THECOOPERUNION

FOR THE ADVANCEMENT OF SCIENCE AND ART

COURSE CATALOG 2025–26

VOLUME 131 | OCTOBER 1, 2025 | IN EFFECT UNTIL REPLACED

COOPER.EDU

ABOUT THE COOPER UNION

VISION

The Cooper Union for the Advancement of Science and Art is dedicated to Peter Cooper's radical commitment to diversity and his founding vision that fair access to an inspiring free education and forums for courageous public discourse foster a just and thriving world.

MISSION

Our mission is to sustain The Cooper Union as a free center of learning and civic discourse that inspires inventive, creative, and influential voices in architecture, art, and engineering to address the critical challenges and opportunities of our time.

ACADEMIC VISION

Through outstanding academic programs in architecture, art and engineering, and a Faculty of Humanities and Social Sciences, The Cooper Union for the Advancement of Science and Art prepares talented students to make enlightened contributions to society.

The Cooper Union for the Advancement of Science and Art, founded in 1859 by Peter Cooper, prepares talented students to make enlightened contributions to society through outstanding academic programs in architecture, art and engineering. The institution provides a challenging, interactive curriculum with distinguished, creative faculty and fosters rigorous, humanistic learning in a dynamic setting.

ACADEMIC CALENDAR

The Cooper Union for The Advancement of Science and Art operates within a two semester calendar (fall and spring). Most classes are scheduled Monday through Friday between the hours of 8 am and 9 pm. We offer a limited summer session with courses typically provided in Math, Physics, and Engineering.

2025–2026

Tue, Aug 26–Mon, Sep 1	Welcome Week
Fri, Aug 29	Welcome Back Picnic
Mon, Sep 1	Labor Day/Academic buildings closed
Tue, Sep 2	Fall 2025 semester classes begin
Tue, Sep 2	Last day for Fall 2025 registration fee refund
Tue, Sep 2–Tue, Sep 9	Fall 2025 add/drop period
Tue, Sept 9	Fall 2025 course add/drop deadline
Tue, Oct 28	Last day to withdraw from Fall 2025 classes
Tue, Nov 18–Fri, Nov 21	Course registration for Spring 2026
Tue, Nov 25	Modified schedule/Thursday classes meet
Wed, Nov 26	Modified schedule/Friday classes meet
Thu, Nov 27–Fri, Nov 28	Thanksgiving Holiday/Academic buildings closed
Mon, Dec 1	Classes resume
Thu, Dec 11–Fri, Dec 12	Study period/No classes/Administrative offices remain open
Mon, Dec 15–Fri, Dec 19	Fall 2025 final classes, crits, and exams
Fri, Dec 19	Last day of the Fall 2025 semester
Mon, Dec 22–Mon, Jan 19	Winter recess/No classes
Mon, Dec 22–Fri, Jan 2	Staff Holiday/Academic buildings closed
Fri, Jan 2	Fall 2025 grades due to the Office of the Registrar
Mon, Jan 5	Administrative offices reopen
Mon, Jan 19	Dr. Martin Luther King, Jr. Day/Academic buildings closed

Tue, Jan 20	Spring 2026 semester classes begin
Tue, Jan 20	Last day for Spring 2026 registration fee refund
Tue, Jan 20–Tue, Jan 27	Spring 2026 course add/drop period
Tue, Jan 27	Spring 2026 course add/drop deadline
Fri, Feb 13–Mon, Feb 16	Founder's Day/President's Day/Academic buildings closed
Tue, Feb 17	Modified schedule/Monday classes meet
Wed, Feb 18	Modified schedule/Tuesday classes meet
Fri, Mar 13	Last day to withdraw from Spring 2026 classes
Mon, Mar 16–Fri, Mar 20	Spring recess/No classes/Administrative offices remain open
Tue, Apr 21–Fri, Apr 24	Course registration for Summer 2026 and Fall 2026
Thu, May 7–Fri, May 8	Study period/No classes/Administrative offices remain open
Mon, May 11–Fri, May 15	Spring 2026 final classes, crits, and exams
Fri, May 15	Last day of the Spring 2026 semester
Mon, May 18	Senior grades due to the Office of the Registrar
Wed, May 20	Non-senior grades due to the Office of the Registrar
Mon, May 25	Memorial Day Holiday/Academic buildings closed
Wed, May 27	Commencement rehearsal/End of Year Show Opening
Thu, May 28	Commencement
Mon, Jun 1	Start of Summer 2026, Session A classes
Mon, Jun 1–Wed, Jun 3	Summer 2026 course add/drop period (Sessions A and B)
Wed, Jun 10	Last day to withdraw from Summer 2026, Session A courses
Fri, Jun 19	Juneteenth/Academic buildings closed
Mon, Jul 13	Last day of Summer 2026, Session A classes
Tue, Jul 14	Start of Summer 2026, Session B classes
Mon, Jul 20	Summer 2026, Session A grades due to the Office of the Registrar
Tue, Jul 21	Last day to withdraw from Summer 2026, Session B courses
Tue, Aug 25	Last day of Summer 2026, Session B classes
Mon, Aug 31	Summer 2026, Session B grades due to the Office of the Registrar

The Cooper Union is accredited by the Middle States Commission on Higher Education; all of the degree programs are registered with the New York State Education Department. In addition, the program leading to the bachelor of architecture degree is accredited by the National Architectural Accrediting Board.

Accredited & Post-Professional Programs

The following programs at The Cooper Union have been registered by the New York State Education Department.

Registered

Program	Hegis Code	Degree
Architecture	0202	B.Arch.
Engineering	0901	B.S.
Computer Science*	0701	B.S.
Chemical Engineering	0906	B.E.
Civil Engineering	0908	B.E.
Electrical Engineering	0909	B.E.
Mechanical Engineering	0910	B.E.
Fine Arts	1001	B.F.A.
Master of Science in Architecture (2019)	0202	
Master of Architecture II (renamed 2019)	0202	
Master of Engineering	0901	M.E.
Concentrations in Civil, Chemical, Mechanical and Electrical Engineering		

Accreditation

The Cooper Union is accredited by the Middle States Commission on Higher Education. "Accreditation is a process of peer review that the educational community has adopted for its self-regulation since early in the 20th century. It is a voluntary process intended to strengthen and sustain the quality and integrity of higher education, making it worthy of public confidence. Institutions choose to apply for accredited status, and once accredited, they agree to abide by the standards of their accrediting organization and to regulate themselves by taking responsibility for their own improvement." (2010, Middle States Commission of Higher Education).

The Middle States Commission on Higher Education (MSCHE) is a voluntary membership association that "defines, maintains, and promotes educational excellence across institutions with diverse missions, student populations, and resources." As a participating institution, Cooper Union engages in a self-study process every 10 years. The core principles for colleges and universities accredited by the Middle States Commission of Higher Education (MSCHE) focus on the student learning experience, emphasis on institutional assessment and assessment of student learning, and continuous institutional improvement and innovation.

Accreditation means that standards of quality and excellence have been met.

Cooper Union's professional schools participate in specialized accreditation. Information regarding these accreditations can be found at:

School of Architecture

School of Engineering

APPLYING TO COOPER UNION

APPLICATION INSTRUCTIONS AND DEADLINES

The Cooper Union is committed to the highest ethical standards in recruiting, admitting, and supporting students in architecture, art, and engineering. Guided by a holistic admissions philosophy, our policies are documented and reviewed on an annual basis to promote clarity, equity, and alignment with institutional values. Recruitment efforts are grounded in strategic policies and procedures that emphasize integrity and shaping a class that can successfully rise to our academic rigor. Outreach is designed to provide accurate information about Cooper's programs, community, requirements, and expectations.

Staff involved in the recruitment process receive ongoing training in ethical practices and professional standards, ensuring that communications with prospective students remain clear, consistent, and equitable. Recruitment activities are also evaluated for effectiveness in attracting a competitive applicant pool prepared to thrive at The Cooper Union.

Applicants must demonstrate strong academic preparation and maintain a competitive GPA. School of Engineering applicants are required to complete a full year of calculus, physics, and chemistry. School of Architecture and School of Art applicants must complete discipline-specific assessments; the Studio Test for the School of Architecture and the Hometest for the School of Art evaluate creative and technical readiness. Each application undergoes multiple levels of review by admissions staff, faculty, and academic leadership to ensure fairness and consistency.

Admissions outcomes are measured through indicators such as yield, retention, and academic performance. Findings are documented and reviewed by key stakeholders, leading to policy updates and process improvements. These practices reflect our commitment to ethical conduct, data-informed decision-making, and the continuous enhancement of the student experience.

Undergraduate

The Cooper Union uses the Common Application as its first-year undergraduate application form. Transfer and Graduate applicants should submit their applications through the website.

Early Decision:

The Albert School of Engineering: November 1

The School of Art and The Irwin S. Chanin School of Architecture: December 1

Regular Decision for all three schools: January 5

Graduate

Master of Science in Architecture: January 5

Master of Engineering: January 15

ADMISSION PROCESS
THE IRWIN S. CHANIN SCHOOL OF ARCHITECTURE

Undergraduate/First-Year

EARLY DECISION

If The Cooper Union is your first choice, you may consider applying early decision. If admitted via early decision you must accept our offer and withdraw your other college applications.

STEP 1 Submit the first part of your application online by December 1.

STEP 2 You will receive a confirmation email.

STEP 3 You will have to prepare and submit by December 1:
- Your official high school transcript or GED certificate (required for all applicants)
- Any official college transcripts (sent directly from the college or university)
- One letter of recommendation
- Official TOEFL, IELTS, or DET scores, if applicable*

STEP 4 You will receive the Studio Test via email.
You will have approximately one month to complete the test. Extensions are not permitted unless in the case of extenuating circumstances. We highly recommend adding admissions@cooper.edu to your email address book in order to prevent important emails (like your Studio Test and admission decision) from going to spam!

Please follow all instructions carefully.

STEP 5 You will receive an admission decision by February 1.

REGULAR DECISION

STEP 1 Submit the first part of your application online by January 5.

STEP 2 You will receive a confirmation email.

STEP 3 You will have to prepare and submit by January 5:

- Your official high school transcript or GED certificate (required for applicants)
- Any official college transcripts (sent directly from the college or university)
- One letter of recommendation
- Official TOEFL, IELTS, or DET scores, if applicable*

STEP 4 You will receive the Studio Test via email.
You will have approximately one month to complete the test. Extensions are not permitted unless in the case of extenuating circumstances. We highly recommend adding admissions@cooper.edu to your email address book in order to prevent important emails (like your Studio Test and admission decision) from going to spam!

Please follow all instructions carefully. For First Year applicants, no additional portfolio material should be sent.

STEP 5 You will receive an admission decision by April 1.

Calculus is a required first-year course for all architecture students. Entering first-year students must have completed Mathematics (including Trigonometry, Algebra II and Pre-Calculus). Any student who has not completed Pre-Calculus in high school must do so during the summer before enrollment, and must submit an official transcript documenting successful completion of the course.

**Undergraduate applicants whose first language is not English and who have not graduated from a secondary school in a country with English as the official medium of instruction are required to take one the following exams.*

TOEFL (Test of English as a Foreign Language), IELTS (International English Language Testing System), or DET (Duolingo English Testing) Scores per the below requirements. Scores must be submitted directly by the testing service to admissions@cooper.edu.

Deferral of an Offer of Admission in the School of Architecture: Undergraduate admitted students may request to defer their offer of admission for one year. Each deferral request will be reviewed by the Office of Admissions and considered on a case-by-case basis. We do not accept deferral requests for the Master of Science in Architecture or the Master of Engineering programs.

Admission After Three Years of High School: Candidates of exceptional merit may be considered for admission after completion of three years of high school. Engineering applicants must have excellent high school averages and test scores. Art and architecture applicants must have excellent high school records and exceptional ability. At least one recommendation from a teacher and an interview will be required. In accordance with the regulations of individual states, a student may or may not be eligible to receive an Equivalency Diploma after completion of a specific number of credits in appropriate subject areas at The Cooper Union. It is the responsibility of the applicant to investigate his or her state regulations in this regard.

Transfer/The Irwin S. Chanin School of Architecture

You may apply for transfer to The Irwin S. Chanin School of Architecture if:

You have completed at least one year of an accredited architecture program elsewhere by June of the year for which you are applying.

OR by June you hold a bachelor's degree or the equivalent in a discipline other than architecture.

OR
you can submit a portfolio of your creative work and you have begun studies in a discipline related to architecture.

REGULAR DECISION

STEP 1 Submit the first part of your application online by January 5.

STEP 2 You will receive a confirmation email.

STEP 3 You will have to prepare and submit by January 5:
- Your official high school transcript or GED certificate (required for applicants)
- Any official college transcripts (sent directly from the college or university)
- One letter of recommendation
- Official TOEFL, IELTS, or DET scores, if applicable*

STEP 4 You will receive the Studio Test via email on January 9.
You will have approximately one month to complete the test. Extensions are not permitted unless in the case of extenuating circumstances. We highly recommend adding admissions@cooper.edu to your email address book in order to prevent important emails (like your Studio Test and admission decision) from going to spam!

The Studio Test will include portfolio requirements for transfers.

Please follow all instructions carefully.

STEP 5 You will receive an admission decision by April 1.

If admitted, transfer students are offered admission into a specific year of the five-year design sequence. Placement in the design sequence is a condition of the offer of admission and not subject to further review or appeal. By accepting the offer of admission, the transfer student agrees to this placement and acknowledges his/her anticipated graduation date.**

**Undergraduate applicants whose first language is not English and who have not graduated from a secondary school in a country with English as the official medium of instruction are required to take one the below exams. TOEFL (Test of English as a Foreign Language), IELTS (International English Language Testing System), or DET (Duolingo English Testing) Scores per the below requirements. Scores must be submitted directly by the testing service to admissions@cooper.edu.*

***It will be necessary for the matriculating transfer student to successfully complete the design studio to which they are admitted, as well as all subsequent studios, as part of his or her degree requirements. There is no opportunity for transfer students to accelerate through the required design sequence. Transfer applicants from programs other than accredited architecture programs will likely be placed in the first-year design studio (Architectonics). The official academic transcript of a transfer student will be reviewed prior to the student's first registration. This review will determine what, if any, additional coursework may be eligible for transfer credit.*

Deferral of an Offer of Admission from the School of Architecture: Undergraduate admitted students may request to defer their offer of admission for one year. Each deferral request will be reviewed by the Office of Admissions and considered on a case-by-case basis. We do not accept deferral requests for the Master of Science in Architecture or the Master of Engineering programs.

SCHOOL OF ART

First Year

EARLY DECISION

If The Cooper Union is your first choice, you may consider applying early decision. If admitted via early decision you must accept our offer and withdraw your other college applications.

STEP 1 Submit the first part of your application online by December 1.

STEP 2 You will receive a confirmation email.

STEP 3 You will have to prepare and submit by December 1:

- Your official high school transcript or GED certificate (required for all applicants)
- Any official college transcripts (sent directly from the college or university)
- One letter of recommendation
- Official TOEFL, IELTS, or DET scores, if applicable*

STEP 4 You will receive the Hometest via email.
You will have approximately one month to complete the test. Extensions are not permitted unless in the case of extenuating circumstances. We highly recommend adding admissions@cooper.edu to your email address book in order to prevent important emails (like your Hometest and admission decision) from going to spam.

The Hometest will include portfolio requirements. All portfolio work should be sent with the Hometest.

Please follow all instructions carefully!

STEP 5 You will receive an admission decision by February 1.

REGULAR DECISION

STEP 1 Submit the first part of your application online by January 5.

STEP 2 You will receive a confirmation email.

STEP 3 You will have to prepare and submit by January 5:
- Your official high school transcript or GED certificate (required for applicants)
- Any official college transcripts (sent directly from the college or university)
- One letter of recommendation
- Official TOEFL, IELTS, or DET scores, if applicable*

STEP 4 You will receive the Hometest..
You will have approximately one month to complete the test. Extensions are not permitted unless in the case of extenuating circumstances. We highly recommend adding admissions@cooper.edu to your email address book in order to prevent important emails (like your Hometest and admission decision) from going to spam!

The Hometest will include portfolio requirements. All portfolio work should be submitted with the Hometest.

Please follow all instructions carefully!

STEP 5 You will receive an admission decision by April 1.

**Undergraduate applicants whose first language is not English and who have not graduated from a secondary school in a country with English as the official medium of instruction are required to take one the below exams.*
TOEFL (Test of English as a Foreign Language), IELTS (International English Language Testing System), or DET (Duolingo English Testing) Scores per the below requirements. Scores must be submitted directly by the testing service to admissions@cooper.edu.

Potential School of Art students who have received a preliminary review at National Portfolio Days, which occur after The Cooper Union's regular admission deadline may be invited to apply after the regular admission deadline. All reasonable effort is made by the School of Art Admissions Committee to review these applications in a fair and timely fashion.

Deferral of an Offer of Admission in the School of Art: Undergraduate admitted students may request to defer their offer of admission for one year. Each deferral request will be reviewed by the Office of Admissions and considered on a case-by-case basis.

Admission After Three Years of High School Candidates of exceptional merit may be considered for admission after completion of three years of high school. Engineering applicants must have excellent high school averages and test scores. Art and architecture applicants must have excellent high school records and exceptional ability. At least one recommendation from a teacher and an interview will be required. In accordance with the regulations of individual states, a student may or may not be eligible to receive an Equivalency Diploma after completion of a specific number of credits in appropriate subject areas at The Cooper Union. It is the responsibility of the applicant to investigate his or her state regulations in this regard.

Transfer/School of Art

You may apply for transfer to The School of Art if:

You have completed 18–60 credits of studio art courses

OR you have previously earned a baccalaureate degree in a discipline other than art

REGULAR DECISION

STEP 1 Submit the first part of your application online by January 5.

STEP 2 You will receive a confirmation email.

STEP 3 You will have to prepare and submit by January 5:
- Your official high school transcript or GED certificate (required for all applicants)
- Your official college transcripts (sent directly from the college or university)
- Two letters of recommendation
- Official TOEFL, IELTS, or DET scores, if applicable*

STEP 4 You will receive the Hometest via email and will have approximately one month to complete the test. Extensions are not permitted unless in the case of extenuating circumstances.

We highly recommend adding admissions@cooper.edu to your email address book in order to prevent important emails (like your Hometest and admission decision!) from going to spam.

The Hometest will include portfolio requirements. All portfolio work should be submitted with the Hometest.

Please follow all instructions carefully.

STEP 5 You will receive an admission decision by April 1.

Deferral of an Offer of Admission in the School of Art: Undergraduate admitted students may request to defer their offer of admission for one year. Each deferral request will be reviewed by the Office of Admissions and considered on a case-by-case basis.

**Undergraduate applicants whose first language is not English and who have not graduated from a secondary school in a country with English as the official medium of instruction are required to take one the below exams. TOEFL (Test of English as a Foreign Language), IELTS (International English Language Testing System), or DET (Duolingo English Testing) Scores per the below requirements. Scores must be submitted directly by the testing service to admissions@cooper.edu.*

***Transfer applicants typically have fewer than 60 credits at another institution. An accepted applicant who has previously earned a baccalaureate degree in a discipline other than art will be treated as a transfer student for purposes of evaluating completion of degree requirements and length of time allotted at The Cooper Union to complete the B.F.A.*

ALBERT NERKEN SCHOOL OF ENGINEERING

Undergraduate/First Year

EARLY DECISION

If The Cooper Union is your first choice, you may consider applying early decision. If admitted via early decision you must accept our offer and withdraw your other college applications. See below for instructions on regular decision.

STEP 1 Submit your application online by November 1.

Please Note: Applicants are required to have studied chemistry, physics and calculus.

STEP 2 You will receive a confirmation email.

STEP 3 You will have to prepare and submit by November 1:

- Your official high school transcript or GED certificate (required for all applicants)
- Any official college transcripts (sent directly from the college or university)
- 2–3 Letters of Recommendation, with at least one from a STEM course instructor
- Official TOEFL, IELTS, or DET scores, if applicable*
- SAT/ACT scores

Please respond to all questions in the writing section of The Common Application. We read these thoroughly and ask that you be thoughtful in your responses.

Submit all application materials through the Common Application. If necessary, you may email materials to us at admissions@cooper.edu, though this is not the preferred method.

STEP 4 You will receive an admission decision by December 15.

STEP 5 Candidate reply date is January 15.

Deferral of an Offer of Admission in the School of Engineering: Undergraduate admitted students may request to defer their offer of admission for one year. Each deferral request will be reviewed by the Office of Admissions and considered on a

case-by-case basis. We do not accept deferral requests for the Master of Science in Architecture or the Master of Engineering programs.

REGULAR DECISION

STEP 1 Submit your application online by January 5.

Please Note: Applicants are required to have studied chemistry, physics and calculus.

STEP 2 You will receive a confirmation email from the Office of the Registrar.

STEP 3 You will have to prepare and submit the following by January 5:

- Your official high school transcript or GED certificate (required for all applicants)
- Any official college transcripts (sent directly from the college or university)
- 2–3 Letters of Recommendation, with at least one from a STEM course instructor
- Official TOEFL, IELTS, or DET scores, if applicable*
- SAT/ACT scores

Please respond to all questions in the writing section of The Common Application. We read these thoroughly and ask that you be thoughtful in your responses.

Submit all application materials through the Common Application.
If necessary, you may email materials to admissions@cooper.edu, though this is not the preferred method.

STEP 4 You will receive an admission decision by April 1.

**Undergraduate applicants whose first language is not English and who have not graduated from a secondary school in a country with English as the official medium of instruction are required to take one the below exams. (Test of English as a Foreign Language), IELTS (International English Language Testing System), or DET (Duolingo English Testing) Scores per the below requirements. Scores must be submitted directly by the testing service to admissions@cooper.edu.*

Admission After Three Years of High School Candidates of exceptional merit may be considered for admission after completion of three years of high school. Engineering applicants must have excellent high school averages. Art and architecture applicants must have excellent high school records and exceptional ability. At least one recommendation from a teacher and an interview will be required. In accordance with the regulations of individual states, a student may or may not be eligible to receive an Equivalency Diploma after completion of a specific number of credits in appropriate subject areas at The Cooper Union. It is the responsibility of the applicant to investigate his or her state regulations in this regard.

Transfer Credit from High School College Programs College-level coursework completed while still enrolled in high school may not be transferable.

Deferral of an Offer of Admission in the School of Engineering: Undergraduate admitted students may request to defer their offer of admission for one year. Each deferral request will be reviewed by the Office of Admissions and considered on a case-by-case basis. We do not accept deferral requests for the Master of Science in Architecture or the Master of Engineering programs.

Transfer/Albert Nerken School of Engineering

Preference for transfer is given to those applicants that have completed coursework similar to all of Cooper Union's first year program at another accredited college. The Transfer application can be found on The Cooper Union website.

STEP 1 Submit your application online by January 5.

STEP 2 You will receive a confirmation email from the Office of the Registrar.

STEP 3 You will have to prepare and submit the following by January 5:

- Your official high school transcript or GED certificate (required for all applicants)
- Your official college transcripts (sent directly from the college or university)
- 2–3 Letters of Recommendation, with at least one from a STEM instructor
- Official TOEFL, IELTS, or DET scores, if applicable*
- SAT/ACT scores

Submit all application materials through the application on The Cooper Union website. If necessary, you may email them to admissions@cooper.edu, though this is not the preferred method.

STEP 4 You will receive an admission decision by April 1.

Deferral of an Offer of Admission in the School of Engineering: Undergraduate admitted students may request to defer their offer of admission for one year. Each deferral request will be reviewed by the Office of Admissions and considered on a case-by-case basis. We do not accept deferral requests for the Master of Science in Architecture or the Master of Engineering programs.

** Undergraduate applicants whose first language is not English and who have not graduated from a secondary school in a country with English as the official medium of instruction are required to take one the below exams. (Test of English as a Foreign Language), IELTS (International English Language Testing System), or DET (Duolingo English Testing)*

HIGH SCHOOL GRADUATION REQUIREMENTS

At The Cooper Union, each school has its own high school graduation requirements for applicants.

The Irwin S. Chanin School of Architecture

High school records must show graduation with a minimum of 19 units* before July 15th of the year for which admission is sought, with required and elective subjects as follows:

Subject	Units Required for Architecture
English	4
History and Social Studies	3
Mathematics (including Trigonometry, Algebra II and Pre-Calculus)	3
Science	3
Other Electives	6
Total Units Required	**19**

Calculus is a required first-year course for all architecture students. Entering first-year students must have completed Mathematics (including Trigonometry, Algebra II, and Pre-Calculus). Any student who has not completed Pre-Calculus in high school must do so during the summer before enrollment and must submit an official transcript documenting successful completion of the course.

School of Art

High school records must show graduation with a minimum of 16 units* before July 15th of the year for which admissions is sought, with required and elective subjects as follows:

Subject	Units Required for Art
English	4
History and Social Studies	2
Mathematics	1
Science	1
Other Electives	8
Total Units Required	**16**

Students who apply while attending high school will be expected to supply transcripts of subjects studied during the first three years of high school (Grades 9, 10, and 11).

High school graduates must supply the full four-year record. High school transcripts should be sent during the fall and winter months, but not later than January 18th if supporting a first-year application. Each candidate should make certain that the high school subjects required for his or her major are completed prior to graduation since The Cooper Union will not be able to verify his or her senior program until final transcripts arrive in June or July. This is too late to make up a missing required subject or to make plans for admission to another college. Students who have not fulfilled their application requirements may have their offer of admission rescinded.

Albert Nerken School of Engineering

High school records must show the following:

Subject	Units Required for Engineering
English	4
History and Social Studies	2
Mathematics (including Calculus)	4
Physics	1
Chemistry	1
Other Electives	5-7
Total Units Required	**17 minimum, 19 recommended**

We understand that high schools offer varying course options and will consider your achievements within the context of your school's offerings. While we will evaluate your academic record holistically, we encourage you to pursue advanced mathematics and physics courses where possible. This will not only strengthen your application but also prepare you for the rigor of Cooper's required science and engineering courses.

If you have not completed the above requirements, and you believe your circumstances may warrant an exception, please include that in your application or consult with the admissions team.

**A unit represents a year's study in a subject, with classes meeting at least four times a week in a secondary school.*

INTERNATIONAL APPLICANTS

International students are those who do not hold U.S. citizenship or permanent residency.

The Cooper Union is proud to have a robust international community, comprising approximately 14% of our student body and representing more than 30 countries. Each year The Cooper Union welcomes international students from around the world to study in our undergraduate and graduate programs.

The mission of the International Student Services Office (ISSO) is to provide services and programs for the international community at The Cooper Union. This support includes advisement on immigration, visa matters, work permission, orientation, cultural adjustment, and general resources. ISSO supports Cooper's overall internationalization and helps facilitate the integration and assimilation of international students into the Cooper Union community.

Financial Aid: International students are not eligible for Federal or State Financial Aid. However, they are eligible for the half-tuition scholarship and additional merit aid.

English Language Proficiency Requirement: Cooper Union does not require TOEFL, IELTS, or DET scores for applicants:

- Whose first language is English
- Who have attended 3 years of high school or more where English is the primary language of instruction
- Who have earned a four-year degree from a U.S. college/university or from a university where English is the primary language of instruction (minimum of three years attendance)

Everyone else is required to submit TOEFL (Test of English as a Foreign Language), IELTS (International English Language Testing System), or DET (Duolingo English Testing) Scores per the below requirements. Your scores must be submitted directly by the testing service to admissions@cooper.edu.

TOEFL (Test of English as a Foreign Language): A minimum score of 600 (paper-based test) or 100 (Internet-based test) is necessary for admission to The Cooper Union. Cooper Union accepts only TOEFL IBT® scores by test administration date(e.g. full test administration results for one sitting) and does not accept MyBest® scores. You may send multiple results for consideration.

IELTS (International English Language Testing System): A minimum score of 7.0 is necessary for admission to The Cooper Union.

DET (Duolingo English Test): A minimum score of 130 on the current DET (or 75 on the DET prior to July 2019) is necessary for admission to Cooper Union.

We do not accept results from the following exams: IELTS Indicator, TOEFL ITP Plus for China, TOEFL Essentials, and PTE Academic Online.

Make sure the name on your passport matches your name on the application, and on your language scores.

Transcripts, Final Exam Results, and Credential Evaluations: All high school and college transcripts must be translated into English, notarized and sent to The Cooper Union. If you graduated from an international high school or completed your bachelor's degree outside of the United States, please follow the guidelines below to submit your high school transcript(s) and exam results here.

Obtaining an I-20: To become an F-1 international student in the United States (U.S.), you must first obtain a Form I-20. Once you've been fully admitted to Cooper and paid your deposit, you will be contacted by the International Student and Scholars Office (ISSO) regarding the next steps to obtain your I-20. Please note that we do not collect documents for the I-20 until you've been fully admitted. More information about Obtaining an I-20 can be found here.

Additional fees: International students are assessed a fee of $1,005 per semester.

In addition to the international student fee, please click here to review all costs of attendance.

Visit our admissions webpage for more information on requirements for students who graduated from international high schools.

READMISSION APPLICANTS

Applicants for readmission are former Cooper Union students who have fully separated from the institution and wish to return. The application should not be completed by students on a short-term approved leave of absence; those students must request reinstatement through the academic dean's office for the school which they were previously enrolled.

In addition to the application, supporting documents may be requested.
For additional information, please contact admissions@cooper.edu.

TUITION AND FEES

Undergraduate Tuition

The cost of tuition at The Cooper Union for the 2025–26 academic year is $44,550. The part time tuition per credit is $1,310 for 2025–26 academic year. Part-time students will not receive any institutional aid including half-merit scholarship, tuition assistance, innovator, institutional grants, and scholarships.

Starting in the Fall of 2014, all students enrolling for the first time at Cooper Union receive a half-tuition scholarship currently worth $22,275 per year ($11,137.50 per semester). Additional financial aid is provided to eligible students to help cover tuition, housing, food, books, supplies etc. The amount of additional aid is based upon a student's demonstrated financial need. Students must file a FAFSA to be considered for additional financial aid. Please note that Cooper Union offers merit scholarships to exceptional students. Also, Cooper Union uses a need-blind admissions process, meaning that a student's ability to pay does not impact the admissions decisions.

Graduate Tuition

School of Architecture 2025–26: The Master of Science in Architecture program is a three-semester program. All admitted students will be assessed tuition at the rate of $27,400 per semester.

In recent years, there has been a 3% annual tuition increase for the Master of Science in Architecture program.

School of Engineering 2025–26: Students in the Master of Engineering program are charged $1,615 per credit; 30 credits total needed for the program.

In recent years, there has been a 3% annual tuition increase for the Master of Engineering program.

Fees and Refunds

PLEASE BE ADVISED THAT ALL FEES ARE SUBJECT TO CHANGE ANNUALLY WITHOUT PRIOR NOTICE.

A nonrefundable application fee of $75 is paid by all applicants to Cooper Union for admission. Cooper Union participates in the Common Application Fee Waiver program. Each student enrolled in a degree program at both the undergraduate and graduate level: mandatory, non-refundable registration fee of $1,135 per semester for the 2025-2026 academic year. Continuing Students must pay each semester's student fee in accordance with the bill's due date. All fees are subject to annual revision. Students who do not pay the required fee may have their registration canceled.

