Class: CGN 4800 – Senior Design I
Semester:
Section:
Time:
Room:
Office Hours:

Instructor:
Telephone:
FAX:
E-mail:
Office:
Prepared by:

Textbook: No required textbook

Reference Texts:

Practical Concepts for Capstone Engineering, Frederick Bloetscher and Daniel Meeroff, J. Ross Publishing, 2015

"Code of Ethics for Engineers", *National Society of Professional Engineers (NSPE)*, July 2019, www.nspe.org/resources/ethics/code-ethics.

"Code of Ethics", *American Society of Civil Engineers (ASCE)*, www.asce.org/code-of-ethics/.

Investigation of March 15, 2018 Pedestrian Bridge Collapse at Florida International University, Miami FL. U.S. Department of Labor, Occupational Safety and Health Administration, Directorate of Construction, 2019.

Prerequisites: Student should be classified as a Senior (Upper-division) in the Civil Engineering Degree Program. This course shall be taken one semester prior to CGN 4802 and one semester prior to graduation; **Co- or prerequisite:** CEG2202L Introduction to Geomatics Engineering Laboratory; **NOTE: Students who do not satisfy the pre- and co-requisites for this course may be dropped from the course at any time during the semester with no refund of fees**.

Course Catalog Description: 3 credit hour. This course covers issues relevant to professional engineering practice, including codes of ethics, licensure and life-long learning. Oral/written communications and group collaboration are emphasized as inter-disciplinary teams work to prepare and present formal pre-design and schematic design documents addressing engineering challenges posed by the senior design project completed in CGN 4802 Senior Design II.

Course Topics and Tentative Class Schedule (Subject to Change):

Date	Course Topic or Activity (Student Presentations in Boldface)	Assignment	Due Date
Week 1	Syllabus Review / Resume Workshop	Develop/Revise Resume	Week 2
Week 2	Oral Presentation Skills / **Elevator Speeches**		

Week 3	Procurement of Engineering Services / Getting the Design Contract	Oral Presentation #1 & Project Concept Report	Week 9
Week 4	Project Presentations from Industry Mentors / Project Presentations from Industry Mentors		
Week 5	Form Project Teams / Technical Writing and High Impact Presentations	Industry Mentor Meeting	Week 6
Week 6	Ethics / Professional Codes of Conduct & Case Studies	Ethics Case Study	Week 7
Week 7	Site Assessment and GIS / Site Grading and ADA	Mini-Project: Site Assessment Report	Week 8
Week 8	Permitting / Hydrology	Revise Ethics Case Study	Week 10
Week 9	**Oral Presentation #1: Short-List Presentation**	Oral Presentation #2 & Final Project Concept Report	Week 15
Week 10	Permitting / Hydrology	Mini-Project: Site Hydrology Report	Week 11
Week 11	Guest Lecture: FBPE / Supervised Group Work	Revise Schematic Design Report Lecture Summary	Week 12
Week 12	Guest Lecture: Graduate School / Supervised Group Work	Lecture Summary	Week 13
Week 13	Guest Panel: Engineer Careers / Supervised Group Work	Five / Ten-Year Plan	Week 14
Week 14	Supervised Group Work / Supervised Group Work		
Week 15	**Oral Presentation #2: Schematic Design Presentation**		
Exam Week	Attend CGN 4802 Final Design Presentations	Mandatory Attendance	

Course Learning Outcomes:

At the end of this course, you should be able to:	**Assessed by:**	**Related Student Learning Outcomes**
1. Ascertain the root cause of engineering failures and recognize ethical dilemmas in civil engineering practice using NSPE and/or ASCE Code of Ethics.	Case study	4a, 4b, 4c

2. Describe the need to attempt the Fundamentals of Engineering Examination while still in college.	Five/ten year plan	4b
3. Work effectively as a valued team member.	Group project team feedback	5a, 5b, 5c
4. Display an understanding of project procurement, planning, and execution.	Short-list presentation	4b
5. Develop and evaluate design alternatives using visual site observations, GIS, software tools, current design codes and standards.	Mini-projects, schematic design report	2b, 2c, 2d, 7a, 7b
6. Convey information orally through formal and informal presentations with or without visual aids.	Elevator speech, oral presentations 1 & 2	3b, 3c
7. Present results using clear and well-organized writing.	Written reports	3a, 3d
8. Explain importance of lifelong learning and continuing education.	Five/ten year plan	7a
9. Explore effect of societal, economic, and environmental factors on engineering projects, and vice versa.	Oral presentation 1 & 2, schematic design report	2b, 2c, 2d
10. Convey ideas clearly, coherently, and effectively for a particular purpose, occasion, or audience representative as appropriate for the field.	Written reports	3a, 3c, 3d

Student Leaning Outcomes relevant to this course (i.e., what do those letters and numbers in the third column of the last table mean):

By graduation, you should have:	**More specifically:**
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental and economic factors.	b. Identify the global, cultural and social impacts of engineering designs. c. Evaluate the economic impact of engineering designs. d. Explain the environmental impact of engineering designs.
3. An ability to communicate effectively with a range of audiences.	a. Write a technical document that is clear, concise, and well organized and that presents background, methodology, results, analysis, and or recommendations.

	b. Plan, prepare, and deliver an oral presentation that is well organized, clear, and appropriate for the target audience. c. Use visual aids and graphics that are easy to read, appropriate, and clear. d. Submit work with minimal errors in spelling, punctuation, grammar, and usage.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	a. Demonstrate knowledge of professional ethics and/or responsibilities. b. Apply codes of ethics to make informed decisions and/or judgments about engineering dilemmas. c. Identify the global, economic, environmental, and/or societal impacts of situations or events.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	a. Contribute individual skills and knowledge to meet team objectives. b. Demonstrate leadership by setting goals, and planning tasks, and completing them in a timely manner. c. Give and receive constructive feedback with team members in a collaborative and inclusive environment.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	a. Retrieve and apply relevant and current literature, codes, and/or standards.

