit Hours

-CGN 5506-Advanced Pavement and Civil Engineering Materials-3 Credit Hours

Complete the remaining required fields and LAUNCH this proposal! Do not begin revisions until **after** launch. Program revisions before launch will not be tracked.

<table>
<tr>
<td rowspan="4" align="right">Informational Description Chart-this will import.*</td>
<td>College: Engineering and Computer Science</td>
<td>Degree: MS</td>
</tr>
<tr>
<td>Department: Civil, Environmental, and Construction Engineering</td>
<td>Option: Thesis, Nonthesis</td>
</tr>
<tr>
<td colspan="2">Program Websites: http://www.cece.ucf.edu/</td>
</tr>
<tr>
<td colspan="2">Graduate Program Handbook</td>
</tr>
</table>

Revise catalog copy here! After you revise courses, click on the Curriculum Schema button below to revise the catalog copy. Please note: this information is what will flow directly to the graduate catalog. Any attached documents to this proposal will not be used for catalog purposes.

Follow these steps to propose courses to the revised program curriculum:

Step 1

There are two options for adding courses: "Add Course" and "Import Course." For courses already in the catalog, click on "Import Course" and find the courses needed. For new classes going through a Curriculog Approval Process click on "Add Course"-- a box will open asking you for the Prefix, Course Number and Course Title.

Step 2

Click on ☰ "View Curriculum Schema." Click on the area/header of the program where you would like to add courses. When you click on "Add Courses" it will bring up the list of courses available from Step 1. Select the courses you wish to add. For removing courses click on the ✖ and proceed.

Prospective Curriculum *

Track Description

The Structural and Geotechnical Engineering track in the Civil Engineering MS program ~~reflects the very broad nature of~~ focuses on the ~~field~~ engineering, ~~which encompasses the design~~ anaysis, ~~construction~~ design, and ~~enhancement~~ construction of the ~~structural and geotechnical~~ built infrastructure ~~of society~~. The ~~Structural and Geotechnical Engineering~~ track ~~in the Civil Engineering MS program reflects the very broad nature of~~ emphasizes on both: the ~~field~~ above-ground engineering (primarily structures), ~~which encompasses~~ the ~~design~~ below-ground engineering (primarily geotechnical), ~~construction, and enhancement of~~ as well as the ~~infrastructure of society~~ interaction between the two systems. The program's course work focuses on structural analysis and design, ~~and geotechnical engineering~~ mechanics and materials, foundations, ~~but may include electives in transportation planning~~ characterization of soils and ~~operations~~ geomaterials, ~~traffic engineering, construction engineering,~~ and computational modeling in structural and ~~water resources~~ geotechnical engineering.

Faculty research interests include geotechnical studies of subsurface conditions, soil characterization and testing ~~"superpave" mix~~, pavement design, ~~intelligent transportation systems~~ retaining structures, ~~traffic safety~~ structural dynamics, nonlinear structural analysis and software development, reinforced and structural dynamics, nonlinear structural analysis and software development, reinforced and prestressed concrete design, ~~construction~~ bridge engineering, ~~hydraulic modeling, coastal ocean modeling, stormwater management,~~ and ~~watershed management~~ pavements. Students completing the program find positions in consulting firms, ~~construction~~ design companies, construction and construction-related industries, in city, county, state, and federal government agencies, and academic institutions.

This program has potential ties to professional licensure or certification in the field. For more information on how this program may prepare you in that regard, please visit https://apq.ucf.edu/licensure-programs/.

Curriculum

The department offers a Structural and Geotechnical Engineering track in the Civil Engineering MS program to students with appropriate science or engineering baccalaureate backgrounds. Both a thesis option and a nonthesis option are available with each requiring 30 credit hours. The thesis option requires 12 credit hours of required courses, 12 credit hours of elective graduate course work (exclusive of thesis and research), and 6 credit hours of thesis. The nonthesis option requires 12 credit hours of required courses and 18 credit hours of elective graduate course work. The nonthesis option also requires submission of an end-of-program portfolio. The student must develop an individual program of study with a faculty adviser and

must have background or articulation course work as described below. At least one-half of the required credits must be taken at the 6000 level.

Total Credit Hours Required: 30 Credit Hours Minimum beyond the Bachelor's Degree

Research studies or projects are required in one or more courses. The research study or project will focus on reviewing and analyzing contemporary research or engineering issues in a student's particular specialization within the profession in order to help students acquire knowledge and skills pertaining to research-based best practices in that specialization area.

Prerequisites (Articulation)

EGN 3310-Engineering Analysis—Statics **3 Credit Hours**
EGN 3321-Engineering Analysis—Dynamics **3 Credit Hours**
EGN 3331-Mechanics of Materials **3 Credit Hours**
CEG 4011C-Geotechnical Engineering I **4 Credit Hours**
CES 4100-Structural Analysis **4 Credit Hours**

CES 4605-Steel Structures **3 Credit Hours** or
CES 4702-Reinforced Concrete Structures **3 Credit Hours**

Required Courses: 12 Credit Hours

Both thesis and nonthesis students must choose two courses from each of the two following groups. Courses with asterisks represent those with specific independent learning experiences and all nonthesis students must choose at least one of the courses with an asterisk.

Geotechnical Engineering

CEG 5700 Geo-Environmental Engineering
[Right] *
CEG 6065 Soil Dynamics
CEG 6115 Foundation Engineering
[Right] *
CEG 6317 Advanced Geotechnical
Engineering
CES 6170 Boundary Element Methods in Civil
Engineering
[Right] * **6 Credit Hours from any CEG 5xxx or 6xxx**   **6**

~~course~~

~~TTE 5835 Pavement Engineering~~

~~CGN 5506 Advanced Pavement and Civil Engineering Materials~~

Structural Engineering

CES 5144 Matrix Methods for Structural Analysis
CES 5325 Bridge Engineering
CES 5606 Advanced Steel Structures
[Right] *
CES 5706 Advanced Reinforced Concrete
[Right] *
CES 5821 Masonry and Timber Design
CES 6010 Structural Reliability
CES 6116 Finite Element Structural Analysis
CES 6209 Dynamics of Structures
CES 6220 Wind and Earthquake Engineering
CES 6230 Advanced Structural Mechanics
CES 6527 Nonlinear Structural Analysis
CES 6715 Prestressed Concrete Structures
[Right] *
CES 6840 Composite Steel Concrete Structures
[Right] *
CES 6910 Research in Structural Engineering

[After] 6 Credit Hours from any CES 5xxx or 6xxx course   6

Elective Courses: 12 Credit Hours

All students, both thesis and nonthesis, must complete at least 12 credit hours of approved electives (primarily from the above two groups but also from the list below or other courses as approved by the student's adviser). Please note that Directed Research (XXX 6918) is not permitted in the MS program of study.

Construction Engineering and Management

~~Any CEG 5xxx or CEG 6xxx courses~~

TTE 5835 Pavement Engineering

CGN 5506 Advanced Pavement and Civil Engineering Materials

~~CCE 5205 Decision Support for Infrastructure Projects~~

~~CCE 5006 Infrastructure Systems~~

~~CCE 5006 Infrastructure Systems Management~~

~~CCE 5220 Sustainable Infrastructure Systems~~
~~CCE 6036 Advanced Construction Planning and Control~~
~~[Right] *~~
~~CCE 6211 Design and Monitoring of Construction Processes~~
~~CCE 6045 Cost Analysis of Sustainable Infrastructure Systems~~
[After] Any CEG 5xxx or CEG 6xxx courses
[After] Any CES 5xxx or CES 6xxx course

Thesis Option: 6 Credit Hours

Successful performance in a final defense of the thesis is required. In addition, the College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's **website** and on the university-wide **Events Calendar** at the College of Graduate Studies website at least two weeks before the defense date.

