CIVIL & URBAN ENGINEERING DEPARTMENT

Guidelines for Experiential Learning in the B.S. Civil Engineering program

Nearly all professions incorporate practice into education and training; for example, law students gain experience in clinics as law clerks, medical students participate in clinical programs as residents, and educators work as student teachers. The National Academy of Engineering, industry representatives, leading universities, and students have identified experiential learning as a primary need for improving engineering education. Expanding experiential learning opportunities provides access to high-impact educational practices, such as capstone projects and undergraduate research, improving the learning process and allowing students to showcase their experience to potential employers, helping them secure competitive positions in the industry.

Experiential learning complements traditional coursework that covers rigorous engineering fundamentals, with practice which enhances the student learning and preparation for the workforce. A variety of experiential learning approaches can be used to enhance trans-disciplinary thinking, creativity, and student professionalism including industry-sponsored project-based learning, work-based learning, internships, team innovation and design projects, and independent research.

The NYU Tandon Department of Civil and Urban engineering currently offers a number of these opportunities, including research and independent study courses. Starting Fall 2019, we will offer two additional channels to advance the undergraduate education: Curricular Practical Training (CPT) and prescribed Experiential Learning (EL) embedded in all courses. The CPT will be carried out through internships, while course-based EL will be achieved by incorporating EL in all courses offered by the department. Examples of course-based EL include hands-on learning (as in laboratory experiments), field trips (such as going to a traffic control center as opposed to only learning about traffic management theory), and group projects that solve a real-world engineering challenge.

All Civil Engineering students are encouraged to pursue experiential learning through a combination of courses in the three tracks shown below. Up to 6 credits may be used to satisfy the 129 credits required for B.S. in Civil Engineering. These courses will count as free electives except as noted.

The followings are acceptable forms of experiential learning, other forms may be approved by petitioning the undergraduate advisor.

1. **Vertically Integrated Projects (VIP-UY 300X).** Up to 6 credits of VIP courses can be used, of which 3 may be used to satisfy CE Technical Electives. The application forms for each team are available at vip.engineering.nyu.edu. Note that the following civil and urban centric VIP Projects are available. Students should contact the listed faculty for details before applying.
   a. Concrete Canoe (Weihua Jin)
   b. Steel Bridge (Alexey Sidelev)
   c. Smart Cities Technology (Jack Bringardner, Joseph Chow, Kaan Ozbay)
   d. Urban LiDAR and Remote Sensing (Debra Laefer)
   e. INTERCEP Resilience and Agility (Carlos Restrepo, Bill Raisch)

2. **Curricular Practical Training (CPT).** Three new 1-credit courses are proposed as part of this initiative. These courses are expected to support the experiential learning that takes place as part of internships. Up to 3 credits of CPT courses can be used to satisfy free electives. It is
anticipated that one of these courses will be offered each of the Fall, Spring, and Summer semesters and that students can earn up to 3 credits in one year of internship.
   a. CE-UY 4911 Curricular Practical Training I: Management
   b. CE-UY 4921 Curricular Practical Training II: Ethics
   c. CE-UY 4931 Curricular Practical Training III: Leadership

3. **Undergraduate Research in Civil Engineering** (CE-UY 496X and 497X). A new variable credit (1-3 Cr) Undergraduate Research Project course is proposed as part of this initiative. Additionally, the existing CE-UY 499X (1-3 Cr) undergraduate Honor’s BS Thesis in Civil engineering is modified to (1) eliminate requirement for enrollment in the honors program, (2) allow repeatability for credit up to 6 credits, and (3) change its course number to be compatible with graduate numbering conventions.
   a. CE-UY 497X Undergraduate Thesis in Civil & Urban Engineering (1-3 Cr)
   b. CE-UY 496X Undergraduate Research Project in Civil & Urban Engineering (1-3 Cr).

Consent of the faculty research adviser must be obtained in writing prior to registration for any of these courses. Submission of the Thesis to the department is required for all students enrolled in CE497X, and can also fulfill the requirements of the Honors program.
Curricular Practical Training provides undergraduate students with a foundation for success. The course supports the development of professional and interpersonal skills gained through participation in an internship. The course combines (1) required reading, (2) an online educational module, and (3) an immersive internship in a relevant practice area, as follows:

A. Readings:


B. Online Modules:

Online modules will consist of videos, reading material, and assessment exercises. Comprehension of the reading material will be assessed using online quizzes and tests.