Professional Component of the Course: The course will teach students the importance of behaving ethically in engineering practice and the dire consequences that can result if codes of ethical behavior are ignored. Students will also learn the importance of licensure and continuing education. Professional practice issues, including procurement of work and interaction between design and construction professionals, will be covered.

Grading:

- **Oral presentations: 30%**
  - Elevator speech: 5%
  - Project presentation 1 (short-list presentation): 10%
  - Project presentation 2 (schematic design presentation): 15%

- **Written reports/homework assignments: 50%**
  - Professional ethics case study: 10%
    - Submit first draft: 5%
    - Revise and resubmit: 5%
  - Mini-Projects: 10%
    - Site assessment report: 5%

    - Site hydrology report: 5%
  - Project proposal: 30%
    - Pre-Design Report (concept paper): 15%
    - Schematic Design Report (final paper): 15%
- **In-class assignments/participation/attendance/lecture summaries: 20%**

Grading Rubric: Maximum guaranteed cutoffs for letter grades: A = 89.5% and above, B = 79.5-89.4%, C = 69.5-79.4%, D = 59.5-69.4%, F = 59.4% and below. At instructor's discretion, cutoffs may be adjusted downward to achieve a consistent mapping of number grades to letter grades. Do not count on adjustments of more than 1-2 points.

Liberal Studies Competencies: This course has been approved to meet several liberal studies competencies. The Liberal Studies curriculum at Florida State University is designed to insure that all students develop a range of abilities and habits of thinking that reflect FSU's mission, which "strives to instill the strength, skill, and character essential for lifelong learning, personal responsibility, and sustained achievement within a community that fosters free inquiry and embraces diversity." The Liberal Studies curriculum is structured so that students can become competent in broad substantive areas through a variety of departments and types of courses.

See below for details on competency area certifications applicable to this course.

Oral Communications Competency (OCC) Requirement: CGN 4800 has been approved to partially fulfill FSU's Oral Communications Competency Requirement (in conjunction with CGN 4802 Senior Design Project). In order to fulfill FSU's Oral Communication Competency Requirement, the student must earn a "C" or better in the course, and in order to receive a "C" or better in the course, the student must earn at least a "C-" on the oral communication competency component of the course. If the student does not earn a "C-" or better on the oral communication competency component of the course, the student will not earn an overall grade of "C" or better in the course, no matter how well the student performs in the remaining portion of the course.

The following competency has been established for the Oral Communications Competency Requirement: Students (will) become flexible and proficient oral communicators for professional purposes. By the end of the course, students will:

1) Deliver original oral messages for a specific purpose, occasion, and type of audience.
2) Make effective use of both verbal and non-verbal delivery in presentations.

Upper Division Writing (UDW) Requirement: CGN 4800 has been approved as meeting the Liberal Studies requirements for Upper-Division Writing and thus is designed to help you become a flexible and proficient writer for professional purposes. In this course, you will compose as a process, including drafts, revision, and editing. The writing cultivated by this process conforms to FSU's definition of "college-level writing," which is writing that:

1) Presents a clearly defined central idea or thesis;
2) Provides adequate support for that idea;
3) Is organized clearly and logically;

4) Is presented in a format appropriate to the purpose, occasion, and audience; and
5) Utilizes the conventions of a standard language.

As such, this course requires the completion of two or more substantial writing assignments or the equivalent. Instructors will provide criteria for evaluating your performance on writing, feedback on your writing (including instructor response), and opportunities for revision.

In order to fulfill FSU's Upper-Division Writing requirement, the student must earn a "C" or higher in the course, and earn at least a "C" average on the required writing assignments. If the student does not earn a "C" average or higher on the required writing assignments, the student will not earn an overall grade of "C" or higher in the course, no matter how well the student performs in the remaining portion of the course. In keeping with FSU's Upper-Division Writing requirement, at least one written submission must be revised based on the feedback provided and resubmitted. The resubmitted assignment will be regraded, and that grade will be incorporated into the score for that assignment. Students will be notified which writing assignment(s) must be revised and resubmitted.

The following competency has been established for the Upper Division Writing requirement: Students (will) become flexible and proficient writers for professional purposes. By the end of the course, students will:

1) Use appropriate evidence from multiple sources to illustrate how a chosen topic is relevant to a particular field.
2) Convey ideas clearly, coherently, and effectively for a particular purpose, occasion, or audience as appropriate for the field.

Scholarship in Practice (SIP) Requirement: CGN 4800 has been approved as meeting the Liberal Studies requirements for Scholarship-in-Practice and thus is designed to help you become a critical thinker, a creative user of knowledge, and an independent learner. In order to fulfill FSU's Scholarship-in-Practice requirement, the student must earn a "C-" or higher in the course.

The following competency has been established for the Scholarship in Practice requirement: Students (will) become critical thinkers, creative users of knowledge, and independent learners. By the end of the course, students will:

1) Apply relevant areas of scholarship to produce an original project.

Student Responsibilities

- Students should log on to Canvas at least every other day to check for course updates.
- Students are expected to keep up with the class, engage with the course material, and submit assignments by due dates.
- Assignments, quizzes, and exams are expected to be products of individual students per the Academic Honor Policy of the student's home university. Students should not discuss any of the questions with each other before or during the actual assignments, activities, quizzes, or exams without instructor approval.
- To receive maximum points for questions, students need to follow the instructions carefully, follow word limits as instructed, and use spell and grammar checking.
- To be successful in this course, students need to complete all required assignments and tests.