XXX 6971 - Thesis **6 Credit Hours**

Nonthesis Option: 6 Credit Hours

Nonthesis students must complete 6 additional credit hours of electives from the lists above or other courses as approved by the student's adviser.   Please note that at least one course in the nonthesis program of study must be one of the courses with an asterisk, which denotes that this course provides an independent learning experience for the student.

Electives **6 Credit Hours**

Portfolio Requirement

Students are required to complete a culminating experience. The culminating experience for nonthesis MS students is submission of an end-of-program portfolio. The portfolio requirements are listed on the CECE website.

Equipment Fee

Students in the Civil Engineering MS program pay a $16 equipment fee each semester that they are enrolled. Part-time students pay $8 per semester.

Independent Learning

A research or design project serves as the independent learning experience for thesis students. Nonthesis students are required to take at least one course with a research project and submit an end-of-program portfolio.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A Bachelor of Science degree in civil engineering or another closely related engineering degree.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Three letters of recommendation.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

The GRE is not required, however, taking the GRE is highly recommended for students wishing to pursue a thesis. In order to be considered for any fellowships, a GRE score is required.

The MS degrees in specialized options are designed for students with appropriate baccalaureate backgrounds. Applicants who are applying to the programs without a directly related undergraduate degree should closely check the prerequisites. Additional undergraduate courses may be required.

Application Deadlines

Structural and Geotechnical Engineering	*Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 1	Dec 1	
International Applicants	Jan 15	Jan 15	Jul 1	
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Financials

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see the College of Graduate Studies **Funding website**, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The **Financial Information** section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see **UCF Graduate Fellowships**, which includes descriptions of university fellowships and what you should do to be considered for a fellowship.

Contact Info

Graduate Program

Andrew Randall PhD PE

Professor

andrew. randall@ucf. edu

Telephone: 407-823-6429

Engineering II, 211-L

Ana Lucia Salas

Ana Lucia Salas

Graduate Student Services Coordinator

AnaLucia. Salas@ucf. edu

Telephone: 407-823-1299

Engineering II, 211-K

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf. edu

Telephone: 407-823-5692

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Graduate Fellowships

Grad Fellowships

Telephone: 407-823-0127

gradfellowship@ucf. edu

https://funding.graduate.ucf.edu

Graduate Financial Aid

Graduate Financial Aid

UCF Student Financial Assistance

Millican Hall 120

Telephone: 407-823-2827

Appointment Line: 407-823-5285

Fax: 407-823-5241

finaid@ucf. edu

http://finaid.ucf.edu

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this revised program, track, or certificate?*

Activity Log

Ana Lucia Salas

✚ **No**

○ Yes   ◉ No

If yes, state the name of the program or track where students are currently enrolled and attach a list of students if possible:

Will students have the option to stay in their existing program, track, or certificate?*

Activity Log

Ana Lucia Salas

✚ **Yes**

◉ Yes   ○ No

If yes, how will current students be impacted by this change?

Future Students

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.

Year 1

Headcount:

SCHs:

Year 2

Headcount:

SCHs:

Year 3

Headcount:

SCHs:

Indicate likely career or student outcomes upon completion:

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:

Source of funds:

Number of fellowship students (specify fellowship):

Number of tuition remissions:

Source of funds:

Year 2

Number of assistantship students

Source of funds:

Number of fellowship students (specify fellowship):	

Number of tuition remissions:		Source of funds:	

Year 3

Number of assistantship students:		Source of funds:	

Number of fellowship students (specify fellowship):	

Number of tuition remissions:		Source of funds:	

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking ⊞ in the top right corner of the form.

Faculty List*

> **Activity Log**
>
> **Ana Lucia Salas**
>
> **+ Attached**

◉ Attached ○ Not Applicable

Support from involved units that no duplication exists*

> **Activity Log**
>
> **Ana Lucia Salas**
>
> **+ Not Applicable**

○ Attached ◉ Not Applicable

Administration Use Only

Catalog Ownership:

> **Activity Log**
>
> **Ana Lucia Salas**
>
> ↳ **Department of Civil, Environmental, and Construction Engineering**

Department of Civil, Environmental, and Construction Engineering

Structural & Geotechnical Faculty:

Apostolakis, Georgios
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Arboleda Monsalve, Luis
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Disciplinary affiliations: Civil Engineering
Contact Info: luis.arboleda@ucf.edu

Catbas, Necati
College: College of Engineering and Computer Science
Disciplinary affiliations: Civil Engineering Research interests: Structural Health
Monitoring, Structural Identification, Condition Evaluation of Constructed Facilities,
Analytical Simulation and Characterization, Non-Destructive Evaluation (NDE)
Technologies, Structural Dynamics-ibrations Bridge Engineering Structural Analysis and
Design
Contact Info: catbas@ucf.edu
Websites: cece.ucf.edu/people/catbas/

Mackie, Kevin
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Disciplinary affiliations: Civil Engineering
Contact Info: kmackie@ucf.edu

Nam, Boo Hyun
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Disciplinary affiliations: Civil Engineering
Contact Info: BooHyun.Nam@ucf.edu

Structural & Geotechnical Faculty:

Apostolakis, Georgios
College: College of Engineering and Computer Science
Disciplinary affiliations: Civil Engineering
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Arboleda Monsalve, Luis
College: College of Engineering and Computer Science
Disciplinary affiliations: Civil Engineering
Contact Info: luis.arboleda@ucf.edu

Catbas, Necati
College: College of Engineering and Computer Science
Disciplinary affiliations: Civil Engineering Research interests: Structural Health
Monitoring, Structural Identification, Condition Evaluation of Constructed Facilities,
Analytical Simulation and Characterization, Non-Destructive Evaluation (NDE)
Technologies, Structural Dynamics-ibrations Bridge Engineering Structural Analysis and
Design
Contact Info: catbas@ucf.edu
Websites: cece.ucf.edu/people/catbas/

Mackie, Kevin
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Disciplinary affiliations: Civil Engineering
Contact Info: kmackie@ucf.edu

Nam, Boo Hyun
College: College of Engineering and Computer Science
Disciplinary affiliations: Civil Engineering
Contact Info: BooHyun.Nam@ucf.edu

College of Engineering and Computer Science - Graduate Program Revision - Civil Engineering MS, Water Resources Engineering Track▶

z2020-2021 Graduate Program Revision/Reactivation

General Catalog Information

This form is to be used to REVISE graduate degree programs, tracks, or certificate programs. If there are tracks being revised or added to a program, one form must be submitted for EACH program and the track(s).

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Select *Program* below.

Program Type:*
- ⦿ Program
- ◯ Shared Core

Proposal Type:*

> Graduate Program Revision

Read before you begin

TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

IMPORT curriculum data from the Catalog by clicking ⬇ in the top left corner.
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LAUNCH proposal by clicking ▶ in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after proposal is launched.**

College:*

> College of Engineering and Computer Science

Unit / Department / College:*

> Department of Civil, Environmental, and Construction Engineering

Unit(s) Housing Program:

Type of Action:*	☑ Program
	☑ Track
	☐ Certificate

IMPORT PROGRAM NOW! Please use the Import feature to import the program information from the Catalog by clicking ⬇ **in the top left corner of the form.**

Name of program, track and / or certificate:*	Civil Engineering MS, Water Resources Engineering Track▶

Are you revising the name of the program, track, or certificate?*	○ Yes ◉ No

Proposed Effective Term / Year:*	Fall 2021

If you will be submitting other revision forms for tracks or course actions, please list them here:	

Is the CIP code being updated?	☐ Yes ☑ No

If yes, please provide the new CIP code:	

Rationale for revision: ADD EXTRA COURSES IN THE "REQUIRED COURSES" SECTION

1.   **CWR - 5999 - COASTAL SYSTEMS ANALYSIS**

2.   **CWR - 6007 - ECOHYDRAULICS**

3.   **CWR - 6606 - STOCHASTIC RIVER NETWORK**

4.   **CWR - 6660 - WATER POLICY, PLANNING & GOVERNANCE**

Track Description

The Water Resources Engineering track in the Civil Engineering MS program reflects the very broad nature of the field, which encompasses the design, construction, and enhancement of the sustainable infrastructure for society.The program's course work focuses on water resources modeling, hydraulics and hydrology.