Summer Session 2026 (2025-26 academic year): Registration fee is $568. This amount will be charged for all students regardless of the number of credits and type of class that the student enroll in. The tuition for Summer 2026 can be found here.

Refund Process During the first month of the semester financial aid refunds are processed in accordance to the Finance Department Institutional policy and procedure.

Direct Deposit All student financial aid or student account refund can only be processed through direct deposit. Click here for detailed direct deposit sign up instructions.

Withdrawal Fees All student financial aid or student account refunds can only be processed through direct deposit.

Fall 2025
100% Tuition Refund: Thursday, August 28 - Tuesday, September 9, 2025
50% Tuition Refund: Wednesday, September 10 - Wednesday, September 17, 2025
25% Tuition Refund: Thursday, September 18 - Thursday, September 25, 2025
0% Tuition Refund: Anytime on or after September 25, 2025
Be advised that the student registration fee of $1,135 is non-refundable after Thursday, August 28 and is not subject to the partial refund policy.

Spring 2026
100% Tuition Refund: Wednesday, January 21 - Wednesday, January 28, 2026
50% Tuition Refund: Thursday, January 29 - Thursday, February 5, 2026
25% Tuition Refund: Friday, February 6 - Friday, February 13, 2026
0% Tuition Refund: Anytime on or after February 14, 2026
Be advised that the student registration fee of $1,135 is nonrefundable after Wednesday, January 21 and is not subject to the partial refund policy.

Registration Fee A mandatory student registration fee of $1,135 per semester will be charged to each student's account. This fee is payable on acceptance of admission or registration and is nonrefundable. For new and continuing students, this fee is payable on acceptance of admission or semester and is non-refundable.

FACILITIES AND RESOURCES

The Cooper Union campus is comprised of five buildings at Manhattan's Cooper Square, between Sixth and Ninth Streets and Third and Fourth Avenues.

The Foundation Building At the center of this educational complex is the Foundation Building, the original structure which was built under Peter Cooper's supervision. Housed in the building are the Great Hall, The Cooper Union's historic auditorium; The Irwin S. Chanin School of Architecture; much of the School of Art; the library; the Arthur A. Houghton Jr. Gallery, the Office of the President and Office Services (mail, photocopies). The building also includes the Architecture Archive, classrooms, shops and studios.

The building is open during the fall and spring semesters from 7:30 am to 12 am, Monday through Friday; and 9 am to 9 pm, Saturday and Sunday. Hours may be extended during high-use periods such as the last two weeks of the semester. The School of Architecture office is open Monday through Friday, 9 am to 5 pm. The School of Art office is open from 8:30 am to 6 pm during the academic year. Shops, special labs, the computer studio and other facilities that require supervision are open on a more restricted basis; each facility posts its own hours.
A detailed schedule is available from the School of Art office.

During the summer months, the Foundation Building is open from 8 am to 5:15 pm Monday through Thursday; the administrative offices are open from 9 am to 5:15 pm Monday through Thursday; and all of the educational facilities are closed except to high school students who participate in the Saturday/Outreach Program and participants in the Typography Design Program.

41 Cooper Square houses the Albert Nerken School of Engineering, the Faculty of Humanities and Social Sciences, the Herb Lubalin Study Center of Design and Typography, 41 Cooper Gallery, the Frederick P. Rose Auditorium, the Jeannette Brooks Computer Center, and the Benjamin Menschel Civic Projects Lab. It also features studios for the School of Art; classrooms, laboratories, and lounges for all students; and the Hub, an information center for visitors and students to meet with members of the Office of Enrollment. The first academic building to achieve the LEED Platinum status, 41 Cooper Square provides all students of The Cooper Union with access to state-of-the-art tools to pursue creative and original research and design in the course of their learning.

30 Cooper Square The Business Office, Office of Communications, Alumni Affairs & Development, Public Programs, and Office of Human Resources are housed at 30 Cooper Square.

Student Residence The 29 Third Avenue Student Residence Hall makes it possible for students to live in a community and share a collegial approach to learning that will have a lasting impact on their adult and professional lives. Intended to provide a transition for new students from living at home to renting a private apartment, the 29 Third Avenue Student Residence Hall opened its doors in September of 1992. The Student Residence Hall is located on the corner of Stuyvesant Street and Third Avenue.

The 29 Third Avenue Student Residence Hall offers apartment-style housing for approximately 170 students. Units range in size to accommodate three to five people, with the majority of the apartments being composed of two bedrooms, shared by four people. Each unit is composed of a bathroom, kitchen and bedrooms. The building amenities include a laundry room, the Menschel Room, 3A Student Reading Room, 3C Student Study Room and the Office of Student Affairs (Center for Career Development, Student Care, Residential Life, Student Life, and International Students & Scholars).

The building is staffed by the Director of Residential Life & Community Development and eight resident assistants. In addition, there is a 24-hour security system, including security guards, closed-circuit cameras and alarm systems.

Due to space limitations, Cooper Union is unable to guarantee housing to any of its students. Cooper Union's policy is to give housing preference to first-year students. Upperclass students will not be considered until all first-year applicants have been housed. Students should assume that on-campus housing will not be available after their first year.

Stuyvesant-Fish House The historic townhouse at 21 Stuyvesant Street, known as the Stuyvesant-Fish House, was gifted to the institution in the late 1990s. The house was renovated by Cooper Union architecture alumna Toshiko Mori to serve as the president's residence and an event space for Cooper Union gatherings. In 2023, a comprehensive project began to restore and preserve the landmarked exterior.

Benjamin Menschel Civic Projects Laboratory

Designed as an all-in-one classroom, workspace, and public showcase, the Benjamin Menschel Civic Projects Laboratory, which opened in 2021, is dedicated to multidisciplinary student projects aimed at civic-focused issues. The idea for the lab grew out of student interest in having a hybrid work and exhibition space in which to pursue project-oriented learning while engaging The Cooper Union's surrounding East Village neighborhood and the broader New York City community.

The Civic Projects Lab can be viewed through large, street-level windows and entered from Third Avenue where it anchors one corner of 41 Cooper Square. The design for the lab is organized around three different zones: a meeting space with a flexible configuration of chairs and tables, an area with standing workbenches for collaborative production, and a presentation area made up of a pinup wall with movable sections.

Center for Career Development

The mission of the Center for Career Development is to advance personal, educational and professional growth. The Career Center complements The Cooper Union's academically centered tradition by preparing students to make a successful transition from studying with a distinguished and creative faculty to applying their knowledge and skills to a professional practice. The Career Center facilitates student inquiry into relevant applications of the education they have received at the institution, strengthening The Cooper Union's historic commitment to science and art. More information about the Center for Career Development can be found here.

Continuing Education offers to the general public and the Cooper Union community a wide range of lectures, symposia, readings, performances and evening courses. These public programs comprise an effort to extend the creative and intellectual life of the institution into the larger community, as well as to complement Cooper's undergraduate offerings. Many of the programs, including courses, are free to Cooper Union students, faculty and staff.

The Cooper Union Library The Cooper Union Library's specialized collections provide support for the academic programs at the institution's three degree-granting schools of Art, Architecture and Engineering, as well as courses in the Humanities and Social Sciences.

Located on the ground floor of the landmark Foundation Building, the Library houses over 100,000 volumes of books and periodicals, maintains collections that include visual and historic materials, and provides access to a wide variety of electronic resources, including thousands of e-journals and e-books. The Library offers group instruction in research techniques and has computer facilities for individual research and study.

Through a number of consortial agreements, the Cooper Union Library provides students, faculty, and administration with access to collections at a wide variety of private academic libraries in New York City. Reciprocal access and borrowing privileges are offered at New York University's Bobst, Courant, and Dibner libraries, the New School Libraries, and the New York School of Interior Design Library. Access without borrowing is provided at NYU's Institute of Fine Arts library and the Chutick Library at the Cardozo School of Law. Membership in the Metropolitan New York Library Council allows for referrals to virtually any private library in the city for on-site use of materials.

Alumni have continued access to the Cooper Union Library at no cost, and can re-establish borrowing privileges for an annual fee.

The Great Hall of The Cooper Union has stood for over a century and a half as a bastion of free speech and a witness to the flow of American history and ideas. When the hall opened in 1858, more than a year in advance of the completion of the institution, it quickly became a mecca for all interested in serious discussion and debate of the vital issues of the day. It has continued in that role ever since.

The Hub (41 Cooper Square, ground floor) brings together the offices of Admissions, Student Financial Services, and the Registrar. The central location lets students find answers to all their questions related to admission requirements, scholarships, financial aid, and registration.

IDC Foundation Art, Architecture, Construction, and Engineering Lab
An interdisciplinary and state-of-the-art maker space, the IDC Foundation Art, Architecture, Construction, and Engineering Lab (AACE) Lab offers a wide variety of advanced digital fabrication tools and resources to students from all three schools of The Cooper Union. The AACE Lab features over 30 pieces of digital fabrication equipment, including laser cutters, CNC routers, 3D printers, 3D scanners, a waterjet cutting machine, a vinyl cutter, an embroidery machine, a wire bending machine, and a vacuum-forming machine, in addition to supplementary tools and instructional resources.

Located on the fourth floor of the Foundation Building, the AACE Lab is housed in a renovated space designed by Samuel Anderson Architects, a firm led by Cooper alumnus and adjunct professor of architecture Sam Anderson. Students can access the lab for in-person use as well as via self-service resources and through a variety of standalone and in-class workshops offered by the facility's professional staff.

SCHOOL OF ARCHITECTURE

The main spaces of the School of Architecture are housed primarily on the second, third and seventh floors of the Foundation Building, a National Historic Landmark widely referred to as one of New York City's great monuments.

When The Cooper Union opened in New York City in 1859, the physical structure of the original building closely followed Peter Cooper's educational philosophy. The five-story Foundation Building was designed by Frederick A. Petersen in the Renaissance Revival style, with studios and classrooms above a first floor of stores open to the public. In 1890, Leopold Cyrus W. Eidlitz added studio skylights and additional floors to the building. The building exemplified not only Peter Cooper's dedication to social mobility through education, but his recognition of the power of technology and the importance of art and design. The tallest building in New York City in 1859, this first "skyscraper" was also the first building to be designed with a rolled

iron I-beam infrastructure and the first to house an elevator shaft top to bottom, although the passenger car and conveyance system for such a shaft had not yet been developed.

In 1974, John Q. Hejduk, the first Dean of the School of Architecture, completely redesigned the interior of the Foundation Building, aligning the program of the building with the pedagogy of the schools, while leaving the exterior largely unchanged. In the words of Ada Louise Huxtable, the renovation was "the best of both worlds," with the "'Renaissance shell intact" and the "clarity and detail of the consciously sophisticated modernism of the interior" attesting to "the creative continuity of history and art." The brownstone exterior of the Foundation Building was extensively restored under the direction of Platt Byard Dovell between 1999 and 2002.

The Studios All students in the School of Architecture are provided workspace on the third floor within a shared studio. With the first through fourth years sharing a single large studio and the fifth-year thesis class and graduate students in smaller studio spaces, a unique environment fostering cross-fertilization between classes and individual students is maintained. Students are provided with individual studio workspace with individual and shared tables for drawing, study, reference, model building, etc. For the health and well-being of students, the school does not support the principle or practice of continual 24-hour studio access. Studios are generally open Monday–Friday, 7:30 am–12 am, and Saturday–Sunday, 9 am–9 pm. Extended studio access may be available during the last two weeks of the semester.

Computer Studio The School of Architecture Computer Studio on the seventh floor of the Foundation Building is specifically intended to support a design curriculum that recognizes the use of computing as an instrument of investigation and practice and which urges students to explore its formal and cultural implications. The facility utilizes both Macintosh and Dell Precision PCs (including high-end multiple-processor rendering stations), scanning and printing capabilities and two large-format plotters. Software includes an array of imaging, drawing, drafting and 3D modeling and rendering programs. This facility is open to all students of The Cooper Union. Considered integral to the activities of the design studio, the computer studio is generally open whenever the design studios are open, giving students access an average of 17 hours a day. A student monitor trained to assist in the effective use of the facility and to do simple troubleshooting on the hardware is present whenever the center is open.

The School of Architecture Computer Studio also supports a 3D printer and laser-cutter; other three-dimensional output capabilities in The Cooper Union include a laser-cutter in the School of Art and CNC and rapid prototype machines in the School of Engineering. Computing facilities designed to serve the specific needs of the Schools of Art and Engineering are open for use by students of the School of Architecture.

Lecture Room A small auditorium on the third floor is used for lecture classes and invited lecturers. Special lectures are open to all interested Cooper Union students.

Art & Architecture Shop An outstanding all-college sculpture shop is located on the fourth floor. Integral to both the program and pedagogy of the School of Architecture, the art and architecture shop is equipped for projects in wood, metal, plastics, plaster and clay, and includes a bronze casting foundry.

Study Collection The School of Architecture has fostered the growth of a non-circulating Study Collection of books and periodicals that are not otherwise accessible through the Cooper Union library system, sometimes including rare or limited edition items, often on loan from private collections. Students make use of the room for quiet reading and study. The room is also used for seminar classes and meetings.

School of Architecture Archive The School of Architecture Archive is responsible for the ongoing collection, documentation and storage of student work, and now has a record of student work produced at the school since the 1930s. This provides an invaluable record of the pedagogy of the school that can be used for exhibitions, publications and student research. In addition, the Archive's Blueprint Collection, Lantern Slides, New York Postcard Collection, Stanley Prowler Slide Collection, New York City Waterfront Archive, Limited Edition Books and rare books are resources available for use by students and faculty for research and study. The Archive also manages the loan of analog and digital video cameras as well as other photographic equipment for student use on class projects.

Arthur A. Houghton Jr. Gallery Named for Arthur A. Houghton Jr., a former trustee and chairman of The Cooper Union, this 1,800 sq ft gallery supports the School of Architecture's pedagogy through public exhibitions and events. For over 40 years, architects, photographers, painters, builders, and the school's faculty and students have exhibited their work here, drawing viewers from schools of architecture, professional design communities, and the general public. The Architecture Archive curates, designs, and installs original exhibitions in Houghton and works with collegial institutions to present jointly sponsored exhibitions. Recent Houghton Gallery exhibitions presented by the School include *Confronting Carbon Form* (2023); *Nivola in New York: Figure in Field* (2020); *Drawing Codes: Experimental Protocols of Architectural Representation* (2019, co-presented with the California College of Arts / Digital Craft Lab); *Archive and Artifact: The Virtual and the Physical* (2018); and *Hélène Binet—John Hejduk Works* (2017).

Personal Laptops The School of Architecture Computer Studio as well as the Cooper Union Computer Center at 41 Cooper Square are open to all architecture students and are equipped with all of the hardware and software necessary for their work and study. We recommend that students who wish to purchase their own laptop computers complete their first year of study before making a purchase in order to fully test a range of programs and platforms. Current students have selected a variety of laptop models in both Mac and PC platforms for individual use. The Cooper Union

assumes no liability for personal laptops. Students who use/bring their personal laptops to school are solely responsible for the safety and security of their equipment and are strongly advised to secure their laptops in their lockers when not in use.

Communication Each new student is assigned a Cooper Union email address during Orientation. It is the responsibility of all students to actively and regularly check and use their Cooper Union email in order to receive, in a timely manner, official school announcements, important information about registration, messages of general interest about events, exhibitions and programs, safety updates, policy notifications, etc. As The Cooper Union continues its transition to an online administrative system, linked solely to The Cooper Union email address, this line of communication becomes even more vital. In addition, wireless internet access is available throughout The Cooper Union and can only be accessed via a Cooper Union email address and password.

SCHOOL OF ART

The School of Art is primarily housed in the 1859 landmark Foundation Building. Additional classrooms and student studio spaces, the Media Lab, the Herb Lubalin Study Center, and the 41 Cooper Gallery are housed across the street at 41 Cooper Square. The studios, classrooms, shops, and labs of the School of Art offer complete facilities for a visual arts education. A professional staff of technical assistants is available in many of these facilities seven days a week to provide help and guidance to students in the School of Art, and to provide a healthy and safe working environment.

In the Foundation Building, skylight ceilings flood abundant natural daylight throughout a number of classrooms, workrooms and student studio spaces. Most studio classrooms are equipped with easels, model stands, palette tables, and sawhorse tables. Common workrooms are furnished with slop sinks, worktables and storage racks to accommodate the preparation and storage of artwork. Seminar classrooms provide seating for between fifteen and seventy five people. Four classrooms in the Foundation Building are fitted with digital projectors and sound and video connections. Two multimedia classrooms at 41 Cooper Square are equipped with high-definition projection teaching stations, and with Apple MacPros, which are connected to the Internet via T1 lines.

All students in their second, third, and fourth year in the School of Art, as well as exchange students, are provided with individual studio spaces. These studios are located on the second, fourth, and sixth floors of the Foundation Building, and on the fifth, sixth, and ninth floors of 41 Cooper Square. Each studio has pinup wall space and is set up with a desk and a lockable storage cabinet.

Technical Shops & Labs

Art and Architecture Sculpture Shop A large, all-college sculpture shop supports opportunities for production of a wide range of three-dimensional work. This facility, located on the fourth floor of the Foundation Building, is equipped with machinery for wood- and metal-working, mold-making, bronze casting and projects using wax, clay, plaster and some plastics.

Film, Video, Animation & Sound

Film Film students can borrow 16mm Bolex cameras with zoom or prime lenses, as well as a Canon Scoopic and Arri 16BL. Camera kits include light meters and complete instructions. Tripods, lighting kits and other support/grip equipment is also available. Film and developer is sold at the Checkout Office and students can hand-process it onsite or send it to a local lab.

The Film Lab has a custom-built 16mm HD transfer machine so that processed film can be converted to digital files, or edited on a Steenbeck flatbed editor. 16mm viewers, splicers and rewinds are also available. A JK optical printer is available for contact prints or optical special effects.

Video Video students have access to large-sensor DSLR cameras and professional camcorders with a range of prime and zoom lenses. GoPro action cameras and older formats are also available. Students can borrow fluid-head tripods, shoulder rigs, stabilizers and a variety of halogen and LED lighting kits. Grip equipment, gels, umbrellas and softboxes can be added to any light kit. Other equipment (monitors, speakers, projectors and media players) is also available for multi-media installations.

The Video Lab has eight Macintosh workstations with Adobe Premiere Pro, After Effects and Photoshop, Pro Tools and other audio and video software. Additional outboard equipment includes various analog and digital and audio and video decks, mixers and special effects devices. The video lab is networked and equipped with a video/data projector for instruction and viewing student work

Animation Animation students have access to DSLR and 16mm cameras for image capture, as well as light tables, peg bars and animation stands for analog/cel animation, direct-on-film painting and stop-motion.

The Animation Lab has 10 Macintosh workstations and provides support for two- and three-dimensional animation. Additional hardware includes DSLR animation stands with Dragonframe stop-motion software, a digital rotoscope station, flatbed scanner, vocal isolation booth and various analog and digital audio/video decks. This lab also serves as a supplementary facility for students working with film, video and sound projects, has all of the same software and is networked and equipped with an HD video/data projector with surround sound for instruction and viewing student work

Sound Students taking Sound classes have access to professional digital audio recorders, supported by a complete array of microphones including shotgun and stereo mics, wired and wireless lavalieres, binaural pairs, contact mics, and custom transducers. A dedicated sound editing room is equipped with surround mixing capabilities and a vocal isolation booth, Pro Tools and Reaper software.

Screening Room/Classroom Classes are primarily held in the Screening Room, a theater for large-screen projection of film and HD video with 5.1 surround sound. The projection booth is equipped for 16mm and Super 8 and offers flexible signal-routing with AV ties to the editing facilities. The room doubles as a shooting studio with a permanent green-screen and additional electric service for high wattage lighting.

Access Equipment and use of facilities is available to all students currently enrolled in a Film, Video, Animation or Sound class. Equipment can be reserved and checked out for 2 and 3 day periods. Students that have previously taken a class have limited access. A professional staff of technicians are continuously available during posted studio and checkout hours.

Photography Lab

The use of the photography lab and equipment is available to students currently enrolled in photo classes. Students who have taken photo previously, but are not currently enrolled, have limited access to facilities and cannot check out equipment.

The analog photography facilities include a spacious, well-ventilated black-and-white communal darkroom with 16 enlargers capable of printing 35mm to 4x5 inch negatives, a large black-and-white film processing area with automatic temperature controls, and a dedicated alternative-processes room with UV exposure units.

The digital photography lab includes 16 Macintosh workstations, each with a dedicated 17" professional-grade Epson inkjet printer. A variety of scanning options for film and prints are available, including letter and tabloid size Epson flatbed scanners, Nikon film scanners and, for advanced students, a Hasselblad Flextight film scanner. Two large format printers are managed by staff, and students enrolled in photo classes may request prints from the checkout window for a fee.

A well-equipped lighting studio, complete with a tethered capture system, provides space to photograph using professional tungsten, LED, and strobe lighting equipment. A wide range of cameras including 35mm, medium format, and large format films are available for checkout, as well as professional DSLRs with full-frame and medium format sensors. Knowledgeable technical assistance is on hand continuously during posted lab hours.

Printmaking Shop & Type Shop

A well-equipped and ventilated printmaking shop on the fifth floor of the Foundation Building accommodates intaglio, lithography, screen printing and relief printing processes and papermaking. The facility includes three lithography presses, three etching presses and four screen printing vacuum tables. There is a dedicated computer facility with two large format printers for digital imaging and pre-press photographic work. There are more than 100 stones for lithography and a collection of rollers for lithography, monotype, and surface rolling in etching. The paper mill is complete with beater, a 75-ton hydraulic press, vats and the capability for both Western and Japanese papermaking.

A professionally-staffed and well-lit letterpress studio is available to all students. It is equipped with five Vandercook cylinder presses, one tabletop pilot platen press, polymer bases, a foil stamping machine, book presses, binding hand tools, a polymer plate maker, and well-organized foundry and wood type, as well as all necessary spacing material and composing equipment. Skilled technical assistants are available to help students execute all manner of printing and binding projects.

Painting Offices & Art Studios

The Painting Office is a resource on painting and painting techniques and is staffed by knowledgable technicians who provide canvas stretching and priming demonstrations and advise on health and safety protocols when working with oil paints and solvents.

Gesso rooms located on the 6th floor of the Foundation Building and 9th floor of 41 Cooper square have large work tables where students can stretch and prime canvases. These areas include slop sinks, a brush washer, large painting racks, storage for paintings and works on paper in painting racks and flat files. High ventilation rooms are also located on the 4th floor of the Foundation Building and 9th floor of 41 Cooper Square.

The Painting Office assigns and maintains all studios for School of Art students and provides a number of supplies gratis and for purchase, and has an inventory of tools for loan.

Herb Lubalin Study Center of Design & Typography

The Herb Lubalin Study Center of Design and Typography in the School of Art was founded in 1985 by The Cooper Union and friends of the late Herb Lubalin. Its mission is to focus on the preservation of design history through its core collection of the work of Herb Lubalin and extensive library and archive of design ephemera. The Study Center and its archive are important central resources for the students and faculty as well as the professional and general public. All materials are fully available by appointment and are regularly highlighted through center's public exhibitions and lecture programming.

Media Lab

The Media Lab is a multimedia digital workspace and output facility. It offers access to a wide array of software, printing, scanning, and professional support services for all Cooper Union student, faculty, and staff.

The Media Lab, a part of the Department of Information Technology, is located on the eighth floor of 41 Cooper Square in rooms 804, 805, and 806, comprising two classrooms and an open workspace. Each room features Apple iMac workstation running Mac OS and Windows platforms, laser printers, and high-resolution flatbed scanners. Room 805 features large-format plotters and archival printers with a wide range of media options, large-format scanning, and a shared [cutting/work] table. All Media Lab computers feature a variety of software for graphic, web, and UX design (Adobe Creative Cloud, Sketch, Atom), video and animation (Adobe After Effects and Premiere), and 3D design (AutoCAD, Rhino, Maya, Unity). Students will have access to Media Lab resources throughout their time at Cooper Union.

Academic Support Technicians (AST) are available at all times to help students, faculty, and staff use the Media Lab's resources in the creation of their projects and class materials. ASTs provide extensive technical knowledge and professional experience with the Media Lab's resources, and can provide assistance with everything from print to video animation projects.

SCHOOL OF ENGINEERING

The Jeanette and Louis Brooks Computer Center (CUCC) is a shared drop-in computer lab, accessible to all students and faculty. It provides centralized administration and technical support for all academic computing needs across campus. The CUCC is equipped with Windows PCs and Apple iMacs, supporting Windows, macOS, and Linux environments. This diverse setup offers a wide range of industry-standard software, including digital media, imaging, and fabrication tools. The high-performance workstations are designed to handle the graphic and processor-intensive applications required across all School of Engineering disciplines. For printing and scanning needs, black-and-white laser and color multifunction printers are also available.

Additionally, there are classrooms on the 8th floor of 41 CS (rooms 802, 803, 804, and 806) that house Windows PCs and Mac Studio workstations, configured identically to those in the CUCC. Students can reserve these stations when necessary, particularly for collaborative work with instructors. When classes are not scheduled, these IT instructional spaces are open for casual drop-in use by both students and faculty. All Engineering School classrooms are equipped with Wi-Fi-enabled projectors, allowing wireless connection to the projector and internet, making it easy to share computer screens from anywhere in the room.

To ensure a consistent experience for both students and faculty, all instructional and drop-in workstations across campus are configured with identical software environments. This uniformity enables students to seamlessly perform their academic work in classrooms and other lab locations throughout campus.

Central and Student Shops The Albert Nerken School of Engineering operates two central shops in Rooms LL218 and LL219 on the lower level 2 of 41 CS for use by students in all engineering majors. Each shop is staffed by a qualified full-time technician and is open 9AM-5PM on weekdays, except on school holidays. Room LL218 houses high-precision automated equipment while LL219 houses manual equipment. Students are only permitted in the shop when the technician or a qualified faculty member is present. The shops contain a variety of fabrication and machining equipment as well as small power tools such as drills and grinders, hand tools, basic stocks of wood and metal and a comprehensive set of fasteners.

Central Shop (Room LL218) The Central Machine Shop equipment includes: 5-axis CNC Mill, CNC Lathe, CNC plasma cutter, two manual milling machines, engine lathe, surface grinder, combo shear & bender sheet metal machine. Extensive metrology tool crib and large software CAD/CAM library are installed on two computer workstations. Machining services are provided in ferrous and non-ferrous metals, stainless steels, plastics, and composite materials.

Student Shop (Room LL219) The Student Machine Shop is equipped with two manual milling machines, three manual toolroom lathes, drill presses, band saws and other bench-type power tools. Three multi-function welding machines are also in operation in a designated area which is ventilated and sectioned off with welding curtains to protect others present in the rest of the shop. Various hand tools and supplies are available for use.

Both the Central Machine and Student Shops are monitored and maintained by trained laboratory technicians and machinists who provide training on safe use of equipment as well as design consultation and instruction. These facilities are available to students and faculty for teaching and research purposes within the School of Engineering.

The Engineering Student Success Center fulfills a variety of academic purposes: it provides a space for ARC tutoring (math, chemistry, physics, and computer science) and proctoring. The Center also hosts workshops for students on a host of subjects, from the specifics of registration to improving study habits. Professors and students, as well as professional societies, use the Center as a meeting space.

Maurice Kanbar Center for Biomedical Engineering

The Kanbar Center is a 970 square feet laboratory for research and education of undergraduate and graduate students in biology and bioengineering. The Kanbar Center offers laboratory support for bioscience electives for engineering students interested in a Bioengineering Minor. The center also provides extensive laboratory training and involvement in projects in biotechnology, bioengineering and biomedical fields in research-based courses and independent studies. The center provides facilities and support for collaborative projects with other engineering laboratories and departments. Kanbar laboratory staff provide advanced level biosciences research for senior projects and Master's thesis research in joint projects with faculty from Mechanical Engineering, Chemical Engineering, Chemistry, or any other department. Kanbar Center offers courses, facilities and projects for training and learning, but also advisory, for students interested in medicine and biotechnology.

The Kanbar Center is comprised of a biosafety-level 1 life sciences laboratory with state-of-the-art equipment for protein purification, biochemical characterization of various biomolecules, cell and tissue culture, and microscopy equipment. The center supports projects with laboratory experiences in molecular biology, genetic engineering, protein biochemistry, cell and tissue engineering, microbiology, biocompatibility, ecology and other fields of biology.

The Kanbar Center life sciences laboratory space is used for a laboratory component of electives: Biology for Engineers 1 and 2 (Bio201/202), Protein Expression, Purification and Analysis (Bio422), Science and Application of Bioengineering Technology (EID325), Synthetic Biology (EID423), and Tissue Engineering (EID327). The center is also used to provide ideas, training, supervision, and resources for research projects in Special Topics in Bioengineering (EID320) and Bioengineering Research Problem (BIO364), Senior Projects (ME393/394) and Master's thesis research.

Master's thesis research accomplished at the Kanbar Center in last few years include projects in biotechnology: developing of new protocols for production of medically relevant proteins, biomaterials, and purification and functional analysis of proteins from immune system modulating bacteria. Independent study projects include use of CRISPR/Cas9 based gene targeting for genetic modification of industrially important bacteria, genetic modification of the cricket gut microbiome for production of vitamins, isolation and electrochemical characterization of electrochemically active bacteria from NYC ponds for microbial fuel cells and other.

The Kanbar Center is typically staffed from 9AM-5PM on weekdays, except on school holidays. For research activities being performed outside of these hours and dates, there must be a faculty member or laboratory technician present with a valid C-14 license (Laboratory Certificate of Fitness) issued by the New York City Fire Department.

STEM Makerspace STEM Makerspace is a prototyping lab located in 707 in 41 Cooper Square and is the flagship space for STEM Outreach programs. It is also a student-run, learning hub that promotes skill-sharing in the form of workshops and hosts Open Hours for the engineering students to readily find resources for hands-on projects. It is equipped with tools such as 3D printers, a laser cutter, and hand/power tools, in addition to a library of raw materials & hardware components for the purpose of rapid prototyping. It is on the same floor as and designed to be complementary to a collaboration space used by first-year students in EID 101, Engineering Design and Problem Solving, and engineering senior design ("capstone") teams.

Chemical Engineering Laboratories

The Chemical Engineering Research Laboratory (303) and Unit Operations Laboratory (304) are the spaces where the senior laboratory courses (ChE371 and ChE372) are offered; this sequence is a two-semester practical, in which groups of students investigate pilot-scale material and energy transfer applications against textbook theory using eight experiments (four per semester) designed for safety, material recovery, and material reuse. These laboratories are fully equipped with benches, stools, sinks, a fume hood, power outlets, and PCs. Room 303 doubles as both undergraduate and graduate research space.

