

CGN 4806: Special Problems in Civil Engineering
“Transportation Water Materials Design”

Required Capstone Course for Hydrology & Water Resources and Transportation Tracks
Elective Capstone Course for General CE Track

1. Catalog Description
Selected problems or projects in the student’s major field of engineering study.
Credits: 3 for “Transportation Water Materials Design” Capstone course.
2. Prerequisite
Recommendation of undergraduate coordinator.
3. Course Objectives
Expose students to the business of engineering design by participating on multidisciplinary teams in an actual design project with as realistic conditions as can be created in the classroom. This course is intended to be the pinnacle or capstone of the college career of the student, incorporating material learned in all the courses taken to date, using the science and engineering fundamentals learned, along with the ability to communicate clearly about what is being done in solving a design problem. At this stage, the student should be able to perform the assigned design project in this class with little or no technical instruction.
4. Contribution of Course to Meeting the Professional Component (ABET only)
This course contributes to the design of systems and components to meet desired needs, functioning on multi-disciplinary teams, and communicating effectively through written proposals and reports and verbally through formal public presentations, while supporting the College’s education objectives.
5. Relationship of Course to Program Outcomes (ABET only)
 - a) 10% - Apply knowledge of mathematics, science, and engineering
 - c) 25% - Design systems and components to meet desired needs
 - d) 30% - Function on multi-disciplinary teams
 - g) 25% - Communicate effectively
 - k) 10% - Use state-of-the-art problem-solving tools and techniques
6. Instructor
Shirish Bhat
Office Location: TBD
E-mail: sbhat@ufl.edu
Office hours: Mon 11:00 am – 1:00 pm (group meetings on Teams); Weekdays after hours (appointments)
7. Meeting Times
Mon; Periods 8, 9, and 10 (3:00 pm - 6:00 pm)
8. Class/Laboratory Schedule
One 150-minute session per week
9. Meeting Location
Weil Hall 0238 (Instruction)
10. Material and Supply Fees
N/A

11. Course Outline

Multidisciplinary design project

Phase I: Proposal Writing (20%)

- Request for Proposal (RFP) and Scope of Services
- Proposal writing
- Sustainability approaches to Transportation-Water-Materials Design
- Project scheduling
- Proposal presentations

Phase II: Project Development & Environment (25%)

- Field investigation
- Conceptual project development from Scope of Services
 - a. Roadway analysis
 - b. Pond siting analysis
 - c. Traffic analysis
- PD&E presentations

Phase III: Preliminary Design (50%)

- Multilane highway segment analysis and traffic signalization
- Pavement design
- Culvert and ditch design
- Stormwater management system design
- Roadway conceptual plans preparation
- Engineering reports submissions
- Preliminary design presentations

Team Participation (5%)

12. Textbook and Software

No textbook is required. Following is a partial list of reference materials that are available for free. Other references will be recommended and/or provided as deemed necessary.

Florida Department of Transportation Design Manual (FDM)

<http://www.fdot.gov/roadway/FDM/>

Florida Department of Transportation Standard Plans for Road Construction

<http://www.fdot.gov/design/standardplans/>

Florida Department of Transportation Standard Specifications for Road and Bridge Construction (Divisions II & III), Special Provisions and Supplemental Specifications

<http://www.fdot.gov/programmanagement/default.shtm>

Florida Department of Transportation Drainage Manual

<http://www.fdot.gov/roadway/Drainage/ManualsandHandbooks.shtm>

Florida Department of Transportation Drainage Design Guide

<https://www.fdot.gov/roadway/Drainage/Manualsandhandbooks.shtm>

Florida Department of Transportation Manual on Uniform Traffic Studies (MUTS)

<https://www.fdot.gov/traffic/TrafficServices/Studies/MUTS/MUTS.shtm>

Florida Department of Transportation Utility Accommodation Manual

<https://www.fdot.gov/programmanagement/utilities/default.shtm>

Florida Department of Transportation Computer Aided Design and Drafting (CADD) Manual

<http://www.fdot.gov/cadd/downloads/publications/CADDManual/default.shtm>

Manual on Uniform Traffic Control Devices (MUTCD) - 2009

<http://mutcd.fhwa.dot.gov/>

Florida Department of Transportation Flexible Pavement Design Manual

<http://www.fdot.gov/roadway/PM/publicationS.shtm>

Florida Department of Transportation Traffic Engineering Manual

<http://www.fdot.gov/traffic/TrafficServices/Studies/TEM/tem.shtm>

Federal Highway Administration Hydraulic Engineering Circular Number 18 (HEC 18).

http://www.fhwa.dot.gov/engineering/hydraulics/library_arc.cfm?pub_number=17

Florida Department of Transportation Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways

<http://www.fdot.gov/roadway/FloridaGreenbook/FGB.shtm>

Florida Department of Transportation Project Development and Environment Manual, Parts 1 and 2

<http://www.fdot.gov/environment/pubs/pdeman/pdeman1.shtm>

13. Course Management

Access to all the class materials is managed through Canvas - E-Learning @ UF. Students are required to submit their assignments and design reports in Canvas.