Water Resource faculty research interests include ecohydraulic and ecohydrologic modeling, groundwater and surface hydrology, sea level rise and other climate change impact assessments, stormwater management, tide, wind-wave and hurricane storm surge modeling, and environmental water resources management. Students completing the program find positions in consulting firms, construction and construction-related industries, in city, county, state, and federal government agencies, and academic institutions.

Curriculum

The Water Resources Engineering track in the Civil Engineering MS program is for students with appropriate science or engineering baccalaureate backgrounds. Both thesis and non-thesis options are available with each requiring 30 credit hours. The thesis option requires 15 credit hours of required courses, 9 credit hours of elective graduate course work exclusive of thesis and research, and a thesis (6 credit hours). The nonthesis option requires 15 credit hours of required graduate course work, 15 credit hours of electives, and submission of an end-of-program portfolio. Each student must have an individual program of study approved by his/her faculty committee and have completed all required articulation course work as described below. At least one-half of the required credits must be taken at the 6000 level.

Complete the remaining required fields and LAUNCH this proposal! Do not begin revisions until **after** launch. Program revisions before launch will not be tracked.

Revise catalog copy here! After you revise courses, click on the Curriculum Schema button below to revise the catalog copy. Please note: this information is what will flow directly to the graduate catalog. Any attached documents to this proposal will not be used for catalog purposes.

Follow these steps to propose courses to the revised program curriculum:

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College of Engineering and Computer Science - Graduate Program Revision - Civil Engineering MS, Water Resources Engineering Track►

Track Description

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Curriculum

The Water Resources Engineering track in the Civil Engineering MS program is for students with appropriate science or engineering baccalaureate backgrounds. Both thesis and non-thesis options are available with each requiring 30 credit hours. The thesis option requires 15 credit hours of required courses, 9 credit hours of elective graduate course work exclusive of thesis and research, and a thesis (6 credit hours). The nonthesis option requires 15 credit hours of required graduate course work, 15 credit hours of electives, and submission of an end-of-program portfolio. Each student must have an individual program of study approved by his/her faculty committee and have completed all required articulation course work as described below. At least one-half of the required credits must be taken at the 6000 level.

Total Credit Hours Required: 30 Credit Hours Minimum beyond the Bachelor's Degree

Research studies or projects are required in one or more courses. The research study or project will focus on reviewing and analyzing contemporary research or engineering issues in a student's particular specialization within the profession in order to help students acquire knowledge and skills pertaining to research-based best practices in that specialization area.

Prerequisites (Articulation)

- CEG 4011C - Geotechnical Engineering I **4 Credit Hours**
- CWR 4632C - Water Resources I **4 Credit Hours**
- CWR 4633C - Water Resources II **3 Credit Hours**
- EGN 3613 - Engineering Economic Analysis **2 Credit Hours**
- STA 3032 - Probability and Statistics for Engineers **3 Credit Hours**

Required Courses: 15 Credit Hours

Both thesis and nonthesis students must choose five CWR courses from the list below. Courses with an asterisk provide an independent learning experience that involves research and design projects. Nonthesis students are required to take at least one course with an asterisk in order to obtain an independent learning experience.

CWR 5125 Groundwater Hydrology

CWR 5205 Hydraulic Engineering

CWR 5515 Numerical Methods in Civil and Environmental Engineering

CWR 5545 Water Resources Engineering

CWR 5634 Water Resources in a Changing Environment

CWR 5999 Coastal Systems Analysis

CWR 6007 Ecohydraulics

CWR 6102 Advanced Hydrology

[Right]   *

CWR 6126 Groundwater Modeling

[Right]   *

CWR 6235 Open Channel Hydraulics

CWR 6236 River Engineering and Sediment Transport

CWR 6535 Modeling Water Resources Systems

[Right]   *

CWR 6539 Finite Elements in Surface Water Modeling

CWR 6606 Stochastic River Network Hydro-Geomorphology

CWR 6660 Water Policy, Planning and Governance

Elective Courses: 9 Credit Hours

All students, both thesis and nonthesis, are required to take at least 9 credit hours of approved electives. The courses may be from the list above or other courses as approved by the student's adviser. Directed Research (XXX 6918) is not permitted in the MS program of study

- Electives **9 Credit Hours**

Thesis Option: 6 Credit Hours

A successful defense of the thesis is required. In addition, the College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

- CWR 6971 - Thesis **6 Credit Hours**

Nonthesis Option: 6 Credit Hours

Nonthesis students must complete at least 6 additional credit hours of electives from either the list above or other courses as approved by the student's adviser.

- Electives **6 Credit Hours**

Portfolio Requirement

Students are required to complete a culminating experience. The culminating experience for nonthesis MS students is submission of an end-of-program portfolio. The portfolio requirements are listed on the CECE website.

Equipment Fee

Students in the Civil Engineering MS program pay a $16 equipment fee each semester that they are enrolled. Part-time students pay $8 per semester.

Independent Learning

A research or design project serves as the independent learning experience for thesis students. Nonthesis students are required to take at least one of the courses marked with an asterisk (*), denoting an independent learning experience, and submission of an end-of-program portfolio.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A Bachelor of Science degree in civil engineering or another closely related engineering degree.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Three letters of recommendation.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

The GRE is not required, however, taking the GRE is highly recommended for students wishing to pursue a thesis. In order to be considered for any fellowships, a GRE score is required.

The MS degrees in specialized options are designed for students with appropriate baccalaureate backgrounds. Applicants who are applying to the programs without a directly related undergraduate degree should closely check the prerequisites. Additional undergraduate courses may be required.

Application Deadlines

Water Resources Engineering	*Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 1	Dec 1	-
International Applicants	Jan 15	Jan 15	Jul 1	-
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Financials

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see the College of Graduate Studies Funding website, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see UCF Graduate Fellowships, which includes descriptions of university fellowships and what you should do to be considered for a fellowship.

Contact Info

Graduate Program

Andrew Randall PhD PE

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Engineering II, 211-L

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Engineering II, 211-K

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf. edu

Telephone: 407-823-5692

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Graduate Fellowships

Grad Fellowships

Telephone: 407-823-0127

gradfellowship@ucf. edu

https://funding.graduate.ucf.edu

Graduate Financial Aid

UCF Student Financial Assistance

Millican Hall 120

Telephone: 407-823-2827

Appointment Line: 407-823-5285

Fax: 407-823-5241

finaid@ucf. edu

http://finaid.ucf.edu

http://finaid.ucf.edu

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this revised program, track, or certificate?* ⚪ Yes ⚫ No

If yes, state the name of the program or track where students are currently enrolled and attach a list of students if possible:

Will students have the option to stay in their existing program, track, or certificate?* ⚫ Yes ⚪ No

If yes, how will current students be impacted by this change?

Future Students

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.

Year 1

Headcount:

SCHs:

Year 2

Headcount:

SCHs:

Year 3

Headcount:	**SCHs:**

Indicate likely career or student outcomes upon completion:

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:	**Source of funds:**

Number of fellowship students (specify fellowship):

Number of tuition remissions:	**Source of funds:**

Year 2

Number of assistantship students	**Source of funds:**

Number of fellowship students (specify fellowship):

Number of tuition remissions:	**Source of funds:**

Year 3

Number of assistantship students:	**Source of funds:**

Number of fellowship students (specify fellowship):

Number of tuition remissions:	**Source of funds:**

College of Engineering and Computer Science - Graduate Program Revision - Civil Engineering MSCE▶

z2020-2021 Graduate Program Revision/Reactivation

General Catalog Information

This form is to be used to REVISE graduate degree programs, tracks, or certificate programs. If there are tracks being revised or added to a program, one form must be submitted for EACH program and the track(s).