Grading Policy

Students are required to earn a "C" or better in all engineering courses that apply toward the degree. In extenuating circumstances, a maximum of one "D" may be waived. The waiver, however, shall not be applied to Senior Design.

The department has a policy of not giving pluses or minuses with final course grades.

Incompletes (I grades) are intended for students who are passing but have not completed the coursework due to extreme circumstances. They will not be given as a matter of course to those failing at the semester's end.

Proctored Exams

Students needing academic accommodations may register to take exams at the available off-site testing centers. FAMU students should register with Center for Disability Access and Resources (CEDAR) and FSU students should register with the Student Disability Resource Center (SDRC). Refer to syllabus section on American's with Disabilities Act for additional information. Please notify the instructor, at least one week in advance of the scheduled exam date, of your desire to take the exam or quiz at the testing center so proper testing arrangements can be made.

Technology Requirements

Course content is accessible through Canvas. Students may need to be able to view videos, write and upload assignments, post to discussion boards, and take assessments via Canvas. Students should have access to high-speed internet and updated software. Mobile devices may be used to view course content, upload assignments, and take assessments as determined by the instructor.

Canvas Support

Need help with Canvas? Your first point of contact is College Computing Services at Engineering.

Phone: (850) 410-6446
Location: Engineering Building A, Suite A332
Hours: 8am to 5pm, Monday - Friday

To Submit a Request online, visit the CCS WorkQueue

Course Policies

Communications/Netiquette

For Discussions:

- Please use polite, respectful behavior when posting your responses to prompts in the Discussion Boards.
- Be mindful of how you express your emotions and humor, and be sensitive to cultural and ability differences of your online peers.
- Keep postings to the point, and make sure your comments are relevant to the topic of discussion.

- Avoid messages such as, "Wow," "Way to go," or "Ditto" and aim for comments that validate other members' ideas through careful explanation of why.
- When replying, give a short description in the subject line of what you are replying to, and use correct punctuation and spelling throughout your post.

For Email Communication:

- For email, please respond to your instructor's and peers' messages within a 24-hour period.
- Use a brief description in the subject line that outlines the topic of discussion.
- Avoid using slang or profane words.
- Use your instructor's correct title he or she prefers for communication.
- Avoid using emoticons, such as smiley faces, and maintain a professional demeanor.
- Sign your email messages using your full name.
- AVOID USING ALL CAPS. This makes the message visually difficult to read and is perceived by the reader as "shouting."
- Use correct spelling, grammar, and punctuation, just as you would for any communication.
- Ask yourself whether you would be comfortable if someone other than the intended receiver were to read your message. Remember, email is not a completely secure form of communication.
- Refrain from "flaming," which is expressing a strongly held opinion without tact or regard for others. Don't assume that recipients will know the intent of the message (e.g., "just kidding"). It reads differently when it's in print (electronic or not).
- Report any inappropriate communication considered to be of a serious nature to your instructor, as it may be a violation of University policy.
- Treat others with respect by making messages clear and succinct.

Participation & Lateness Policy

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Policy for Missed Tests

Make-up exams (Presentations) will only be allowed in cases of extreme emergency, if approved in advance, or in cases of illness, if a note from a health care professional is provided. Documentation must be provided with all requests. No exceptions.

Because of the difficulty in creating makeup exams (presentations) that are neither easier nor harder than, longer nor shorter than, too similar to, or too different from the original exam, and because of the importance of ensuring that all students are being graded using substantially the same instruments, **only one makeup exam will be permitted per course. A second missed exam will result in a grade of zero for the missed exam.**

Policy for Homework

Complete all assignments. All paper submissions are due by the beginning of class, one week from the assignment date, unless instructed otherwise. Online submissions are due at the time and date indicated on CANVAS. Late homework will be accepted for one week, with a 20% reduction in credit per day. Prior to submitting homework, consider making a copy of your homework for your records.

Policy on Responding to Students

- Email responses typically within 24 to 48 hours.
- Graded assignments typically returned within 2 weeks after due date.

Institutional Policies & Procedures

UNIVERSITY ATTENDANCE POLICY

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

ACADEMIC HONOR POLICY

Students are expected to uphold the University Student Code of Conduct and/or University Academic Honor Code.

The Florida A&M University (FAMU) is committed to academic honesty and its core values which include scholarship, excellence, accountability, integrity, fairness, respect, and ethics. These core values are integrated into its academic honesty policy. Being unaware of the Academic Honesty Policy is not a defense to violations of academic honesty. Academic Honesty Policy violations shall be reported and appropriate actions taken by the Department Chair and administration: https://www.famu.edu/BOT/Academic%20Honesty%20Policy%207.27.17.pdf

The Florida State University (FSU) Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at http://fda.fsu.edu/Academics/Academic-Honor-Policy

AMERICANS WITH DISABILITIES ACT

For FAMU Students:

Students with disabilities needing academic accommodation should (1) register with and provide documentation to the Center for Disability Access and Resources (CEDAR) and (2) bring a letter to the instructor indicating the need for accommodation and what type. Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from CEDAR has been provided. This syllabus and other class materials are available in alternative format upon request. For more information about services available to FAMU students with disabilities, contact the:

Center for Disability Access and Resources (CEDAR)
667 Ardelia Court, Tallahassee, FL 32307

Email: CEDAR@famu.edu
Phone: (850) 599-3180
Fax: (850) 561-2513
TDD: (850) 561-2783

For FSU Students:

Students with disabilities needing academic accommodation should (1) register with and provide documentation to the Student Disability Resource Center and (2) bring a letter to the instructor indicating the need for accommodation and what type. Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from the Student Disability Resource Center has been provided. This syllabus and other class materials are available in alternative format upon request. For more information about services available to FSU students with disabilities, contact:

Student Disability Resource Center (*Tallahassee Campus*)
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
Email: sdrc@admin.fsu.edu

Students Disability Resource Center (*Panama City Campus*)
Dr. Kimberly Leath
Office of Student Affairs
2nd Floor Barron Building (Room 215)
Email: kleath@fsu.edu or sds@pc.fsu.edu
(850) 770-2172 (office)
(866) 693-7872 (toll free)

UNIVERSITY'S NON-DISCRIMINATION POLICY STATEMENT

FAMU:
http://www.famu.edu/index.cfm?EOP&NON-DISCRIMINATIONPOLICYSTATEMENT

FSU:
http://www.hr.fsu.edu/PDF/Publications/diversity/EEO_Statement.pdf

SYLLABUS CHANGE POLICY

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advanced notice.

A NOTE ON SEXUAL MISCONDUCT

FAMU and FSU are committed to fostering a safe, productive learning environment. Title IX and school policy prohibits discrimination on the basis of sex. Sexual misconduct — including harassment, domestic and dating violence, sexual assault, and stalking — is also prohibited.

The universities encourage anyone experiencing sexual misconduct to talk to someone about what happened, so they can get the support they need and the university can respond appropriately.

If you wish to speak confidentially about an incident of sexual misconduct, want more information about filing a report, or have questions about university policies and procedures, please contact the Title IX Coordinator: ***Carrie Gavin*** *(850) 599-3076 http://www.famu.edu/EOP or* ***Mandy Hambleton*** *(850) 644-6271 http://knowmore.fsu.edu/title-ix/title-ix-signed-statement/.*

The universities are legally obligated to investigate reports of sexual misconduct, and therefore it cannot guarantee the confidentiality of a report, but it will consider a request for confidentiality and respect it to the extent possible.

As a teacher, I am also required by the universities to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident.

Confidential University Representatives are available to provide assistance and resources, without any obligation to report allegations of Sex Discrimination and Sexual Misconduct to the Title IX Director, designee, or any law enforcement agency. Confidential University Representatives include the following individuals when providing medical care, advice, and/or counseling when acting in their primary professional responsibility:

i. Licensed University and medical, University Health Services

FAMU: 850-599-3777, famu.edu/shs/

FSU: 850-644-6230 http://uhs.fsu.edu/, and mental health providers,

FAMU Office of Counseling Services: (850) 599-3145, http://www.famu.edu/counseling

FSU Counseling Center: 850-644-TALK (8255), https://counseling.fsu.edu/ ;

ii. Designated University paid and unpaid staff working under the supervision of a licensed medical or mental health provider;

iii. University Victim Advocates

FAMU: (850) 599-3145 http://www.famu.edu/index.cfm?Counseling&VictimAdvocateProgram

FSU: (850) 644-7161, or for nights/weekends (850) 644-1234, ask for advocate on call, https://dos.fsu.edu/vap/ ;

iv. Designated University paid and unpaid staff working under the supervision of the University Victim Advocate Program;

v. Pastoral counselors affiliated with the University; and

vi. Designated University paid and unpaid staff working under the supervision of Pastoral counselors affiliated with the University.

CGN 4800: Senior Design I
Ethics Assignment

Background: Personal, professional, and business ethics are important to the successful practice of engineering. Professional organizations, including the National Society of Professional Engineers and the American Society of Professional Engineers produce codes/canons of ethics defining ethical behavior. Engineers can draw upon these resources to decide how to proceed in various situations.

Assignment: Read *Investigation of March 15, 2018 Pedestrian Bridge Collapse at Florida International University, Miami, FL* prepared by the U.S. Occupational Safety and Health Administration.

This case involves multiple engineering companies and engineers. You may focus on either the engineering design firm and engineer of record (EOR) **or** on the construction engineering inspection (CEI) firm/engineers, peer review firm/engineers, and FDOT/engineers. For the purposes of this assignment, you are a member of the Board of Ethical Review for NSPE and must prepare the written case study for this case. You will look at the actions of each of the chosen companies and engineers and decide whether or not they acted in an ethical manner in accordance with the NSPE Code of Ethics. You will then provide guidelines for correcting the actions that were taken.

Your case study (750 – 1000 words) should include the following:

- **Facts** - Provide a summary of the facts in the case.
- **Question(s)** – Choose one or more ethical questions that must be answered in the case.
- **NSPE Code of Ethics References** – List references from the NSPE Canon of Ethics that apply to the case.
- **NSPE BER Case References -** Read the canons carefully. Visit nspe.org/resources/ethics/code-ethics and find cases that discuss two or more of the canons you believe have been violated. Use these additional cases to support your discussion and include them in the reference section.
- **Discussion** – Discuss how the references listed should be applied to the case. Discuss the ethical constraints of the case. Support your discussion by providing examples of both ethical and unethical behaviors. Explain whether or not the engineer's actions are consistent with the NSPE Code of Ethics. If you believe the actions are not consistent with the Code of Ethics provide guidelines for correcting the actions that were taken. Discuss the effect of societal, economic, and/or environmental factors. What role did these factors have in the failure of the bridge and conversely what role did the actions or inactions of the engineering companies and engineers have in terms of economic impacts and impacts on society.
- **Conclusion** – Answer the ethical question(s) posed by the case.
- **References** – Provide full citations for the NSPE Canon of Ethics and NSPE cases used in preparing your discussion using MLA, IEEE, APA or other consistent style.

