

Fall 2019

FED 101-001: Fundamentals of Engineering Design for Civil Engineering

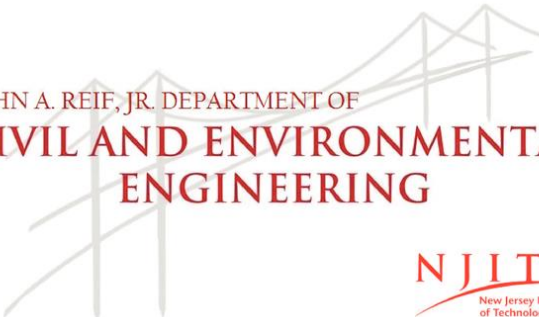
Frank L. Golon

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JOHN A. REIF, JR. DEPARTMENT OF
**CIVIL AND ENVIRONMENTAL
ENGINEERING**



FED 101 – Fundamentals of Engineering Design (CE), Section 001

Fall 2019

Corequisites: [HUM 101](#) and ([ENGR 101](#) and [MATH 110](#)) or [MATH 111](#). Teams of students work on open-ended engineering projects. Sections are offered to represent an introduction to real-world engineering design problems in a specific engineering discipline. Topics covered include introduction to basic engineering design elements, processes, measurements, product and project design and development, with hands-on experiments in a specific major area. Students also learn to use engineering tools for computer-aided design and simulation. Technical writing and oral presentation along with project management skills are emphasized. Students are required to take an FED section corresponding to their declared major. Undecided students will be placed in FED sections which best correspond to their interests according to space availability.

“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found

at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university.** If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

OUTLINE OF COURSE

1. Course Description
2. Required Texts
3. Lecture Classroom
4. Attendance Policy
5. Grading Policy
6. Withdrawals and NJIT Honor Code
7. Class Requirements
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10. Lecture Dates

1. COURSE DESCRIPTION

Main Topics: *“Civil infrastructure – bridges, dams, roads & highways, tunnels, canals, sewer & water systems, and buildings of all types, along with engineering economics*

Fundamentals of Engineering Design (FED) is a two-credit course that will introduce students to the basics of Civil Engineering construction, design, and inspection. This course will provide an overview of the different disciplines within Civil Engineering, including structures, geotechnical, infrastructure, water resources, engineer economics environmental, transportation, construction engineering and construction management. FED will facilitate, through class lecture, demonstrations and student participation, a blending of engineering science and technology.

- Guest lecturers may come to class and share their experience working in the field.
- Student organizations and department personnel will be introduced.
- Students will be required to complete a team technical project and make an oral presentation on their project to the class.
- All homework assignments will be due the following week unless otherwise specified by the instructor.

Moodle

Assignments and materials for this course will be posted on Moodle. Students must use their UCID to sign in at <http://www.moodle.njit.edu>

Course Instructors: Frank L. Golon, Ph.D., P.E.
Professor

Office: 300 Wilson Avenue

Office Hours: By appointment

E-mail: Frank.L.Golon@njit.edu

2. REQUIRED TEXTS: NONE REQUIRED

One Architectural Scale & One Engineering Scale (book store carries)

3. LECTURE CLASSROOM

Kupfrian Hall 117

Tuesday and Friday: 10am – 11:20am

4. ATTENDANCE POLICY

Students must sign in for every class. You are required to attend every lecture class. If a class is missed, it is the student's responsibility to submit the homework on the assigned submission date. If you miss more than one (1) class lecture without excuse/prior permission, each subsequent class missed will result in loss of up to 5% of the overall grade. Five (5) or more total missed classes will result in an F grade.

NJIT FRESHMAN ATTENDANCE POLICY

All freshmen are required to attend every class.

Late arrival to class is not permitted. It is the decision of the instructor to admit you to the class late. Approval for late arrival will be considered by the instructor prior to the class. Request for late arrival must be sent via e-mail to the instructor. Students will not be admitted to class if they overslept or forgot they had a class or if they provide some other similar explanation.