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Select *Program* below.

Program Type:* ⦿ Program
⚪ Shared Core

Proposal Type:* Graduate Program Revision

Read before you begin

TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

IMPORT curriculum data from the Catalog by clicking 🔽 in the top left corner.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking ▶ in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after proposal is launched.**

College:* College of Engineering and Computer Science

Unit / Department / College:* Department of Civil, Environmental, and Construction Engineering

Unit(s) Housing Program:

Type of Action:* ☑ Program

☐ Certificate

IMPORT PROGRAM NOW! Please use the Import feature to import the program information from the Catalog by clicking ⬎ in the top left corner of the form.

Name of program, track and / or certificate:*	Civil Engineering MSCE▶

Are you revising the name of the program, track, or certificate?*	◯ Yes ⦿ No

Proposed Effective Term / Year:*	Fall 2021

If you will be submitting other revision forms for tracks or course actions, please list them here:	

Is the CIP code being updated?	☐ Yes ☑ No

If yes, please provide the new CIP code:	

| **Rationale for revision:** | New track added to Civil Engineering Program, adding all Smart Cities courses to the MSCE track. |

ADD TO GEOTECHNICAL ENGINEERING:

CEG 5700

CES 6170

TTE 5835

CGN 5506

ADD TO STRUCTURAL ENGINEERING:

CES 691

ADD TO TRANSPORTATION ENGINEERING:

ESI 5219

STA 5206

ADD TO WATER RESOURCES:

CWR 6539

Program Description

The Master of Science in Civil Engineering degree is designed for students who have an undergraduate degree in Civil Engineering or another closely related engineering degree. Graduate work and research in civil engineering reflect the very broad nature of the field, which encompasses the design, construction, and enhancement of the infrastructure of society.

The Master of Science in Civil Engineering (MSCE) degree is designed for students who have an undergraduate degree in Civil Engineering or another closely related engineering degree. Graduate work and research in civil engineering reflects the very broad nature of the field, which encompasses the design, construction, and enhancement of the infrastructure of society. The program includes course work in structural analysis and design, geotechnical engineering and foundations, transportation planning and operations, traffic engineering, construction engineering, and water resources engineering.

Faculty research interests include geotechnical studies of subsurface conditions, soil testing "superpave" mix design, intelligent transportation systems, traffic safety, structural dynamics, nonlinear structural analysis and software development, reinforced concrete, construction engineering, hydraulic modeling, coastal ocean modeling, stormwater management, and watershed management. Students completing the program find positions in consulting firms, construction, and construction-related industries, in city, county, state, and federal government agencies, and academic institutions.

This program has potential ties to professional licensure or certification in the field. For more information on how this program may prepare you in that regard, please visit **https://apq.ucf.edu/licensure-programs/**.

Complete the remaining required fields and LAUNCH this proposal! Do not begin revisions until **after** launch. Program revisions before launch will not be tracked.

Informational Description Chart- this will import.<superscript>*</superscript>	**College:** <u>Engineering and Computer Science</u>	**Degree:** MSCE
	Department: <u>Civil, Environmental, and Construction Engineering</u>	**Option:** Thesis, Nonthesis
	Program Websites: <u>http://www.cece.ucf.edu/</u>	
	<u>Graduate Program Handbook</u>	

Revise catalog copy here! After you revise courses, click on the Curriculum Schema button below to revise the catalog copy. Please note: this information is what will flow directly to the graduate catalog. Any attached documents to this proposal will not be used for catalog purposes.

Follow these steps to propose courses to the revised program curriculum:

Step 1

≡ There are two options for adding courses: "Add Course" and "Import Course." For courses already in the catalog, click on "Import Course" and find the courses needed. For new classes going through a Curriculog Approval Process click on "Add Course"-- a box will open asking you for the Prefix, Course Number and Course Title.

Step 2

Click on ≡ "View Curriculum Schema." Click on the area/header of the program where you would like to add courses. When you click on "Add Courses" it will bring up the list of courses available from Step 1. Select the courses you wish to add. For removing courses click on the ✗ and proceed.

College of Engineering and Computer Science - Graduate Program Revision - Civil Engineering MSCE►

Program Description

The Master of Science in Civil Engineering degree is designed for students who have an undergraduate degree in Civil Engineering or another closely related engineering degree. Graduate work and research in civil engineering reflect the very broad nature of the field, which encompasses the design, construction, and enhancement of the infrastructure of society.

The Master of Science in Civil Engineering (MSCE) degree is designed for students who have an undergraduate degree in Civil Engineering or another closely related engineering degree. Graduate work and research in civil engineering reflects the very broad nature of the field, which encompasses the design, construction, and enhancement of the infrastructure of society. The program includes course work in structural analysis and design, geotechnical engineering and foundations, transportation planning and operations, traffic engineering, construction engineering, and water resources engineering.

Faculty research interests include geotechnical studies of subsurface conditions, soil testing "superpave" mix design, intelligent transportation systems, traffic safety, structural dynamics, nonlinear structural analysis and software development, reinforced concrete, construction engineering, hydraulic modeling, coastal ocean modeling, stormwater management, and watershed management. Students completing the program find positions in consulting firms, construction, and construction-related industries, in city, county, state, and federal government agencies, and academic institutions.

This program has potential ties to professional licensure or certification in the field. For more information on how this program may prepare you in that regard, please visit https://apq.ucf.edu/licensure-programs/.

Curriculum

The Civil Engineering MSCE program requires a minimum of 30 credit hours beyond the bachelor's degree, and both thesis and nonthesis options are available. The thesis option requires 24 credit hours of formal graduate-level course work and 6 credit hours of thesis. The nonthesis option requires 30 hours of formal course work and completion of a culminating experience. For nonthesis MS students, the culminating experience is submission of a portfolio that satisfies program requirements. It is strongly suggested that part-time students pursue the nonthesis option.

Total Credit Hours Required: 30 Credit Hours Minimum beyond the Bachelor's Degree

Students must develop an individual plan of study with a faculty adviser by their second semester of study. At least one-half of the required credits must be taken at the 6000 level.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in a student's particular specialization within the profession in order to help students acquire knowledge and skills pertaining to research-based best practices in that specialization area. In addition, students may engage in directed independent studies, directed research or a research report during their studies. Courses with asterisks represent those with specific independent learning experiences, and all nonthesis students must choose at least one course with an asterisk.

Elective Courses: 24 Credit Hours

Thesis MS students must take a minimum of 24 credit hours of course work with at least 18 credit hours from the Civil, Environmental and Construction Engineering (CECE) Department in their program of study.

Nonthesis MS students must take at least 24 credit hours of course work from the CECE Department in their program of study. Nonthesis students must take at least one course where a research project is required (one course marked with an asterisk).