ChE Research Laboratory The Chemical Engineering Research Laboratory is a space for chemical engineering students to utilize the engineering knowledge they've obtained from their coursework and apply it towards their own research endeavors. Students are provided the space and tools to conduct sections of their research ranging from experimental design and data collection to the writing and editing of their reports and papers. In addition to being a space for research, the laboratory also hosts the ChemE Car club and several unit operations for the senior laboratory course such as:

- Flooding Point of a Packed Column/Absorption Column
- Heat Exchanger
- Drying
- Membrane Air Separation
- Reverse Osmosis
- Fume hoods
- Air conditioning and exhaust ventilation systems
- Safety showers in adjacent hallway
- Fire extinguishers and fire blankets
- Eye wash stations
- First Aid Kits
- Gas cylinder storage facility
- Safety regulations sheets
- Hazard signs
- Safety Data Sheet (SDS)

Unit Operations Lab The Unit Operations Laboratory provides chemical engineering students the opportunity to observe, analyze and apply their engineering knowledge and training to the operation of equipment and processes commonly found in many chemical industries. In 1922, Arthur D. Little, former President of both the American Institute of Chemical Engineers (AIChE) and the American Chemical Society (ACS) stated: "Chemical engineering... as distinguished from the aggregate number of subjects comprised in courses of that name, is not a composite of chemistry and mechanical and civil engineering, but a science of itself, the basis of which is those unit operations which in their proper sequence and coordination constitute a chemical process as conducted on the industrial scale."

Throughout their undergraduate education at The Cooper Union, students are exposed to various unit operations in their coursework. During their senior year, students take a two-semester laboratory sequence in which they are given hands-on exposure to ten different unit operations. This complements their training as chemical engineers and provides intensive experiences in rigorous experimental approaches, analysis and safe operating procedures. Currently, the following unit operations are being studied:

Fall Semester

- Filtration
- Flooding Point of a Packed Column
- Fluid Flow
- Heat Exchanger
- Reactors

Spring Semester

- Distillation
- Drying
- Liquid-Liquid Extraction
- Membrane Air Separation
- Reverse Osmosis

In addition to performing experiments that illustrate the above unit operations, the students receive extensive training in technical and communication skills. Students are required to write laboratory reports on a scholarly level, prepare and present posters, write executive memorandums and funding proposals, and give technical oral presentations.

Civil Engineering Laboratories

Civil Engineering Laboratories The Civil Engineering Curriculum recognizes the importance of laboratory experience that combines elements of theory and practice as an integral part of the student's professional education. To accomplish this objective, the Department maintains a separate, well-equipped laboratory.

Materials & Structures Laboratory This facility is maintained to meet the program's laboratory needs in solid mechanics, properties of engineering materials, structural engineering, study of dynamic response, and concrete technology. This laboratory is used in CE 321 and CE 361. The laboratory is also used in CE 369, and by master's students for their research. The 2,400 sq. ft. facility has the following capability:

This laboratory houses the MTS 810 System that can perform a wide variety of standard materials tests. The system consists of the following major components: load frame and actuator with a maximum capacity of 100 KN or 22,000 lbs., hydraulic power supply, microconsole (command post), microprofiler (programming post), A/D Boards, computer/printer and software, oscilloscope and accessories (e.g., grips, extensometers, etc.). The MTS 793 Control software is available to perform tension tests, compression tests and low and high cycle fatigue tests. The MTS Flex Test Model 40 Controller Hardware provides real-time closed- loop control, with transducer conditioning and function generation to drive our existing servo-actuators.

Linear and rotary actuators operate in conjunction with MTS 810 system, but they provide additional flexibility in several areas. For example, the linear actuator permits a larger tes tbed for full-scale or proportional structural applications. In addition, the linear actuator has swivel capability, so that it can be positioned for horizontal, inclined or vertical load applications. The rotary actuator permits application of programmable dynamic loads to a specimen in torsion.

A Tinius Olsen universal testing machine with capacity of 120,000lb is available for a full range of tension, compression, bending, and buckling tests. It was last calibrated in the Spring of 2024.

Students can use a complete range of strain gage instrumentation for the measurement and analysis of strain and stress in scale models or full-scale structures.

A large test bed for heavy loading of structural systems and hydraulic loading frames are available for structural testing.

There is also a separate 400 sqft concrete mixing and casting room and another separate humidity and temperature-controlled curing room for concrete.

The following acquisitions were made in this laboratory in the last 2 years:

- MTS Series 793 Control Software Upgrade. A test design application that allows to create monotonic and cyclic tests and to acquire data.
- The old computer was replaced with a new one and the new version of the 793 Control software was installed in the Spring of 2023.
- The MTS machine was last serviced in the Spring of 2023.

Geotechnical Laboratory This facility is maintained to meet the program's needs in soil mechanics, foundation engineering and specialized geotechnical studies such as soil stabilization, etc. This laboratory is used in CE331, CE361, CE369 and by master's students for their research. It contains the following major items of equipment:

- Two tri-axial/CBR/unconfined compression machines for the confined strength determination of soil samples. Confined pressures up to 100 psi can be achieved with this equipment
- High and low range consolidation units with the capability of testing samples from 2.5 to 4.4 inches in diameter- several units are available in the laboratory for simultaneous student use
- Complete set of equipment to perform the California Bearing Ratio Test
- Constant head and variable head permeability equipment
- Relative density set, including a vibrating table
- Equipment for determining the direct shear strength of soil samples
- Complete set of standard testing sieves with two mechanical sieve shakers
- Complete set of equipment for Proctor Tests

Hydraulics Laboratory This facility is maintained to meet the program's laboratory needs in fluid mechanics, hydraulic engineering, ocean engineering and groundwater hydrology. Specialized capabilities include dispersion and thermal plumes and measurements of a complete range of flow parameters. Professor Jeong Eun Ahn is responsible for the development, direction and operation of this laboratory.
This laboratory is used in CE 343, CE 361, CE 369, and by master's students for their research. The undergraduate Civil Engineering students conduct a series of hydraulic experiments in the hydraulic laboratory as a required element of CE 343 Water Resources Engineering. The students conduct experiments in pipe flow, friction losses, the venture meter, turbulent/laminar flow, the hydraulic jump and pressure on gates. It contains the following major items of equipment:

- Reynolds demonstration apparatus
- Piping systems
- Large flume, moving cradle, and wave-generation system
- Small flume for open channel flow experimentation
- Green roof experiment

Environmental Laboratory This facility is maintained to meet the program's needs in water and wastewater analysis, soil analysis, environmental engineering, hazardous waste analysis and treatment. This laboratory is used in CE 344, CE361, CE369, and by master's students for their research.

The lab contains the following major items of equipment:

- Instrumentation for the analysis of basic water parameters such as color, turbidity, dissolved oxygen and chemical parameters

- Instrumentation for the analysis of basic wastewater parameters such as BOD, COD, nitrates, phosphates, and organic nitrogen.
- Bench scale unit operations such as: filtration, flocculation, activated carbon, activated sludge, and enhanced solar photo-oxidation
- HACH COD Reactors and HACH Manometric BOD apparatuses
- HACH DO Meter with 50 ft. probe and bottle probe
- Azur Corp. dedicated spectrophotometer, single sample analysis for BOD, COD, solids, nitrates, sugars and surfactants
- Two Investigator's Aids (Model 850) for air pollution (hydrocarbon) analysis
- Hand-held instruments for air pollution analysis (VOC, CO, CO2, NOx)
- OHMNICRON Corp. immunoassay analyzer for pesticides, PCB, etc.
- Three soil analyzers for TPH
- Two soil quality parameter analysis portable labs
- One water quality analysis portable lab
- Three dedicated ion analyzers for water samples
- A Challenge Environmental respirometer for aerobic and anaerobic waste treatability studies
- Programmable SIGMA sampler

Concrete Mixing and Concrete Curing Laboratories The concrete mixing room has a concrete rotary mixer with platform scale load capacity of 1,000 lb., 0.10 readability. This laboratory is used in CE321, CE 361 and by master's students for their research.

Electrical Engineering Laboratories

Special Projects Laboratory This room, located in Room 601 of 41 Cooper Square, is called a "special projects" lab because the projects assigned to the space may vary from year to year. The room is unique among the EE laboratories in that is has two sections, with an inner room with more restricted entry. The inner space is behind a locked metal gate, for projects that require the most restricted access.

Room 608 is another flexible space. Typical uses are benches dedicated to senior and graduate level students. This room is also the location of five software defined radio (SDR) USRP2 systems, with accessories such as Gigabit Ethernet cards, that are used in some wireless communications projects. Other high-end equipment includes an Audio Spectrum Analyzer and a Vector Network Analyzer, the latter used in the ECE335 Engineering Electromagnetics course.

Microlab (uLab), Server Room, ICE (Integrated Circuit Engineering) Laboratories The Microlab/ICE laboratory area is a student-run computer engineering laboratory. Students in the "uLab staff" are responsible for maintaining the computing resources of the EE department. The uLab staff support the needs of the electrical engineering faculty, with ultimate supervision by the EE department chair. The Cooper Union IT Department funds the staff and provides supervision.

The computing facilities have significant autonomy from the schoolwide computing facilities. Specifically, the EE department has full control over a subnet. The uLab provides dozens of virtual machines and containers hosting stations, over fifty workstations that are all centrally managed and orchestrated (distributed throughout the EE labs, not necessarily all in rooms 602/603), and six physical services including a GPU compute node.

The purposes of the uLab include:

- Supplement computing services provided by the Cooper Union IT Department to the Department of Electrical Engineering.
- Support student research projects in computer engineering.
- Provide an opportunity for students to have positions of responsibility, requiring leadership, professionalism and a call to service.

Rooms 602 ("Microlab") and 603 ("ICE laboratory") are essentially computer rooms, although there may be other equipment, such as oscilloscopes and FPGA development boards, depending on the projects.

ICE is an acronym for "Integrated Circuit Engineering." The computers in this room tend to have advanced software packages, such as Cadence , which is used for chip design and electronic circuit simulation in courses such as ECE342 Electronics II, ECE345 Integrated Circuit Engineering. We also have ADS software for microwave domain design. Various electives, as well as senior and master projects use these special software tools. Other tools, such as MATLAB, are installed widely on practically all computers.

The server room 602A is a separate locked space that is located between the Microlab and ICE laboratory and has computer and networking equipment that requires additional cooling. Normally, only electrical engineering faculty and Microlab staff have access to the server room. The primary computing facilities kept in the server room include:

- Servers used for various courses, such as ECE366 Software Engineering and ECE345 Integrated Circuit Engineering.
- GPU Cluster: 32-core, 64-thread GPU-optimized server with 256GB RAM, two large ZFS storage arrays, one Tesla K40c GPU, and 5 Titan X Pascal GPUs. A GPU based cluster which provides access to high end computing.
- Networking equipment (routers, switches, etc.).

Senior and Undergraduate Laboratories Rooms 604 and 605 are adjacent spaces, separated by a large row of bookcases, each equipped with 20 work benches. Room 605 is where first year students taking ECE150 Digital Logic Design, sophomores taking ECE291 Sophomore EE Projects, and juniors taking ECE393/394 Junior EE Projects I and II do their work. The 604 side is reserved for senior projects (ECE395/396). Every senior project group gets a dedicated laboratory bench for the full year. When the space is not large enough to accommodate all senior projects, bench space may

be allocated in other rooms, most typically 601 (the part that is not behind the metal gate) or 608.

These rooms generally contain standard electrical engineering equipment, such as oscilloscopes, power supplies, signal generators, and the like. Circuit components and other miscellaneous supplies are kept in this space.

Printed Circuits Board (PCB) Laboratory When a project requires realizing a system on a PCB, the layout is prepared in software tools and the PCB is manufactured externally. However, students typically perform at least part of the assembly (e.g., mounting chips on the board) in-house.

The PCB Laboratory at the Cooper Union enables students to undertake in-depth hands-on PCB reworks with the help of the high-quality soldering stations, hot-air gun, and microscopes. This enables students to create higher end PCBs that are denser in components with more capabilities and makes it easier to debug any issues.

The laboratory also houses the pick-n-place machine which allows the mass production of the Cooper Common Node Board, which serves as a breakout board for the ESP32-S3FN8 microcontroller.

There are also a number of FPGA development boards (Zedboards) that are nominally kept in 607, though in reality the boards may be moved to other rooms if needed. These boards are used in ECE311 Hardware Design, which is required for EE students in the signals and electronics track, though they may also be used in other projects as well, such as senior design projects.

The department has developed a system for training student operators, who have the necessary expertise to use the equipment properly. With the assistance of the electrical engineering laboratory technicians, students operators can train other operators, so that continuity is maintained as students graduate. Students without proper training are not permitted in the laboratory unless an EE laboratory technician or student operator is present.

The student PCB Laboratory operators help other students review their design schematics or layouts or help them create one from a pre-existing schematic. The operators also help with ordering and assembling.

This laboratory supports schoolwide projects that require PCB or FPGA development, not just those in electrical engineering. For example, many VIP projects rely on the facilities in the room and expertise provided by the PCB Laboratory operators.

Mechanical Engineering Laboratories

Automotive, Experimentation, and Combustion Laboratory This laboratory features a combustion and propulsion test cell and a 300-hp eddy current dynamometer that can be linked to either an FSAE engine or a DC motor/battery-electric powertrain. A custom-built 10-hp AC dynamometer allows students to research the combustion stability limits of a homogeneous charge compression

ignition engine. In this laboratory, students get the chance to disassemble, analyze, and reassemble a series of Briggs & Stratton engines; a small gas turbine engine has also been under development for several years. Fundamental combustion studies are performed in fume hoods to determine the effects of fuel-air flow rate and equivalence ratio on laminar flame speed. A research engine outfitted with a quartz cylinder liner gives students the ability to watch the combustion process of a running engine while taking in-cylinder pressure data in real-time.

This Automotive Laboratory also has a drop test rig designed for dynamic testing of crush energy absorption for vehicle impact safety design. Because the laboratory has a fume hood and exhaust syphons it is also used from time to time to safely perform certain carbon fiber epoxy composite manufacturing operations. This laboratory is fully equipped with a reconfigurable high-volume exhaust system, stationary fume-hoods, and separated from the main laboratory by an Explosion-proof partition with viewing windows making the space particularly appropriate for combustion experimentation with the added safety of remote monitoring and data acquisition. The main door has an interlock switch to prevent testing while the door is ajar as a further safety measure.

A combustion and propulsion test cell contains a 300-hp eddy current dynamometer linked to either the FSAE engine or a DC motor/battery-electric powertrain. A custom-built 7-hp AC dynamometer allows students to research the combustion stability limits of a homogeneous charge compression ignition engine. In this laboratory, students get the chance to disassemble, analyze, and reassemble a series of Briggs & Stratton engines; a small gas turbine engine has also been under development for several years. Fundamental combustion studies are performed in fume hoods to determine the effects of fuel-air flow rate and equivalence ratio on laminar flame speed. A research engine outfitted with a quartz cylinder liner gives students the ability to watch the combustion process of a running engine while taking in-cylinder pressure data in real-time.

Mechatronics Laboratory Mechatronics combines mechanical engineering and electronic control using a systems perspective for the design of products and processes. With the advent of inexpensive microprocessors, the benefits of a mechatronics design philosophy span application areas such as product design, manufacturing, robotics, instrumentation, and process and device control. The Mechatronics Laboratory includes 960 square feet of designated space for both hands-on learning and research purposes with an emphasis on design and application of mechatronics and control systems theory. The Mechatronics Laboratory is used in the Process Control Laboratory Course (ME352), Mechatronics (ME353), Autonomous Mobile Robots (ME412), and Experimentation (ME360) courses to supplement technical concepts with practical applications.

To experiment with problems and applications associated with industrial process control, students in the Process Control Laboratory (ME352) utilize process control (PROCON) test rigs, which include: (1) two liquid level-flow process rigs, (2) two heat exchanger and radiator/fan temperature control rigs, and (3) a pressure control rig consisting of a pipeline on which a pneumatic control valve, orifice block, flow meter and pressure tappings are mounted. All PROCON test rigs utilize ABB industrial controllers that interface with computer workstations. These experimental workstations mirror the types of systems engineers encounter in industry, such as heating, ventilation, and air-conditioning; petrochemical; and pharmaceutical plants. As part of a NSF award titled "Building Sustainability into Control Systems Courses" (Grant No. DUE #1044830; $107,884), these PROCON test rigs were upgraded with new modern controllers, configurable laboratory software interface and a redesigned laboratory manual. These PROCON experiments are supplemented with building mechanical room tours and online learning materials to expose mechanical engineering students to real-world applications related to building control systems. Student researchers also have read-only access to the Building Management System for building control and energy efficiency research projects.

The Mechatronics Laboratory includes several computer workstations for conducting feedback control experiments and mechatronics projects. Eight workstations are equipped with Quanser QUBE DC Motor rigs also used in ME352.

Each workstation in the Mechatronics Laboratory is further outfitted with electronics hardware, including power supplies, oscilloscopes, function generators, breadboards, and circuit programmers, used for signal processing and prototyping. These workstations are also used by students in the Mechatronics (ME353) and Autonomous Mobile Robots (ME412) courses, in which students build autonomous mobile robots designed to perform tasks or to compete with each other. The laboratory is further equipped with LabVIEW software and National Instruments data acquisition devices and laptops for remote data acquisition. To demonstrate digital signal processing concepts, seven National Instruments Educational Laboratory Virtual Instrumentation Suite (ELVIS) are used in Advanced Vibration (ME401) and available to students for breadboarding projects. These data acquisition devices are often lent to students throughout the engineering school for taking data for various undergraduate and graduate student research projects. The laboratory also houses equipment for building energy auditing and air quality monitoring and to support the hands-on workshops in the interdisciplinary Environmental Technology courses (EID233/ ARCH134A and EID234/ARCH134B), which was purchased with support of a School of Engineering Educational Innovation Grant and support from the IDC Foundation's Innovation Initiative This process is maintained via an Excel spreadsheet which lists the equipment and to whom it is checked out.

Plasma and Exergetics (PleX) Laboratory The Plasma and Exergetics (PleX) Laboratory is a 750 square foot space shared by Mechanical Engineering Professors Wright, Sidebotham and Wootton. This laboratory was previously used by externals researchers but starting in 2022 the space was repurposed to support core Mechanical Engineering Department objectives.

Prof. Wright leads graduate and undergraduate research in plasma engineering. He guides research as part of his Thermo-fluid, Energy and Plasma Laboratory Group, stationed in the back of the PLeX Laboratory. More energetic than solids, liquids, and gases, the 4th state of matter – plasma – is generated in the PLeX Laboratory using electrical discharges and is studied for its ability to stimulate beneficial effects when in contact with other forms of matter. Engineering systems relying on low temperature plasmas (LTP) can be used to help address grand challenges related to sustainability, carbon capture and utilization, and providing access to clean water. Wright has guided students in developing instrumented plasma reactors to decompose CO2 gas and achieve a balance in conversion and efficiency. Recent research in the laboratory includes development of a plasma dielectric barrier discharge (DBD) system with liquid electrodes for gas treatment. This system was reported as part of the Proceedings of the ASME 2023 International Mechanical Engineering Congress and Exposition (IMECE) 2023. The Thermo-fluid, Energy and Plasma Laboratory Group space of the PleX Laboratory supports undergraduate and graduate researchers at Cooper in designing and safely testing plasma systems. It is also used to support safe demonstrations and hands-on experiences in the newly developed Plasma Engineering graduate (and undergraduate) elective course (ME436), as well as for relevant projects in Experimentation (ME360), Senior Capstone Design (ME393/394), and independent studies. These relevant projects have included plasma actuator/airfoils, plasma thrusters, and plasma CO2 and water treatment studies. Other thermo-fluids experimental apparatuses of interest, especially for master's level research studies are also supported here, such as a heat transfer rig for determining thermal conductivity of solids, and a benchtop section for developing and instrumenting airfoils. The PLeX Laboratory facilities contain a range of equipment to support the activities of the Thermo-fluid, Energy and Plasma Laboratory Group, including:

- Three dedicated computers with internet connectivity and associated access to a range of open-source resources in addition to licenses for a range of standard software for:
  - –general mathematical processing, visualization, and graphical editing
  - –CAD (SolidWorks)
  - –programming and numeric computing to analyze data, develop algorithms and creating models (MATLAB).
  - –multiphysics simulations (COMSOL)

- Equipment to support experiments, including:
  - –benchtop power supplies for generating high voltages.
  - –high voltage safety gloves and glove testing apparatuses
  - –electrical characterization via oscilloscope; high voltage probe; current probe
  - –CO2 gas analyzer (Licor-850)
  - –vacuum pump for low pressure experiments and demonstrations
  - –peristaltic pump for uncontaminated transport of liquid samples
- Small tools/instrumentation to measure: length, temperature, pressure, gas velocity; more
- General facilities: fume hood, sink/water access; compressed air; compressed CO2

Prof. Sidebotham is developing laboratories that are designed to reinforce fundamental principles in the thermal fluids course sequence (Thermodynamics, Fluids, Heat Transfer, Advanced Thermodynamics). Use of the term exergy (the useful work potential of a system) for this laboratory is aspirational, a reminder that while energy is always conserved, mechanical (useful) energy is not as it can be dissipated into low-grade thermal energy. One test stand consisting of a 1.6 m tall transparent vertical tube (5.9 cm ID) with fittings on the top and bottom to be used in two main modes: the draining tank and the hydrostatic vacuum tube. Both of these modes are forms of "Module 1" laboratories defined in ME360 (Engineering Experimentation) and have been successfully tested during regular ESC330 (Engineering Thermodynamics) class sections.

In the draining tank mode, the column is initially filled with water and is open to the atmosphere at the top. The exit can be connected to any combination of piping and exit nozzles to investigate major and minor losses in pipes. The test consists of opening a valve and measuring the water depth as a function of time. The experiment requires a team of at least 3 (one to monitor water level and call out time, one to set the times on a stopwatch and one to collect the discharge). It is designed so that a team can collect a data set in a 15-minute time block. Therefore, in a 2-hour class period, up to 8 teams can conduct a test, and each team can be assigned a different nozzle configuration. While not conducting tests, the teams work on a workshop designed to analyze the data and compare theory with experimental results. Deviations can be attributed to loss of exergy.

In the hydrostatic vacuum tube (HVT) mode, air is trapped above the water column by closing a valve. When the exit valve is opened, water drains but as the air pocket expands, its pressure decreases below atmospheric (a vacuum) and the flow eventually stops when a hydrostatic balance is attained. Student teams measure the quantity of water that exits for different initial water heights and compare that result with the theoretical prediction which involves ideal gas properties.

Other demonstration laboratories are in development, including a water rocket (constrained in a vertical tube), a heat exchanger laboratory, a pressure vessel (similar to draining tank, but venting compressed air through a nozzle, which involves compressible flow principles), and a heat pump instrumentation development test stand. Prof. Wootton has 2 multiprocessor Intel Xeon computer workstations and a stepper motor/piston pump airflow simulator to support his obstructive sleep apnea respiratory biomechanics research. Students can use the computers via windows remote desktop.

Dynamics and Control Laboratory The focus of the Dynamics and Control Laboratory is an educational and research space for students to develop model-based controllers for smart vehicles, such as quadcopters and ground robots. It is equipped with a state-of-the-art Motion Capture System and Lighthouse stations for tracking objects. The laboratory is used regularly for independent studies (ME363, ME493), senior research projects (ME393-4), Vertically Integrated Projects (Smart Cities VIP) and control courses (ME451). In addition, the laboratory is used to develop hands-on projects and demos that supplement courses (ME200, ME351). For example, a small quadcopter (Crazyfly) is used to illustrate the design process for a feedback controller. The space is also used for research by Master students.

Materials and Design (MAD) Laboratory The Materials Science Laboratory is a mixed-use space dedicated both to materials characterization and student-led design and prototyping activities. It is used in the materials science course (ESC210) and for several of the early design courses (EID101, EID103, ME211). In the materials science end of the spectrum, students get practical experience in characterizing materials with an array of dedicated machines, including a brand new Instron axial tester, a Charpy impact tester, several hardness testers, and a new optical profilometer. Over the last several years, we have made a significant effort to include more open-ended, hands-on projects with the materials science laboratories. For example, students have designed their own heat-treatment protocols to increase the hardness in metals and tested their ideas in the laboratory furnaces. We have introduced sandcasting of aluminum and brass and casting of molten metal into the manufacturing and materials science courses.

The space is also used extensively for prototyping projects, especially because it is the home of the department laser cutter and two 3D printers. The proximity of the materials science equipment and the prototyping equipment lend themselves to interesting cross-pollination of ideas. There are new wheelable desks, new configurations for providing outlets (hanging from the ceilings) and new cabinetry for organizing tools.

CubeSat/Formula SAE/Biomechanics Simulation Laboratory Room 708 is a small lab space shared between the student Formula SAE team and the Cooper Satellite Launch Initiative (a CubeSat team). Previously, this room was used solely for Formula SAE design hosting a driving simulator, which is still located in the space. The CubeSat team is currently developing a satellite to test the efficacy of e-Ink as a thermal regulation mechanism in space. To support this effort, the lab includes instrumentation for a space-environment simulator (in development), including a vacuum chamber, solar simulator, and temperature instrumentation. Additionally, the space houses equipment for satellite communications, including software-based radio equipment and a large antenna.

The lab has a separate space (708A) that houses three multiprocessor workstations used for biomedical engineering simulation. This small space is important for Professor Wootton's respiratory biomechanics research projects, because it is an access-controlled space but approved students can work on their simulations on their own schedules without the need for a lab supervisor.

Bio-Inspired Robotic Design (BIRD) Laboratory The Bio-Inspired Robotic Design (BIRD) Lab is a 280 square foot space within a shared 430 square foot robotics research space (shared with Prof. Mili Shah from the Math department who also works in robotics). It is dedicated to the design, fabrication, and testing of novel bio-inspired robotics, including soft robotics and flapping-wing vehicle design. The lab contains equipment for the fabrication and testing of soft robotics, including a silicone mixing, de-gassing station, and molding station, and a custom, student-built automated pressure testing rig. Additionally, it contains an Elegoo Saturn stereolithography 3D printing center with washing and curing machines and a Creality Ender 3 S1 Pro FDM 3D printer for fabrication. For inspection and testing, the lab also houses a Nikon SMZ-U optical microscope, and an optical table. Small hand tools are also available. Fabrication materials, including multiple silicones and various 3D printing resins are available for student research projects.

Three dedicated computers are available in the space for 3D design, finite element modeling, and data analysis and visualization. The computers have licenses for most standard mathematical, computing, and graphical editing and analysis software packages, as well as finite element software and CAD software.

The space is primarily used by undergraduate and master's researchers but is also used for relevant projects in the bio-inspired robotics section of EID101, senior capstone design, and the bio-inspired robotics upper-level elective. It is also currently the working space for the Cooper Satellite Launch Initiative, a team of students advised by Prof. Rosen on designing and building a CubeSat and accompanying ground station.

Vibration And Acoustics Laboratory The Vibrations and Acoustics Laboratory is a 590 square feet laboratory for research and educational activities. The laboratory offers opportunities for hands-on, project-based learning and is used in the Mechanical Vibrations (ME301), Advanced Mechanical Vibrations (ME401), Musical Instrument Design (EID/ME116), and interdisciplinary Acoustics, Vibration and Noise Control (EID260) courses. The laboratory and its various equipment are used in the Mechanical Vibration and Experimentation courses so students gain practical experience with accelerometers and data acquisition to characterize dynamic properties of structures. A practical vibration measurement experiment was incorporated into the undergraduate ME curriculum where students create their own LabVIEW virtual instrument, use vibration instrumentation to study the vibratory behavior of a cantilever beam, and relate theoretical calculations to experimental test results in a written lab report. In the Advanced Vibration class, students perform experimental modal analysis via impact hammer and shaker testing to predict, troubleshoot, and/or optimize structural response characteristics. Examples of past student projects include: designing base excitation demonstrations, analyzing string vibration, and studying the vibration of our AACE Lab embroidery machine. Students are encouraged to approach real-world projects in their environment, such as the vibration of an atomic force microscope, overhead projector vibration in our building's auditorium, vibration of laboratory exhaust fans and vibration of our building's cantilevered stairwell.

Extensive testing equipment and instrumentation includes various modal impact hammers, ICP force sensors, signal conditioners, five electrodynamic shakers, and PCB and Bruel & Kjaer seismic, tri-axial, and uni-directional accelerometers. The laboratory is equipped with LabVIEW software including the Sound and Vibration Suite, National Instruments data acquisition devices, seven PC computer workstations and four laptops for remote data acquisition. A grant from the Brooks Family expanded the testing and data acquisition capabilities to include a state-of-the-art, 16-channel LMS SCADAS data acquisition system.

The Vibration and Acoustics Laboratory includes a 520 cubic foot full-coverage anechoic chamber, Larson-Davis 831 and Extech sound level meters, and Bruel & Kjaer and PCB Piezotronics measurement grade microphones. Various audio and sound analysis software and equipment, such as ProTools MBox computer audio workstations, 5000W JBL Professional sound system, and Mackie studio monitor and console, facilitate research projects in acoustics, audio, and music. The laboratory offers opportunities for interdisciplinary projects with engineering, art, and architecture. Current and past projects include environmental noise studies, troubleshooting HVAC noise problems, architectural acoustics, and musical instrument design. An Excel spreadsheet is used to monitor and track equipment usage.

Student Residence Fees Students electing to live in Student Residence will be responsible for paying the regular housing fees. The fees for the 2025–26 academic year are $15,545 for a double (two students per bedroom) and $16,940 for a single (one student per bedroom). The fees cover residence for the fall and spring semesters and may be paid in two parts.

Housing Deposit Fee A $500 refundable housing deposit is required to secure your housing offer. The refund is contingent upon the room being returned without damages. Housing deposits should only be paid after a housing offer has been received and accepted.

Refund Policy for Student Residence A refund of housing charges resulting from an approved request to cancel the housing agreement will be made in accordance with the following schedule: 100 percent of the total housing charges for the semester if the cancellation request is made prior to August 1 for the subsequent fall semester and December 1 for the subsequent spring semester; 65 percent if made by August 30 for the fall semester and January 6 for the spring; and 35 percent if made by September 30 for the fall and February 1 for the spring. No refunds will be made after these dates. Students who are evicted from the Student Residence or whose Housing Agreements are terminated for violations of the terms of the Housing Agreement are not eligible for refunds.

Cooper Union Health Insurance It is a requirement that all matriculated students have health insurance coverage. The Cooper Union provides health insurance for all students through The Cooper Union Accident and Sickness plan. The cost of insurance will appear on every student's billing statement. Students who are covered under their own or their parent's insurance policy may choose to waive The Cooper Union Accident and Sickness plan. Please be advised that if you wish to waive the insurance, he insurance you provide must be currently active and will be subject to verification. To enroll or waiver in the health insurance plan, you must access The Cooper Union Accident and Sickness plan here using their Cooper Union ID number. More information about the health insurance plan, including cost, can be found here.

If you do not complete health insurance waive process with the above insurance company by October 15 (for students who begin classes in the fall semester) and March 17 (for students who begin classes in the spring semester), you will be responsible to all assigned health insurance charges. There will be no exceptions to this policy.

International Student Fee International Students (those who are non-citizens or who are not permanent residents) are responsible for an additional non-refundable fee of $1,005 per semester.

Graduation Fee A graduation fee of $250 is required of all students entering their first semester of their undergraduate/graduate senior year at The Cooper Union. This fee is payable upon registration for the senior year and is refundable if a student fails to meet graduation requirements that year.

Special Fees

A $100 late fee will be charged for past due payment each month.

A $25 will be charged per occasion involving a change of section or registration program.

A fee of $100 shall be incurred for late registration.