Important: All identifying information should be omitted when preparing the written case study. For example, Pedestrian Bridge Collapse at FIU should simply be referred to as pedestrian bridge collapse. Engineers and companies should be referred to as Engineer X, Y, Z and Company A, B, C, etc. Examples of NSPE case studies are available at nspe.org/resources/ethics/code-ethics.

Submission: Before midnight on the due date, submit your assignment using TurnItIn.com. Double space each page and provide the word count (not including the title/header or references). See the Assignments link on the class website for additional instructions and due date.

Grading: The project is an individual project. Please work independently and provide proper references for all sources cited. Twenty percent of your grade will be based on each of the five student outcomes addressed by the assignment (see Page 2). Points will be deducted if basic requirements (number of words, citations/references provided, etc.) are not met.

Course Outcomes addressed by this assignment	Related Student Learning Outcomes
1. Ascertain the root causes of engineering failures and recognize ethical dilemmas in civil engineering practice using NSPE and/or ASCE Code of Ethics.	4a, 4b
7. Present results of case studies using clear and well-organized writing with minimal errors in spelling, punctuation, grammar, and usage.	3a,3d
9. Explore effect of societal, economic, and environmental factors on engineering projects, and vice versa.	4c

Student Outcomes addressed by this assignment	1=Unsatisfactory (0 points)	2=Developing (8 points)	3=Satisfactory (16 points)	4=Exemplary (20 points)
3a. Write a technical document that is clear, concise and well organized.	Poor readability; either very wordy or overly simplistic; no logical order; no central idea and few details	Significant issues with readability, wordiness and/or tone; significant issues with logic and organization; lacking in detail	Mostly clear and concise; appropriate vocabulary and tone; fairly logical order; central idea supported with some details	Clear and concise; excellent vocabulary and tone; content presented in logical order; central idea supported with numerous details
3d. Submit work with minimal errors in spelling, punctuation, grammar, and usage.	Numerous errors in spelling, punctuation, grammar, and usage, affecting readability of report	Numerous errors in spelling, punctuation, grammar, or usage, not affecting readability	Few errors in some areas, not affecting readability	Very few, minor errors in spelling, punctuation, grammar, and usage
4a. Demonstrate knowledge of professional ethics and/or responsibilities	Mentions ethics codes without citing specific canons	References one or more canons with no discussion; incorrect references	Correctly references one or more canons with brief discussion of relevance, impact	Correctly references one or more canons with detailed discussion of relevance, impact
4b. Apply codes of ethics to make informed decisions and/or judgements about engineering dilemmas	No use of available case studies to support discussion	Limited use of available case studies (one case) to support discussion	Basic use of available case studies (two cases) to support discussion	Detailed use of available case studies (three or more cases) to support discussion
4c. Identify the global, economic, environmental, and/or societal impacts of situations or events	No explanation of impact of ethical violations	Limited explanation of one impact of ethical violations	Some explanation of a few impacts of ethical violations	Detailed explanation of multiple impacts of ethical violations

CGN 4800 Senior Design I

Pre-Design Report (Concept Paper) and Short-List Presentation

Objective: Create a plan for completing the Senior Design Project and present it to the class orally and in writing.

Assignment: Choose a project to be completed during CGN 4800 Senior Design I and CGN 4802 Senior Design II. Form groups. Each group should have membership representing a minimum of three sub-disciplines from within the civil and environmental engineering profession, for example, transportation, water resources, and geotechnical engineering. Typically, groups will have three to four members. **Instructor permission is necessary for any group exceeding four members.** The amount of work performed by each group should be commensurate with the size of the group – larger group equates to more work. You will prepare a written project concept paper and deliver an oral short-list presentation.

Pre-Design Report (length, as needed):

As civil engineers, much of your work will be performed for clients in the public sector. Some examples of public sector clients include cities, counties, school boards, and other government agencies at the local, state, or federal level.

Public sector agencies are normally required to follow a stringent consultant selection process. The typical process requires the client to advertise the project and then to collect and rate firms based on their qualifications. Based on initial rankings most agencies then create a short-list of the competing firms. Firms present their qualifications and ideas for the project and a final selection is made. The agency then attempts to negotiate and enter a contract with the successful firm.

Your team's assignment is to meet with your industry sponsor to determine your project scope. After receiving your project scope, prepare a project concept paper, frequently referred to in industry as a Statement of Interest and Qualifications (SIQ) for the project. Submit your group's completed project concept paper on or before the assigned time and date.

Below are the typical types of information to be provided by the competing firms:

- Letter of Transmittal
- Cover Page
- Letter of Interest
- Description of the proposer's team
- Firm Experience
- Project Questionnaire

Your team's assignment is to meet with your industry sponsor to determine your project scope. After receiving your project scope, prepare a project concept paper, frequently referred to in industry as a Statement of Interest and Qualifications (SIQ) for the project. Submit your team's SIQ online on or before 12:00 p.m. (noon) on assigned due date.

A. Cover Sheet and Signatures – The cover sheet must include the group number/group name/logo (develop a name and logo for your group's consulting firm), project name, client name, due date, and signature block. In addition to a client/project sponsor (recommended but not required), each group should identify one or more faculty members to serve as faculty advisors. To make sure that everyone is in agreement on expectations for the senior design project, you MUST have your client/sponsor, faculty advisor, instructor, and all team members sign the following statement on the cover sheet of your proposal: "All parties signing the cover sheet have reviewed this proposal and endorse the initial project plan, including initial safety assessment. Student members acknowledge that the Senior Design instructor has final approval over the scope and requirements of the Senior Design project, including the safety plan, and reserves the right to change them at the beginning of the final Senior Design semester." **Proposals will not be graded without these signed statements.**

B. Letter of Interest – This letter should include the name of the person(s) authorized to make representation on behalf of the respondent (this person should be your team leader), as well as other pertinent contact information such as job title, address, telephone number, and email *(use creative license for these items or use the information for the COE)*

C. Table of Contents, List of Figures and List of Tables

D. Description of the proposer's team – This section should identify each group member, group sponsor(s) and faculty advisor(s). Provide a project staffing plan, organizational chart (create a chart showing the client and your team's organization structure as you will set it up to serve the client).