Geotechnical Engineering

CEG 5700 Geo-Environmental Engineering
CEG 6065 Soil Dynamics
[Right]　*
CEG 6115 Foundation Engineering
CEG 6317 Advanced Geotechnical Engineering
CES 6170 Boundary Element Methods in Civil Engineering
CGN 5506 Advanced Pavement and Civil Engineering Materials
TTE 5835 Pavement Engineering

Structural Engineering

CES 5144 Matrix Methods for Structural Analysis
CES 5325 Bridge Engineering
[Right]　*
CES 5606 Advanced Steel Structures
CES 5706 Advanced Reinforced Concrete
CES 5821 Masonry and Timber Design
CES 6010 Structural Reliability
CES 6116 Finite Element Structural Analysis
CES 6209 Dynamics of Structures
[Right]　*
CES 6220 Wind and Earthquake Engineering
CES 6230 Advanced Structural Mechanics
CES 6527 Nonlinear Structural Analysis
CES 6715 Prestressed Concrete Structures
[Right]　*
CES 6840 Composite Steel Concrete Structures
[Right]　*
CES 6910 Research in Structural Engineering
~~CES 6910 Research in Structural Engineering~~

Transportation Engineering

TTE 5204 Traffic Engineering

TTE 5805 Geometric Design of Transportation Systems

TTE 5835 Pavement Engineering

TTE 6205 Highway Capacity

[Right]   *

TTE 6256 Traffic Operations

TTE 6270 Intelligent Transportation Systems

[Right]   *

TTE 6315 Traffic Safety Analysis

[Right]   *

TTE 6526 Planning and Design of Airports

TTE 6625 Mass Transportation Systems

CGN 6655 Regional Planning, Design, and Development

ESI 5219 Engineering Statistics

STA 5206 Statistical Analysis

Water Resources Engineering

CWR 5125 Groundwater Hydrology

CWR 5205 Hydraulic Engineering

CWR 5515 Numerical Methods in Civil and Environmental Engineering

CWR 5545 Water Resources Engineering

CWR 5634 Water Resources in a Changing Environment

CWR 6102 Advanced Hydrology

[Right]   *

CWR 6126 Groundwater Modeling

[Right]   *

CWR 6235 Open Channel Hydraulics

CWR 6236 River Engineering and Sediment Transport

CWR 6535 Modeling Water Resources Systems

[Right]   *

CWR 6539 Finite Elements in Surface Water Modeling

Construction Engineering and Management

CCE 5205 Decision Support for Infrastructure Projects

CCE 5006 Infrastructure Systems Management

CCE 5220 Sustainable Infrastructure Systems

[After]   CCE 5937 - Construction Contracts **3 Credit Hours**

CCE 6036 Advanced Construction Planning and
Control
[Right]   *
CCE 6211 Design and Monitoring of Construction
Processes
[Right]   *
CCE 6045 Cost Analysis of Sustainable
Infrastructure Systems

Thesis Option: 6 Credit Hours

For those pursuing the thesis option, students must complete 6 credit hours of thesis and
successfully defend the thesis.

The College of Engineering and Computer Science requires that all thesis defense
announcements are approved by the student's adviser and posted on the college's <u>website</u> and
on the university-wide <u>Events Calendar</u> at the College of Graduate Studies website at least two
weeks before the defense date.

- XXX 6971 - Thesis **6 Credit Hours** (with the course prefix of CGN, CEG, CES, CWR
  or TTE)

Nonthesis Option: 6 Credit Hours

Students in the nonthesis option must complete 6 credit hours of electives in addition to the 24
credit hours of formal course work described above. All totaled, the nonthesis option requires 30
credit hours of course work.

- Electives **6 Credit Hours**

Portfolio Requirement

Students are required to complete a culminating experience. The culminating experience
for nonthesis MS students is submission of their portfolio of activities by the course
Withdrawal date of the semester prior to their intended graduation. The portfolio
requirements are listed on the CECE website.

Equipment Fee

Students in the Civil Engineering MSCE program pay a $16 equipment fee each semester that
they are enrolled. Part-time students pay $8 per semester.

Independent Learning

A research or design project serves as the independent learning experience for thesis students.
Nonthesis students are required to take at lease one course where a research project is required and
submit an end-of-program portfolio.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A Bachelor of Science degree in civil engineering or another closely related engineering degree.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Three letters of recommendation.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

The GRE is not required, however, taking the GRE is highly recommended for students wishing to pursue a thesis. In order to be considered for any fellowships, a GRE score is required.

Application Deadlines

Civil Engineering MSCE	*Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 1	Dec 1	
International Applicants	Jan 15	Jan 15	Jul 1	
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Financials

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see the College of Graduate Studies Funding website, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

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Contact Info

Graduate Program

Andrew Randall PhD PE

Professor

andrew. randall@ucf. edu

Telephone: 407-823-6429

Engineering II, 211-L

Ana Lucia Salas

Graduate Student Services Coordinator

AnaLucia. Salas@ucf. edu

Telephone: 407-823-1299

Engineering II, 211-K

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf. edu

Telephone: 407-823-5692

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Graduate Fellowships

Grad Fellowships

Telephone: 407-823-0127

gradfellowship@ucf. edu

https://funding.graduate.ucf.edu

Graduate Financial Aid

UCF Student Financial Assistance

Millican Hall 120

Telephone: 407-823-2827

Appointment Line: 407-823-5285

Fax: 407-823-5241

finaid@ucf. edu

http://finaid.ucf.edu

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

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Fax: 407-823-5241

finaid@ucf.edu

http://finaid.ucf.edu

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this revised program, track, or certificate?*	⚪ Yes 🔘 No

If yes, state the name of the program or track where students are currently enrolled and attach a list of students if possible:	

Will students have the option to stay in their existing program, track, or certificate?* ◉ Yes ○ No

If yes, how will current students be impacted by this change?

Future Students

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.

Year 1

Headcount:

SCHs:

Year 2

Headcount:

SCHs:

Year 3

Headcount:

SCHs:

Indicate likely career or student outcomes upon completion:

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship

Source of funds:

assistantship students:	**Source of funds:**

Number of fellowship students (specify fellowship):	

Number of tuition remissions:	**Source of funds:**

Year 2

Number of assistantship students	**Source of funds:**

Number of fellowship students (specify fellowship):	

Number of tuition remissions:	**Source of funds:**

Year 3

Number of assistantship students:	**Source of funds:**

Number of fellowship students (specify fellowship):	

Number of tuition remissions:	**Source of funds:**

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking **in the top right corner of the form.**

Faculty List* ○ Attached ◉ Not Applicable

Support from involved units that no duplication exists* ○ Attached ◉ Not Applicable

Administration Use Only

College of Engineering and Computer Science - Graduate Program Revision - Environmental Engineering MSEnvE▶

z2020-2021 Graduate Program Revision/Reactivation

General Catalog Information

This form is to be used to REVISE graduate degree programs, tracks, or certificate programs. If there are tracks being revised or added to a program, one form must be submitted for EACH program and the track(s).

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Select *Program* **below.**

Program Type:* ⦿ Program
◯ Shared Core

Proposal Type:* | Graduate Program Revision |

****Read before you begin****

TURN ON help text before starting this proposal by clicking 🛈 in the top right corner of the heading.

IMPORT curriculum data from the Catalog by clicking 🔽 in the top left corner.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking ▶ in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after proposal is launched.**

College:* | College of Engineering and Computer Science |

Unit / Department / College:* | Department of Civil, Environmental, and Construction Engineering |

Unit(s) Housing Program:

Type of Action:* ☑ Program

☐ Track

☐ Certificate

IMPORT PROGRAM NOW! Please use the Import feature to import the program information from the Catalog by clicking ⬇ in the top left corner of the form.

Name of program, track and / or certificate: *	Environmental Engineering MSEnvE ▶

Are you revising the name of the program, track, or certificate? *	◯ Yes ⦿ No

Proposed Effective Term / Year: *	Fall 2021

If you will be submitting other revision forms for tracks or course actions, please list them here:	

Is the CIP code being updated?	☐ Yes ☑ No

If yes, please provide the new CIP code:	

Rationale for revision:	Reason: updates on catalog.

Remove from "PROGRAM DESCRIPTION": **The program's overall mission is to prepare students for careers in environmental engineering with consulting firms; with industry; within federal, state, and local governments; and/or in higher education.**

Add to "TOTAL CREDIT HOURS REQUIRED: 20 CREDIT HOURS MINIMUM BEYOND THE BACHELOR'S DEGREE" :

Students choosing the thesis option must take 12 credit hours of required **courses and 12** credit hours of electives, **plus** 6 thesis credit hours.