A $50 fee will be charged for returned payment, canceled checks, and insufficient funds.

A bill payment plan fee of $50 per semester will be charged to your account at the time of payment plan enrollment.

The Cooper Union reserves the right to change its fees at any time.

Graduate Student Maintenance of Matriculation Fee The requirements for the Master of Engineering program must be completed within two years of admission to graduate status, except with the expressed consent of the Dean of Engineering. Requests for extension must be presented in writing to the Dean in the final semester of the second year. In addition, approval must be granted from the student's thesis adviser. Master's students who receive approval to extend their studies beyond two years will be assessed a maintenance of matriculation fee of $3,000 per semester.

Tuition/Housing Payment Plan Instructions Payment plans are available for students or tuition and housing fees. The tuition and housing fees can be paid in four installments. A $50 payment plan enrollment fee (per plan) will be added to your total bill. A $100 late payment fee will be assessed for each late payment. A $25 returned payment fee will be charged to your account.

Financial Aid Recipients You may elect to apply expected sources of financial aid and/or loans towards the tuition and housing fees. You are responsible for completing and submitting the required paperwork to the Financial Aid Office. Please contact the Financial Aid Office for more information. Students expecting outside scholarships may apply these amounts to the installment plan when the scholarship is received. International payments (any payments made from foreign accounts) may be made here.

THE IRWIN S. CHANIN SCHOOL OF ARCHITECTURE

About

The mission of The Irwin S. Chanin School of Architecture is to provide for its students the finest professional education available within an intellectual environment that fosters and expands their creative capacities and sensibilities and establishes the foundation for a creative professional life. The school is committed to the belief that one of society's prime responsibilities is toward learning and education in the deepest sense: that the exercise of individual creativity within a willing community is a profoundly social act. Fundamental to the mission of the school is the maintenance of an atmosphere in which freedom of thought and exploration can flourish, where students can explore and utilize their strengths and individual talents, interests and modes of working, to their highest potential.

BACHELOR OF ARCHITECTURE

The Bachelor of Architecture curriculum of the School of Architecture is designed to provide the student with a comprehensive educational experience, gaining knowledge and skills in preparation for the successful and ethical practice of architecture. Design studios and courses build cumulatively over the five years in order to establish a broad and deep foundation of knowledge in architecture and urban design in relation to developments in the sciences, arts, and technology. The curriculum stresses the importance of architecture as a humanistic discipline concerned with the design and construction of habitats in diverse social and ecological conditions, and their corresponding requirements for sustainability and ethical responsibility.

The traditional and essential skills of drawing, model-making and design development are complemented by a full investigation of the analytical and critical uses of digital technologies. The study of world architecture and urbanism is deepened by the understanding of individual cultures, environmental, and technological issues at every scale. The theory of the discipline, past and present, is investigated through the close analysis of critical texts and related to the theory and practice of other arts, such as public art, film and video. The position of the School of Architecture, together with the Schools of Art and Engineering and the Faculty of Humanities and Social Sciences, offers a unique opportunity for interaction and interdisciplinary research and experience.

In recent years the school has developed the studio curriculum in ways that have reinforced its strong traditions of design and craft while investigating problems that reflect the changing conditions of contemporary practice, the urgent issues resulting from rapid urbanization and the need for environmental and cultural conservation. In these studio experiments students and faculty together explore the potential contributions of architecture to our changing world, redoubling their efforts to imagine a positive future for an architecture that is, after all, a discipline of design. This task does not involve a wholesale rejection of the past—our traditions and historical experience—for what has changed are not the principles, but rather the determinants and the materials of design. We are in the process of re-learning the poetics of a space of life: of air and water, of geology and geography, of culture and society, of poetics that lie deeply within these elemental forces. On this re-framing—programmatically, technologically, and above all formally—rests not simply the future of architecture, but of our life in the world. Gradually, out of this process, architecture, once more, may become a force through which life is transcribed into art in order to enhance life.

Cooper Union's five-year professional program is framed within the context of a rigorous liberal arts education that includes a wide range of required and elective courses in the humanities and social sciences. Together with elective opportunities in the art and engineering schools, this program emphasizes the nature of architecture as a cultural, social, and technological practice intimately tied to increasingly urgent questions raised by our man-made and natural environments.

First Year

The First Year is conceived as a broad introduction to society, culture, environment, and the nature, place and role of architecture in this context. The student is introduced to the principles and experience of drawing and representation in a broad range of media and formats: freehand drawing is taught side by side with projective geometry (hand constructed and computer generated), and other means of architectural representation. The Architectonics Studios encourage the investigation of space, structure, and form, as inflected by the occupation and movement of the human body, and situated in the context of environments from natural to urban. The first two semesters of the History of Architecture sequence take the student through the global developments in architecture from Antiquity to the end of the Medieval Period, with special attention to non-western and traditional architectures. The First year of the Humanities and Social Sciences Core emphasize the student's reading, writing, and analytical skills through the study of literary, historical, and sociological texts.

Second Year

The Second Year advances the student's knowledge of architecture historically, culturally, and professionally. The Second Year Design Studios are dedicated to the examination, through analysis and design exercises, of the "elements" of architecture and their assemblage, including sites and its ecological conditions, program, spatial accommodation and organization structure and environment. The first segment of the structures sequence introduced students to the principles of architectural structure. The second two semesters of the History of Architecture sequence examine the history of global architecture from the Renaissance to the present, with special emphasis on the complex environmental relations between increasingly industrialized and developing societies. The second year of the Humanities and Social Sciences core advances the students' knowledge of writing and analytic skills with in-depth courses in literature, history, and philosophy.

Third Year

The third year is envisioned as a comprehensive experience of design and professional knowledge, supplemented by a range of required and elective courses in environmental, technological, and humanistic subjects. This approach forms an integrated introduction to an environmental, social, and programmatic understanding of design. Third-year design studios build from analysis to synthesis, ranging from analyses of total building assemblages and smaller-scale design exercises to the development of a comprehensive design for a complex programmatic institution. To this end, faculty teaching environmental technology, building technology, and structures join design faculty in the studio, where students elaborate on appropriate design aspects of work from their non-studio courses.

Fourth Year

The Fourth Year broadens the study of architecture, placing it within its diverse urban and rural contexts, with students gaining advanced knowledge of technological, structural, and professional concerns, the planning, zoning, social and cultural implications of architectural interventions. The Fourth Year Design Studios study the relation of institutional architecture to urban networks and infrastructures, public space, and typologies, from the investigation of rebuilding strategies following disasters, the role and nature of tall buildings, the nature of public and private institutions. The study of landscape is emphasized, both as large-scale natural environments and smaller scale site developments. A broad spectrum of specialized elective courses, including Modern Architectural Concepts, Analysis of Architectural Texts, Landscape, Advanced Topics in Environmental Studies, History, Theory and Criticism, Advanced Concepts in the related arts and professional ethics, deepens the understanding of the profession, and its relationship to different cultures and environmental context.

Fifth Year

The Fifth Year is constructed around the student's development of their individual thesis project, and the in-depth study of professional practice in all its aspects. The year-long Thesis is divided into two stages over two semesters, with intensive research followed by a comprehensive design. The subjects of the thesis vary in scale and context, with the proviso that the student investigates a problem of fundamental importance to contemporary life and architecture, identified as a site for the intervention of design as an ameliorative construct. Overall the design thesis emphasizes the profound relationship of architecture to the broader problems of the environment and ecological sustainability, whether at the scale of desertification and rising sea-waters brought on by global warming, the provision of unpolluted water to developing communities, to the smaller scales of urban signification, mobility, and programmatic re-use. The course in professional practice surveys the questions of licensing, internship and IDP participation, and introduces students through site visits to a range of practices and public hearings.

MASTER OF SCIENCE IN ARCHITECTURE

The Master of Science in Architecture (M.S.Arch.), formerly known as Master of Architecture II, is the School's post-professional degree program. Launched in 2009, Cooper's M.S.Arch. program extends the vision and intellectual rigor of the School's undergraduate program and advances its preeminent role in the education of architects. The program is open to applicants with a professional degree in architecture (Bachelor of Architecture or Master of Architecture I) from a program accredited by the NAAB or an equivalent accrediting agency abroad.

Applicants are required to complete a minimum of one year of work experience after obtaining their first professional degree before applying to the program. Design research forms the program's core. Seminars address issues specific to the interdisciplinary environment of the graduate program, making use of The Cooper Union's substantial resources.

While the M.S.Arch. program is studio based, concentrations in one or a combination of three areas are offered: theory, history, and criticism of architecture; urban studies; and technologies. The program offers opportunities for advanced research in an enlarged field of inquiry and allows students to craft their own agenda across diverse

areas of study. Prospective students declare their area(s) of concentration during the application process.
In addition to two advanced design studios that culminate in a thesis project, graduate-level seminars and workshops offer an intensive one-year immersion in the criticism, history, and theory of architecture. Emphasis is placed on approaches to architectural analysis and history, the role and contemporary relevance of theory, and the relations between theory and design. Seminars help students prepare for careers in journalism, teaching, and eventual doctoral studies, by providing a broad understanding of the cultural conditions of architectural production and concentrating on excellence in writing. Analysis studios provide deep insight into the formal and programmatic diversity of historical and contemporary architecture, the process of design, and potential avenues for new approaches to theory and practice. A required emphasis on either urbanism or technologies of representation allows for deeper investigation into specific areas of historical or contemporary architectural theory.

Faculty directly engaged with the Master of Science in Architecture program in studios and seminars include Diana Agrest, Nora Akawi, Lauren Kogod, Michael Young, and Guido Zuliani among others.

Recent guest lecturers and visiting critics have included Aaron Sprecher (McGill University), Mary McLeod (Columbia University), Timothy M. Rohan (University of Massachusetts), Spyridon Papapetros (Princeton University), Alessandra Ponte (Université de Montréal), Dietrich Naumann (Brown University), Caroline A Jones (MIT), Brandon Clifford (MIT), Mariana Ibanez (MIT), Peter Laurence (Clemson University), Jean-Louis Cohen (Princeton University), Mario Carpo (Yale University), Andrew Saunders (University of Pennsylvania) and Anthony Richard Acciavatti (Columbia University), among others.

Theory, History and Criticism of Architecture
Considers questions concerning the theory and criticism of modernism and contemporary architecture, the philosophy and aesthetics of architecture, the mediatization of architecture and broader cultural and historical issues through the critical readings of texts, the development of critical projects and a written thesis.

Urban Studies
Addresses issues central to the design, planning and development of cities and regions, including study of the morphological, social and cultural effects of globalization; the survival of local urban cultures; redevelopment of central cities, suburbs and exurbs; and issues specific to New York and comparative cities.

Technologies

Focuses on technological issues of architectural design, representation, planning and production, such as the impact of new information technologies, new materials and manufacturing processes; hardware and software development; mapping and modeling techniques; and the technologies of fabrication as they influence new design strategies. This area focuses as well on the economic, ethical and technological dimensions and design potentialities of sustainability and developments in new structural systems, materials and building assemblies.

Eligibility

All applicants to the Master of Science in Architecture program must 1) hold a professional Bachelor of Architecture (B.Arch.) degree, a professional Master of Architecture (M.Arch. I) degree, or an equivalent accredited professional degree in architecture from a foreign institution; and 2) have completed a minimum of one year of work experience after obtaining their first professional architectural degree. The program is structured to be completed during two full-time, consecutive semesters followed by a final thesis semester during the subsequent summer. The summer semester runs from June, after Memorial Day, through early September. Final thesis presentations and an exhibition of thesis work will take place during the second week of September at the end of the student's year of study. Graduate students must complete thirty required credits for the Master of Science in Architecture degree during full-time, contiguous resident study at The Cooper Union.

CURRICULUM

Bachelor of Architecture Professional Degree

The School of Architecture offers a five-year program leading to the Bachelor of Architecture, a first professional degree which is accredited by the National Architectural Accrediting Board (NAAB). The architecture curriculum is designed to prepare students for a breadth of opportunities in the profession, offering a broad cultural and intellectual foundation in the liberal arts as they relate to the design of the environment at all scales. The discipline of architecture interpreted as a cultural practice is seen as a basis for a fully-rounded education at the undergraduate level. Students develop their knowledge and design skills within a framework of studios and courses that stimulate research and debate into the nature and role of architecture as a cultural practice with profound social and environmental implications.

The content of the curriculum, based on a wide cultural view of architecture, reflects broad ethical values. Faculty-student interaction is conducted on an intensive basis in the design studio and other classes. Within this framework faculty members encourage students to develop their individual interests and strengths, with a constant stress on fundamentals and a basic commitment. This is intended to equip the graduate with a lasting ability to produce an architectural design that is a meaningful synthesis of the social, aesthetic and technological. The relationship between architecture and other creative disciplines is stressed through the five years. Students are encouraged to express themselves both verbally and visually.

In a moment when the role and scope of the architect is rapidly assuming new dimensions in social and technological domains, the School emphasizes design principles and their underlying human values while preparing students to respond positively to change. Cooper's program seeks to engender a strong sense of the responsibilities of service and leadership, teamwork, and individual creativity essential to developing principled professionals dedicated to interpreting and constructing the spatial needs of their communities. The five-year undergraduate design sequence is carefully structured to introduce students to the principles of architectonics, the investigation of program and site, structures, and environmental and building technologies, in a comprehensive and integrated curriculum. Design studios introduce the basic elements of form, space, and structure; complex institutional design problems in their urban context; and a year-long thesis that demonstrates the student's ability to synthesize a comprehensive understanding of architecture in society. The essential skills of drawing, model-making, and design development are complemented by analytical and critical uses of digital technologies. Study of world architecture and urbanism is deepened by an understanding of individual cultures and environmental and technological issues at every scale. The theory of the discipline, past and present, is investigated through a close analysis of critical texts and related to the theory and practice of other arts, such as public art, film, and video. The position of the School of Architecture, together with the School of Art, the Albert Nerken School of Engineering, and the Faculty of Humanities and Social Sciences, offers a unique opportunity for interaction and interdisciplinary research and experience.

The Cooper Union's location in New York City in the heart of downtown Manhattan provides a stimulating professional, social and cultural context for the education of an architect and an urban laboratory for the study of design in society. The numerous cultural institutions of the city provide an inexhaustible resource for research and experience outside the studio and classroom.

The school's faculty includes nationally and internationally recognized architects; the school's diverse student body consists of highly talented and motivated individuals and its distinguished alumni are leaders in architecture and related fields.

Master of Science in Architecture Post-Professional Degree

The Master of Science in Architecture, formerly known as the Master of Architecture II, is a post-professional degree program launched in 2009 to extend the vision and intellectual rigor of the undergraduate program and allow a further development of the school's preeminent position in the education of architects. It is open to applicants with a first professional degree in architecture (Bachelor of Architecture or Master of Architecture I) from a program accredited by the NAAB or equivalent accrediting agency in another country.

This program serves professionals who wish to advance their practice through research and design addressing the program's areas of specialization. It also prepares qualified candidates for careers in teaching and/or research toward a Ph.D. at another institution.

Program Description

The Master of Science in Architecture (M.S.Arch.), formerly known as Master of Architecture II, is the School's post-professional degree program. Launched in 2009, Cooper's M.S.Arch. program extends the vision and intellectual rigor of the School's undergraduate program and advances its preeminent role in the education of architects. The program is open to applicants with a professional degree in architecture (Bachelor of Architecture or Master of Architecture I) from a program accredited by the NAAB or an equivalent accrediting agency abroad.

Applicants are required to complete a minimum of one year of work experience after obtaining their first professional degree before applying to the program. Design research forms the program's core. Seminars address issues specific to the interdisciplinary environment of the graduate program, making use of The Cooper Union's substantial resources.

While the M.S.Arch. program is studio based, concentrations in one or a combination of three areas are offered: theory, history, and criticism of architecture; urban studies; and technologies. The program offers opportunities for advanced research in an enlarged field of inquiry and allows students to craft their own agenda across diverse areas of study. Prospective students declare their area(s) of concentration during the application process.

In addition to two advanced design studios that culminate in a thesis project, graduate-level seminars and workshops offer an intensive one-year immersion in the criticism, history, and theory of architecture. Emphasis is placed on approaches to architectural analysis and history, the role and contemporary relevance of theory, and the relations between theory and design. Seminars help students prepare for careers in journalism, teaching, and eventual doctoral studies, by providing a broad understanding of the cultural conditions of architectural production and concentrating on excellence in writing. Analysis studios provide deep insight into the formal and programmatic diversity of historical and contemporary architecture, the process of design, and potential avenues for new approaches to theory and practice. A required emphasis on either urbanism or technologies of representation allows for deeper investigation into specific areas of historical or contemporary architectural theory.

Faculty directly engaged with the Master of Science in Architecture program in studios and seminars include Diana Agrest, Nora Akawi, Lauren Kogod, Michael Young, and Guido Zuliani among others.

DEGREE REQUIREMENTS

Bachelor of Architecture

The Irwin S. Chanin School of Architecture offers a five-year program leading to the Bachelor of Architecture degree. The degree requirements are intended to provide students with a rigorous training in and exposure to the creative and technical aspects of architecture. The professional courses in the curriculum are supplemented and enhanced by required courses both within and outside the discipline of architecture. The requirements are:

First Year		Sem 1	Sem 2
ARCH 103	Calculus and Analytic Geometry	3	-
ARCH 106	Concepts of Physics	-	3
ARCH 111	Architectonics	4	4
ARCH 115	History of Architecture I	3	3
ARCH 117	Representation I, II	3	3
FA 100RA	Shop Tech	1	1
HSS 1	The Freshman Seminar	3	-
HSS2	Texts and Contexts: Old Worlds and New	-	3
Total Credits		17	17

Second Year		Sem 1	Sem 2
ARCH 121	Design II	5	5
ARCH 122	Structures I	2	2
ARCH 124	Environments	2	2
ARCH 125	History of Architecture II	3	3
ARCH 127	Representation III, IV	3	3
HSS3	The Making of Modern Society	3	-
HSS4	The Modern Context: Figures and Topics	-	3
Total Credits		18	18

Third Year		Sem 1	Sem 2
ARCH 131	Design III	5	5
ARCH 132	Structures II	2	2
ARCH 133	History of Architecture III	-	2
ARCH 134	Environmental Technologies	3	3
ARCH 135	Building Technology	2	2
	Electives/Optional Studies*	3	3
Total Credits		15	17

Fourth Year		Sem 1	Sem 2
ARCH 141	Design IV	5	5
ARCH 142	Structures III	2	2
ARCH 143	Construction Management	1	1
	Electives/Optional Studies*	5	5
Total Credits		13	13

Fifth Year		Sem 1	Sem 2
ARCH 151	Thesis	6	6
ARCH 152	Structures IV	2	-
ARCH 154	Professional Practice	2	2
ARCH 205/225	Advanced Concepts/Topics	2	2
	Electives/Optional Studies*	5	5
Total Credits		**17**	**15**

Total Credit Requirements for B. Arch Degree **160**

**The bachelor of architecture curriculum includes 27 credits of REQUIRED coursework in general studies (non-professional course-work outside the discipline of architecture). In addition to general studies, students also complete 26 ELECTIVE/OPTIONAL STUDIES credits. The elective/optional studies component can be fulfilled by elective/optional studies courses in subject areas such as architecture, humanities and social sciences, visual arts, mathematics, engineering, science, and languages. Among the elective/optional studies credits, at least 6 elective/optional studies credits must be completed in humanities and social sciences. Additionally, a minimum of 7 elective/optional studies credits must be completed outside the discipline of architecture for a total of 13 elective/optional studies credits in general studies.*

Minor Architecture students in good academic standing with advance permission who complete a minimum of 15 upper-division credits in a specific field of liberal arts may qualify for a minor in that field of humanities and social sciences. Minors are offered and will be designated on student transcripts in the following fields: **Art History** | **Economics and Public Policy** | **History and Society** | **Literature** | **Science, Technology, and Society.** Students must apply in advance of completing their coursework to be considered for the minor. Approval from the dean of the School of Architecture is required for the minor. Additional information is available from the Office of the Dean of Humanities and Social Sciences.

Master of Science in Architecture

All applicants to the Master of Science in Architecture program must 1) hold the professional degree of Bachelor of Architecture (B.Arch.), the professional degree of Master of Architecture (M.Arch. I) or an equivalent accredited professional degree in architecture from a foreign institution; and 2) have completed a minimum of one year of work experience after obtaining their first professional architectural degree. The program is structured to be completed in two full-time consecutive semesters with a final thesis semester during the subsequent summer session. See the Academic Calendar for information on the Fall and Spring semesters. The Summer semester runs from June-early September (after Memorial Day until the date of the Master of Science in Architecture final Thesis review and exhibition opening during the second week of September). Final thesis presentations will take place during the second week of September at the end of the student's year of study. Graduate students must complete all 30 credits of the Master of Science in Architecture degree requirements in full-time contiguous resident study at The Cooper Union

FOR STUDENTS ENTERING **PRIOR TO** FALL 2026

Semester 1 (Fall)		
ARCH 411	Graduate Research Design Studio I	6
ARCH 401	Proseminar	2
FA100R	Introduction to Techniques	0
	Seminar in concentration	2
	Seminar out of concentration	2
Total Credits First Semester		**12**

Semester 2 (Spring)		
ARCH 412	Graduate Research Design Studio II	6
ARCH 402	Thesis Research Tutorial	2
FA 100R	Introduction to Techniques	0
	Seminar in concentration	2
	Seminar out of concentration	2
Total Credits Second Semester		**12**

Semester 3 (Fall)		
ARCH 413	Graduate Thesis (written or studio)	6

Total Credit Requirement for M.S. Arch. Degree	**30**

FOR STUDENTS ENTERING FALL 2026

Semester 1 (Fall)		
ARCH 411	Graduate Research Design Studio I	6
ARCH 401	Proseminar	2
FA100R	Introduction to Techniques	0
	Seminar in concentration	2
	Seminar out of concentration	2
Total Credits First Semester		**12**

Semester 2 (Spring)		
ARCH 412	Graduate Research Design Studio II	6
ARCH 402	Thesis Research Tutorial	2
FA 100R	Introduction to Techniques	0
	Seminar in concentration	2
	Seminar out of concentration	2
Total Credits Second Semester		**12**

Semester 3 (Fall)		
ARCH 413	Graduate Thesis (written or studio)	6

Total Credit Requirement for M.S. Arch. Degree	**30**

Thesis In April of the spring semester prior to advancing to Arch 413 Thesis, each student will be required to present an elaboration of his or her thesis topic and program for review and acceptance by the faculty. As of Fall 2025, final thesis presentations will be made at the end of the student's second fall semester of study.

Seminars Out of Concentration It is recommended that students register for courses originating in the graduate program (Arch 482, Arch 483 and Arch 485) to satisfy their out-of-concentration seminar requirements.

Graduate courses in the Albert Nerken School of Engineering as well as select upper level undergraduate elective courses could be made available to Master of Science in Architecture students with prior permission from the student's academic adviser and the individual course instructor. Undergraduate courses may be used to satisfy requirements for out-of-concentration coursework only.

ACADEMIC STANDARDS AND REGULATIONS

Credits

Only those students who are officially registered in a course (i.e., by approval of the dean of the School of Architecture or a faculty adviser and notification of the Registrar will have grades and credits entered on their records.

Satisfactory Progress Toward Degree

The bachelor of architecture degree program is a rigorous course of study that seeks to prepare students intellectually and professionally for the investigation and making of architecture. The privilege of studying at The Cooper Union, with the benefit of a 50% tuition scholarship for all admitted undergraduate students, brings with it important responsibilities. For students in the School of Architecture, these responsibilities include meeting the requirements of a demanding professional curriculum.

All students who accept our offer of admission are expected to fully commit themselves to completing the degree requirements in accordance with the curriculum, which has been designed with great attention to sequence, prerequisites and the relationships between course work and the goals of each design studio. All classes that comprise the curriculum are essential to the education of an architect, and must be successfully completed by each student in the year and sequence intended. Students admitted as freshmen will complete the program in five years; transfer students will complete the program in accordance with their placement in the design sequence.
Students who do not successfully complete required courses as outlined in the curriculum will not be permitted to advance to the next year of study until the missing requirement(s) is/are completed. Since make-up classes are not offered at The Cooper Union, missing requirements may need to be fulfilled through coursework taken outside The Cooper Union. The intention to complete requirements outside The Cooper Union requires a meeting with the appropriate academic adviser or faculty member in order to obtain advance approval of the potential substitute course, and to confirm the minimum grade required in order for transfer credit to be awarded. It is the responsibility of the student to locate an eligible course at a college/university that allows part-time/summer study; the approved course will be taken at the student's expense. Students making up courses in this manner will be permitted to register for Cooper Union classes in September only after the Office of the Registrar receives a transcript showing the successful completion of these courses. It is in the best interest of each student to complete their coursework here at Cooper Union in conformance with the approved curriculum.

A student must pass a sufficient number of credits each semester to complete his or her degree requirements within five years of study. When dropping or adding courses, a student must follow all degree requirements for their particular year of study.
The normal course load is 15–19 credits per semester. Students are required to be registered for a minimum of 12 credits per semester. Failure to maintain satisfactory progress toward the degree may be grounds for dismissal.

Transfer Students

Transfer students are admitted into a specific year of the five-year design sequence. Placement in the design sequence is a condition of the offer of admission and not subject to further review or appeal. By accepting the offer of admission, the transfer student agrees to this placement and acknowledges his/her anticipated graduation date. There is no opportunity for transfer students to accelerate through the required design sequence.

Placement in the design studio sequence is the only transfer credit evaluation made at the time of the offer of admission. Independently of design studio placement, transfer students must fulfill all B.Arch. degree requirements either through transfer credit or by completing required and elective coursework here. Transfer credit evaluation for required and/or elective coursework in the B.Arch. curriculum, other than the design studio, is the responsibility of the individual transfer student. Transfer students are required to have all other previous courses individually evaluated for transfer credit. It may not be possible for transfer students to complete all academic coursework simultaneously with their design studio requirements. It will be necessary for the matriculating transfer student to successfully complete the design studio to which he or she is admitted, as well as all subsequent studios, as part of his or her degree requirements. The official academic transcript of a transfer student will be reviewed prior to the student's first registration. This review will determine what, if any, additional coursework may be eligible for transfer credit.

Transfer Credit Approval of transfer credit will be made by the appropriate dean or faculty based on transcripts from other schools and additional materials, including a course description, a course syllabus with topics and course requirements, a reading list, and any quizzes, examinations, papers, or projects, etc. that demonstrate the level, content, and requirements of the course, as well as the student's proficiency with course topics. If necessary, a proficiency/placement exam may be administered in certain subject areas. Transfer students must be prepared to present these and other requested materials for each course for which transfer credit is sought. Transfer credit evaluation must be completed by the end of the first semester of study.

Currently enrolled students who find it necessary to complete degree requirements at another institution for transfer credit to The Cooper Union must have appropriate advance approval.

Credit may be granted for work done at another institution by any student upon examination by the dean. This credit is to be recorded after satisfactory completion of one semester's work at The Cooper Union.

Grades

Grades used, with their numerical equivalents, are: **A** (4.0), **A-** (3.7), **B+** (3.3), **B** (3.0), **B-** (2.7), **C+** (2.3), **C** (2.0), **C-** (1.7), **D+** (1.3), **D** (1.0), **D-** (.7), **F** (0).

Assigned numerical equivalents are used in computing semester and annual ratings by multiplying the numerical equivalent of the grade for each subject by the credits assigned to the subject. The sum of such multiplications for all the subjects carried by a student is divided by the total credits carried by him/her for that period to determine the average rating.

The official meanings for letter grades are as follows:

A Outstanding performance
B Above average performance
C Requirements satisfactorily completed
D Minimum requirements met; passing but unsatisfactory
F Failure to meet the minimum requirements of a subject
I The designation **I** indicates that the work of the course has not been completed and that assignment of a grade and credit has been postponed.

An **I** designation is permitted only in cases of illness (confirmed by a physician's letter) or documentation of other extraordinary circumstances beyond the student's control.

The deadline for removal of an **I** designation will be determined by the instructor and recorded at the time the designation is given, but will not be later than two weeks after the start of the next semester. If the **I** is not removed within the set time limit, either by completing the work in the subject or by passing a reexamination, the **I** will automatically become an **F** unless the dean of the School of Architecture extends the time or the student withdraws from school. The designation of **I** will be granted only with the approval of the dean.

W The student has received permission from the instructor and the dean of the School of Architecture and has withdrawn from a course while passing the course requirements at the time of withdrawal. This permission must be obtained before the end of the sixth week of the semester. The grade is not included in the calculation of the student's semester rating (grade point average) but remains on the student's transcript. (See Change of Program: Withdrawing from a Course) Students are not permitted to withdraw from required classes.

WF The student has received permission from the dean of the School of Architecture and the instructor and has withdrawn from a course while failing the course requirements at the time of withdrawal. This permission must be obtained before the end of the sixth week of the semester. This grade is included in the calculation of the student's semester rating, its numerical equivalent is 0, and it remains on the student's transcript. (See Change of Program: Withdrawing from a Course).

When appropriate, certain courses may be designated as Pass/Fail courses.

Pass Requirements completed. This designation is not included in the calculation of the student's semester rating.

Fail Failure to meet the minimum requirements of a course. This grade is included in the calculation of the student's semester rating; its numerical equivalent is 0.

Automatic Probation/Final Probation

The Academic Standards Committee meets following the end of the Fall and Spring semesters to review the academic records/status of students on automatic probation and, as necessary, final probation. These students will be informed of the meeting in order to have the opportunity to appear before the Committee.

Studio Grades, Grade Point Average and Probation A student who receives a semester grade point average (GPA) below 2.0 will be placed on automatic probation, which may be the basis for final probation or dismissal as determined by the Academic Standards Committee.

A student who receives a grade less than **C** in Architectonics, Design or Thesis will be placed on automatic probation and may be the basis for final probation or dismissal, as determined by the Academic Standards Committee.

A student who receives a grade of **C-** in Architectonics, Design or Thesis may be required by the Academic Standards Committee to repeat the studio.

A student who receives a grade of **D+, D** or **D-** in Architectonics, Design or Thesis will be placed on automatic probation and will be required to repeat the studio. If, in addition, the student has a semester rating below 2.0 the Academic Standards Committee may place the student on final probation. The Academic Standards Committee may also set further academic and/or grade requirements for the student.

A student who receives an **F** in Architectonics OR Design II, if Design II is the student's first design studio at The Cooper Union will be placed on probation and will be required to repeat the studio. The student will be required to receive a grade of **C+** or better in the repeated class.

General Probation Rules A student placed on automatic probation may be subject to academic requirements as determined by the Academic Standards Committee.

A second probation may result in final probation or the dismissal of the student as determined by the Committee. The Academic Standards Committee may place a student on final probation. A student on probation may not be registered for more than 18 credits a semester.

Final Probation A student may not be placed on final probation before the end of his/her third semester, regardless of whether the student is in Architectonics or Design II.

A student who receives an F in Design or Thesis will be placed on final probation and will be required to repeat the studio. The student will be required to receive a grade of C+ or better in the repeated class. A student who fails to meet this condition may be dismissed by the Academic Standards Committee.