E. Firm experience – Each respondent should include recent (with the last 5 years or so) direct firm experience in the design and construction of capital improvement projects, particularly those that involved directing a similar or more complex scope of services than listed in the solicitation, under a parallel or higher responsibility level *(Provide resumes for each team member. Include a head shot, your name/project role/business name/logo, education, relevant coursework, course design projects, technical papers, internships, awards/achievements, and community experience that may be relevant to the project.)*

F. Project Questionnaire – Each respondent should address the required information solicited by the client, which typically includes a project plan, schedule, communications plan, and safety assessment.

- Project Plan – For most projects, the following areas should be addressed in the following order (and numbered accordingly):

1. Project Summary and Objectives: What is the project? Where is it located? Why is it important? What are the problems that are to be solved and/or what are the client's needs that must be met?
2. Background Information and Scope: What, if anything, has been done before to address these types of problems/needs? What is the specific scope of this project? If the scope of the project is not clearly understood, the project will be doomed from the start. Describe the existing conditions of the site and surrounding areas, as applicable.
3. Approach and Method – In general, what will be done to solve these problems and/or needs? How will it be done? This section outlines how well the responder understands the issues associated with the project. This section requires some groundwork to address important issues like zoning, design codes, permitting requirements, environmental issues, and any other identified constraints, along with proposed solutions. Discuss the items of this section with your sponsor(s), mentor(s) and your group, conduct a site visit when possible, take or review photos of the project location, and any other information that may be available for the project. Think about the proposed project and the types of physical constraints that impact the project. For example, a site project may have significant slopes, environmental features, or access constraints. A bridge project may have MOT, geometric, or ROW constraints, etc. What are the specific challenges for your project? How will you solve them? When competing with other firms, this is the area of the proposal where you attempt to look at the problems posed by the project and using your skills and experience to determine the best, most cost effective way to solve the problem. This is the part of the proposal process where you often land the project or not.
4. Tasks: What specific tasks will you undertake? What deliverable will you provide to the client upon completion of the project? Much of the success of a senior design project depends on quantity of work, not just quality. Be specific about the scope of your project: but expect that it might need to be changes/expanded as you proceed. The final decision for all project requirements belongs with the instructor.
5. Alternatives: Engineers are expected to find the solution that is the best fit with all project requirements. This is done by exploring multiple design alternatives. What design alternatives do you plan to investigate and to what degree? (For example, will you perform calculations, conduct literature review, experimental testing, etc.?) How do you plan to decide which alternatives are best?
6. Constraints: What environmental concerns must be addressed in your solution? What societal or community needs will you be addressing? How have community concerns (e.g. NIMBY) affected the timeline and scope of similar projects? Do you expect similar concerns for this project? What economic constraints must be met? What are the foreseeable threats to the project or design challenges?
7. Impacts: What will be the impact (positive and/or negative) of your solution, both from an environmental and societal/economic perspective?

- Schedule – How long will each design task take, and in what order will you proceed? Given a completion data of late during your CGN 4802 semester, when do you plan to start and finish each task? It is recommended that you render this schedule as a Gantt (bar) chart or flow chart using Microsoft project (if available), Excel, or a computer-drawing tool.

- Communication Plan - Describe how often your team will meet, how often the team will meet with industry sponsors and faculty mentors. Will you meet face-to-face, on-line, by phone, or using email? How will you update all parties on progress or obtain required information?

- Safety Assessment: Describe all safety risks associated with completing your senior design project (risks associate with field work, lab work, use of tools and equipment, etc.). Research and describe one or more accidents that have occurred under similar circumstances. Describe controls, practices, or equipment that will be used to mitigate all identified risks. In the event that such an accident was to occur, describe emergency response procedures that you will use, and provide appropriate emergency contacts. (All accidents or unexpected events/near misses should be reported to instructors and faculty mentors).

Short-list Presentation:

Based on your response to the Request for Qualifications (RFQ), your firm has been chosen to present before the review committee. Interviews of short-listed firms will be conducted at the assigned date and time. The review committee will hear a brief 10-minute presentation from each group followed by a 2- to 5-minute question and answer session.

- Introduce the project firm and team
- Provide an organizational chart for the team and define the roles of each team member
- Use your team member experience (course work, internships, volunteer efforts, work experience, etc.) to convince us of why you are the right team for this project.
- Introduce the project scope and site location
- Explain the reasons for the project and what is to be accomplished
- Present at least two conceptual design alternatives for the project
- Discuss how these alternatives meet the specific goals of the project
- Present a strong conclusion that summarizes why your team should be chosen this project and take questions

Note: The storyboard above contains 8 key points. The presentation, however, need not be exactly 8 slides. Some concepts can be combined while others may need multiple slides to discuss the details. **All presentations must be prepared using the FAMU-FSU College of Engineering presentation template.**

Fonts and Font Size

- Use no font smaller than 24 point. 40 point fonts are great for titles.
- Select a single sans-serif font such as Arial, Helvetica or Calibri. Do not mix fonts.