C. Immersive Internship

The internship should provide the opportunity for intellectual growth and a career-building experience. Internships are managed by industrial employers, and must be approved in advance by the Internship Course Advisor. Internships taking place over the summer may be done on a full-time or part-time basis, but must be a minimum of at least 8 weeks. Fall or spring term internships are typically part-time, and are expected to take place over a period of at least 12 weeks. All internships must conform to Tandon’s internship policies and guidelines, available in the Bulletin. At the completion of each internship, a student must complete the attached *Verification of Internship Experience Report,* and have it signed by his or her supervisor. The internship supervisor shall return the report directly to the Internship Course Advisor. At the conclusion of each internship, a student shall submit a report addressing the following seven topics:

1. Main objectives of the internship;
2. Those elements of the student’s academic program to which the internship is related, and how they are related;
3. The tasks that were required of the student and the principles or skills learned during the internship, both theoretical and practical;
4. Obstacles or challenges encountered, and how they were overcome;
5. Technology and platforms used;
6. How the internship improved the student’s understanding of professional ethics;
7. How the student’s management skills were enhanced as a result of the internship experience; and
8. How the student’s leadership skills were enhanced as a result of the internship experience.

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1 Expected report length is approximately 10 single spaced pages.
Registration

Registration for this courses is open to undergraduate students who will have completed a minimum of 36 credits and are in good academic standing prior to the start of the internship.

These three CPT courses need not be taken in any particular sequence; however, a student may not register for more than one of these courses in any semester, nor repeat any of these courses. Completion of the sequence is not required.

Registration for any of these courses shall require the consent of the student’s Program Advisor and the Internship Course Advisor. The student must provide a letter from the intended employer, on company letterhead, that includes the job description, hours per week, start and end dates, the name of the student’s immediate supervisor, any relevant department or group name, pay rate, and location. It should be signed by an authorized representative of the employer. Internship dates must closely match the dates of the academic term for a student to receive credit. In addition, international students must apply for Curricular Practical Training (CPT) and have it approved by NYU’s Office of Global Services (OGS). Students interning during their final semester of study and taking only 3 credits in addition to the internship may be eligible to work a full-time schedule. International students must have their full-time eligibility confirmed by OGS prior to commencement of the internship.

Prerequisite(s): Cumulative GPA >2.5

Grading

The final grade for the course will be assigned by the Internship Course Advisor, based on the following criteria:

- 30% Report describing internship submitted by the student
- 30% Verification of Internship Experience Report submitted monthly by student and signed by internship supervisor
- 40% Grade on online assessment exercises

Attachments

- Verification of Internship Experience Report
Curricular Practical Training provides undergraduate students with a foundation for success. The course supports the development of professional and interpersonal skills gained through participation in an internship. The course combines (1) required reading, (2) an online educational module, and (3) an immersive internship in a relevant practice area, as follows:

A. Readings:


B. Online Modules:

Online modules will consist of videos, reading material, and assessment exercises. Comprehension of the reading material will be assessed using online quizzes and tests.

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1. Main objectives of the internship;
2. Those elements of the student’s academic program to which the internship is related, and how they are related;
3. The tasks that were required of the student and the principles or skills learned during the internship, both theoretical and practical;
4. Obstacles or challenges encountered, and how they were overcome;
5. Technology and platforms used;
6. How the internship improved the student’s understanding of professional ethics;
7. How the student’s management skills were enhanced as a result of the internship experience; and

\(^1\) Expected report length is approximately 10 single spaced pages.
8. How the student’s leadership skills were enhanced as a result of the internship experience?

**Registration**

Registration for CPT courses is open to undergraduate students who will have completed a minimum of 36 undergraduate credits and are in good academic standing prior to the start of the internship.

These three courses need not be taken in any particular sequence; however, a student may not register for more than one of these courses in any semester, nor repeat any of these courses. Completion of the sequence is not required.

Registration for any of these courses shall require the consent of the student’s Program Advisor and the Internship Course Advisor. The student must provide a letter from the intended employer, on company letterhead, that includes the job description, hours per week, start and end dates, the name of the student’s immediate supervisor, any relevant department or group name, pay rate, and location. It should be signed by an authorized representative of the employer. Internship dates must closely match the dates of the academic term for a student to receive credit. In addition, international students must apply for Curricular Practical Training (CPT) and have it approved by NYU’s Office of Global Services (OGS). Students interning during their final semester of study and taking only 3 credits in addition to the internship may be eligible to work a full-time schedule. International students must have their full-time eligibility confirmed by OGS prior to commencement of the internship.

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A. Required Reading:


B. Online Modules:

Online modules will consist of videos, reading material, and assessment exercises. Comprehension of the reading material will be assessed using online quizzes and tests.

C. Immersive Internship

The internship should provide the opportunity for intellectual growth and a career building experience. Internships are managed by industrial employers, and must be approved in advance by the Internship Course Advisor. Internships taking place over the summer may be done on a full-time or part-time basis, but must be a minimum of at least 8 weeks. Fall or spring term internships are typically part-time, and are expected to take place over a period of at least 12 weeks. All internships must conform to Tandon’s internship policies and guidelines, available in the Bulletin. At the completion of each internship, a student must complete the attached *Verification of Internship Experience Report*, and have it signed by his or her supervisor. The internship supervisor shall return the report directly to the Internship Course Advisor. At the conclusion of each internship, a student shall submit a report addressing the following eight topics:

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3. The tasks that were required of the student and the principles or skills learned during the internship, both theoretical and practical;
4. Obstacles or challenges encountered, and how they were overcome;
5. Technology and platforms used;
6. How the internship improved the student’s understanding of professional ethics;

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7. How the student’s management skills were enhanced as a result of the internship experience; and
8. How the student’s leadership skills were enhanced as a result of the internship experience?