A student on Final Probation who receives a semester rating below 2.0 and/or a grade less than C in Design or Thesis at any point in the remainder of his or her academic career in the School of Architecture will be automatically and permanently dismissed from The Cooper Union with a forfeit of the right of appeal.

At the Academic Standards Committee meeting immediately following automatic dismissal, the Academic Standards Committee may decide to reconsider cases of automatic dismissal and may rescind the dismissal of a student allowing the student to continue the course of study in the School of Architecture. In the case of automatic dismissal being rescinded, the Academic Standards Committee may establish performance requirements for the remainder of their education at the School of Architecture.

Automatic dismissal on final probation (not rescinded by the Academic Standards Committee) unconditionally and irrevocably terminates a student's academic career in the School of Architecture. A student dismissed on final probation (or permitted to withdraw on final probation) cannot apply or petition for readmission to the School of Architecture.

Failing and/or Repeating Design Studio Each student is responsible for his or her total accomplishment and for being continuously aware of the standards defined in the preceding paragraphs. Students whose work by mid semester indicates possible failure to meet the minimum standards of a course, including excessive absences, may be so informed and should arrange to meet with their respective faculty to address the matter in detail.

A student may not repeat any Design studio (or Architectonics and Thesis) more than once. Any student who fails Arch 151 (Thesis) twice will be dropped automatically from the program.

A student may not fail Architectonics, Design or Thesis throughout the five years more than two times in total. A third grade of F in any of these courses will result in automatic dismissal.

Additional credits for any repeated Design studio (including Architectonics or Thesis) remain on a student's transcript, but do not count towards the 160 credits required for the B.Arch. degree.

Change of Grade

A change in an official grade of record cannot be made by the registrar without the express consent of the dean of the School of Architecture except as defined here. The registrar will automatically convert an **I** designation to an **F** if an official change of grade is not submitted within the two-week deadline after the start of the following semester. A grade change is not permitted after the end of the subsequent semester.

Change of Program

Adding a Course A student is permitted to add a course only during the first week of a semester, during the drop/add period, and only with the dean's approval.
Adding a course after the drop/add period is not permitted even if the student has been attending the class.

Dropping a Course A student may drop a course during the first week of the semester, during the drop/add period, with the dean's approval. A student who wishes to drop a course may be required to add equivalent credits in an-other course as needed to maintain satisfactory progress towards the degree.
A course dropped during the first week of the semester will be deleted from the transcript.

Withdrawing from a Course After the drop/add period a student may withdraw from a course through the sixth week of the semester, with the dean's approval. It is the student's responsibility to obtain the necessary permission from the School of Architecture and to notify the instructor in order to withdraw from a course. If the student is passing the course at the time of withdrawal, a grade of **W** will appear on the transcript. If the student is failing the course at the time of withdrawal, a grade of **WF** will be recorded.

Failure to attend a class does not constitute withdrawal; a student who fails to attend a class without formally withdrawing will earn a grade of **F** in the course. A student may not withdraw from a course to avoid receiving a failing grade.

A student is not permitted to drop or withdraw from a course necessary to maintain satisfactory progress towards the degree.

Attendance

Classes and studios are scheduled Monday through Friday between 9 am and 10 pm. Studio facilities usually are available to students on Saturdays and Sundays throughout the academic year. Each student is required to be punctual and to attend each scheduled class. In the case of unavoidable absence, the student should, on his or her return, report to the instructor to explain the absence and inquire about making up the lost work.

All architecture students are provided with studio space and are expected to work in the studio during regular business hours.

Leave of Absence

Only students in good academic standing who are making satisfactory progress toward their degree may request a leave of absence. Students who have completed at least one year of study and need to interrupt their studies may be granted a leave of absence for up to one year by permission of the dean. A leave of absence is generally permitted between the second and third years or the fourth and fifth years of study. Receiving a leave of absence requires a meeting with and permission from the dean of the School of Architecture.

Mandatory Leave of Absence If it is not possible for a student to make significant progress towards degree requirements in the semester prior to repeating a studio course (as determined by the Academic Standards Committee and/or the dean), the student will be placed on a mandatory leave of absence for one semester and will resume his or her studies the following semester by repeating the required studio and enrolling in other classes for a total registration of at least 12 credits. If a student is permitted to continue in lieu of repeating and/or a mandatory leave of absence, the student will do so as per the instructions of the Academic Standards Committee. In both cases, the student's registration must be approved by the dean.

Readmission Students who have withdrawn from the School of Architecture after having completed at least one year of study at The Cooper Union must reapply to the School of Architecture to be considered for readmission as a transfer applicant. Students who have withdrawn from the School of Architecture before they have completed one year of study at The Cooper Union must reapply through the freshman admission procedure.

Students who have been dismissed by the Academic Standards Committee or to whom the Academic Standards Committee has given permission to withdraw in lieu of dismissal and are eligible for readmission must apply within two years to the chair of the Academic Standards Committee before May 15 for admission in September and before November 15 for admission in January. Applicants must be prepared to demonstrate a change from the circumstances that warranted their dismissal.

Former students who have been dismissed by the Academic Standards Committee or to whom the Academic Standards Committee has given permission to withdraw in lieu of dismissal and who have been out of The Cooper Union for more than two years (four semesters) must apply through the regular admission procedure at the time of anticipated return. If offered admission, previous Cooper Union credits earned may be evaluated for transfer credit.

Residence

A student must spend a minimum of four semesters in full-time resident study at The Cooper Union to be eligible for graduation with a Bachelor of Architecture Degree. A candidate for a degree must be enrolled and in residence during the entire academic year immediately preceding the granting of the degree.

A student must complete all curriculum requirements for the Master of Science in Architecture degree program while in residence during three contiguous and consecutive semesters of study (Fall, Spring, Summer) to be eligible for graduation with the Master of Science in Architecture. Beginning in Fall 2025, a student must complete all curriculum requirements for the Master of Science in Architecture degree while in residence during three contiguous and consecutive semesters of study (Fall, Spring, Summer) to be eligible for graduation with the Master of Science in Architecture.

A student must have a cumulative grade point average of 2.0 or better in order to graduate from the School of Architecture.

Graduation

Students are responsible for their total accomplishment and for being continuously aware of the standards for graduation. A student must complete all curriculum requirements for the Bachelor of Architecture degree program.

ANNUAL EXHIBITION OF STUDENT WORK

The End of Year Show is a major event of the School of Architecture, exhibiting the work developed during the previous academic year to the academic and professional communities and the public at large. It is an opportunity to present the pedagogical framework of the school and faculty and to celebrate the rigor and diversity of the student work.

The exhibition occupies the lobbies, halls and classrooms of the third and seventh floors, and the Houghton Gallery. Preparation of these spaces and hanging the work is a tremendous task that must be accomplished in the very short period of time between the end of classes and commencement. Students of all years are required to make requested projects available for the exhibition and are expected to fully participate in the installation.

In addition to making their work available for the Annual Exhibition, individual student work may be requested for other purposes (other exhibitions, accreditations, etc.). Students are required to provide requested projects or other materials, which will be returned to them in a timely manner. While student work is to be available for these purposes,work produced by students as part of their coursework remains their property.

Students are required to sign a release form at the start of their studies granting the school permission to use, copy, publish or distribute, perform or publicly display, create derivative works, and incorporate into compilations or collective works the works of authorship created during their enrollment as a student at Cooper Union in any form, format or media now known or later developed or created in the future, for educational purposes and for promoting, marketing and advertising Cooper Union and its educational services worldwide, without compensation. The student retains the copyright to the work.

COURSES

Below are courses offered for Fall 2025. Spring 2026 courses will be listed in the Catalog addendum.

UNDERGRADUATE REQUIRED

Arch 103: **Calculus and Analytic Geometry**
Emphasis on topics that involve the mathematical approach to geometrical and physical relationships and on basic concepts and applications of calculus of functions of one and two variables. *Credits: 3*

Arch 111 A: **Architectonics**
Introduction to the study of architecture; investigation of the interrelationships of space, structure and visual composition. Exploration of the syntax of architecture. Models and orthographic drawing. *Credits: 4*

Arch 115 A: **History of Architecture I/Semester I**
Introduction to Architecture & History, Theory, and Criticism
The courses of the HTC curriculum provide an introduction to the history of architecture and human settlements with a transcultural perspective, inclusive of diverse canons and traditions. The course sequence addresses architecture's cultural, ideological and material influences and exchanges, as well as the points of rupture throughout history that have determined the development of the field's conceptual frameworks and material instrumentalities. These courses place architectural and urban history and theory in the specific contexts of the various paths of colonization at different moments in history, and will consider the geopolitical influences on principles, concepts, styles and techniques, both within the centers of power and at the peripheries. This course provides a transnational and transcultural introduction to critical concepts in practice and theory of architecture across millennia, focusing on urban and architectural examples from diverse histories, geographies and traditions. These will be read in terms of the cultural, material, sociopolitical, and environmental forces that shape them. The course will focus on the analysis of different modes of architecture discourse as it is developed through buildings, drawings, and texts. *Credits: 3*

Arch 117A: **Representation I: Geometry**
Introduction to various geometric logics; methods of graphic description, as well as an introduction to concepts and systems of projection and the two-dimensional representation of three-dimensional form and space. Emphasis on the control, precision, and rigor of the geometric description of form. *Credits: 3*

Arch 121 A: **Design II**
Projects comprise elemental architectural programs wherein the student is required to sustain the formal investigations of first year while integrating the complexities of program, context and site. Spatial, structural, material, environmental and visual design are integrated. Emphasis is placed on communicating concepts through drawings and models. *Credits: 5*

Arch 122 A: **Structures I**
A qualitative examination of the behavior of structures. Characteristics and development of the stresses generated from the simple to the complex. A study of the materials of construction used in structures. *Credits: 2*

Arch 124: **Environments**
Introduction of critical issues of the "natural" environment and the recognition of contemporary interior space as a complex environment both mechanical and passive. This class will provide students with a conceptual grounding in environmental issues at the urban and building scales in the second-year curriculum, when complexities of program, context and site are introduced in the studio. The class will be directly aligned with the Design II Spring semester studio, through common faculty and shared projects. *Credits: 2*

Arch 125 A: **History of Architecture II/Semester I**
Architecture and Globalization
The courses of the HTC curriculum provide an introduction to the history of architecture and human settlements with a transcultural perspective, inclusive of diverse canons and traditions. The course sequence addresses architecture's cultural, ideological and material influences and exchanges, as well as the points of rupture throughout history that have determined the development of the field's conceptual frameworks and material instrumentalities. These courses place architectural and urban history and theory in the specific contexts of the various paths of colonization at different moments in history, and will consider the geopolitical influences on principles, concepts, styles and techniques, both within the centers of power and at the peripheries. This course focuses on concepts, designs and built examples of architecture from the 15th to the 17th centuries at the time when

the discipline of architecture formed its identity as a profession; it sets this period in the context of globalization and the emergence of modern capitalism and colonialism. The course will study selected works from across cultural and geopolitical settings, by analyzing their intellectual, political, and social contexts, as well as examining formal, symbolic, technological, and environmental impacts and influences. *Credits: 3*

Arch 127A: **Representation III: Analysis**
Introduction to the representational conventions of architectural analysis. Drawing modes to include plans, sections, elevations and axonometrics. Analytical readings of form, structure, space, program, and site will be explored. Students achieve the ability to critically interpret architectural precedents through analytical representation. *Credits: 3*

Arch 131 A: **Design III**
Study and analysis of historical precedents followed by a sequence of design problems of increasing complexity. Emphasis on the planning of buildings and the interrelationships among form, structure, detail and technologies. *Credits: 5*

Arch 132 A: **Structures II**
The study of strength of materials is applied to the quantitative design procedures for wood and steel structures. Students complete individual projects in wood and lowrise steel structures. *2 credits per semester. Prerequisites: Arch 103/104, Ph 165/166, Arch 122 A-B Structures I.*

Arch 133: **History of Architecture III**
A Critical Study of Architectural Ideologies Post-WWII
The courses of the HTC curriculum provide an introduction to the history of architecture and human settlements with a transcultural perspective, inclusive of diverse canons and traditions. The course sequence addresses architecture's cultural, ideological and material influences and exchanges, as well as the points of rupture throughout history that have determined the development of the field's conceptual frameworks and material instrumentalities. These courses place architectural and urban history and theory in the specific contexts of the various paths of colonization at different moments in history, and will consider the geopolitical influences on principles, concepts, styles and techniques, both within the centers of power and at the peripheries. This course focuses on the major breaking points in recent history and their influence on architectural discourse and production. The course investigates architectural concepts, movements, and theories of the post-war period that are essential to an understanding of the present moment. Through the analysis of texts, drawings, and built projects, the course will offer a critical study of architecture's relationship to ideology. *Credits: 2*

Arch 134 A: **Environmental Technologies**
Environmental and life safety systems as they affect program and building form, including mechanical (heating, cooling, ventilating), water supply and disposal, electrical, lighting, acoustics, vertical transportation, communication, security and fire protection. Principles of sustainability. Passive and active systems. *Credits: 3*

Arch 135 A: **Building Technology**
Materials and methods of architectural construction, lectures, examination and discussion of classic as well as current building techniques. Students assemble full-size "mock-ups" of details for class study germane to their design classes. In general, this course does not separate "construction" from "design" but attempts to supplement, by a means of a more detailed study of design assignments. Field trips may be made to buildings under construction. *Credits: 2*

Arch 141 A: **Design IV**
Investigation of urban programs and sites requiring the integration of form, structure and space. Examination of the complexities implicit in the resolution of urban problems. Analytic studies and explorations generate specific programs for development of each project. Emphasis given to large-scale integrations and the impact of urban transformations upon existing fabric. *Credits: 5*

Arch 142 A: **Structures III**
The design of reinforced concrete using stress methods and plastic design is combined with individual projects in low-rise concrete structures. Elements of soil mechanics and soil investigations are included (Fall only) in foundations design. Prerequisite: Arch 132 A-B Structures II. *Credits: 2*

Arch 143 A: **Construction Management**
Introduction to construction management principles, techniques and methods including scheduling, cost-estimating, planning and controlling construction process. *Credits: 1*

Arch 151 A: **Thesis**
A synthesis of four years' educational experience. The choice of the area of study is the responsibility of the student. The scope of the problem is defined by each student, who also decides on his or her method of exposition. Problems are analyzed and studied with the aid of faculty from each discipline and by visiting critics. *Credits: 6*

Arch 152: **Structures IV**
Intensive seminars are completed on prestressed concrete, wind and earthquake design for tall structures and special structures, while the student becomes the structural consultant for individual assignments for the structural solution of real architectural projects covering prestressed, high-rise steel and concrete buildings and shells. *Prerequisite: Arch 142 A-B Structures III Credits: 2*

Arch 154 A: **Professional Practice**
The role of the architect in relation to the community, client, builder, worker and engineer. Societal, ethical, legal and personal obligations. Office organization and administration. *Credits: 1*

Arch 205: **Advanced Concepts**
This course is intended to be an advanced course dealing with the relationship between architectural space and some other discipline in the humanities. The course deals with an interdisciplinary approach toward a new poetic and the phenomenology, psychology and metaphysics of space. *Prerequisite: permission of instructor. After fulfilling the Arch 205 Advanced Concepts degree requirement, a student may enroll in other additional Arch 205 Advanced Concepts classes for elective credit. Credits: 2*

Arch 225: **Advanced Topics in History, Theory, Criticism**
Advanced study in history, theory, criticism of architecture, urbanism and technology. Prerequisites: Arch 115 A-B, Arch 125 A-B and Arch 175 or permission of the instructor. *After fulfilling the Arch 225 Advanced Topics degree requirement, a student may enroll in other additional Arch 225 Advanced Topics classes for elective credit. Credits: 2*

FA 100RA–FA 100RB: **Shop Tech**
An introduction to the physical aspects of working with wood, metal and plaster (mold making). *1 credit per semester.*

UNDERGRADUATE ELECTIVES

Arch 176: **Theory of Landscape Architecture**
Lecture/studio course explores the interrelationships of nature, site design and built form. Focus on basic elements of nature addressed ideologically, poetically, culturally and practically through an interdisciplinary study of works by selected artists, writers, landscape architects and architects. Work with landscape fundamentals, continue on to more complex issues of natural processes and aesthetics, such as atmosphere, ephemerality and time, and of site planning, such as site selection, topography, drainage, ecology and climate, especially as related to architecture and art in the land. *Credits: 2*

Arch 177: **Computer Graphics, Image Processing and Vision**
Introduction to basic concepts of spatial description and manipulation by computer enables student to use these techniques as an aide in problems of formal spatial drawing with a computer. Examination of the issues of "hand-eye axis" in computer-based drawing and "paint" systems as well as more abstract algorithmic methods of drawing. Image acquisition and transformation by computer, its relation to computer vision and control of robots and machines which build will be another area of emphasis. Survey of a wide variety of applications including typeface design, page layout and make-up, animation and interactive control of video systems. *Credits: 2*

Arch 178: **Advanced Drawing Seminar**
The course will focus on the dialogue between figuration and abstraction. Students will be expected to plan and elaborate an ongoing series of drawings. The class will meet on a seminar basis to critique work in progress and to discuss issues relevant to the language of drawing. There may be an open studio available for those students who wish to pursue drawing from the model. However, students will be encouraged to investigate a broad spectrum of imagery and materials. *Prerequisite: permission of instructor. Credits: 2*

Arch 186: **Workshop**
Operating outside the confines of the semester structure, this one-credit workshop will vary in duration and schedule and have the flexibility to engage a variety of focused, project-oriented topics. The workshop is to be structured towards a critical engagement with specific concepts, techniques and media. Open to students in third year and above. *Prerequisite: permission of the instructor. Class instruction for a minimum of 15 hours. May be take a maximum of one (1) time each semester; may be repeated for a maximum total of four credits. Credits: 1*

Arch 199: **Architecture Independent Study**
Objective: The purpose of this Independent Study is to allow students to pursue an independent study or research project outside their regular coursework, in order to delve more deeply into a specific topic of interest. An Independent study may be taken under the supervision of a member of the resident faculty (defined as full-time or proportional-time faculty members) or adjunct faculty members who have taught at the School of Architecture for at least 6 semesters. The faculty member—who becomes the advisor for the independent course—must approve the proposed study and agree to provide continuing supervision of the work.
Eligibility: *Only students in fourth and fifth years in good academic standing (defined as having earned a minimum 3.25 G.P.A. overall for the previous semester) are eligible for independent study. Independent study may be taken only once during a semester in an advanced subject for two (2) credits. One (1) credit of independent study represents a minimum of three (3) hours of work during each week of a 15-week semester.*

Application procedure: *The major consideration in approving proposals for independent study is the educational value of the study project within the structure of the degree requirements as well as the student having successfully completed any relevant introductory coursework in the topic proposed. Before applying for an independent study, eligible students should contact the faculty they wish to consider as an advisor to discuss their proposal.*

1. *The selected faculty advisor must be teaching in the School of Architecture during the semester in which you wish to enroll (a professor on leave may not supervise an independent study).*
2. *The student writes a one-page proposal for the course including a concise description, deliverables, workplan, schedule and preliminary bibliography and describe previous coursework in the proposed topic as well as the educational value of the selected topic of interest.*
3. *The student selects a faculty adviser who must sign off on the proposal*
4. *The student submits the signed proposal to the Dean for review in consultation with the faculty member.*
5. *Approval of the Independent Study based on merits of proposal and availability of funds to compensate faculty member in compliance with CUFCT/CUOP contract.*
6. *Once approved, student will receive permission to register for ARCH 199.*

Credits: 2

GRADUATE REQUIRED

Arch 401: **Proseminar**

An introduction to research in architecture and urbanism: theory, research (methods and techniques) and writing, for M.Arch. II degree students only. Selected readings in historiography, theory, criticism and design and methods. Includes lectures and seminars by faculty and visiting specialists in the fields of history and criticism, architecture and urban design methods, research in representational techniques, digital technology, etc. Presentations by each student in the program will encourage interdisciplinary comparison and shared knowledge. *Credits: 2*

Arch 411: **Graduate Design Research Studio I**

The Design Research Studio 1 will establish a general problem incorporating aspects of architectural, urban and technological design research to be undertaken by the class, with each student contributing to his or her specific area of expertise. The studio will include seminars by invited guests on topics relevant to the program's principal areas of study. *Credits: 6*

Arch 413: **Graduate Thesis**

The choice of the area of study is the responsibility of the student. The scope of the project and method of exposition is defined by each student in consultation with their thesis adviser and must be approved prior to the beginning of the summer term on the basis of a thesis prospectus presented to the group of faculty. Students will develop a mutually agreed upon schedule for meetings with their adviser and for regular project reviews. *Credits: 6*

Arch 482: **Graduate Seminar in Technologies**
Selected topics in the advanced study of technological issues in architectural design, representation, materials, planning, production and construction. Open to undergraduate fourth- and fifth-year architecture students as an elective with permission of the instructor and the dean. *Credits: 2*

Arch 483: **Graduate Seminar in Urban Studies**
Selected topics in the advanced study of urban form including readings and case studies in urban analysis, global development, historic preservation and typological transformation. Open to undergraduate fourth- and fifth-year architecture students as an elective with permission of the instructor and the dean. *Credits: 2*

Arch 485: **Graduate Seminar in Theory, History and Criticism of Architecture**
Selected topics in the advanced study of the theory and criticism of modernism and contemporary architecture, the philosophy and aesthetics of architecture, the mediatization of architecture and broader cultural and historical issues, through the critical readings of texts as well as case studies. Open to undergraduate fourth- and fifth-year architecture students as an elective with permission of the instructor and the dean. *Credits: 2*

Arch 499: **Architecture Independent Study**
Objective: The purpose of this Independent Study is to allow students to pursue an independent study or research project outside their regular coursework, in order to delve more deeply into a specific topic of interest. An Independent study may be taken under the supervision of a member of the resident faculty (defined as full-time or proportional-time faculty members) or adjunct faculty members who have taught at the School of Architecture for at least 6 semesters. The faculty member—who becomes the advisor for the independent course—must approve the proposed study and agree to provide continuing supervision of the work.
Eligibility: *Only graduate students in good academic standing (defined as having earned a minimum 3.25 G.P.A. overall for the previous semester are eligible for independent study (which means that graduate students become eligible for Independent Study starting in their second semester of study). Independent study may be taken only once during a semester in an advanced subject for two (2) credits. One (1) credit of independent study represents a minimum of three (3) hours of work during each week of a 15-week semester.*
Application procedure: *The major consideration in approving proposals for independent study is the educational value of the study project within the structure of the degree requirements as well as the student having successfully completed any relevant introductory coursework in the topic proposed. Before applying for an independent study, eligible students should contact the faculty they wish to consider as an advisor to discuss their proposal.*

1. *The selected faculty advisor must be teaching in the School of Architecture during the semester in which you wish to enroll (a professor on leave may not supervise an independent study).*
2. *The student writes a one-page proposal for the course including a concise description, deliverables, workplan, schedule and preliminary bibliography and describe previous coursework in the proposed topic as well as the educational value of the selected topic of interest.*
3. *The student selects a faculty adviser who must sign off on the proposal*
4. *The student submits the signed proposal to the Dean for review in consultation with the faculty member.*
5. *Approval of the Independent Study based on merits of proposal and availability of funds to compensate faculty member in compliance with CUFCT/CUOP contract.*
6. *Once approved, student will receive permission to register for ARCH 499.*

Credits: 2

ADMINISTRATION, FACULTY AND STAFF

Deans

Benjamin Aranda
Acting Dean;
IDC Distinguished Professor
B.A., University of California, Berkley; M.Arch., Columbia University

Mersiha Veledar, RA
Acting Associate Dean;
Assistant Professor
B.Arch., The Cooper Union; M.Arch., Princeton University

Full-Time Faculty

Diana Agrest, RA, FAIA
The Irwin S. Chanin Distinguished Professor
Diploma, University of Buenos Aires School of Architecture and Urbanism; Centre de Recherche d'Urbanisme, and at the Ecole Pratique des Hautes Etudes, VI Section, Paris, France

Nora Akawi
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B.Arch, Bezalel Academy of Arts and Design, Jerusalem; M.Sc.CCCP, Columbia University

Nader Tehrani
Professor
B.F.A., B.Arch, Rhode Island School of Design; The Architectural Association; M.A.U.D., Harvard University

Michael Young, RA
Coordinator of Graduate Studies: Associate Professor
B.Arch, California Polytechnic University; M.Arch., Princeton University

Proportional-Time Faculty

James Lowder
Assistant Professor
B.Arch., SCI-Arc; M.Arch., Princeton University

Visiting Professors

Ted Baab
Visiting Professor II

Brad Samuels
Visiting Professor II

Affiliated Faculty

Ninad Pandit
Assistant Professor of History

Neena Verma
Instructor Adjunct

Adjunct Faculty

Stan Allen
Professor Adjunct

Samuel Anderson
Professor Adjunct

Laura Britton
Assistant Professor Adjunct

Pamela Cabrera
Assistant Professor Adjunct

Esther Choi
Associate Professor Adjunct

Yoonjai Choi
Assistant Professor Adjunct

Zach Cohen
Assistant Professor Adjunct

Dionisio Cortes
Instructor Adjunct

Gerri Davis
Assistant Professor Adjunct

Justin Den Herder
Assistant Professor Adjunct

Hayley Eber
Associate Professor Adjunct

Caleb Ehly
Assistant Professor Adjunct

Sue F. Gussow
Professor Emerita

Thorsten Helbig
Associate Professor Adjunct

Aletheia Ida
Associate Professor Adjunct

Nima Javidi
Associate Professor Adjunct

David L. Johnson
Instructor Adjunct

Hana Kassem
Associate Professor Adjunct

Andy Kim
Instructor Adjunct

Lauren Kogod
Associate Professor Adjunct

Steve Kreis
Associate Professor Adjunct

Katie Lau
Assistant Professor Adjunct

Jon Maass
Assistant Professor Adjunct

Sofia Mercado
Instructor Adjunct

Kayla Montes de Oca
Associate Professor Adjunct

Jessica Ngan
Assistant Professor Adjunct

Owen Nichols
Assistant Professor Adjunct

Joan Ockman
Professor Adjunct

Elizabeth O'Donnell
Distinguished Professor Adjunct

Don O'Keefe
Assistant Professor Adjunct

Julian Palacio
Assistant Professor Adjunct

Jihoon Park
Instructor Adjunct

Linda Pollak
Professor Adjunc

Frederick Rapp
Instructor Adjunct

Suchi Reddy
Assistant Professor Adjunct

Christian Rieser
Assistant Professor Adjunct

Guillermo Ruiz de Teresa
Assistant Professor Adjunct

Tommy Schaperkotter
Assistant Professor Adjunct

Matt Shaw
Assistant Professor Adjunct

Sheng Shi
Assistant Professor Adjunct

Gjergji Shkurti
Assistant Professor Adjunct

Clara Syme
Assistant Professor Adjunct

Ala Tannir
Assistant Professor Adjunct

Ryan Brooke Thomas
Assistant Professor Adjunct

Nicole Vlado
Assistant Professor Adjunct

Matthew Waxman
Assistant Professor Adjunct

Bryan Young
Assistant Professor Adjunct

Guido Zuliani
Distinguished
Professor Adjunct

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Academic Support,
Technician, Architecture Lab;
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Adrian Rivera
Academic Support Technician,
Media Lab and Digital
Architecture Studio

Monica Shapiro
Academic Administrator

PROFESSIONAL ACCREDITATION

In the United States, most registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit professional degree programs in architecture offered by institutions with U.S. regional accreditation, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted an eight-year term, an eight-year term with conditions, a two-year term of continuing accreditation, or a three-year term of initial accreditation, depending on the extent of its conformance with established education standards.

Doctor of Architecture and Master of Architecture degree programs may require a non-accredited undergraduate degree in architecture for admission. However, the non-accredited degree is not, by itself, recognized as an accredited degree.

The Irwin S. Chanin School of Architecture of The Cooper Union offers the following NAAB-accredited degree program:

Bachelor of Architecture (160 undergraduate credits)

The next accreditation visit for this program will be in 2025.

The NAAB expects programs to be transparent and accountable regarding the information provided to students, faculty, and the public. As a result, all NAAB-accredited programs are required to ensure that the following information is posted online and is easily available to the public:

6.1 Statement on NAAB-Accredited Degrees
All institutions offering a NAAB-accredited degree program or any candidacy program must include the exact language found in the NAAB Conditions for Accreditation, 2020 Edition, Appendix 2, in catalogs and promotional media, including the program's website. See above.

6.2 Access to NAAB Conditions and Procedures
The program must make the following documents available to all students, faculty, and the public, via the program's website:
a) Conditions for Accreditation, 2020 Edition
b) Conditions for Accreditation in effect at the time of the last visit
c) Procedures for Accreditation, 2020 Edition
d) Procedures for Accreditation in effect at the time of the last visit

6.3 Access to Career Development Information

The program must demonstrate that students and graduates have access to career development and placement services that help them develop, evaluate, and implement career, education, and employment plans. See the Center for Career Development

6.4 Public Access to Accreditation Reports and Related Documents

To promote transparency in the process of accreditation in architecture education, the program must make the following documents available to all students, faculty, and the public, via the program's website:

a) All Interim Progress Reports and narratives of Program Annual Reports submitted since the last team visit

2018 IPR, 2021 IPR

b) All NAAB responses to any Plan to Correct and any NAAB responses to the Program Annual Reports since the last team visit

2019 response, 2021 response

c) The most recent decision letter from the NAAB

d) The Architecture Program Report submitted for the last visit

e) The final edition of the most recent Visiting Team Report, including attachments and addenda

f) The program's optional response to the Visiting Team Report—not applicable

g) Plan to Correct—not applicable

h) NCARB ARE pass rates

NCARB publishes pass rates for each section of the Architect Registration Examination by institution. This information is considered useful to prospective students as part of their planning for higher/postsecondary education in architecture. Therefore, programs are required to make this information available to current and prospective students and the public by linking their web sites to the results.

i) Statements and/or policies on learning and teaching culture

Academic Standards and Regulations
About The Irwin S. Chanin School of Architecture
Curriculum
Degree Requirements: Bachelor of Architecture
Bachelor of Architecture Program Description
Facilities and Resources
Facilities and Resources: Studios

j) Statements and/or policies on diversity, equity, and inclusion

Diversity and Inclusion
Initiatives
Anti-Racist Resources
Anti-Racism in Thesis Workshop
A Manifesto and Call to Action
Cabinet Response to the Student Letter of June 8, 2020
Juneteenth at Cooper
Standing with the Asian Community

New Diversity & Inclusion Task Force

Late last year, the Faculty Student Senate passed a resolution recommending we take a closer look at gender diversity issues in engineering admissions. I support the resolution and am eager to better understand this issue. I am also expanding the exploration of diversity issues college wide and establishing a new Diversity & Inclusion Task Force to help us do so. Diversity is a central feature of Cooper Union's legacy and historic mission. It's also an area where, I believe, we must lead. The structure and approach for this Task Force is being developed now and will launch shortly. The goal is to engage faculty, students and staff in a process that examines diversity and inclusion in our community in order to develop an actionable plan that drives us toward excellence by promoting inclusive practices across all facets of Cooper Union operations, pedagogy, and student support. Look for more information to come on this initiative in the coming weeks, including how you can get involved.