5. GRADING POLICY

Homework Assignments (5)	20%
Technology Special Topic Saturday site visit Lake Cushetunk Dam Readington Twp.	15%
Quizzes and/or Project Assignments 1. Site Civil 10% 2. Critical Infrastructure 10% 3. Building Inspection & Design 10%	30%
Project Report – Oral Presentation <u>Topic:</u> Civil Engineering <i>(presentation will be evaluated based on the following traits):</i> Nonverbal Skills, Verbal Skills and Content	15%
Class attendance & Participation Plan reading, scales, code evaluation, Etc.	20%
Total	100%
EXTRA CREDIT: problems to be assigned 10 points Structural, geotechnical, site civil,	

Grading Scale

A	100-90
B+	89-85
B	84-80
C+	79-75
C	74-70
D	69-60
F	Below 60

6. WITHDRAWALS AND NJIT HONOR CODE

In order to insure consistency and fairness in application of the NJIT policy on withdrawals, student requests for withdrawals after the deadline will not be permitted unless extenuating circumstances (e.g., major family emergency or substantial medical difficulty) are documented. The course Professors and the Dean of Students are the principal points of contact for students considering withdrawals.

The NJIT honor code will be upheld and any violations will be brought to the immediate attention of the Dean of Students. <http://www.njit.edu/academics/pdf/academic-integrity-code.pdf>.

All students are responsible for upholding the integrity of NJIT by reporting any violation of academic integrity to the Office of the Dean of Students. <http://www.njit.edu/doss>. The identity of the student filing the report remains anonymous.

7. CLASS REQUIREMENTS

- Homework must be handed to the instructor in the class. Homework will not be accepted thru e-mail or Moodle posting. Homework will not be accepted after the due date. Hand written assignments will not be accepted.
- Each assignment must include the following information on the upper right corner of each page.
 - Your name
 - Date
 - Learning Communities ID (if applicable)
 - Number of pages
 - Assignment Number and/or Assignment Name
- Homework must be stapled if more than two (2) pages. Loose page assignments will not be accepted.
- Cite your references when writing your individual and group reports. Use the format identified in your HUM 101 course.
- Each person will contribute to and be responsible for the team technical report, the presentation slides, and participation in making the presentation.
- At the end of the course, each student will be required to submit an evaluation of the performance of their project team members.

- The schedule is not absolutely fixed. It is prepared only to give students the topics to be covered in the course. Schedule is subject to change as per the availability and convenience of guest lecturers and that of the field visit site personnel.
- Students will be informed of all changes in advance and any changes to the syllabus will be discussed in class.
- Students are encouraged to back up their work on a personal flash drive or compatible media. You are required to save your homework assignments.
- Cell phones/tablets/laptops, etc. must be turned off in class. Electronic devices can be used when it is necessary for the class when directed by the instructor.
- Remove hats, sunglasses, ear buds.
- Leaving the room for any reason is permissible at any time. Please do so quietly.

8. CEE MISSION, PROGRAM OBJECTIVES AND STUDENT OUTCOMES

The mission of the Department of Civil and Environmental Engineering is:

- *to educate a diverse student body to be employed in the engineering profession*
- *to encourage research and scholarship among our faculty and students*
- *to promote service to the engineering profession and society*

Our program objectives are reflected in the achievements of our recent alumni.

1 – Engineering Practice: Alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working toward sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.

2 – Professional Growth: Alumni will advance their skills through professional growth and development activities such as graduate study in engineering, research and development, professional registration and continuing education; some graduates will transition into other professional fields such as business and law through further education.

3 – Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

Our Student Outcomes are what students are expected to know and be able to do by the time of their graduation:

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
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
3. an ability to communicate effectively with a range of audiences
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
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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Revised: 2/13/18

9. Outcomes Course Matrix – FED 101 – Fundamentals of Engineering Design

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Work on engineering design problems at the start of their education to stimulate their interest in engineering.			
Students will learn CEE design practices in bridge engineering and construction cost estimating.	1, 2	1	Class assignments.
Student Learning Outcome 2: Use the team approach to problem solving.			
Students will work in teams on the assigned design problems.	1, 2, 5	1, 2	Meetings with instructor. Class assignments.
Student Learning Outcome 3: Practice oral and written communication skills.			
Student will be required to make written and oral reports on their class projects.	3	1, 2	Class project.