14. Class Schedule

Week #	Date	Activity
1	1/10/2022	Class begin, course and project overview
2	1/17/2022	MLK Jr. Day – no class
3	1/24/2022	Public communication & practice, sustainability basics
4	1/31/2022	Proposal writing
5	2/7/2022	Phase I presentations
6	2/14/2022	PD&E development
7	2/21/2022	PD&E development
8	2/28/2022	Phase II presentations
9	3/7/2022	Spring Break – no class
10	3/14/2022	Multilane highway segment analysis and traffic signalization
11	3/21/2022	Pavement design, drainage analysis
12	3/28/2022	Culvert and ditch design
13	4/4/2022	Stormwater management facility design
14	4/11/2022	Roadway conceptual plan preparation
15	4/18/2022	Phase III presentations
16	4/20/2022	Class end – no class

15. Attendance and Expectations

Because of the limited number of class meetings and the multi-disciplinary team nature of this course, each student is expected to attend every class, and effectively use the class time to identify, assign and coordinate work assignments and effort among the team members.

16. Grading (Methods of Evaluation)

There are no examinations for this class. For each phase of an assigned project, each group will receive a numeric grade (maximum of 100) for the written submittal and the presentation. After each phase submission and presentation, each manager is required to submit a team participation report for her or his group. It should reflect the percent contribution each team member made toward the submission, with all

percentages totaling 100%. At the end of the semester, each student will be asked to summarize the performance of their team members over the semester by completing an optional peer review. Everyone's final numeric grade will be calculated from the group numeric grades received from the instructor and individual numeric grades received from managers and peer reviews. The relative weights of the individual numeric grades include: (a) Phase I - Proposal Writing (20%), (b) Phase II - Project Development and Environment (25%), (c) Phase III - Preliminary Design (50%), and Team Participation (5%). The total marks for team participation will be distributed based on your involvement in team participation, group discussion, and class attendance. Involving in these activities is highly encouraged. Finally, these numeric grades will be translated to letter grades.

17. Grading Scheme

Final Average Numeric Grade	Letter Grade
94 – 100	A
90 – 94	A-
87 – 90	B+
84 – 87	B
80 – 84	B-
77 – 80	C+
74 – 77	C
70 – 74	C-
67 – 70	D+
64 – 67	D
61 – 64	D-
Less than 61	E

Information on current UF grading policies for assigning grade points may be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx#grades>.

18. Late Submission Policy

Any presentation that is not presented on the scheduled date will receive a zero. Late reports will lose 5 points for each day late. You can no longer be able to submit reports after two days, and you will receive a zero.

19. Honesty Policy

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

Information on current UF's Student Conduct and Honor Code may be found at: <https://www.dso.ufl.edu/%20sccr/process/student-conduct-honor-code> and the ASCE Code of Ethics may be found at: <http://www.asce.org/code-of-ethics/>

20. Accommodation for Students with Disabilities

Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

21. UF Counseling Services

Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
- SHCC Mental Health, Student Health Care Center, 392-1171, Personal and Counseling.
- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392 1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

22. Software Use

University of Florida faculty, staff and students are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

23. Course Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens. They can complete evaluations through the email they receive from GatorEvals in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

24. Diversity and Inclusion

The Herbert Wertheim College of Engineering (HWCOE) values a diverse and inclusive community. It is integral to success in every area of our college. Therefore, the College is committed to non-discrimination with respect to all areas of human differences, including but not limited to national and ethnic origin, race, age, sex, sexual orientation, gender identity and expression, beliefs and opinions, religion, and faiths, culture, socio-economic background, level of physical or mental ability, and veteran's status. This commitment applies in all areas-to students, faculty, and staff and intends to reflect the College's belief that educational and employment decisions and access to university activities should be based on an individual's abilities and qualifications.

The HWCOE values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. We aspire to educate students to become future leaders capable of creating diverse and inclusive work cultures wherever their careers may take them.