(Excerpted from President Sparks' communication Opportunities for Involvement in Cooper's Future, dated April 6, 2017)

6.5 Admissions and Advising

The program must publicly document all policies and procedures that govern the evaluation of applicants for admission to the accredited program. These procedures must include first-time, first-year students as well as transfers from within and outside the institution. This documentation must include the following:

a) Application forms and instructions
b) Admissions requirements; admissions-decisions procedures, including policies and processes for evaluation of transcripts and portfolios (when required); and decisions regarding remediation and advanced standing
c)Forms and a description of the process for evaluating the content of a non-accredited degrees
d) Requirements and forms for applying for financial aid and scholarships
e) Explanation of how student diversity goals affect admission procedures

6.6 Student Financial Information

6.6.1 The program must demonstrate that students have access to current resources and advice for making decisions about financial aid. See Financial Aid and Financial Aid at Cooper

6.6.2 The program must demonstrate that students have access to an initial estimate for all tuition, fees, books, general supplies, and specialized materials that may be required during the full course of study for completing the NAAB-accredited degree program. See 205-265 Tuition & Fees

SCHOOL OF ART

MISSION

The mission of the School of Art is to educate artists in the broadest sense, both as creative practitioners engaged with a wide range of disciplines in the visual arts and as enlightened citizens of the world who are prepared to question and transform society. The program is structured around an integrated curriculum that fosters connections between disciplines, as well as between traditional and new media. The studio experience affords the opportunity for the development of individual artistic vision in dialogue with collective debates and experiments within an intimate community of artists. The study of history, theory and criticism in the visual arts and general studies in the humanities and social sciences are considered essential in intellectually grounding studio practice. Central to the school's philosophy is the advancement of the artist's role in relation to the prevailing forms and institutions of cultural production. Students are challenged to expand their research and experimentation across The Cooper Union, as well as in the surrounding urban environment and in the wider public sphere.

CURRICULUM

The goal of the BFA program is to educate students in the skills, knowledge, and understanding necessary for professional practice in art- and design-related fields. Our integrated curriculum educates students in specific fine arts disciplines but also in the complex interrelation of all visual vocabularies. Through courses in the humanities, the social sciences, the sciences, and the history and theory of art, the program invites students to expand their studio education across disciplines and subjects.

The first year Foundation Program is designed as a basis for the educational program of the School of Art and is intended to prepare students for studies in all the disciplines offered within the curriculum. Through exposure to a variety of two-, three-, and four-dimensional projects, students are given a general introduction to the specifics of visual and spatial phenomena, and to concepts, principles, and techniques of the visual arts. Required courses in the history and theory of art, and in Cooper Union's unique humanities and social sciences "core" sequence, introduce critical thinking and writing as a necessary part of artistic practice.

Following the completion of the Foundation Program, sophomore students may choose courses in the disciplines of drawing, audiovisual, graphic design, painting, photography, printmaking, and sculpture. Elective studio and techniques classes are also offered on a rotating basis. Since the prerequisite studio courses students take in sophomore year will in large part determine their options for advanced study, students are encouraged to choose a variety of areas in consultation with their instructors and advisors. A continuing involvement in general academic studies serves as a tool to broaden each student's developing studio experience across histories of ethics, social agency, and human expression.

In junior year, students experience increased freedom and flexibility to determine the depth and breadth of their advanced studies. Students are encouraged to use general academic studies electives, along with elective courses offered by the Schools of Architecture and Engineering, as a basis for the self-directed inquiry which is an integral part of making art.

Seniors work with the highest degree of autonomy, taking advanced courses based on their sophomore and junior prerequisites, expanding both technical aptitude and critical dexterity, and developing a continuous studio practice. The Senior Presentation is an opportunity for a public showing and telling of this work, and, together with projects across the curriculum, provides a context through which students prepare for work and life after Cooper.

Since each transfer student arrives at the School of Art with unique experiences and background, they work closely with their advisors to determine the appropriate academic trajectory.

ACADEMIC STANDARDS AND REGULATIONS

Attendance

Attendance at classes is mandatory. Excessive absences or lateness may result in a failing grade, and can be grounds for probation or dismissal.

Credits

A credit is an academic unit of measure used for recording progress in the program of study and in meeting the academic requirements of the degree. In studio and lecture courses, one credit represents a minimum of three hours of work during each week of a 15-week semester dedicated solely to that course. These criteria apply to each course in which the student is enrolled.

Example in studio courses Drawing, 3 credits, equals 9 hours of work per week (i.e., 4 hours in class and 5 hours outside work [studio or home].

Example in techniques courses Casting Techniques, 2 credits, equals 6 hours of work per week (i.e., 4 hours in class and 2 hours outside work).

Example in a lecture course HSS-1: Freshman Seminar, 3 credits, equals 9 hours of work per week (i.e., 3 hours in class and 6 hours of outside work).

The number of credits awarded in each course represents the fulfillment of an agreement by the student to satisfy the course requirements as defined by each instructor, on time, and in accordance with the definition of credit.

Additional Credits in an Advanced Studio or Science Course Juniors and seniors in good academic standing may request to add credits to their individual course commitments within the following limitations: no more than two additional credits in one course and no more than a total of three additional credits in any one semester.

Written approval of the instructor and the Office of Academic Advising & Off-Campus Programs must be obtained during the registration or add/drop period. Permission will be granted only under special circumstances.

Additional Credits in a Semester Normal progress towards a degree is approximately 16 credits per semester. Students may register for up to 20 credits only if they earned a minimum 3.0 GPA for the previous semester. Under special conditions and with the permission of the Office of Academic Advising & Off-Campus Programs, students may register for more than 20 credits. Students who wish to register for fewer than 16 credits must do so in consultation with the Office of Academic Advising & Off-Campus Programs.

Independent Study Independent study in a School of Art subject is an alternative to classroom study and may be taken only with a member of the resident faculty (defined as full-time or proportional-time faculty members or adjunct faculty members who have taught at the School of Art for at least seven semesters). Only juniors and seniors in good academic standing are eligible for independent study. Independent study in a School of Art subject may be taken only once during a semester for one, two, or three credits. One credit of independent study represents a minimum of three hours of work during each week of a 15-week semester.

The major considerations in approving proposals for independent study are the educational value of the study project within the structure of the degree requirements and relevance to ongoing studio practice as encouraged by faculty. Permission to undertake independent study off-campus can be given only when it is required by the

nature of the specific project and when the experience has been evaluated to be valid by the instructor and approved by the Office of Academic Advising & Off-Campus Programs.

School of Art students who wish to apply for independent study in a Faculty of Humanities & Social Sciences subject should refer to the FHSS policy.

Good Standing, Probation, Dismissal, and Administrative Course Withdrawal
Good standing is defined as a semester GPA of 2.0 or higher and normal progress toward the degree. A semester GPA below 2.0, and/or failure to make normal progress, places students on probation and makes them subject to dismissal. Students with excessive absences and lateness are also subject to probation or dismissal.

Post-Semester Review Student grades are reviewed at the end of each semester. Students who are at risk of dismissal will be invited to write a letter or meet with the review committeeto provide context around their unsatisfactory academic performance. Students who are subsequently placed on probation or dismissed will be notified in writing. Decisions regarding probation are final. Students may appeal dismissal.

Probation Students on probation who do not improve their academic standing during the probationary semester or who fail to meet minimal academic standards during any subsequent semester are subject to further probation or dismissal from The Cooper Union.

Dismissal Students who are dismissed who wish to return to The Cooper Union may appeal their dismissal and/or apply for readmission. Instructions for appeal and readmission are included in dismissal letters. Questions should be directed to the Office of Academic Advising & Off-Campus Programs.

Administrative Course Withdrawal If an instructor determines that a student's behavior is hindering the educational progress of the class, the instructor will first make the student aware of the concerns in writing and, if appropriate, provide an opportunity for the student to change their behavior. If the behavior continues, the instructor will consult with the Office of Academic Advising & Off-Campus Study and the Office of the Dean of the School of Art to determine next steps. If it is determined that the student has been provided with reasonable opportunity to participate without hindrance to the educational progress of the class, and that even with these opportunities, the student has not modified their behavior, then the student may be withdrawn from the course and receive a grade of W. Students may appeal such decisions by writing to the Dean of the School of Art within three business days of the notice of course withdrawal.

Grades

At the end of every semester students receive grades for their semester's work in each subject.

The letter grades which may be given in School of Art courses are: **A** (4.0), **A-** (3.7), **B+** (3.3), **B** (3.0), **B-** (2.7), **C+** (2.3), **C** (2.0), **C-** (1.7), **D+** (1.3), **D** (1.0), **D-** (.7), **F** (0).

The numbers in parentheses give the assigned numerical equivalents of the letter grade for each course. These are used in computing semester index and cumulative index ratings by multiplying the numerical equivalent of the grade for each course by the credits assigned to that subject. The sum of such multiplications for all the subjects carried by a student is divided by the total credits carried for that period to determine the index or grade point average.

The official meanings for letter grades are as follows:

A Outstanding performance
B Above average performance
C Requirements completed; average performance
D Passing, but unsatisfactory
F Failure to meet the minimum requirements of a subject
I Incomplete (see below).
W Withdrawn (see below).
WU Withdrawn Unauthorized (see below).

I The designation **I** indicates that the work of the course has not been completed and that assignment of a grade and credit has been postponed. An **I** will be given only in cases of illness (confirmed by a physician's letter) or documentation of other extraordinary circumstances beyond the student's control. The designation of **I** will be granted only with the approval of the Office of Academic Advising & Off-Campus Programs.

The deadline for removal of an **I** designation will be determined by the instructor and recorded at the time the designation is given but will not be later than two weeks after the start of the next semester. If the **I** is not removed within the set time limit, either by completing the work in the subject or by passing a reexamination, the **I** will automatically become an **F** unless the dean of the School of Art extends the time, or the student withdraws from school before the deadline date.

W Indicates that the student has withdrawn from the course. Students must request course withdrawals through the Office of Academic Advising & Off-Campus Programs by the deadline posted on the academic calendar (approximately the eighth week of the semester). The grade is not included in the calculation of the student's semester rating. Students are encouraged to speak with their instructors both before and after their decision to withdraw.

WU A student who stops attending a course without withdrawing through the Office of Academic Advising & Off-Campus Programs may receive a grade of **WU**; however, the instructor is free to record a grade of F in such a case. A **WU** grade is not included in the calculation of the student's semester rating, while an **F** grade is included.

When appropriate, certain courses may be designated as Pass/Fail courses.

Pass Requirements completed. This designation is not included in the calculation of the student's semester rating.

Fail Failure to meet the minimum requirements of a course. This grade is included in the calculation of the student's semester rating; its numerical equivalent is 0.

A change in an official grade of record, other than the **I** designation, cannot be made by the Office of the Registrar without the express written consent of the instructor and the dean of the School of Art. Grade changes will not be accepted after one year has elapsed from the completion of the course.

Graduation

To be eligible for graduation students must complete the minimum number of credits required for the B.F.A. degree and must have been enrolled for a minimum of four semesters at The Cooper Union as a full-time student for the B.F.A.

All candidates for the B.F.A. degree must satisfactorily complete the requirement for a senior presentation.

Students must have a cumulative grade point average of 2.0 or better in order to graduate from The Cooper Union School of Art.

Students eligible to graduate and participate in commencement exercises must be approved by the Faculty of the School of Art.

Students who have not fulfilled the requirements for graduation will normally not be permitted to participate in commencement exercises.

Graduation requirements as outlined here are guidelines that are subject to change.

Students are responsible for their total accomplishment and for being continuously aware of the standards defined in the preceding paragraphs.

Leave of Absence and Reinstatement

Students considering a leave of absence must review Cooper Union's regulations governing leaves of absence and consult with the Office of Academic Advising & Off-Campus Programs. For medical leave, students should also contact the Office of Student Affairs.

Readmission Students who have been on leave for more than 4 semesters (consecutive or non-consecutive), dismissed, or who have withdrawn from the school and wish to be considered for readmission must reapply through the readmission procedure. Questions should be directed to the Office of Academic Advising & Off-Campus Programs.

Registration and Change of Program

Only those students who are officially registered in a course will have credits and a grade entered on their records. Students are required to register for each semester through the online registration system, during the announced registration period.

A student who receives a grade of **F, W,** or **WU** in the first semester of a two-semester course sequence will not be allowed to register for the second semester of that course. In such a situation the student will consult with the Office of Academic Advising & Off-Campus Programs in order to determine a future program of study. Students whose records by mid-semester indicate a possible failure to meet required standards may be so informed.

Adding a Course A student is permitted to add a course during the drop/add period with approval from the Office of Academic Advising & Off-Campus Programs.

Dropping a Course A student may drop a course during the drop/add period with approval from the Office of Academic Advising & Off-Campus Programs. A student who wishes to drop a course may be advised to add equivalent credits as needed to maintain satisfactory progress towards the degree. A course dropped during the drop/add period will be deleted from the transcript.

Withdrawing from a Course A student who wishes to leave a course after the drop/add period must request course withdrawal through the Office of Academic Advising & Off-Campus Programs. The deadline, approximately the eighth week of the semester, is posted on the academic calendar. A grade of **W** will appear on the transcript.

A student who stops attending a course without withdrawing may receive a grade of either **WU** or **F** at the instructor's discretion.

Residence Requirement

A candidate for a degree must have been enrolled during two academic semesters preceding the granting of the degree and in residence during the last semester.

Transfer Credit

Transfer students and freshmen with advanced standing may apply for transfer credits to be counted toward the BFA degree requirements.

A maximum of 60 credits may be transferred toward the BFA degree, at the time of admission only. An accepted applicant who has previously earned a baccalaureate degree in a discipline other than art will be treated as a transfer student for purposes of evaluating completion of degree requirements and length of time allotted at The Cooper Union to complete the BFA.

Faculty in both the School of Art and the Faculty of Humanities & Social Sciences (HSS) evaluate official transcripts and make recommendations for awarding credits, which must then be approved by their academic dean. Faculty in the School of Art evaluate credit in the areas of the Foundation program, studio, science, and contemporary art issues. Faculty in FHSS evaluate credit in other humanities and social science areas.

Generally, the required 10 credits of free electives are completed during the student's stay at The Cooper Union, and previously earned credits are not transferred into this category. Exceptions to this rule may be granted by the Admissions Committee, with the approval of the dean of the School of Art, at the time of admission only. (See School of Art Transfer Requirements).

Transfer credits will be officially recorded only after one semester of satisfactory work is completed at The Cooper Union.

Withdrawal from School

Written requests for withdrawal should be addressed to the dean of the School of Art and submitted through the Office of Academic Advising & Off-Campus Programs.

The academic standards and regulations outlined here are guidelines that are subject to change.

Students are responsible for their total accomplishment and for being continuously aware of the standards defined in the preceding paragraphs.

DEGREE REQUIREMENTS

FOR STUDENTS ENTERING **PRIOR TO** FALL 2022

Candidates for the Bachelor of Fine Arts degree are expected to complete 130 credits within eight semesters of study and within the following disciplinary credit distribution.

Courses	*Credits*
Required Foundation Courses	
Basic Drawing (Analytical and Descriptive)	6[1]
2-Dimensional Design	6[1]
3-Dimensional Design	6[1]
4-Dimensional Design	3[1]
Color	2[1]
Introduction to Techniques I & II	1[1]
Foundation Project	1[1]
Required Art History Courses	
Modern to Contemporary: An Introduction to Art History	4[1]
Art History Electives	10*
**Including 2 credits in prehistory through 17th century art and 2 credits in global perspectives on art*	
Required General Academic Studies	
Freshman Seminar	3[1]
Texts and Contexts: Old Worlds and New	3[1]
The Making of Modern Society	3[2]
The Modern Context: Figures and Topics	3[2]
Science	3
General Academic Studies Electives	
To be elected from Art History[3], Foreign Language[4], History of Architecture, Humanities, Social Sciences, and Sciences	12
Prerequisite and Advanced Studio Courses	
To be elected from any studio discipline	54
Required Senior Presentation	0
Free Electives	
To be elected from courses in any discipline at Cooper Union or at other institutions approved by the dean of the School of Art	10
Total Credit Requirements for the B.F.A. Degree	**130**

[1] *First-year requirement for all students*

[2] *Second-year requirement for all students*

[3] *Maximum of three credits*

[4] *With preapproval of the Faculty of Humanities and Social Sciences*

FOR STUDENTS ENTERING **AFTER** FALL 2022

Candidates for the Bachelor of Fine Arts degree are expected to complete 125 credits within eight semesters of study and within the following disciplinary credit distribution.

Courses	*Credits*
Required Foundation Courses	
Basic Drawing (Analytical and Descriptive)	3[1]
2-Dimensional Design	3[1]
3-Dimensional Design	3[1]
4-Dimensional Design	2[1]
Color	2[1]
Introduction to Techniques I & II	1[1]
Foundation Orientation	.5[1]
Foundation Project	.5[1]
Foundation Studio	3[1]
Required Art History Courses	
Modern to Contemporary: An Introduction to Art History	6[1]
Art History Electives	10
Required General Academic Studies	
Freshman Seminar	3[1]
Texts and Contexts: Old Worlds and New	3[1]
The Making of Modern Society	3[2]
The Modern Context: Figures and Topics	3[2]
Science	3
General Academic Studies Electives	
To be elected from Art History[3], Foreign Language[4], History of Architecture, Humanities, Social Sciences, and Sciences	12
Prerequisite and Advanced Studio Courses	
To be elected from any studio discipline	54
Required Senior Presentation	0
Free Electives	
To be elected from courses in any discipline at Cooper Union or at other institutions approved by the dean of the School of Art	10
Total Credit Requirements for the B.F.A. Degree	**125**

[1] First-year requirement for all students

[2] Second-year requirement for all students

[3] Maximum of three credits

[4] With preapproval of the Faculty of Humanities and Social Sciences

Degree Requirements for All Students

Prerequisite and Advanced Studio Courses The student's choice of studio courses is based on individual interest in various disciplines, on prerequisite courses for advanced areas of study and on the student's interest in working with particular instructors. Students are required to complete 54 credits.

There are limitations on the number of credits a student may take each semester in any one area of study, depending upon the student's progress in the program (number of credits completed toward the degree). The number of credits allowed is determined as listed below:

Credits Completed	Maximum Credits per Semester per Area of Study*
30-32 (Sophomore)	6
60-64 (Junior)	9
90-96 (Senior)	no limit

* Includes related techniques courses

Art History The Art History requirements include two introductory courses and five elective courses under the HTA (History and Theory of Art) prefix. Contemporary Art Issues (SE 401) may also be counted toward the art history elective requirement up to two times.

General Academic Studies Requirements The general academic studies requirements of the BFA degree include four core courses in the humanities and social sciences (HSS-1-4) and a natural science course (three credits).

General Academic Studies Electives In addition to the art history and general academic studies required courses, students must fulfill 12 credits of general academic studies electives. Students choose a combination of courses from the categories of the humanities (HUM), the social sciences (SS), the history and theory of art (HTA, three credits maximum), the history of architecture, and the natural sciences. Students should note that some courses in these areas are two credits while others are three credits. Depending on the courses selected, some students may need to complete more than four courses to earn the required 12 credits.

During Foundation year, BFA candidates take two core courses in the humanities and social sciences and two required courses in art history.

During sophomore year, BFA candidates take two further core courses in the humanities and social sciences and either two art history electives or one art history elective and a science course.

Throughout the last two years, students complete their remaining general academic studies requirements, art history electives, and general academic studies electives.

Foreign language coursework at the intermediate or advanced level, taught by language instructors with appropriate academic credentials, may be presented to the Faculty of Humanities & Social Sciences for possible general academic studies elective credit. A maximum of four credits of language study may be approved in this category. Intermediate or advanced foreign language studies beyond four credits may be presented to the dean of the School of Art for possible free elective credit.

Minors School of Art students may apply to earn a minor through the Faculty of Humanities & Social Sciences (FHSS). See the FHSS minor's section for a list of available minors and other details.

Free Electives

Any Cooper Union course not being counted toward another requirement may be counted toward the free elective requirement. Students frequently take TE (techniques) courses toward the free elective requirement. It should be noted that students may take only one TE course per semester, unless granted an exception through the Office of Academic Advising & Off-Campus Programs.

Students can also use the 10 credits required under free electives towards fulfilling a FHSS minor. Electives chosen towards the fulfillment of a minor must satisfy the conditions of the minor's guidelines.

Senior Presentation Requirement A public presentation of each senior student's work, normally in the student's final semester, is a requirement for graduation. Each student may satisfy this requirement with an exhibition or, where appropriate, a screening, performance, or publication. No student will be permitted to receive a degree unless this requirement is completed to the satisfaction of the faculty and the dean of the School of Art at a mutually agreed upon time and venue. Completion of the requirement will be reflected on the student's transcript. The 41 Cooper Gallery will be reserved for senior student exhibitions during much of the spring semester; other appropriate exhibition spaces will also be made available.

Progress Toward the Degree Students are expected to maintain normal progress toward their degrees.

Normal progress in the Foundation year is defined as completing all courses in the Foundation curriculum.

Normal progress in any semester after the Foundation year, and for transfer students, is defined as completing an appropriate balance of fine arts, general academic studies requirements, general academic studies electives, and free elective courses such that the student can finish all degree requirements in the number of semesters allotted.

Students should use online resources and consult with the Office of Academic Advising & Off-Campus Programs in order to assess their progress towards the degree.

Exchange Program The School of Art offers a number of exchange programs with schools abroad. They currently include opportunities for a junior-year semester of study in the Czech Republic, England, France, Germany, Israel, Japan, Mexico, the Netherlands, Spain, or Sweden. Students should consult the Office of Academic Advising & Off-Campus Programs as early as possible for information about these exchange opportunities.

Eligibility Requirements for the Exchange Program Students who have completed at least 64 credits toward the BFA degree, have a cumulative GPA of 3.0, and have no outstanding first- and second-year requirements, may apply for one semester of exchange. The student must maintain good academic standing in the semester prior to departure, otherwise permission to participate may be revoked.

Transfer students must have completed at least 32 credits in residence at The Cooper Union before applying for exchange and must have an additional 32 credits to complete in residence upon their return. Transfer students must also have met all first- and second-year requirements and have a cumulative GPA of 3.0.

Students applying for exchange must be in residence during the semester when they are completing the application process.

Students may earn a maximum of 12 credits in studio courses for one semester of study on exchange. A maximum of 6 credits may be awarded by any one faculty member for work done while on exchange. Typically, students do not take courses toward their requirements in the humanities, social sciences, or sciences while on exchange. Students must therefore complete additional coursework in these areas in the semesters before and after exchange.

Since foreign schools may have academic calendars at variance with that of The Cooper Union, students studying on exchange who cannot return in time for the start of the next semester at the School of Art must request a discretionary leave of absence for that semester.

Students may participate in exchange only once during their stay at The Cooper Union.

Students from other institutions who are enrolled at the School of Art as exchange students may not apply to transfer to The Cooper Union School of Art while in residence at The Cooper Union.

COURSES

Foundation **Foundation courses are required for all first-year students.**

FA-100.1/FA-100.2 **Introduction to Techniques**
An introduction to the physical aspects of working with wood, metal, plaster, and plastics, as well as an introduction to on-campus computer facilities and resources. A basic introduction to the Adobe interface, specifically Photoshop and Illustrator will be provided. *Fall 2025/Spring 2026. Required for first-year students. Pass/Fail. Credits: 0.5*

FA-101 **Color**
A study of the physical, perceptual, art historical and cultural aspects of color. The phenomenon of color and principles of light are explored in various media towards an understanding of color application in all of the fine art disciplines and architecture. *Spring 2026. Required for first-year students. Credits: 2*

FA-102 **Two-Dimensional Design**
Exploration of the visual and intellectual aspects of form on the two-dimensional surface, in a variety of media. Investigations into the relationships of perception, process and presentation. *Spring 2026. Required for first-year students. Credits: 3*
**During the 2024-2025 Academic Year, FA-102.1 (Two-Dimensional Design) was offered in the Fall semester. Beginning the 2025-2026 Academic Year, FA-102 (Two-Dimensional Design) will be offered in the Spring semester.*

FA-104 **Basic Drawing**
A course in freehand drawing designed to emphasize perceptual and inventive skills in all drawing media. *Fall 2025. Required for first-year students. Credits: 3*
**During the 2024-2025 Academic Year, FA-104.1 (Basic Drawing) was offered in the Spring semester. Beginning the 2025-2026 Academic Year, FA-104 (Basic Drawing) will be offered in the Fall semester.*

FA-105 **Four-Dimensional Design**
This course investigates the properties of time and movement and the fundamentals of four-dimensional design. Students explore duration, condensation, expansion, interruption, simultaneity, stillness, action and situation through a wide range of materials. *Fall 2025. Required for first-year students. Credits: 2*

FA-108 **Foundation Studio**
A studio methods and theories course for foundation students with a focus on the development of multiple lines of visual competency helping to prepare students for advanced study. This course works in conjunction with technical labs through a set of offerings in shorter lab/studio seminars. In this sense, the technical or craft learning necessary for visual practice, and the beginning of a personal conceptual or research methodology, merge. *Spring 2026. Required for first year students. Credits: 3 credits.*

FA-109.1 **Three-Dimensional Design**
Students work on projects that explore the fundamentals of forms and space and investigate the properties of materials, structure, mass, scale, light and motion.
Fall 2025. Required for first-year students. Credits: 3

SE-101 **Foundation Orientation**
Foundation Orientation brings together all first-year students as an introduction to the academic life of the School of Art, as part of The Cooper Union for the Advancement of Science and Art. The course is designed to give students a working overview of opportunities and resources available to them.
Fall 2025. Required for first-year students. Pass/Fail. Credits. 0.5

SE-150 **Foundation Project**
This course brings together all first-year students within a seminar. This course consists of a series of presentations that introduce various artistic practices, critical languages, and criticism. This aspect of the course indents to present contrasting historical and contemporary models of creating, seeing, speaking, and thinking about art. *Spring 2026. Required for first-year students. Pass/Fail. Credits. 0.5*

Audiovisual

FA-275 **Audiovisual I**
Audiovisual I is the first semester of a two-semester trajectory. In semester one, students will be introduced to concepts, production techniques, and multiple histories of artists' sound and moving image work, exploring origins and evolutions of animation, film, video, and audio recording. Alongside a historical and theoretical framework, a wide range of practical tools will be introduced, including pre-cinematic image capture, 16mm film and digital cinema production, stop action animation, sound recording, and lighting. This is an assignment-driven class where students will work independently and in groups, supported by classroom instruction, screenings, workshops, and one-on-one meetings with the professor. Each of these modes will also contribute toward student development of critical thinking and language in which to conceptualize, make, and share with the class their time-based work.
Fall 2025. May not be repeated. Credits: 3

FA-276 **Audiovisual II**

Audiovisual II is the second semester of a two-semester trajectory. The course is designed for students to further their exposure to important concepts, production techniques, and histories of artists' sound and moving image work, while developing the tools to work independently in the audiovisual realm. With an emphasis on students developing longer form prompted and self-generated projects, AV2 will delve further into both conventional and experimental techniques of moving image and sound recording, assembly, editing, post-production, lighting, and installation. Through classroom instruction, screenings, guest artist visits and group critiques, students will experiment with multiple modes of making, while also evolving critical thinking and language in which to conceptualize, make, and share with the larger class and school community their time-based work.

Fall 2025. May not be repeated. Pre-Req: AV I. Credits: 3

FA-386 **AV Projects**

Students will advance their practice by producing work using a range of audiovisual tools and/or found material of their choice. Work will be discussed in group critiques as well as individual conferences with the instructor. Audiovisual strategies as forms—material and conceptual—will be the subject of readings, guest artists, and class discussions. *Fall 2025. May be repeated. Pre-Req: AV I and Pre/Co-Req: AV II. Credits: 3*

FA-386-1 **AV Projects: Video Editing**

Editing isn't just a means to an end – it's an artform in itself. The many processes involved in editing literally sculpt your recordings and found material to yield something entirely new. In this course, we will focus on the techniques, theories and histories of editing. We will work on story building, and the strategic use of transitions, effects and compositing to create meaning and affect the emotions of viewers. We will consider the following questions: How does editing create a sense of a real or imaginary space? How does editing create dramatic tension or a sense of the poetic dimension of everyday life? Who are the key figures in the conceptualization of film and video editing and what are their most important ideas? How have certain technical innovations transformed editing practices? Students will be encouraged to develop their own projects in the course and strengthen their editing techniques so that they can take their moving image work to a higher level.

Fall 2025. Pre-Req: AV I and Pre/Co-Req: AV II. Credits: 3

FA-386-2 **AV Projects: Blender Bootcamp**
This course is a hands-on introduction to Blender, a powerful and free 3D software that offers an expansive toolset for creative ideation across disciplines. Designed for artists of all backgrounds, Blender Bootcamp provides a structured immersion into the fundamentals of 3D modeling, texturing, lighting, rigging, animating, and rendering. By the end of the course, students will have a working knowledge of Blender's core functions—and the beginnings of a personal toolkit for bringing three-dimensional thinking into their own artistic practices. *Fall 2025. Pre-Req: AV I and Pre/Co-Req: AV II. Credits: 3*

FA-387 **AV Projects Topics**
This class will center around a specific audiovisual topic. Emphasis is on independent student work made in relation to the topic and related material presented by the instructor. Topics will range broadly to include thematic ideas and concepts in sound, video and installation, historic and contemporary strategies of making and installing work, and specific or esoteric zones of audiovisual interest. Student work will be discussed in group critiques and in one-on-one visits with the professor. The class will include readings, discussions, screenings, guest artists and class trips organized in relation to the class topic. *Fall 2025. May be repeated. Pre-Req: AV I and Pre/Co-Req: AV II. Credits: 3*

FA-387-1 **AV Projects Topics: Deformers Too**
This course will be focused around viewing, discussing, and producing audio/visual works that, through experiencing them, deform you. These are works that distort the norm, disrupt convention, and disregard expectation to produce effects both physiologically and psychically altering. If Transformers are "More Than Meets the Eye," Deformers contort the eyes and the mind, in ways both transitory and lasting, ever so slightly warping what was there before. Deformers Too will focus explicitly on these themes in comedy, material behavior, and (infra)structural films. Students will work independently on self-directed projects after proposing a work or set of works that directly engage with the course topic. Class time will be used for screenings and listening sessions, discussion and analysis of works and related writing, artist visits, individual presentations, and one on one visits with the professor.
Fall 2025. Pre-Req: AV I and Pre/Co-Req: AV II. Credits: 3

FA-387-2 **AV Projects Topics: Media Burn**
In Media Burn we will investigate and be inspired by artworks from the 1960s to the present that use moving images, space, sound, loops, performance, site-specificity, chance, repetition, and games as tools for communicating ideas. In the course, students will create collaborative and individual projects and explore ways of expanding their practices. Students are encouraged to use analog and digital media (with appropriate training in specific tools) to connect interdisciplinary interests in music, theater, dance, sculpture, painting, writing, and more. A component of the class will take place outside the classroom at museums, galleries, non-profits and alternative spaces in and around New York. *Fall 2025. Pre-Req: AV I and Pre/Co-Req: AV II. Credits: 3*

Drawing

FA-240 **Drawing**
The course is designed to explore the phenomena of drawing as basic to the visual language of all disciplines. The fundamental notion of observation and analysis in drawing is investigated. As preparation for work in an advanced level, the course involves further development of drawing skills and techniques, as well as an emphasis on individual aesthetic development. Assignments and group critiques are central to the course. *Fall 2025. May not be repeated. Credits: 3*

FA-341 **Advanced Drawing**
This course is for students seeking further growth in drawing, either as individual studio focus or as a tool for ideation and methodologies within other disciplines. Advanced study in drawing interrogates historical notions of traditional draftmanship and the contemporary contexts of the discipline. Students are encouraged to explore and experiment with drawing as a way to further develop visual understandings of pictorial, sculptural or temporal space. The course is intended to help students use drawing as a critical and procedural tool within individual art practice. Group critiques and drawing sessions as well as individual meetings with the instructor are integral components of the course. *Fall 2025. May be repeated. Pre-Req: Drawing. Credits: 3*
**Beginning Spring 2026, Drawing will no longer be a pre-requisite for Advanced Drawing.*

Graphic Design

FA-211 **Graphic Design I**
An introduction to the techniques and visual language of graphic design. Weekly projects explore fundamental concepts in form, composition, and typography. Presentations and readings in graphic design history will complement weekly assignments. Students will explore basic imagemaking processes as well as be instructed in digital production techniques. *Fall 2025. May not be repeated. Credits: 3*

FA-215 **Typography**

An introduction to the core principles of typography. Students will explore how typography influences language and communication and gain a foundation for purposeful and expressive typography. This course will emphasize the formal qualities of typography, the implications of typeface selection, adapting to various contexts, visualizing concepts using only type, and attention to detail.