Change credit hours for "THE FOLLOWING PREREQUISITES MAY BE REQUIRED FOR STUDENTS WITH UNDERGRADUATE DEGREES IN OTHER ENGINEERING DISCIPLINES":

1. EES 411C Biological Process Control **4 credit hours**

2. EES 4202C Chemical Process Control **4 credit hours**

Add to "ELECTIVE COURSES: 12 CREDIT HOURS":

Environmental Specialization - Any of the appropriate ENV **of EES** graduate-level (5000 or 6000) with the consent of the student's adviser

Remove from "APPLICATION REQUIREMENTS":

Prospective applicants who are encouraged to apply to their intended graduate program based on the information provided for their pre-screening are not assured of admission or financial assistance when they submit a complete online application. Although it is possible, it is not likely, that prospective applicants who are discouraged from formally applying to a graduate program at the pre-screening stage will be admitted if they elect to submit online application anyway.

Complete the remaining required fields and LAUNCH this proposal! Do not begin revisions until **after** launch. Program revisions before launch will not be tracked.

Informational Description Chart- this will import.*	College: Engineering and Computer Science	Degree: MSEE
	Department: Civil, Environmental, and Construction Engineering	Option: Thesis, Nonthesis
	Program Websites: http://www.cece.ucf.edu/graduate/	
	Graduate Program Handbook	

College of Engineering and Computer Science - Graduate Program Revision - Environmental Engineering MSEnvE▶

Program Description

The Master of Science in Environmental Engineering program was created for students who have an undergraduate degree in environmental engineering or any other closely related degree in engineering. Applicants are expected to be knowledgeable in topics including chemistry, process design, water resources, and air pollution. The program focuses on pollution control, pollution prevention, and the correction of pollution effects on natural and man-made environments.

The program is noted for its strong faculty research interests, and areas of study include drinking water treatment, wastewater treatment, solid and hazardous waste management, atmospheric pollution control and modeling, environmental water resources, and stormwater management. ~~The program's overall mission is to prepare students for careers in environmental engineering with consulting firms; with industry; within federal, state, and local governments; and/or in higher education.~~

The program's overall mission is to prepare students for Environmental Engineering careers in federal, state, and local governments; higher education; consulting; and industry. Other key objectives include:

- Producing graduates who have technical knowledge in critical areas of environmental engineering
- Providing a professional engineering education that challenges our graduates to think critically
- Forming and maintaining partnerships with industry, government agencies, and professional organizations
- Developing awareness of the changing environmental needs of society and the global environment.

This program has potential ties to professional licensure or certification in the field. For more information on how this program may prepare you in that regard, please visit https://apq.ucf.edu/licensure-programs/.

Curriculum

The Environmental Engineering MSEnvE program offers both thesis and nonthesis options with each requiring 30 credit hours of courses beyond the bachelor's degree. Prerequisites are required depending upon the discipline of a student's bachelor's degree. The thesis option is primarily for those who can devote a full-time effort to their research project and is required for all students supported by contracts and grants, as well as any student receiving department financial support. The nonthesis option is recommended strongly for part-time students and requires submission of an end-of-program portfolio as a requirement for graduation.

Total Credit Hours Required: 30 Credit Hours Minimum beyond the Bachelor's Degree

Students choosing the thesis option must take 12 credit hours of required credit hours of electives, and 6 thesis credit hours. Students choosing the nonthesis option must take 12 credit hours of required

courses, 18 credit hours of electives, and submit a portfolio (which includes a comprehensive final examination) before graduating.

Students develop an individualized program of study with a faculty adviser. At least 24 credit hours in the program of study must be earned exclusive of thesis and research courses and Directed Research (XXX 6918) is not permitted in the MSEnvE program of study.

Research studies or projects are required in one or more courses. The research study or project will focus on reviewing and analyzing contemporary research or engineering issues in a student's particular specialization within the profession in order to help students acquire knowledge and skills pertaining to best practices in that specialization area.

Prerequisites (Articulation)

The completion of prerequisite courses may be required before students can begin program course work. Please contact the program director to review your background and determine the prerequisites that you may need to take.

The following mathematics prerequisite requirement is for all students.

- Calculus through Differential Equations

The following prerequisites may be required for students with undergraduate degrees in Civil, Mechanical, or Chemical Engineering. Equivalent courses may be acceptable.

- ENV 3001 Introduction to Environmental Engineering **3 Credit Hours**
- STA 3032 Probability and Statistics for Engineers **4 Credit Hours**
- CWR 4202 Hydraulics **3 Credit Hours**
- ENV 4120 Air Pollution Control **3 Credit Hours**
- ENV 4531 Environmental Engineering Operations and Processes I **3 Credit Hours**

The following prerequisites may be required for students with undergraduate degrees in other Engineering disciplines.

- ENV 3001 Introduction to Environmental Engineering **3 Credit Hours**
- STA 3032 Probability and Statistics for Engineers **3 Credit Hours**
- CWR 4202 Hydraulics **3 Credit Hours**
- CWR 4120 Hydrology **3 Credit Hours**
- EES 4111C Biological Process Control ~~3~~ **4 Credit Hours**
- EES 4202C Chemical Process Control ~~3~~ **4 Credit Hours**
- ENV 4120 Air Pollution Control **3 Credit Hours**
- ENV 4531 Environmental Engineering and Processes I **3 Credit Hours**

Required Courses: 12 Credit Hours

All students are required to take the following two courses and then choose one course from each of the two groupings below.

> ENV 6015 Physical/Chemical Treatment Systems in Environmental Engineering
>
> ENV 6016 Biological Treatment Systems in Environmental Engineering
>
> [Right]   *

Waste Treatment/ Water Treatment/ Industrial Waste Treatment

> ENV 6558 Industrial Waste Treatment
>
> ENV 5410 Water Treatment
>
> EES 5318 Industrial Ecology

Water Resources

- Any CWR course at the 5000 or 6000 level **3 Credit Hours**

Note:

Courses with an asterisk (*) provide an independent learning experience for students, consisting of a research or design project. Nonthesis students are required to take at least one of the courses with an asterisk. This requirement is fulfilled in the required course <u>ENV 6016</u> above and is also fulfilled by the elective course <u>ENV 6126</u> Design of Air Pollution Controls* (3 credit hours) and the elective course <u>ENV 6106</u> Theory and Practice of Atmospheric Dispersion Modeling (3 credit hours).

Elective Courses: 12 Credit Hours

All students, both thesis and nonthesis, are required to take 12 credit hours of elective courses. Courses that comprise the elective part of the program are selected in accordance with the general requirements of the College of Engineering and Computer Science and often include courses taken from the following two sub-discipline areas:

- Environmental Specialization—Any of the appropriate ENV **or EES** graduate-level courses (5000 or 6000) with the consent of the student's adviser
- Water Resources Specialization—Any of the appropriate CWR graduate-level courses (5000 or 6000) with the consent of the student's adviser

Thesis Option: 6 Credit Hours

Thesis students are expected to complete an independent research project and then write and successfully defend their thesis.

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the Events Calendar and on the College of Graduate Studies website at least two weeks before the defense date.

- XXX 6971 - Thesis 6 Credit Hours

Nonthesis Option: 6 Credit Hours

Nonthesis students must take 6 more credit hours of electives in addition to the 12 credit hours of electives described above.

- Electives **6 Credit Hours**

Portfolio Requirement

Students are required to complete a culminating experience. The culminating experience for nonthesis MS students is submission of an end-of-program portfolio. The portfolio requirements are listed on the CECE website.

Equipment Fee

Students in the Environmental Engineering MSEnvE program pay a $16 equipment fee each semester that they are enrolled. Part-time students pay $8 per semester.

Independent Learning

A research or design project serves as the independent learning experience for thesis students. Nonthesis students are required to take at least one of the courses marked with an asterisk (*), denoting an independent learning experience, and submit an end-of-program portfolio.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

Admissions decisions are made on the basis of a complete online application only, and not on the basis of any pre-screening. Prospective applicants who are encouraged to apply to their intended graduate program based on the information provided for their pre-screening are not assured of admission or financial assistance when they submit a complete online application. Although it is possible, it is not likely, that prospective applicants who are discouraged from

~~formally applying to a graduate program at the pre-screening stage will be admitted if they elect to submit a complete online application anyway.~~

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Three letters of recommendation.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting applicants into their research programs.