10. LECTURE TOPICS – ENGINEERING AND TECHNOLOGY

Lectures may include, but not limited, to the following topics.

Introduction to Technology

11. LECTURE TOPICS – ENGINEERING AND TECHNOLOGY

Lectures may include, but not limited, to the following topics.

Introduction to Technology

- a. Design/Build/Inspections/Budget/Analyze
- b. Drone/Bluetooth Technology
- c. Materials Science/Protective Technologies

Civil Engineering – Discipline Specific

- a. Structural Engineering
- b. Geotechnical Engineering
- c. Construction Engineering/Management
- d. Engineering Economics
- e. Environmental Engineering
- f. Contract Law
- g. Site Engineering

Engineering Topics

- a. “The Soft Skills” – Engineers and Writing
- b. Engineering cost estimating & scheduling
- c. Spreadsheets (EXCEL)
- d. PennAve vs. Newark Water Authority–Contract Case Study
- e. Basics of Engineering Mechanics
- f. Data Presentation-Dr. Hsu testing
- g. OSHA & Safety Engineering
- h. Life Cycle Assessment

Video Discussion Topics

- a. Construction & Inspection Engineering

Project Report (topics suggested by the Professor or other topics as approved by the Professor)

12. COURSE OUTLINE (Subject to updating throughout semester)

Week	Dates	Textbook/Reading	Assignment (*)	Topics
1	03 & 06 Sept	To be assigned or hand-outs	Syllabus Review & Intro Student presentation for ASCE & AWWA	Overview of Civil Engg Industry; ASCE & AWWA presentation
2	10 & 13 Sept	Financial Analysis & Money Mgmt	Engg Economics Assignment #1	Loans & time value of money
3	17 & 20 Sept	Plan reading & scales Buildings-Arch & Engg	Assignment #2	Arch & Engg Plans
4	24 & 27 Sept	Plan reading & scales Site/Infrastructure	and handout	Dams & Bridges
4a	28 Sept	Cushetunk Lake Dam Field Trip	Inspection report	Dam Inspection
5	1 & 4 Oct	Lake Cushetunk Dam Restoration	Original repairs 1994 Inspections Present Assignment #3	Gunite Repairs 2008
5a	5 Oct	Cushetunk Lake Dam Field Trip	Inspection report	Dam Inspection
6	8 & 11 Oct	Wreak Lead bridge LIRR-MTA	Bascule bridge Structural & Cable	Repairs after hurricane damage
7	15 & 18 Oct	Geotechnical Engg & site evaluation	Borings and test pits Assignment #4	PennAve Quiz/Project
8	22 & 25 Oct	Building design & construction foundations	Codes deep foundations & bldg. foundation	Local sites
9	29 Oct & Nov 1	Building design superstructure	Handout class projects	Quiz/Project
10	5 & 8 Nov	Building design Materials	Assignment #5 handout,	Testing materials
11	12 & 15 Nov	Fast track case study South Street Urban Renewal	MS schedule & presentation with problems	Practical Case Studies-Newark & Elizabeth Projects
12	19 & 22 Nov	Design requirements	Wind & Earthquakes	Building and structures
13	26 Nov	Class presentations	Student Presentations	Student Presentations
14	3 & 6 Dec	Class presentations	Student Presentations	Student Presentations
15	10 Dec	Class presentations	Student Presentations	Review any material
16	14 Dec	Finals week	TBD	Final cover entire semester

Reading day 1 & 2 Dec 12 & 13 - Final Exam Period begins: Dec 14. Ends Dec 20

OSHA & Ethics will be covered each week specific to the topics

Assignment sheet will be handed out in class and/or found in Moodle with due dates

*Actual Assignments may differ from list and can be changed by Instructor during Semester.

Fall 2019 Academic Calendar (refer to NJIT Registrar for specific details)

September 3, 2019:	First Day of Classes
September 13, 2019:	Last Day to Add/Drop Classes
November 11, 2019:	Last Day to Withdraw
November 28–December 1, 2019: Thanksgiving	
December 11, 2019:	Last Day of Classes
December 14, 2019:	Final Exam Begin
December 20, 2019:	Final Exams End