Fall 2025. May not be repeated. Pre-Req: GD I and Pre/Co-Req: GD II. Credits: 3

FA-312 **Advanced Typography**

This class will explore a range of concepts that govern typographic form, from the geometric shapes that make up an individual letterform to the way words and sentences behave in a composition. Projects will address the modular systems that generate typefaces along with the ways that principles from the physical world can influence the way letters and words look, act, and engage in space. Students are encouraged to think expansively—outside conventional typography—and to incorporate purposeful play into their experiments.

Fall 2025. May be repeated. Pre-Req: GD I, GD II, and Typography. Credits: 3

FA-315 **Advanced Design Topics: Ethics in Design**

Advanced Studio: Ethics in Design is an advanced course in graphic design. Classes are a blend of conversation and creating. We'll use a loose framework of working backwards to help us complete projects. Students are encouraged to work in whichever medium they feel most comfortable in. We'll work together as if we were in a real studio. The teacher (that's me) will work as a creative director and the students (that's you) will work as designers, owning and delivering on creative work. Storytelling is the core theme of this course. We'll use our time to investigate the answers to these questions: What is the story you want to tell? What do you want the audience to take from your work? What does your visual voice look like? You are encouraged to drive each other's work through discussion and critique.

Fall 2025. May be repeated. Pre-Req: GD II and Pre/Co-Req: Typography. Credits: 3

FA-317 **Advanced Design: Open Studio**
This class gives students an opportunity to conduct investigations of their own choosing through a series of open-ended prompts. We will look at the wide range of methods used in contemporary design practice and investigate ways they can be used to generate your own work. Projects include expanding on a past project, accumulating a series of daily acts of design, and creating a format to house contributions solicited from classmates. We will discuss a variety of techniques for creating self-generated work with a focus on how projects can be presented and circulated. Students will be required to share their explorations in carefully designed and clearly articulated presentations. Visiting lectures, videos, and readings will complement group critiques and one-on-one meetings.

In this course students will complete two fully realized independent projects. Emphasis will be placed on contemporary graphic design and typographic practices and on developing a personal voice and aesthetic. Students are expected to regularly present their works-in-progress and to participate actively in class discussions. Visiting lecturers, readings, and individual meetings with the instructor will complement group critiques. *Fall 2025. May be repeated. Pre-Req: GD II and Pre/Co-Req: Typography. Credits: 3*

FA-328 **Motion Graphics**
Students will explore the conceptual and technical challenges of design for the television screen. All aspects of industry video/ broadcast production are introduced and integrated into a design core focused on strong communication. Projects include identity design, combining kinetic typography, animation, sound and video.
The course includes workshops in After Effects, Final Cut Pro and Protools.
Fall 2025. May be repeated. Pre-Req: GD II and Pre/Co-Req: Typography. Credits: 3

Painting

FA-130A **Painting I**
This course is centered around the material, conceptual and historical concerns of painting media within a group setting. The course is intended to give foundational technical and theoretical instruction in preparation of advanced study in painting. There is an emphasis on group learning with in-class and out of class assignments. Group critiques and instruction will enhance the development and articulation of individual ideas and build relationships with paint media. This hands on approach to painting will be supported by readings, films, lectures and field trips that expand the historical and contextual understandings in the area of painting.
Fall 2025. May not be repeated. Credits: 3

FA-331 **Advanced Painting**

This course offers students individual and group contexts to discuss their work and personal development as an artist. Students engage with relevant, practical, historical and contemporary discussions around painting. There is an emphasis on personal development. Clarification of interests, content, material processes center students within the context of advanced study. Individual and group critiques offer students opportunities to further locate their practice and voice as an artist. Various media and experiences such as lectures, films, reading and field trips expand classroom and individual studio space learning.

Fall 2025. May be repeated. Pre-Req: Painting I and Pre/Co-Req: Painting II. Credits: 3

FA-336 **Advanced Painting: Alex Katz Chair**

The Katz Chair is a distinguished artist working in the fields of Painting and Drawing invited to teach for one term. The style and objectives of this course vary and build in relationship to the Katz Chair, their work, research and experiences as an artist. The flexible nature of this course is for highly self-motivated students who wish to collaborate and/or work closely with a distinguished practitioner in the field. The course offers students opportunity for further growth within the context of advanced study. Individual critiques and group critiques guide individual studio development. Media such as readings, films, lectures and field trips support the course objectives.

Fall 2025. May be repeated. Pre-Req: Painting I and Pre/Co-Req: Painting II. Credits: 3

FA-339 **Advanced Painting: Katz Guest Artist Series**

The Katz Guest Artist Series is named after and funded by Cooper Union alumni Alex Katz. This course introduces contemporary emerging and established artists in the fields of Painting & Drawing guided by a Cooper Union faculty. The course offers students opportunity for further growth within the context of advanced study through conversations around professional practices and individual development. Students interact with each guest in lectures, one-on-one studio visits and group critiques. Lectures introduce students to a wide range of practice and perspectives in Painting or Drawing within a classroom setting or field trips to guest artist studios. There is time for critical discussion about the material presented. Individual studio spaces become sites for creation, research, presentations and meetings with faculty and guest artists. In this way, the course reflects the professional space of the artist studio. Students develop a deeper connection to their personal language and practice through a rigorous studio visit and lecture schedule. Students experience the "real world" model of studio visits in which visitors not familiar with their work or immediate concerns engage them. In this way students develop the communication of their work and interests outside of the traditional classroom structure. Group critiques and media such as readings and film expand and clarify student development and course objectives. *Fall 2025. May be repeated. Pre-Req: Painting I and Pre/Co-Req: Painting II. Credits: 3*

Photography

FA-206 **Lens/Screen/Print I**
LSP I Lens/Screen/Print I is the first section of a two-semester trajectory. This is an immersive foundation course in the practice of photography focusing on a critical engagement with lens technology, color theory/management and combined analog/digital workflows. Topics include: exploratory and technical knowledge of 35mm analog cameras, DSLR cameras, lenses and lighting conditions, fluid movement through digital black-and-white and color processes, such as digital imaging editing software, scanning analog color, and digital printing in black-and-white and color. Exposure to critical theory and major philosophical arguments central to lens, screen and print based practices will be explored. This is an assignment driven class.
Fall 2025. May not be repeated. Credits: 3

FA-207 **Lens/Screen/Print II**
Lens/Screen/Print II is the second half of a two-semester trajectory. This course builds upon the foundations of LSP I with an emphasis on post-production and a critical engagement with lens technology, color theory/management and combined analog/digital workflows. Technical knowledge of the tensions and possibilities found between "digital" and "analog" spaces in relation to critical theory and major philosophical arguments central to lens, screen and print based practices will contribute to student development. Topics include advanced digital editing and printing techniques, analog black-and-white production methods, such as shooting with black-and-white film and darkroom printing, advanced medium-format cameras and scanners, as well as introduction to new technologies and modes of display. A distinction in LSP II is a focus on experimentation, articulation and acumen. Students are encouraged to begin to develop semi-autonomous ways of working over the course of the semester, this includes supervised independent or collaborative projects. This course will afford students the opportunity to build a coherent body of work in preparation for advanced study. *Fall 2025. May not be repeated. Pre-Req: L/S/P I. Credits: 3*

FA-364 **Advanced Photography: Open Studio**
Students will advance their practice by producing work using photographic material(s), cameras or any photographic device of their choice. Work will be discussed in group critiques as well as individual conferences with the instructor. Photographic issues and representation will be the subject of readings and class discussions.
Fall 2025. May be repeated. Pre-Req: L/S/P I and Pre/Co-Req: L/S/P II. Credits: 3

FA-366 **Advanced Photography: Alternative Processes**
This course breaks the barriers between digital and analog photography, transforming meaning and content through various forms of manipulation. Fastpaced hands-on demos include hand-applied photographic emulsions (such as cyanotype, Van Dyke, palladium, and liquid light) and digital printing/transferring options (beyond emulating the traditional print, on surfaces such as paper, wood, metal, fabric, etc.). Eco-friendly options will be discussed and explored. The production of large-format analog and digital negatives will also be explored. Student work will be discussed in relation to contemporary art issues.
Fall 2025. May be repeated. Pre-Req: L/S/P I and Pre/Co-Req: L/S/P II. Credits: 3

FA-368 **Photography: Henry Wolf Chair**
This course is intended to help students clarify and further the growth of their own work through group and individual critiques, classroom presentations and discussions with a contemporary photo based artist in the position of the Wolf Chair.
Fall 2025. May be repeated. Pre-Req: L/S/P I and Pre/Co-Req: L/S/P II. Credits: 3

Printmaking

FA-250 **Screen Printing**
This introductory course covers all aspects of contemporary Screen printing as a photomechanical stencil printing method. In a series of demonstrations, lectures and projects, students will become familiar with stencil making, color separation, printing, color mixing and image registration with the goal of building a broad knowledge of Screen printing. Methods for producing images by hand and by computer output are both addressed. Attention will be paid to the use of Screen printing within fine art, design and popular culture spheres as a way of discussing the history and current use of the process. *Fall 2025. May not be repeated. Credits: 3*

FA-251 **Lithography**
This is a comprehensive course covering the full range of lithographic techniques. Instruction begins with hand working processes on lithographic stones and progresses through to contemporary approaches of digital image preparation for output to photographic printing plates. A series of projects and critiques are targeted to develop command of the material process and place the use of Lithography in contemporary visual practice. *Fall 2025. May not be repeated. Credits: 3*

FA-252 **Etching**
This course is an introduction to the process of etching and printing from metal plates. Topics covered are the full range of platemaking techniques, from traditional wax grounds to contemporary photographic grounds, and printing techniques, including chine-collé, multi-plate color work and surface rolling. Lectures and critiques will place the practice of Etching in historical and contemporary context.
Fall 2025. May not be repeated. Credits: 3

FA-253 **Paper: Materiality and Sustainability**
This studio course explores making paper from traditional to contemporary approaches. The course incorporates specified instruction and experimentation driven by student independent projects. The exploration of the structural and historical uses of Western and Eastern methods including contemporary issues of recycled and alternative fibers will frame an understanding of the potential uses and appearances of handmade paper. From a basis in sheet forming, pigmenting, sizing, and the use of additives, the class will move into an emphasis on paper as a visual and sculptural object, covering paper casting and other three-dimensional approaches.
Fall 2025. May not be repeated. Credits: 3

FA-354 **Experimental Printmaking**
This course is focused on advanced studies across all forms of print media toward the development of individual student work. Instruction will build on the introductory level courses, covering color separations, extended techniques, experimental approaches, and additional print media forms. Student development will be driven by individual meetings and a series of group critiques. *Fall 2025. Pre-Req: 2 Printmaking Classes (Etching, Lithography, Relief, Paper: Materiality and Sustainability, or Screen Printing). Credits: 3*

FA-355 **Relief**
This course provides an introduction to Relief printing techniques. Projects will cover hand carving wood and alternative surfaces, with specific attention to the Japanese water-based woodblock tradition and the western oil-based tradition. Instruction will cover printing by hand, as well as printing on Etching presses, hydraulic presses and Letterpresses. *Fall 2025. May not be repeated. Credits: 3*

Sculpture

FA-39**: Sculpture: Open Studio**
In this course "Sculpture" will be understood as open to an expansive and changing definition of its limits. Students may draw from its historical traditions or choose more experimental modes of production, in other media or methodologies. The course will be structured as an open studio, where students can bring in works as they progress through each individual's studio thought and experiment. Students are expected to work independently in initiating their research, concepts, choice of mediums, and the installation/context for their projects. *Fall 2025. May be repeated. Credits: 3*

FA-393 **Sculpture: Making, Craft, and Concept**
This course will emphasize a balance between craft and concept in making Sculpture as creative acts that produce physical interventions in the world. Unlike other courses, we will work closely with the 4th floor Shop facilities to explore how a combination of woodworking, metalworking, casting, as well as other fabrication methods (plastics, sewing, new technologies, etc.) can facilitate and expedite each student's vision. Students are expected to be self-driven and self- motivated with their projects. they are interested in working on over the semester. This class will help reinforce their technical and material research in completing complex fabrication. Skills will be learned as well as built upon, and workdays will be integrated into class time to get as much hands-on experience as possible. *Fall 2025. May be repeated. Credits: 3*

FA-394 **Sculpture: Narrative and Systems**
This is a sculpture studio course. While all media are welcome, we will approach the course with sculptural concerns. The theme of the class is Narrative and Sculpture with a focus on Relationships to Systems. This class is loosely defining a system as a group of interacting or interrelated elements that act according to a set of rules to form a unified whole. The class is broken into three ways of exploring this theme: artists intervening within existing systems; artists reinventing or creating their own systems; artists displacing or circulating material from one system to another. Together we will look at examples of artists practice which fall within these themes, visit related exhibitions, and host visiting artists. Throughout the class, students will make their own works or projects with these themes in mind.
Fall 2025. May be repeated. Credits: 3

Studio Electives

FA-281 **Project in Sound Art**
This class will introduce strategies for understanding and participating in the aural world. The course is divided into specific weekly topics including acoustic ecology, radio transmission, and others. Screenings, readings, and discussion are supported by hands-on workshops in capturing, manipulating, and reproducing sound in unconventional ways. Grading is based on student projects and participation in class discussions. *Fall 2025. May not be repeated. Credits: 3*

FA-326 **Interactive Design Concepts: AI + Data Play**
An exploration of the nature of interactive design and how it informs and transforms experience. Information structures, navigational issues, design strategies and social implications of interactive experiences using traditional as well as electronic media will be examined.

Over the course of the semester, students will learn how data influences how AI functions and apply the basics of game design to explore, design & prototype solutions for the issues they collectively wish to address at the intersection of contemporary culture & digital media. The goal of the class is to dive into our ideas and biases surrounding technology and humanity and create something meaningful through it. The key takeaways from this interdisciplinary course are cultivating an understanding of the AI & Data, system biases, human-centered design process and game design. Students will develop systems thinking skills and the ability to work collaboratively in an interdisciplinary environment, challenge and solve problems that they encounter. Also, learn the practice creating by iteration and explore different prototyping and testing methods within aesthetics, engineering and structural design.
Fall 2025. May be repeated. Credits: 3

FA-327 **Computational Studio: Digital Fabrication**
This course provides a comprehensive introduction to digital fabrication and is designed to augment existing practices through access to new tools, materials, and concepts for art production. Students will learn fundamental skills and will utilize a variety of digital fabrication methods including 3D printing, laser cutting, and CNC machining, along with software & capture methods such as: Rhino 3D and 3D scanning. In the first half of the course, students will learn fundamental digital fabrication skills through technical demos and technique-oriented projects. In the second half of the course, students will develop a body of work utilizing these tools. We will move between computer classrooms, the AACE lab, and individual studios to explore topics such as built environments, sculptural methods, and medium specificity. As background, we will explore the history of digital fabrication, and ask critical questions about its relevance and impact on creative industries and society more broadly.
Fall 2025. May be repeated. Credits: 3

FA-384 **Projects**
Students work independently on self-initiated projects under the guidance of professors and visiting artists. *Fall 2025. May be repeated. Credits: 3*

FA-384-1B **Projects: Black Secret Technology**
This course explores the intersections of contemporary art, sonic technologies, performance, and the social responsibility of science, with a critical focus on the ethical dimensions of empiricism, genetic surveillance, and histories of quantification. We will examine how 19th-century systems of knowledge—emerging alongside industrial capitalism—produced categories of difference through accounting mechanisms that determined what counted as material reality. These theoretical assumptions continue to shape human biomonitoring and genetic sampling, where the bodies of workers have served as chemical sensing devices for polluted environments and sites of extraction. The metabolic entanglement of human populations with their surroundings reveals how biotechnologies function not only as tools of environmental assessment but also as mechanisms of control and surveillance under the guise of objectivity.

Against these structures, we ask: What are the moral and political implications of these empirical systems? How do plantocratic logics persist within contemporary scientific and technological frameworks? Can the racializing assumptions embedded in these methodologies be interrupted by a poetics of science? Black Secret Technology, an album by A Guy Called Gerald, offers one possible counterpoint—a coded system of knowledge that, like alchemy, demands processes of decoding and distillation. This course embraces interdisciplinarity by thinking across the natural sciences, technoscience, media geologies, Black Studies, aesthetics, and bioethics. We will engage with the works of Moor Mother, Butch Morris ("Conduction"), Aki Sasamoto, mayfield brooks, and artists employing DNA and biotechnical processes. Readings will include texts by Ramon Amaro, Katherine McKittrick, Stuart Hall, Lorraine Daston, Jussi Parikka, and others.

The course includes weekly project exercises, class discussions and a culminating project that invites students to develop an artistic practice or work informed by these ideas. *Fall 2025. Credits: 3*

FA-384-1D **Projects: Exhibitions: Design and Practice**
This practical studio course will design and produce exhibitions. We will explore critical theory and histories only to the extent that they enable this practice. The function and habits of the contemporary museum and its supporting partner, the commercial gallery, are under tremendous critical and social pressure. Vital interventions by artists into the appearance and function of these institutions have proved to be explosively important to what art can and could do. The course proposes that architectural space, catalogs, signage, and archives are opportunities for the public presentation of artistic invention. Students will be encouraged to approach public display beyond the containment of single practices, authors, or disciplines. Transfigured by formal arrangement, the conditions of an exhibition's ability to address consciousness, community, education, and social reality will be our subject. Students will use the exhibition spaces, archives, and histories of the Cooper Union as well as sites and contexts beyond campus, when possible. *Fall 2025. Credits: 3*

FA-399 **Special Topics**
This class will center around a specific topic in art. Emphasis will be on the students' work in relation to the topic. The specific topic will cover a range of ideas, methods, strategies, and installation of work related to the topic. Work will be discussed in group critiques and individual studio visits. The class will include readings, discussions, visitors, and class trips to exhibitions that pertain to the topic of the class.
Fall 2025. May be repeated. Credits: 3

FA-399-1 **Special Topics: Institutional Therapy**
Do institutions need therapy? Yes, they probably do. This class explores the concept of institutional therapy in relation to art making through field trips, visitors, discussions, presentations, readings, class critiques, and a collaborative assignment. We will approach institutional therapy as a creative, nonhierarchical practice for transforming systems within institutions in order to generate change from within. Originally a term used in alternative psychiatry, we will consider its use in relation to broader societal institutions that have developed throughout history, as well as the art system. This class will ask questions such as: Which institutions are in need of remediation and what might an art practice that can do that look like? How does institutional therapy compare to institutional critique as an art practice? Can art 'heal' or even shift systemic issues, and if so how could desire be an important component of that practice?
Fall 2025. Credits: 3

Electives

RS-201-G **Science: Astronomy**
The course starts with how to measure things, such as units of time, length and mass. We introduce the celestial sphere, which will help us to understand such things as days as measured by the Sun and by a star. This will also help to understand seasons. We then introduce a short history of western astronomy. We look at the universe, starting at home (Earth and Moon) and move out---solar system (Sun and planets), stars, galaxies and cosmos. Along the way, we look at how we look (light and telescopes), and how we measure things (distance, brightness and color).
Fall 2025. May not be repeated. Credits: 3

RS-201-H **Science: Laws of Nature**
The course will look into the history and significance of major physicals laws, such as mass and energy conservation, Newton's laws of motion, the laws of thermodynamics etc., and explore their applications in biological and environmental sciences. The topics covered in the course will include the origins and the physical basis of life; the mechanisms of heredity, genes and the DNA; the evolution of species; Earth's systems and climate change. *Fall 2025. May not be repeated. Credits: 3*

RS-201-I **Science: Properties of Ceramic, Metals, and Glass**
In this course students will gain an understanding of the fundamental similarities and differences between ceramics, metals and glass. Through first exploring the crystalline unit structures of each material on a microscopic level, students will learn about the related material characteristics, working properties, and ultimately manufacturing techniques on a macroscopic level. Then we will focus on causes of degradation of each material with particular attention to pollution, the life cycle of the materials, and the resulting chemical reactions from the inorganic materials and the interactions with their environments. Project based work will serve as a focal learning tool with independent research and weekly in class hands on work and discussions. Students will recreate, observe, and document degradation properties through accelerated aging of metals. Sustainability, sustainable development, and our mindsets towards changing our behaviors in favor of lower environmental impact choices will be a continual thread throughout the semester. Students will evaluate a carbon calculator at the beginning and at the end of the class, and will work on an independent assignment where they will explore material production, use, atomic structure, degradation mechanisms, how the climate crisis threatens our cultural heritage, and experimentation of artists materials as a driving force for technological advancements.
Fall 2025. May not be repeated. Credits: 3

TE-216 **Calligraphy**
Geometry, optical balance and the stoke of the broad-edge pen are primary influences that shape the Roman alphabet. Students learn the fundamentals of "beautiful writing" through the study of historical models and the principals that are the basis of classical and modern letter forms. Exercises in ink train the hand kinaesthetically to write letters with graceful movement. Exercises in pencil train the eye to see and analyze the subtle geometry and skeletal "ideal" form of letters. Precise rhythm in letterspacing and careful line-spacing create the color and texture of the page. The class will have an emphasis on page design involving hand written compositions. Roman and Italic capitals and small letters will be the focus of first semester students.
Fall 2025. May not be repeated. Credits: 2

TE-390 **Casting Techniques**
Casting Techniques is a process intensive course covering the methods of translating a wax positive into bronze or other non-ferrous metals. All associated techniques from beginning a plaster or rubber mold to casting, chasing, finishing and patination of metal sculptures will be covered. Students will explore a variety of approaches to casting, as well as engage in discussions involving the history of bronze casting, and its place in contemporary art. *Fall 2025. May not be repeated. Credits: 2*

SE-401 **Contemporary Art Issues**
This seminar addresses issues essential to an understanding of contemporary aesthetic thought and critical practice as explored by artists and theoreticians. Integral to this discussion is an examination of the role of art in contemporary society, the changing concept of the avant-garde and the relationship of art to culture.
The format of the seminar provides for required readings, oral and written reports, guest speakers and regular museum and gallery visits.
Fall 2025. May be repeated once for Art History credit. Credits: 2

ADMINISTRATION, FACULTY AND STAFF

Deans

Adriana Farmiga, Dean
BFA, The Cooper Union, New York, NY; MFA, Bard College, Annandale-on-Hudson, NY

Yuri Masnyj, Associate Dean
BFA, The Cooper Union, New York, NY

Administration

Camille Levy
Administrative Assistant

Fia Backstrom
Associate Professor
Academic Advisor

Sam Draxler
Administrative Manager

Frances Green
Assistant Dean

Tia Jeung
Art School Budget Manager

Coco Fusco
Adjunct Professor
Director of
Off-Campus Programs

Emmy Mikelson
Director of Studio and Technical Operations

Corinna Ray
Coordinator of Student Exhibitions and Special Projects

Nazig Tchakarian
Director of
Academic Operations

Alexander Tochilovsky
Director, Herb Lubalin Study Center of Design and Typography

Full-Time Faculty

Dennis Adams
BFA, Drake University, Des Moines, IA; MFA, Tyler School of Art, Philadelphia, PA

Doug Ashford
BFA, The Cooper Union, New York, NY

Fia Backstrom
Undergraduate degree, University of Stockholm and Columbia University; MFA eq., Konstfack Royal College of Arts and Craft, Stockholm, Sweden

Mike Essl
BFA, The Cooper Union; MFA, Cranbrook Academy of Art

Coco Fusco
BA, Brown University, Providence, RI; MA, Stanford University, CA; PhD, Middlesex University, London, England

Cristóbal Lehyt
BA, Hunter College, New York, NY

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BFA, Rhode Island School of Design, Providence, RI; MFA, Yale University, New Haven, CT

Jennifer Packer
BFA, Temple University, Philadelphia, PA; MFA, Yale University, New Haven, CT

Lucy Raven
BFA, University of Arizona, Tucson, AZ; MFA, Bard College, Annandale-on-Hudson, NY

William Villalongo
BFA, The Cooper Union, New York, NY; MFA, Tyler School of Art at Temple University, Philadelphia, PA

Adjunct and Visiting Faculty

Marina Ancona
Adjunct Instructor

Jack Barth
Adjunct Professor

Tony Bluestone
Adjunct Instructor

John Boling
Adjunct Instructor

Lea Cetera
Adjunct Professor

Shahrzad Changalvaee
Adjunct Instructor

Jason Coombs
Adjunct Instructor

Benjamin Degen
Adjunct Instructor

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Jessica Dickinson
Adjunct Instructor

Leslie Diuguid
Adjunct Instructor

River Friedman
Adjunct Instructor

Barbara Glauber
Adjunct Professor

Fields Harrington
Adjunct Instructor

Emma Hedditch
Adjunct Professor

Camille Hoffman
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Vera Iliatova
Alex Katz Chair in Painting; Adjunct Instructor

Einat Imber
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Adjunct Instructor

Tatiana Istomina
Adjunct Instructor

Beverly Joel
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David Johnson
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Corinne Jones
Adjunct Professor

Robyn Kanner
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David Kenny
Adjunct Instructor

Zack Khalil
Adjunct Instructor

MacKenzie Kimler
Adjunct Instructor

Savannah Knoop
Adjunct Instructor

Troy Kreiner
Adjunct Instructor

Steve Kreis
Adjunct Instructor

Fawn Krieger
Adjunct Instructor

Jess Kuronen
Adjunct Instructor

Sowon Kwon
Adjunct Instructor

Kevin Leonard
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Karl LaRocca
Adjunct Instructor

Zoe Leonard
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Adjunct Instructor

Melanie Marino
Adjunct Instructor

Akemi Martin
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Taro Masushio
Adjunct Instructor

Rachel Matts
Adjunct Instructor

Felipe Meres
Adjunct Instructor

Eric Monasterio
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James Miller
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Adjunct Instructor

Itziar Okariz
Adjunct Instructor

Jenny Perlin
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Zach Poff
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Iman Raad
Adjunct Instructor

Andrew Ross
Adjunct Instructor

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Asha Schechter
Adjunct Instructor

Nadir Souirgi
Adjunct Instructor

Jessie Stead
Adjunct Instructor

Mackenzie Stroh
Adjunct Professor

Tida Tep
Adjunct Instructor

Richard Yurewitch
Adjunct Instructor

John Vondracek
Adjunct Professor

Andrew Wilhelm
Adjunct Professor;

Technical Assistant, Art & Architecture Shop

Jennifer Williams

Adjunct Professor; Head Technician, Photography

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AACE Lab Director

Amy Westpfahl
Director of Admissions, The Irwin S. Chanin School of Architecture and School of Art

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Adjunct Professor; Head Technician, Photography

Meryl Williams
Technical Assistant, Film/Video

Cheng-Daw Wu
Painting Office Coordinator, Painting/Drawing

ALBERT NERKEN SCHOOL OF ENGINEERING

Overview

With an average enrollment of about 450 undergraduate students, engineering is the largest of The Cooper Union's schools. The school maintains small class sizes in courses and laboratories in order to provide for personal attention. It offers a bachelor of science (B.S.) degree program in computer science and bachelor of engineering (B.E.) degree programs in chemical, civil, mechanical and electrical engineering. The Chemical Engineering Program is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for the Chemical, Biochemical, Biomolecular and Similarly Named Engineering Programs. The Civil Engineering Program is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for the Civil and Similarly Named Engineering Programs. The Electrical Engineering Program is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for the Electrical, Computer, Communications, Telecommunication(s) and Similarly Named Engineering Programs. The Mechanical Engineering Program is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for the Mechanical and Similarly Named Engineering Programs.

In addition, the school offers a general engineering program (B.S.E.). This program empowers students to create their own curricula (within carefully set parameters) in those areas of engineering that cross traditional boundaries—for example, computer science, entrepreneurship, biomedical, energy, sustainability, infrastructure, environmental, mechatronics, robotics, etc. The B.S.E. program provides an excellent preparation for graduate work in law, medicine, business, finance, etc. However, please note that the B.S.E. program will no longer be admitting students into the program beginning Fall of 2025.

The computer science program was launched in 2024 and will admit the first class in September of 2025. Like the other engineering majors, the computer science program integrates theory with practical application from the onset, starting with collaborative projects in the first year and progressing through specialized projects. Students develop industry-ready skills by focusing on group dynamics, project management, software development, debugging, and presentation skills modeled on real-world

practices and enhanced through experiential learning opportunities. Key focus areas include artificial intelligence, cybersecurity, robotics, distributed systems, and user-centric computing.

The integrated master's program offers the opportunity to earn both a bachelor's and a master's degree in an engineering discipline at The Cooper Union within four, five or six years.

Degree programs are designed to prepare students to enter the workplace immediately after graduation or to pursue graduate study. An extraordinary number of Cooper Union engineering graduates go on to earn Ph.D. degrees at the nation's most prestigious graduate schools. Others go on to study in fields such as medicine, law or business. Many graduates rise to leadership positions in industry, education and government.

The early curricula are based on intensive study in the sciences, mathematics, computer science and engineering sciences, which serve as preparation for deeper immersion within the engineering fields. Building on this strong base of mathematics and sciences, and emphasizing the integration of knowledge, these curricula promote an understanding of nature, the limitations of our present knowledge and the potential for advancing that knowledge.

Defining characteristics of the School of Engineering's programs are the emphasis on project-based learning and opportunities for undergraduate research. Students and their peers regularly join the faculty in solving real-life problems that exist in contemporary society. Multi-disciplinary teams, frequently cooperate with outside professionals, who act as mentors. Superior analytical abilities and thorough grounding in disciplinary fundamentals and design enable students to collaborate on these projects. Results may be published, presented at conferences or even patented.

A strong background in design threads throughout the curriculum, starting with the first year. These design experiences take into consideration factors such as environmental issues, sustainability, economics, teamwork, societal impact, safety and political climate—showing students that a "design" is much more than a purely technological solution.