The GRE is not required, however, taking the GRE is highly recommended for students wishing to pursue a thesis. In order to be considered for any fellowships, a GRE score is required.

Those applying to the programs without a directly related undergraduate degree should closely check the prerequisites. Students with nontechnical undergraduate degrees are recommended to complete a second undergraduate degree in Environmental Engineering before applying to graduate school.

Final articulation requirements will be determined by the department after students have been admitted and after discussions with their advisers.

Application Deadlines

Environmental Engineering MSEnvE	*Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 1	Dec 1	
International Applicants	Jan 15	Jan 15	Jul 1	
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Financials

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see the College of Graduate Studies Funding website, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and

do not have a work obligation. For more information, see UCF Graduate Fellowships, which includes descriptions of university fellowships and what you should do to be considered for a fellowship.

Contact Info

Graduate Program

Andrew Randall PhD PE

Professor

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Telephone: 407-823-6429

Engineering II, 211-L

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf. edu

Telephone: 407-823-5692

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

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Grad Fellowships

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Impact on Current Students

Will students be moved from an existing program, track, or certificate into this revised program, track, or certificate?* ○ Yes ● No

If yes, state the name of the program or track where students are currently enrolled and attach a list of students if possible:

Will students have the option to stay in their existing program, track, or certificate?* ● Yes ○ No

If yes, how will current students be

impacted by this change?	

Future Students

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.	

Year 1

Headcount:		SCHs:	

Year 2

Headcount:		SCHs:	

Year 3

Headcount:		SCHs:	

Indicate likely career or student outcomes upon completion:	

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:		Source of funds:	

Number of fellowship students (specify fellowship):	

Number of tuition remissions:		Source of funds:	

Year 2

Number of assistantship students	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Year 3

Number of assistantship students:	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List* ◯ Attached ◉ Not Applicable

Support from involved units that no duplication exists* ◯ Attached ◉ Not Applicable

Administration Use Only

Catalog Ownership: Department of Civil, Environmental, and Construction Engineering

Program OID 7758

Program Type Master

College of Engineering and Computer Science - Graduate Program Revision - Environmental Engineering PhD

z2020-2021 Graduate Program Revision/Reactivation

General Catalog Information

This form is to be used to REVISE graduate degree programs, tracks, or certificate programs. If there are tracks being revised or added to a program, one form must be submitted for EACH program and the track(s).

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Select *Program* below.

Program Type: * ◉ Program
⚪ Shared Core

Proposal Type: * Graduate Program Revision

Read before you begin

TURN ON help text before starting this proposal by clicking ⓘ in the top right corner of the heading.

IMPORT curriculum data from the Catalog by clicking ⬇ in the top left corner.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking ▶ in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after proposal is launched.**

College: * College of Engineering and Computer Science

Unit / Department / College: * Department of Civil, Environmental, and Construction Engineering

Unit(s) Housing Program:

Type of Action: * ☑ Program

☐ Track

☐ Certificate

IMPORT PROGRAM NOW! Please use the Import feature to import the program information from the Catalog by clicking ⬇ in the top left corner of the form.

Name of program, track and / or certificate:*	Environmental Engineering PhD

Are you revising the name of the program, track, or certificate?*	⚪ Yes ⦿ No

Proposed Effective Term / Year:*	Fall 2021

If you will be submitting other revision forms for tracks or course actions, please list them here:	

Is the CIP code being updated?	☐ Yes ✔ No

If yes, please provide the new CIP code:	

Rationale for revision:	Reason: Catalog Updates Remove from "PROGRAM DESCRIPTION": **The Environmental Engineering PhD program focuses on pollution control, pollution prevention, and the correction of pollution effects on natural and man-made environments preparing students for careers in enviromental engineering with consulting firms; with industry; within federal, state, and local governments; and/or in higher education.** REMOVE from "ELECTIVE COURSES": - ENV 6336 - SITE REMEDIATION AND HAZARDOUS WASTE TREATMENT - 3 CREDIT HOURS ADD to "ELECTIVE COURSES": - ENV 6616 - ECOLOGICAL ENGINEERING - RECEIVING WATER IMPACT - 3 CREDIT HOURS

Complete the remaining required fields and LAUNCH this proposal! Do not begin revisions until **after** launch. Program revisions before launch will not be tracked.

Informational Description Chart- this will import.*	College: <u>Engineering and Computer Science</u>	Degree: PhD
	Department: <u>Civil, Environmental, and Construction Engineering</u>	Option: Dissertation
	Program Websites: <u>http://www.cece.ucf.edu/graduate/</u>	
	<u>Graduate Program Handbook</u>	

Revise catalog copy here! After you revise courses, click on the Curriculum Schema button below to revise the catalog copy. Please note: this information is what will flow directly to the graduate catalog. Any attached documents to this proposal will not be used for catalog purposes.

Follow these steps to propose courses to the revised program curriculum:

Step 1

≡ There are two options for adding courses: "Add Course" and "Import Course." For courses already in the catalog, click on "Import Course" and find the courses needed. For new classes going through a Curriculog Approval Process click on "Add Course"-- a box will open asking you for the Prefix, Course Number and Course Title.

Step 2

Click on ≡ "View Curriculum Schema." Click on the area/header of the program where you would like to add courses. When you click on "Add Courses" it will bring up the list of courses available from Step 1. Select the courses you wish to add. For removing courses click on the ✗ and proceed.

College of Engineering and Computer Science - Graduate Program Revision - Environmental Engineering PhD

Program Description

~~The Environmental Engineering PhD program focuses on pollution control, pollution prevention, and the correction of pollution effects on natural and man-made environments preparing students for careers in environmental engineering with consulting firms; with industry; within federal, state, and local governments; and/or in higher education.~~

The Environmental Engineering PhD program focuses on pollution control, pollution prevention, and the correction of pollution effects on natural and man-made environments. The program is known for its strong faculty research interests. Areas of study include drinking water treatment, astute treatment, solid and hazardous waste management, atmospheric pollution control and modeling, environmental water resources, and stormwater management. The program's mission is to prepare students for careers in environmental engineering with consulting firms; with industry; within federal, state, and local governments; and/or in higher education.

The program offers an intensive, individually tailored research program suitable for the development of an academic or similar research-oriented career. Graduates of the program will have technical knowledge in critical areas of environmental engineering, critical thinking skills, formed and maintained partnerships with industry, government agencies, and professional organizations, and have developed an awareness of the changing environmental needs of society and the global environment.

This program has potential ties to professional licensure or certification in the field. For more information on how this program may prepare you in that regard, please visit https://apq.ucf.edu/licensure-programs/.

Curriculum

The Environmental Engineering PhD program is research oriented and requires a minimum of 72 credit hours beyond the bachelor's degree. Thirty of the 72 credit hours can be met with either a nonthesis or thesis MS in Environmental Engineering. This leaves 42 credit hours of which 18 credit hours must be Dissertation and a minimum of 15 credit hours must be formal course work. A maximum of 9 credit hours of Doctoral Research can be used in the doctoral program, which could be replaced by additional formal coursework.

For students not having an MS degree who directly enter the PhD program (BS to PhD), there will be a minimum of 45 credit hours formal coursework (i.e., 30 credit hours identical to the coursework for a nonthesis MS in Environmental Engineering plus a minimum of 15 credit hours course work past the MS). However, unlike MS students, BS to PhD students will be required to take only 4 of the 5 required courses from the nonthesis MS in Environmental Engineering requirements. In addition, these students can enroll for Doctoral Research credit hours during or after their first semester in the program. The 27 credit hours required in addition to the 45 credit hours coursework will be 18 credit hours in Dissertation Research, and a maximum of 9 credit hours in Doctoral Research. Up to 9 credit hours of Doctoral Research can be replaced by additional formal coursework subject to the approval of the PhD adviser and the advisory committee.