Contrast

- Slides with light backgrounds and dark letters are these easiest to read followed by light letters on dark backgrounds. It is best to use slightly larger size fonts if using light letters on a dark background.
- Avoid importing charts, tables, or AutoCad drawings with a black background as these are difficult to read as slides. Instead, go to options and change the AutoCad background to white or print the drawing to a PDF first with a white background and black line work.

Animation

- If animation is used, keep it simple and avoid annoying audio clips (sounds) or complex transitions. Remember that If someone in the audience asks you to go back a few slides, you do not want to waste a lot of time waiting for these to play again.

Composition

- Keep slides simple. Remember that the main point of the slide is to convey a point. Avoid overly complex slides. It is preferable to have a simple slide with more explanation from the presenter. Limit slides to a headline, a few bullet points, maybe an image, chart, graph, or table.
- Be sure to number all slides.

Presentation Tips

- Develop an outline or storyboard for the presentation.
- Select appropriate visual aids to make the important points.
- Begin with an agenda (road map) for the audience, present the data, and then finish with a strong conclusion. The old adage of tell them what you're going to talk about, then tell them, and then tell them again applies here.
- After planning, creating, reviewing, proofreading, and revising the presentation, it is time to rehearse, after which it may be time for some more editing and revisions to make the presentation flow better.
- Know your audience.
- Content and delivery are the hallmark of an effective presentation, but a poor first impression can doom it to failure, so make sure to look the part of a professional.
- Avoid playing with personal belongings (keys, cellular phone, loose change, etc.)
- Avoid moving around too much without a purpose.
- Avoid walking in front of the projector and covering up or blocking the audience's view of the slides.
- Avoid looking directly into the projector, which will cause momentary blindness.

- Avoid anything that might distract the audience's focus from the words or content of the presentation.
- Avoid slouching or never making eye contact, as the audience infers lack of confidence in the material, which does not bode well for their perception of the speaker's engineering judgement.

Questions and Answers

- Always repeat back the question and clarify as needed. This helps others who may not have heard the question to understand what is being asked. It also gives you additional time to better understand the question and to formulate a response before answering the question.
- Use a strong voice that conveys confidence.
- Make eye contact with the person asking the question, and scan the rest of the audience as well.
- Use the appropriate level of formality.
- Coordinate responses within the project group. If the question was directed to the project manager but others have something important to add, they should be encouraged to chime in without interrupting the speaker. There is likely to be one person on the team best qualified to answer, but beware of throwing a teammate under the bus.
- Answer honestly. Do not fake an answer as this will ruin all credibility that the team worked so hard to gain from the audience during the presentation. If you do not know an answer or did not consider what is being asked politely say so and move on. Just don't use this tactic on every question asked.
- Never appear defensive or combative, even when disagreeing with a comment. Always formulate answers in a positive and professional manner.

Grading: This assignment will form the basis of two class grades, the written project concept paper and the oral short-list presentation. For the pre-proposal, the writing and content grades are weighted equally (50% each). Detailed rubrics for both grades will be provided online.

CGN 4800 Senior Design I

Schematic Design Report (Final Paper) and Presentation

Objective: Revise and expand upon the work prepared for the Pre-Design Report (concept paper) and Short-List Presentation to prepare and present the Schematic Design Report (final paper) and oral presentation for the Senior Design Project to be completed in CGN 4802 Senior Design II.

Assignment: The questionnaire section of the Pre-Design Report provided an abbreviated project description, summary of goals and objectives, background information and discussion of the approach and methods to be used in completing the Senior Design Project as well as preliminary information related to project schedule, communications, and safety. In this assignment, the group is to revise and extend this work to develop a full schematic design report and schematic design presentation by adding more detail, including conceptual project drawings. It is expected that the team will incorporate all feedback received on the Pre-Design Report (concept paper) and Short-List Presentation into the Schematic Design Report (final paper) and Presentation.

Schematic Design Report (length, as needed):

The schematic design report should include the following sections:

1. Letter of Transmittal
2. Report
   - Cover Page
   - Table of Contents
   - List of Figures
   - List of Tables
   - Abstract
   - Chapter 1.0 - Introduction
     Provide detailed information on the description of the project, the project location, problem statement, objective, and scope. The final section of the chapter should provide an overview of the material to be included in the remaining chapters of the report.
   - Chapter 2.0 – Design Criteria
     For each major design component provide information complete with code references the design criteria that will be used for the project. For example, provide code references for items such as building setbacks, number of parking spaces, design storms, structural loads, etc. Provide information on all permits and permit requirements such as review times, checklists, and fees.
   - Chapter 3.0 –Approach/Procedure and Methods
     Discuss physical site constraints and how the project will be designed in order to meet all design criteria and permit requirements while at the same time meeting the objectives, goals, and intended use of the project. Provide information on the specific design methods, tools, and software to be used in the design.

- Chapter 4.0 – Design Alternatives

  Describe in detail all design alternatives being considered for your project. Include maps, photographs, figures, tables. Explain how each alternative will be designed and how they will be evaluated.

- Chapter 5.0 – Discussion
  Discuss the advantages and disadvantages of design alternative in terms of which project goals and objectives they meet and do not meet. Discuss impacts of each project during and after construction. Discuss features of the proposed design alternatives that will assist in limiting public opposition to the project. Explain why the design alternatives chosen are the best alternatives for the project. Consider the following statements when preparing this section of the report. Permit and code requirements must always be met unless the codes allow exemptions and the project can be modified to use an exemption. Physical project constraints such as high water table, topography, etc. typically impact cost and schedule but can be overcome if adequate resources are available. The client has specific goals and objectives for the project. Some of these goals and objectives absolutely have to be met in order to continue with the project while a compromise may be reached on others. No project is constructed in isolation. During construction, the project may generate increased noise, dust, vibration, stormwater run-off, etc. The project may also impact wetlands, or endangered and threatened species, floodplains, etc. as permits do allow limited impacts in most cases. Once constructed, the project may permanently alter traffic patterns, produce undesirable lighting, reflections, noise. Many, if not most projects, face some sort of opposition by the communities in which they are located (NIMBY). Think about and design your project while balancing economic, environmental, and societal factors.