Registration

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Prerequisite(s): Cumulative GPA >2.5

Grading

The final grade for the course will be assigned by the Internship Course Advisor, based on the following criteria:

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- 30% Verification of Internship Experience Report submitted monthly by student and signed by internship supervisor
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Attachments

- Verification of Internship Experience Report
CE-UY 497X Undergraduate Thesis in Civil & Urban Engineering (1-3 Cr)

The Undergraduate Thesis in Civil and Urban Engineering should report the results of an original investigation. The research should explore traditional or emerging areas of civil or urban engineering. The thesis may involve experimental research, theoretical analyses, numerical simulations, or combinations thereof. The B.S. Thesis must be conducted with faculty supervision. Students are required to submit a bound thesis to the Civil & Urban Engineering Department. Honors students may submit the same document to the Office of Undergraduate Academics to fulfill the Honor’s College requirements. May be repeated for credit up to 6 credits.

Prerequisite(s): Junior standing, cumulative GPA > 3.0, and permission of the Civil Engineering Program Advisor.
CE-UY 496X Undergraduate Research Project in Civil & Urban Engineering (1-3 Cr)

The Undergraduate Research Project in Civil and Urban Engineering involves analytical, design or experimental studies in civil or urban engineering guided by a faculty adviser. The work should explore traditional or emerging areas of civil and urban engineering. A written report is required. May be repeated for credit up to 3 credits.

Prerequisite(s): Junior standing, cumulative GPA > 2.7, and permission of the Civil Engineering Program Advisor.
### Section I: Student Information

1. **Last Name**
2. **First Name**
3. **Net ID**
4. **Mailing Address:**
   - Line 1
   - Line 2
   - City
   - State
   - Zip Code
5. **Telephone/E-Mail Address**
   - **Phone Number**: Area Code Phone Number
   - **E-Mail Address**: 

### Section II: Experience

**Experience described on this form was obtained while employed by:**

- **Business Name**: 
- **Business Address**: 
- **Beginning**: _______ / _______ / _______ and ending _______ / _______ / _______. 
- **Total time claimed**: _______ Weeks
- **Full time**: _______ **Part time**: _______ hrs./wk
SECTION III: TO BE COMPLETED BY ENDORSER (TYPE OR PRINT LEGIBLY).

Instructions to the Endorser

1. Read carefully the information presented by the student on this form.
2. Provide the requested information below and answer questions 1 - 9.
3. If you disagree with any information presented by the student on this form, or wish to provide any other information for consideration by the Civil and Urban Engineering Department relative to the applicant, please submit a separate letter with this form. If you do, please identify the applicant by his/her full name and Net ID in your letter.
4. SIGN THE ENDORSER’S AFFIDAVIT IN SECTION IV. If you do not sign the Affidavit, please explain in a separate letter attached to this form.
5. Scan and email the entire form along with any other information to Professor Mohsen Hossein (mhossein@nyu.edu). Do not return this form to the student. This form will not be accepted if submitted by the student.

Endorser’s name: ________________________________
Firm: ________________________________
Position in Firm: ________________________________
Current Business address: Street: ________________ City: ________________ State: ________________ Zip Code: ________________
Business Phone number: __________________________ Business E-mail address: __________________________
Are you a professional engineer? □ Yes □ No □ If "Yes": __________________________ State: ________________

REGARDING THE APPLICANT’S DESCRIPTION OF WORK EXPERIENCE AS DESCRIBED ON THIS FORM:

1. Do you have in-depth knowledge of the applicant’s work during the time covered by this endorsement? □ Yes □ No
2. Does the description accurately reflect the work personally performed by the applicant? □ Yes □ No
3. Is the time claimed by the applicant for this experience accurate? □ Yes □ No
4. Was the applicant’s work performed in an adequate, reliable, and professional manner? □ Yes □ No
5. Are/were you the applicant’s supervisor during the time period claimed above? □ Yes □ No
6. If not, please identify your work relationship to the applicant at the time. ________________________________
7. Are you attaching a separate letter with additional information about the applicant? □ Yes □ No
8. Please assign a letter grade to the student’s performance and work: □ A □ B □ C □ F
9. Comments: ________________________________
   ________________________________
   ________________________________

SECTION IV: ENDORSER’S AFFIDAVIT

I have read the information presented by the student on this form. I hereby certify that I am knowledgeable about, and qualified to attest to, the student’s work and that, except as otherwise noted on the front of this form, or in attached correspondence, the work experience described by the applicant and the time claimed for it, are generally true and accurate.

Endorser’s Signature: ________________________________ Date: ________________

[Signature]

[Signature]

I cannot so certify. Letter of explanation attached.

Return form directly to: Professor Mohsen Hossein (mhossein@nyu.edu)