For both MS to PhD and BS to PhD students, the program of study must be developed with an advisory committee and meet with departmental approval at the beginning of the PhD program, at which time

transfer credit will be evaluated on a course-by-course basis.

Total Credit Hours Required: 72 Credit Hours Minimum beyond the Bachelor's Degree 42 Credit Hours Minimum beyond the Master's Degree

Required Courses: 12 Credit Hours

All students completing the PhD program must take one course each from 4 of the 5 technical areas listed below for a total of 12 credit hours.

Water Process Engineering

ENV 6015 Physical/Chemical Treatment Systems in Environmental Engineering

Wastewater Process Engineering

ENV 6016 Biological Treatment Systems in Environmental Engineering

Waste Treatment/Water Treatment/Industrial Treatment

ENV 6347 Hazardous Waste Incineration
ENV 6558 Industrial Waste Treatment
ENV 5410 Water Treatment
EES 5318 Industrial Ecology

Air Quality Modeling/Air Pollution Control

ENV 6106 Theory and Practice of Atmospheric Dispersion Modeling
ENV 6126 Design of Air Pollution Controls

Water Resources

[Before]   Any CWR course at the 5000 or 6000 level
3 Credit Hours

ENV 5636 Environmental and Water Resources Systems Analysis

ENV 6047 Environmental Informatics and Remote Sensing

Elective Courses: 42 Credit Hours

- To be approved by a faculty adviser and the graduate coordinator
- At least 27 credit hours of formal course work is required, exclusive of research and independent study. For students entering the program with a completed master's degree, at least 15 of the 27 credit hours (exclusive of independent study and research) must be taken at UCF after the master's program, from approved formal courses. For students entering the program without a master's degree in Environmental Engineering or a closely related discipline, at least 45 credit hours of formal course work are required.
- Doctoral Research (XXX 7919) - 9 credit hours maximum (more than 9 research credit hours can be taken, but only a maximum of 9 credit hours will be counted toward the program of study).
- Independent Study (XXX 6908) - 3 credit hours maximum
- No more than a total of 12 credit hours of doctoral research plus independent study will be included in a program of study.
- Directed Research (XXX 6918) is not permitted in a PhD program of Study.

Students can chose among the following courses with the consent of the academic adviser. Students that have no MS degree should complete the core courses for the MS degree in Environmental Engineering or Environmental Engineering Sciences. In addition, all elective courses will be 5000 or 6000 level courses.

In addition, elective courses can be chosen from any of the following disciplines:

Engineering: any 5000 or 6000 level course from any Engineering discipline. Typical electives come from Environmental Engineering (ENV courses), Water Resources Engineering (CWR courses), Civil Engineering, Construction Engineering, and Industrial Engineering.

Non-Engineering: Statistics, Molecular Biology, Microbiology, Biochemistry, Organic Chemistry, General or Inorganic Chemistry, Biology, Math, and Physics.

Suggested elective courses include:

ENV 6015 Physical/Chemical Treatment Systems in Environmental Engineering

ENV 6016 Biological Treatment Systems in Environmental Engineering

ENV 6347 Hazardous Waste Incineration

ENV 6558 Industrial Waste Treatment

ENV 5410 Water Treatment

EES 5318 Industrial Ecology

ENV 6106 Theory and Practice of Atmospheric Dispersion Modeling

ENV 6126 Design of Air Pollution Controls

ENV 5636 Environmental and Water Resources Systems Analysis

ENV 6047 Environmental Informatics and Remote Sensing

ENV 5505 Sludge Management Operations in Environmental Engineering

ENV 5517 Engineering Chemical and Biological Processes

ENV 6046 Membrane Mass Transfer

ENV 6030 Environmental Biotechnology

[After] ~~ENV 6336 Site Remediation and Hazardous Waste Treatment~~ **~~3 Credit Hours~~**

ENV 6515L Biological Unit Operations and Processes Laboratory
ENV 6519 Aquatic Chemical Processes
ENV 6616 Ecological Engineering and Receiving Water Impacts

Dissertation: 18 Credit Hours

- ENV 7980 **18 Credit Hours** minimum

Examinations

Students must pass three examinations. The first is the PhD qualifying examination. This examination must be taken within the first year of admission into the PhD program. It may be attempted no more than twice. In addition to the qualifying examination, students must pass the candidacy examination and the dissertation defense examination. The candidacy examination is normally taken near the end of the course work and consists of a written and oral presentation of a research proposal, and may include additional written or oral questioning by the committee. A copy of the written examination will be kept as part of the student's official record. The dissertation defense examination is an oral examination taken as defense of the written dissertation.

The College of Engineering and Computer Science requires that all dissertation defense announcements be approved by the student's adviser and posted on the college's website and on the College of Graduate Studies Events Calendar at least two weeks before the defense date.

Admission to Candidacy

The following are required to be admitted to candidacy and enroll in dissertation hours. Evidence of meeting these requirements must be received by the College of Graduate Studies by the day before the first day of classes for the semester in which a student wishes to enroll in dissertation hours.

- Completion of all but 6 hours, or less, of course work, except for dissertation hours.
- Successful completion of the candidacy examination.
- Successful defense of the written dissertation proposal.
- The dissertation advisory committee is formed, consisting of approved graduate faculty and graduate faculty scholars.
- Submittal of an approved program of study.

Equipment Fee

Full-time students in the Environmental Engineering PhD program pay $16 per semester for equipment used in the laboratories. Part-time students pay $8 per semester.

Independent Learning

The Independent Learning Requirement is met by successful completion of the student's candidacy and dissertation defense examinations.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirement, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- Official, competitive GRE score taken within the last five years.
- A bachelor's and/or master's degree in Environmental Engineering or a closely related discipline.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Three letters of recommendation.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Final articulation requirements will be determined by the department after students have been admitted and after discussions with their advisers.

Application Deadlines

Environmental Engineering PhD	*Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 1	Dec 1	
International Applicants	Jan 15	Jan 15	Jul 1	
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see the College of Graduate Studies Funding website, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

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Contact Info

Graduate Program

Andrew Randall PhD PE

Professor

andrew. randall@ucf. edu

Telephone: 407-823-6429

Engineering II, 211-L

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf. edu

Telephone: 407-823-5692

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

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PO Box 160112

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Institution Codes

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Impact on Current Students

Will students be moved from an existing program, track, or certificate into this revised program, track, or certificate? *

○ Yes ◉ No

If yes, state the name of the program or track where students are currently enrolled and attach a list of students if possible:

Will students have the option to stay in their existing

◉ Yes ○ No

their existing
program, track, or
certificate?*

If yes, how will
current students be
impacted by this
change?

Future Students

Provide a statement
of who is likely to
enroll and why.
Please state if there
is licensure or
certification that
depends upon this
education, etc.

Year 1

Headcount:

SCHs:

Year 2

Headcount:

SCHs:

Year 3

Headcount:

SCHs:

Indicate likely
career or student
outcomes upon
completion:

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of
assistantship
students:

Source of funds:

Number of
fellowship students
(specify fellowship):

| Number of tuition remissions: | | Source of funds: | |

Year 2

| Number of assistantship students | | Source of funds: | |

| Number of fellowship students (specify fellowship): | |

| Number of tuition remissions: | | Source of funds: | |

Year 3

| Number of assistantship students: | | Source of funds: | |

| Number of fellowship students (specify fellowship): | |

| Number of tuition remissions: | | Source of funds: | |

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking ▣ in the top right corner of the form.

| Faculty List* | ○ Attached ● Not Applicable |

| Support from involved units that no duplication exists* | ○ Attached ● Not Applicable |

Administration Use Only

| Catalog Ownership: | Department of Civil, Environmental, and Construction Engineering |

| **Program OID** | 7732 |

| **Program Type** | Doctoral |

| **Degree Type** | Doctor of Philosophy |

| **Status*** | ⦿ Active-Visible ◯ Inactive-Hidden |