- Chapter 6.0 – Group Member Contributions
  (Describe the work contributed by each group member).

- Chapter 7.0 – Works Cited
  (Cite references for all codes, books, manuals, websites, software, images, and other copyrighted materials used in the completion of the design project).

- Appendices

  Provide copies of geotechnical reports, environmental site assessments, and any other pertinent data used to prepare the report.

3. Drawings

Consult with your project mentor for the specific sheets needed to complete the schematic design portion of your project, but you may use the list below as a guide. In some instances, projects may consist primarily of a "assessment report or process" rather than drawings for construction. In this case, provide flow charts, tables, diagrams, or other graphical aids to describe the project and design alternatives.

All Projects

- Cover Sheet
  - Project Title
  - Vicinity Map
  - Location Map
  - Drawing Index
- Existing Conditions Sheet
  (Show the site and any structures existing on the site prior to this project).
- Demolition Plan
  (Include if existing structures, utilities, etc. are impacted by the project).
- Schematic Plan
  (Include a preliminary drawing of the site, bridge, roadway, etc. to show the major components of the project).

Schematic Design Presentation:

- Introduce the project team and the role of each team member
- Introduce the project scope and site location
- Explain the reasons for the project and what is to be accomplished
- Identify and describe design constraints
- Discuss design criteria such as codes, standards, and permitting
- Present a minimum of two major design alternatives
- Discuss the impact of design constraints on each alternative
- Discuss how each design alternative does or does not meet your project goals
- Discuss potential project impacts and how these will be mitigated
- Summarize the key points of your presentation, give us your best recommendations for the future direction of the project, and take questions.

Note: The storyboard above contains 10 key points. The presentation, however, need not be exactly 10 slides. Some concepts can be combined while others may need multiple slides to discuss the details. **All presentations must be prepared using the FAMU-FSU College of Engineering presentation template.**

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- Answer honestly. Do not fake an answer as this will ruin all credibility that the team worked so hard to gain from the audience during the presentation. If you do not know an answer or did not consider what is being asked politely say so and move on. Just don't use this tactic on every question asked.
- Never appear defensive or combative, even when disagreeing with a comment. Always formulate answers in a positive and professional manner.

Detailed writing rubric, used for all major writing assignments (orignal and revised submissions)

Writing Rubric					
		1=Unsatisfactory	2=Developing	3=Satisfactory	4=Exemplary
		Skill Level 1 (2/10 points)	Skill Level 2 (5/10 points)	Skill Level 3 (8/10 points)	Skill Level 4 (10/10 points)
Subject knowledge/Content		Little to no grasp of information presented; many incorrect statements	Fair grasp of information presented; some incorrect statements	Good grasp of information presented; few or no incorrect statements	Excellent grasp of information presented; no incorrect statements
Grammar	Mechanics	Many mechanics errors (punctuation, spelling, capitalization)	Some mechanics errors (punctuation, spelling, capitalization)	Few mechanics errors (punctuation, spelling, capitalization)	No mechanics errors (punctuation, spelling, capitalization)
	Word usage	Rarely uses words, tenses, and parts of speech correctly	Sometimes uses words, tenses, and parts of speech correctly	Mostly uses words, tenses, and parts of speech correctly	Uses words, tenses, and parts of speech correctly
	Sentence structure	Rarely written in complete sentences; many run-on sentences and/or sentence fragments	Sometimes written in complete sentences; some run-on sentences and/or sentence fragments	Mostly written in complete sentences; few run-on sentences and/or sentence fragments	Written in complete sentences; avoids run-on sentences and/or sentence fragments
Writing Style		Poor readability; either very wordy or overly simplistic	Significant issues with readability, wordiness and/or tone	Mostly clear and concise; appropriate vocabulary and tone	Clear and concise; excellent vocabulary and tone
Composition		No logical order; no central idea and few details	Significant issues with logic and organization; lacking in detail	Fairly logical order; central idea supported with some details	Logical order; central idea supported with numerous details
Thoroughness and compliance		Does not meet required elements	Meets few required elements and provides little required information	Meets most required elements and provides most of required information	Meets all required elements and provides all required information

Content Rubric

	1=Unsatisfactory	2=Developing	3=Satisfactory	4=Exemplary
	Skill Level 1 (2/10 points)	**Skill Level 2 (5/10 points)**	**Skill Level 3 (8/10 points)**	**Skill Level 4 (10/10 points)**
Understanding of Design Problem	Little or no grasp of problem. Incapable of producing a successul solution.	Some understanding of solution. Significant deficiencies that will impact the quality of solution.	Overall sound understanding of the problem and constraints.	Clear and complete understanding of design goal and constraints.
Thoroughness of Background Research	Provides no required elements	Provides few required elements and provides little relevant information	Provides most required elements and provides most of required information	Provides all required elements and provides all relevant information
Graphics	No or very few graphics	Some graphics, mostly irrelevant and unhelpful	Some graphics, mostly relevant and helpful in understanding content	Superior graphics (helpful, clear, well designed and laid out)
References and sources	Little or no use of citations.	Many necessary sources missing; cites some sources but often inaccurately.	A few references missing or inappropriate, but cites and formats sources consistently.	Provides necessary references and cites and formats sources accurately and completely.