Some design problems are offered in collaboration with foreign universities to increase awareness of the global nature of the engineering profession (e.g., The Cooper Union's study abroad and international exchange programs). Others may involve collaboration with industry, hospitals and/or other US universities.

Diverse electives are offered so that students can add a background in business and finance, additional mathematics and sciences or a "concentration" in an additional area of study.

Like The Cooper Union's other schools, the Albert Nerken School of Engineering is intimately involved with the New York metropolitan area. Sometimes, the city and its infrastructure are used as a laboratory. The school also draws on the region's abundant talent and resources, including an outstanding array of engineers and scientists employed at major corporations, governmental agencies and consulting firms in the New York region. The school calls on physicians, lawyers and other specialists to collaborate on research and mentoring and to give unique insights into contemporary problems and social issues confronting modern engineers. Many of these professionals are alumni and may serve as adjunct faculty members lending a dynamism to the classroom.

Students benefit from an uncommonly close interaction with dedicated faculty, some of whom are alumni, in a conservatory style environment. Our faculty bring their diverse experiences to the classroom and laboratory setting and serve as role models to our students. See the work that our faculty and students have produced. Our students are encouraged to participate in The Cooper Union's rich seminar and cultural programs as well as to attend talks by guest speakers. They join various professional societies, many of which have chapters at The Cooper Union. Students are inspired to qualify for membership in national engineering honor societies. They also participate in student government and sports, and take advantage of the vast cultural environment offered by New York City and the neighborhood.

The School of Engineering strongly encourages undergraduate research activities and permits juniors and seniors to register for graduate level courses, when deemed appropriate. This enrollment does not guarantee admission to the master's program however. A Cooper Union undergraduate may declare the intent to complete an integrated degree in the second semester of the junior year or apply to the graduate program in one of the degree-granting departments during the second semester of the senior year.

Graduates of The Cooper Union are recruited by major national and international corporations, consulting companies, new ventures and graduate schools nationwide. Alumni are found in the top management and research leadership of many American corporations; hold key positions in federal, state and city agencies; and distinguish themselves on university faculties and administrations nationwide. Through their many and varied professional accomplishments, alumni have earned for the school its reputation for excellence.

Bachelor of Engineering

The requirements for the bachelor's degree programs must be completed within four years of first registration, except with the explicit consent of the dean/associate dean. Requests for extension must be presented in writing to the dean's office prior to the sixth semester of registration (or the end of junior year). It is the responsibility of the student to maintain normal and reasonable progress toward the degree.

Courses may be taken at other institutions for credit with prior advisor(s) approval only. If the course is to substitute for a Cooper Union course, prior approval must be given by the chair of the appropriate department in the engineering school or by the appropriate school or faculty for courses outside engineering. The student is responsible for all costs incurred. As a general matter, many courses simply may not be taken elsewhere (e.g., Physics I). In order to get a course pre-approved, bring as much course documentation as possible to the Chair of the appropriate department to have the course assessed. These materials must include at least the syllabus and textbook. The course must be judged to be equivalent to one taught at Cooper or an appropriate high academic standard. Note that only grades "B" or better can be transferred (not B-) and the grade will not be factored into your G.P.A.

Additionally, ABET accreditation requires:

- One year of a combination of mathematics and sciences (some with experimental experience) appropriate to the discipline,
- One and a half years of engineering topics consisting of engineering sciences and engineering design appropriate to the student's field of study and
- A general educational component that complements the technical content of the curriculum and is consistent with the program and institutional objectives.

In order to graduate, all students must meet the following conditions:

- A minimum of 135 credits are required
- Satisfaction of all program curricula
- Satisfaction of the residence study requirements
- A minimum grade point average (G.P.A.) of 2.0
- A minimum grade point average (G.P.A.) of 2.0 for the junior and senior years combined

Faculty Advisors

All first-year students have the same faculty advisor. For subsequent years, students will be assigned one, two or more advisors each, appropriate to their field of study. Each student's program is established in consultation with their advisor(s); changes can only be made with approval of the advisor(s).

Humanities and Social Sciences

The requirements in this area are satisfied by courses offered by The Cooper Union Faculty of Humanities and Social Sciences or by transfer credit for liberal arts courses taken at other institutions. The courses in this area are intended to provide both breadth and depth and should not be limited to a selection of unrelated introductory courses.

The Cooper Union liberal arts courses, shown elsewhere in the Faculty of Humanities and Social Sciences catalog section, have prefixes HUM, SS and HTA. The basic courses HSS1–HSS2 and HSS3–HSS4 are prerequisites for all higher level courses in the same prefix family. HUM and SS courses carry three credits each; HTA courses carry two credits. Engineering students should consult with the dean of Humanities and Social Sciences or the HSS Academic Advisor about choice of courses to satisfy particular interests.

Transfer credits for liberal arts courses must be approved by the dean of Humanities and Social Sciences. Courses that cannot be used to satisfy the Humanities and Social Sciences requirement are:

- Language skills courses such as introductory foreign language, public speaking, report writing
- Craft and performance courses unless accompanied by theory or history
- Subjects such as accounting, finance, engineering economy, industrial management, personnel administration

Free Electives/Non-Technical Electives

Some programs require "free electives or non-technical electives." For transfer credit for particular courses, the School of Art or the School of Architecture may be a more appropriate authority to sanction the transfer. Students who are uncertain should approach the Office of the Dean of Engineering in the first instance and be directed to the correct group of faculty.

Program Requirements

The specific programs for entering students are shown in detail in the curriculum tables. From time to time, changes are made to these programs following curricular developments authorized by the faculty. Advances in technology and new technologies are closely monitored and are reflected by adjustments in all the engineering programs.

Course Substitutions and Credits

A student may request to substitute for a required course or courses given in the School of Engineering provided that:

- The substitution is limited to 12 credits maximum toward the total number of credits required for graduation,
- The substitution is approved by the dean/associate dean and program advisor(s) and
- ABET accreditation requirements are not violated.

The Chemical Engineering Department does not permit the substitution of any courses.

The number of academic credits for each course generally is based on the following relationship:

- 1 credit per contact hour in class
- 0.5 credit per contact hour of laboratory

This relationship was established on the basis that generally two hours of preparation are expected of the student for every contact hour in class or project activities and generally one hour of preparation is expected for every contact hour of laboratory.

Residence Study Requirement

A candidate for a bachelor's degree must be enrolled during the entire academic year immediately preceding the granting of the degree and must carry at least 12 credits per semester during that period. Also, the candidate must have been enrolled for a minimum of four semesters at The Cooper Union as a full-time student for the bachelor's degree.

ACADEMIC STANDARDS AND REGULATIONS

Academic Integrity

Faculty at Cooper Union are committed to preserving an environment that challenges every student to realize his or her potential. You are expected to provide your best effort and will be supported to produce original work of the highest caliber. Plagiarism is the presentation of another person's "work product" (ideas, words, equations, computer code, graphics, lab data, etc.) as one's own. Whether done intentionally or unintentionally, plagiarism is not tolerated in the School of Engineering.

There are many types of plagiarism, some of which are listed below. (The list is not exhaustive. Speak with the appropriate faculty member or dean or associate dean of engineering if you are uncertain as to what constitutes ethical conduct in a particular situation.)

You are plagiarizing if:

- You present as your own work product a homework assignment, a take-home exam or a class project that includes the efforts of other individuals. The contributions of other individuals (if permitted by your instructor) must be acknowledged in writing on the submitted assignment, exam or project.
- You copy the work of other students on an in-class examination or communicate with other individuals in any fashion during an exam.
- You submit as part of a homework assignment, take-home exam or class project material that has been copied from any source (including, but not limited to, a reference book, periodical, the Internet) without properly citing the source, and/or without using quotation marks. It is also prohibited to submit such materials in a minimally altered form without proper attribution. Improperly copied material might include text, graphics (computer or otherwise), computer source code, etc.

Other prohibited acts of academic dishonesty include (but are not limited to):

- Attempting to obtain a copy of an examination before it is administered.
- Dishonesty in dealing with a faculty member or a dean, such as misrepresenting the statements of another faculty member.
- Bringing notes into an examination when forbidden to do so.

- Bringing any device into an examination (computer/ smartphone/ calculator), which permits the retrieval of examination-related materials unless expressly permitted by the instructor.
- Bringing any device into an examination that allows communication with other individuals or computers or computer databases unless expressly permitted by the instructor.

Faculty members may not unilaterally resolve incidents of academic dishonesty. Each faculty member is required to report all cases of plagiarism or academic dishonesty to the engineering dean's office in a memorandum. If documentary evidence of the incident exists, it should be attached. The dean's office, in consultation with the faculty member and the student, will select from the following sanctions: a grade of **F** for the assignment, a grade of **F** for the course or dismissal of the student from the school. A record of all incidents will be kept in the dean's office and considered for second-time offenders. Students who are dismissed because of academic dishonesty should be aware that incident reports and any responsive actions by the dean's office or Academic Standards Committee become part of their permanent record.

Sexual or Racial Harassment

Such behavior will not be tolerated. Incidents should be reported immediately. Students should see the dean or associate dean, and also the dean of students as soon as possible.

Code of Conduct

Students are required to read and abide by The Code of Conduct.

Transfer Credit

Students, at their own expense, desiring to register for courses at another institution for transfer credit to The Cooper Union must have appropriate approval in advance. For courses in mathematics, sciences or engineering, this approval is to be obtained from:

- the department responsible for the course at The Cooper Union and
- the dean or associate dean of engineering.

For liberal arts courses, approval is to be obtained from the dean of Humanities and Social Sciences. In order that transfer credits from another school be accepted, a grade of B or better is required. (A grade of B- or worse cannot be transferred). An exception may be granted in special circumstances only upon formal appeal to the Academic Standards Committee. Transfer credit is never granted for paid summer internships or work experience or paid or unpaid research.

Math Placement Exam

Architecture Students Students with a 4 or 5 on Calculus AB and/or BC exams, or scores of 6-7 on the IB-HL, or equivalent international exams, will have the opportunity to sit for a Math Placement Exam. If successfully completed, students will be offered the opportunity to waive ARCH-103 Calculus I (they will still need to complete another course for credit in its place) or receive credit for completing ARCH-103 (and not need to complete another course in its place).

Engineering Students Students that have obtained a 4-5 on the BC Calculus AP exam or a 6-7 on the IB HL Math exam are eligible to take the Calculus Placement Exam. Students that successfully pass the exam will be permitted to waive Calculus I, but will still be required to take another course for credit in its place.

Grades of Record

The definitions below deal with the student's attainment in the formal work of the subject. Nevertheless, it should be understood that such essential qualities as integrity, adherence to class regulations, enthusiasm, motivation, clarity in presentation of work and sense of obligation, together with ability to use the English language correctly and intelligibly, are reflected in the grade. The course grade is assigned by the instructor in conformity with definitions indicated in this section.

The grade **A** indicates a superior and comprehensive grasp of the principles of the subject. It denotes an ability to think quickly and with originality toward the solution of difficult problems.

The grade **B** indicates evidence of a good degree of familiarity with the principles involved in the subject. It implies less originality and a tendency to hold to patterns of thought presented in the formal subject matter.

The grade **C** indicates an average knowledge of the principles involved in the subject and a fair performance in solving problems involving these principles. This grade implies average ability to apply the principles to original problems.

The grade **D** indicates a minimum workable knowledge of the principles involved in the subject. This grade denotes low achievement and therefore the number of such grades permitted any student is limited in a manner prescribed by the section on Scholastic Standards.

The grade **F** indicates an unsatisfactory understanding of the subject matter involved. A grade of **F** may be made up only by repeating the subject in class; both the new grade and the new credits and the original grade and credits are included in the permanent record and in the grade point average. A student who receives an **F** grade in a repeated course is a candidate for dismissal by the school's Academic Standards Committee.

The Incomplete I Grade The designation of **I** indicates that the work of the course has not been completed and that assignment of a grade and credit has been postponed. This designation will be given only in cases of illness (confirmed by authorized physician's letter) or of other documented extraordinary circumstances beyond the student's control. The **I** designation will be given only with the approval of the dean or associate dean of engineering. At the time of submission of an **I** designation, the instructor will indicate whether the student's progress to that point has been satisfactory or unsatisfactory, offering an estimation of grades whenever possible as a means of assisting the Academic Standards Committee in their deliberations.

The deadline for removal of an **I** designation will be determined by the instructor, but will not be later than six weeks after the start of the spring semester for students who receive such a designation in the fall semester and not later than one week after the start of the fall semester for students who receive such a designation in the spring semester. If the **I** is not removed within the set time limit, either by completing the work in the subject or by passing a re-examination, the l will automatically and irrevocably become an **F** unless the dean or associate dean of engineering, in consultation with the instructor, extends the time or the student withdraws from the school.

Grade Point Average or Ratings To determine academic ratings, numerical equivalents are assigned to grades as follows: **A** is represented by 4, **B** by 3, **C** by 2, **D** by 1 and **F** by 0. The sum of the products of credits attempted and grade equivalents earned in a period at The Cooper Union, divided by the sum of credits for that period, is the rating for that period.

Only Cooper Union grades of **A, B, C, D** and **F** will be used in determining ratings. Grades from other colleges and other designations such as **I** and **W** are not used in Cooper Union ratings.

Grade Changes A change in an official grade of record, other than the designation **I**, cannot be made by the registrar without the express consent of the dean or associate dean of engineering. Grade changes will not be accepted after one year has elapsed from the completion of the course.

Final Examinations Final examinations are held in most subjects, except in cases when content does not lend itself to formal examination, such as laboratory or project work. In certain other subjects, the class record may be ample for determining student standing. The decision on giving a final examination in a given subject is made by the instructor.

Academic Probation, Withdrawal and Dismissal

Probation is the consequence of unsatisfactory scholarship. It is a warning that may involve a compulsory reduction of academic load, interviews with an assigned advisor and additional academic counseling. A student on academic probation must fulfill conditions as prescribed by the Academic Standards Committee.

- The records of all students may be reviewed by the office of the dean of engineering for recommendations to the Academic Standards Committee for appropriate action at any point in the student's career.
- Students may be required to withdraw or resign from The Cooper Union based on a single semester's academic performance, a cumulative GPA lower than 2.0, and/or infractions of the academic integrity policies.
- The Academic Standards Committee reserves the right to determine probation and/or dismissal at any point in the student's career for appropriate academic issues.
- A student whose semester grade point average is below 2.0 is on automatic probation and is a candidate for dismissal by the committee.
- Estimates of grades in subjects with I designations may be included in all committee deliberations.
- Students who fail to register will have their records annotated: "Dropped: Failure to Register"

Students seeking readmission to the School of Engineering with a separation from Cooper Union of less than two years must apply through the Academic Standards Committee. The student must first contact the registrar and Chair of Academic Standards to discuss the measures required to meet before the Academic Standards Committee. Students seeking readmission for the fall term must contact the registrar and Chair of Academic Standards no later than April 1 to schedule an appointment for the June Academic Standards meeting.

Students seeking readmission to the School of Engineering with a separation from Cooper Union of more than two years must apply through the Office of the Registrar and adhere to the transfer application requirements. Students who believe that a modification of their status should be made because of extenuating circumstances may petition, in writing, the Academic Standards Committee.

Change of Program

Adding a Course A student is permitted to add a course only during the first week of a semester, during the drop/add period, and only with the advisor's approval.

Adding a course after the drop/add period is not permitted even if the student has been attending the class.

Dropping a Course A student may drop a course during the first week of the semester, during the drop/add period, with the advisor's approval.

A course dropped during the first week of the semester will be deleted from the transcript.

Withdrawing from a Course A student anticipating inability to continue an assigned program should immediately see his or her advisor. A student's program may be adjusted at the discretion of and after conferring with the advisor and the dean or associate dean of engineering, but only in cases where scholastic performance is impaired by conditions beyond the control of the student, such as health or home conditions. After the drop/add period a student may withdraw from a course through the eighth week of the semester. A grade of **W** will appear on the transcript. A student who stops attending a course without permission of the instructor and the dean or associate dean will receive a grade of **WU**; however, the instructor is free to record a grade of **F** in such a case.

A student may lighten his or her academic load and receive a **W** grade after the eighth week of classes only with the approval of the course instructor, the advisor, and the dean or associate dean. It is the policy of the faculty and the Office of the Dean not to approve any withdrawal after the eighth week of classes except under extreme, extenuating circumstances.

A student is not permitted to drop or withdraw from a course if doing so would impede satisfactory progress towards the degree.

Repeating a Course A course may be repeated if a student has failed the course or, with appropriate approval been allowed to withdraw from the course. When a course is repeated, the grade earned when the course was repeated is calculated into the G.P.A.

Course Designation

Course	*Prefix*
Biology	Bio
Chemical Engineering	ChE
Chemistry	Ch
Civil Engineering	CE
Computer Science	CS
Electrical Engineering	ECE
Engineering Sciences	ESC
Interdisciplinary Engineering	EID
Mathematics	Ma
Mechanical Engineering	ME
Physics	Ph

Students should consult official class schedules for courses offered in a given semester.

Be advised that each school at The Cooper Union offers certain electives that are open to all students; consult each school's course listing.

Unless otherwise indicated, credit listings are for single semesters. Courses are not generally offered in the summer.

Definitions

- A free elective is any course (for which a student is qualified) given within The Cooper Union. Foreign language courses do not count as free electives.
- The status advanced engineering elective is to be determined by the advisor(s) and the Office of the Dean. Normally, such courses will require prerequisites and are usually taken by juniors and seniors.
- A minimum of 12 credits of engineering electives must be at an advanced level.

Honors and Special Programs

Dean's List The Office of Enrollment determines a Dean's List twice a year, at the end of each semester, on the basis of the record of the completed grade in every subject at the official end of the grading period. To qualify, a student must have a 3.5 or better semester grade point average for a study program of at least 12 credits during that semester with no grade lower than **C** and no grades of **I** (Incomplete). Note: Students may petition the dean/associate for reconsideration in the Dean's List after the Incomplete **I** has been made up.

Course Overload An overload in the first year consists of a credit total greater than the standard load for that semester in a student's respective program. A student having a grade point average of 3.0 or better may take an overload of one course in any given semester with the approval of the freshman academic advisor and the written approval of the dean or associate dean. In all other cases, overload is any credit load over the designated load for that semester in the student's program curriculum and requires approval of the student's academic advisor(s). Overload beyond 21.0 credits also requires the written permission of the dean/associate dean and no overload is permitted for students with a prior semester G.P.A. of less than 3.0 or a cumulative G.P.A. of less than 3.0. Requests for overloads must be submitted to the dean/associate dean during the add period of that semester together with written advisor's approval, and only after all grades from the previous semester(s) have been entered.

Graduation with Honors Each graduating senior in the School of Engineering who has achieved an overall cumulative rating of 3.8 or higher is awarded the degree with the notation summa cum laude. Magna cum laude requires a G.P.A. of 3.7 or higher and cum laude requires at least a 3.5 G.P.A.

Curricular Transfers A student wishing to change his or her major should first discuss the plan with his or her current advisor(s) in the current major and the chair of the new major. Transfer is at the discretion of the dean's office and the receiving department. It may be affected by the student's grades and availability of program resources. Students who request a change in major must consult with the policies of the department they wish to transfer into. It becomes effective when the required petition form, approved by the dean or associate dean of engineering, has been delivered to the Office of the Registrar. First-year students may not change their area of study until the end of the year when two semesters' grades are available. A G.P.A. of 3.0 or better is required for approval to transfer curriculum.

Pre-Medical, Pre-Law or Pre-Business Studies Upon completion of the engineering degree, some graduates may decide to attend medical, dental, business or law school. Most of the prerequisites for such a course of action are offered at The Cooper Union. For medical school or dentistry, students are advised to take one year of organic chemistry and one year of biology. For law or business, additional economics, political science and professional ethics courses are useful. Students should consult their advisor(s).

Study Abroad

The summer study abroad experience is a 6–8-week opportunity. Participating students work on an engineering research or design project for a non-US supervisor, in a foreign country, immersed in a foreign culture. Participants are encouraged to sightsee and take part in the cultural life of the host city. Weekend trips are fine during the program if they do not interfere with one's study. Students who want to travel for a week or more should do so after their study abroad program is finished. By the end of the summer, many have traveled the European and Asian continents.

What are the opportunities? Students may conduct research at universities in Dresden or Karlsruhe, Germany; in Burgos or Madrid, Spain; in Singapore; in Montevideo, Uruguay; or Reykjavik, Iceland. There are humanitarian engineering projects in Santa Cruz del Quiche in Guatemala with the Barbara Ford Peace Building Center, and in Bosnia (in conjunction with the BH Futures Foundation).

Who is eligible? Summer study abroad participants serve as ambassadors from Cooper to these international communities. Study abroad is a competitive program for students who:

- have completed their second or third year of study at Cooper
- have a cumulative GPA of at least 3.0 and are not currently on academic probation
- are in good disciplinary standing (no current active findings of responsibility for academic integrity, Code of Conduct, other student conduct violations). Applicants must verify their good standing during the application process, and this will be verified by the Office of Student Affairs and academic program offices.

How to apply? Acceptance is a two-step process. The first step is to apply to the Albert Nerken School of Engineering Dean's Office. Application forms and deadlines for the summer of 2025 are due January 10, 2025. The summer 2025 application instructions can be found on the study abroad website.

Since each international organization has a limited number of slots for Cooper students, there may be more applicants than space.* The Associate Dean overseeing the summer abroad program will determine the most competitive candidates for each location. Candidates who are fully qualified but not competitive for their first-choice location will be considered for their second-choice location, and so on.

Applicants who meet the eligibility requirements and are recommended by Cooper will be notified of the next step. In some cases, the student will be asked to apply directly to the foreign institution and in others, the Deans' office will forward the Cooper application to the host institution. The foreign institution has the authority to decline admission to a student, even if Cooper recommends them.

Participants must spend six to eight weeks conducting research at the foreign institution (exclusive of any sightseeing before or after the program). Students will be enrolled in EID 300 for the summer. A student may earn up to six academic credits: three for a technical elective and three for a non-technical elective, but students should check with their academic advisor, as acceptance of credits is major-specific.

Upon return to Cooper, each student must submit to Associate Dean for Educational Innovation, Lisa A. Shay, two reports on their activities and an evaluation form. The first report describes their research activities (the "technical report") and the second (the "cultural report") is a thoughtful reflection on their experience in the country. The technical report should be a conference-quality paper in content, organization, and grammar. Submission of the technical report to a peer-reviewed research publication forum (workshop/conference/journal) is strongly encouraged. See the EID 300 syllabus for specific requirements for each paper.

Students are advised to check the academic calendar of their host institution when proposing dates of study and should plan to align their experience with the host institution's schedule. If they are working on a project with students from the host institution, those students will most likely end their work at the end of the semester, and it's unlikely there will be much work to do on the project after the term ends. Also, be mindful that most of Europe goes on vacation in August, and faculty availability could be quite limited at that time.

What are the financial considerations? Students who are accepted for the Summer Study Abroad program will be eligible for a Dean's Office Summer Abroad Cultural Immersion Fellowship which will cover the cost of travel, accommodations and program-related fees. The number of Fellowships awarded will not exceed the number of positions allocated to each program, based on the partnership agreements. Admission to the Summer Study Abroad program and awarding of Fellowships will be at the discretion of Associate Dean Lisa Shay. Tuition will not be charged for EID 300, but students are responsible for registration fees. This Fellowship is only available once during a student's enrollment at Cooper. Students who wish to participate in a second summer abroad experience may apply in a subsequent year and may be accepted if space permits, but they will not be eligible for the Fellowship nor will they earn EID 300 credit.

Our hope is that students will be able to fully participate in the Summer Study Abroad program in summer 2025. However, we will follow all recommendations by Cooper Union's leadership, as well as applicable governmental policies (both US and foreign). In light of Covid-19, some programs may decide to offer their summer study abroad experience virtually. Please note that the six credits offered for EID 300 will not be awarded for virtual summer programs, nor will students be required to submit the final reports. Students may still apply to participate in these programs and still must be nominated by Cooper Union. Students in virtual programs are not eligible for the Dean's Office Summer Abroad Cultural Immersion Fellowships.

Need additional information? For more information about the Summer Study Abroad program, please contact Associate Dean of Educational Innovation, Lisa A. Shay.

Professional Development

Mastering the technical aspects of an engineering field is only part of being a successful engineer. There are many other areas that go toward building and continuing a professional career.

MASTER'S DEGREE REQUIREMENTS

Cooper Union offers a Master of Engineering degree with areas of concentration in chemical engineering, civil engineering, electrical engineering and mechanical engineering. The integrated bachelor/master of engineering program is intended to integrate work at the undergraduate and graduate levels and prepare graduates for entry into the engineering profession at an advanced level or for further graduate study.

See the application guidelines for the admissions procedure.

Cooper Union students applying for the 4 year undergraduate/graduate dual degree see instructions for application below.

See the course list for graduate level courses.

General Application Requirements

Applicants who are not Cooper Union graduates are expected to have a superior undergraduate record and to have given evidence of ability for independent work. Students are accepted on an academically competitive basis subject to the availability of an advisor and of suitable available facilities. Students have up to five years to complete their degree. They must declare whether they plan to pursue the thesis or non-thesis option by the end of their third year or when they complete 24 credits, whichever comes first. Once students declare the thesis option, they have four semesters to finish the program. Students may complete the degree requirements as part-time or full-time students in consultation with their advisor. Students receiving more than 50% scholarship or are in receipt of a Fellowship may be required to complete their degree on a different timeline.

Cooper Union Undergraduates A Cooper undergraduate degree does not guarantee admission to the graduate program. To be considered for admission to the master's program, one must be a currently enrolled Cooper Union undergraduate, with a minimum 3.0 grade point average according to the major.

Integrated Degree: All Cooper undergraduates looking to earn their Master's degree at Cooper fall within the integrated degree program. In an integrated program, there is only one transcript for the Bachelor of Engineering and Master of Engineering coursework, with one cumulative GPA. There are two types of integrated degrees:

1. The Dual degree: The Cooper Union Dual Degree Master's Program is one in which the bachelor's and master's degree are awarded simultaneously after four years of study. Only the thesis option is available for the Dual degree. With the approval of their advisor, students apply credits from courses taken beyond those required for the Bachelor of Engineering towards the requirements for the Master's degree. In the dual degree program, a student's status remains as an "undergraduate" throughout the program, until award of the bachelor's and master's degree. To maintain undergraduate status, students are required to enroll in a minimum of 12 credits that are applied to the undergraduate degree each term.

Students interested in the dual degree program should NOT submit an application to the graduate program via the admissions site. Instead, students should submit the Dual Degree Notification Form in the second semester of their junior year. The form is available from Beth Slack who will need to know the names of your undergraduate academic advisor, graduate thesis advisor, and the chair of the department in which you are pursuing your master's degree.

Please note: If a Cooper Union student interested in the dual degree program fails to follow this instruction, the submitted application will be rejected, and the application fee will not be refunded.

2. 4+ degree: The Cooper Union 4+ Master's Program is one in which a Cooper Union undergraduate student completes the undergraduate degree, receives the diploma and then begins the graduate degree program. Students interested in the 4+ degree should apply to the Master of Engineering program via the admissions site in one of the degree-granting departments during their senior year.

Graduates of Other Colleges The School of Engineering may admit outstanding students or qualified practicing professionals, on a tuition basis, into the master's degree programs. To be considered for admission, a student should have completed an engineering baccalaureate program that is accredited by the Accreditation Board for Engineering and Technology (ABET). In addition, an essay is required of all applicants who were not Cooper Union graduates. Applicants must submit official transcripts. Graduates of foreign institutions whose first language is not English are required to submit scores of the Test of English as a Foreign Language (TOEFL). Admitted students may be required to register for advanced engineering courses to make up for any deficiencies.

Degree Requirements

The Albert Nerken School of Engineering offers both thesis and non-thesis Master of Engineering degrees. A minimum of 30 graduate level credits beyond the baccalaureate degree must be completed at The Cooper Union (in addition to resolving possible undergraduate deficiencies) for both the thesis requiring M.E. Program and the non-thesis M.E. Program. All graduate level credits, including possibly cross-listed upper level undergraduate credits, must be approved by a student's academic advisor(s). A complete program of study is designed by the student with the assistance and approval of the academic advisor(s) and filed in the Office of the Dean of Engineering.

Each student is required to submit a thesis or project in their area of study, equivalent to a maximum of six credits (graduate level), for partial fulfillment of the master of engineering requirements. This project must be discussed with and approved by an advisor prior to being started. The thesis or project must be successfully presented orally by the student and submitted in written form.

Each of the engineering departments may have additional specific guidelines for the requirements for the M.E. degree. See links for Masters Program found under each department.

Thesis Requirements

The 30 credits offered for the thesis program degree must satisfy the following distribution:

- Major: Complete a minimum of 12 credits of graduate level courses in a chosen field
- Complete a minimum of 12 further credits of graduate level courses.
- Thesis Project: 6 credits

All four departments offer the thesis option.

Non-Thesis Requirements

The 30 credits offered for the non-thesis program degree must satisfy the following distribution along with a special project requirement:

- Major: Complete a minimum of 18 credits of graduate level courses in a chosen field
- Complete a minimum of 12 further credits of graduate level courses

Special Projects requirement can be fulfilled in one of two ways:

- Complete a graduate level independent study course (up to 3 credits)
- Submit a report to the Dean's office of other course work that satisfies requirements for a graduate level course in which a grade of "B" or higher was received. If your home department has specific guidelines for the Special Projects requirement report, you should follow those guidelines. If there are no guidelines from your department, the Deans office suggests these basic structure and formatting requirements.

When the special projects requirement is completed this form should be filled out and submitted, along with any report, to the Dean's office.

The Department of Chemical Engineering does not offer the non-thesis option at this time.

Other General Requirements

Grade Requirement A minimum overall grade point average of 3.0 is needed in all courses used to satisfy the 30 credit master's degree requirement.

Appropriate Excess Credits Taken as an Undergraduate For Cooper Union baccalaureate holders, any credits of graduate level, taken as undergraduates in excess of their bachelor's degree requirement, may be applied to the master's degree, subject to the above cross-listing requirements and advisor approval.

Time Limitation Once students have declared they are following the thesis or non-thesis track, they must complete the program within four semesters. Students receiving less than 50% scholarship must declare no later than the end of their sixth semester of enrollment. Students who receive more than 50% scholarship are required to be full-time students, and must complete the program in either four or five semesters, dependent on their department's requirements. Students who request and are granted an extension beyond the four, five or ten semesters of expected enrollment will be assessed a maintenance of matriculation fee of $3,000 per semester.

Enders Fellowship One source of funding available to students wishing to pursue graduate study in engineering is the Enders Fund, governed by the will of Henry C. Enders and administered by the New York Community Trust. This fellowship is available to engineering graduates of The Cooper Union who have satisfactorily completed all required chemistry courses in the ChE curriculum and plan to do graduate work in chemistry, chemical engineering, chemistry-based environmental engineering, or chemistry-based bioengineering. Recipients are selected by the joint faculties of chemistry and chemical engineering.

The Department of Chemical Engineering requires that any recipient of the Enders Fellowship be a full-time student pursuing their Masters in Engineering and must follow the "thesis option" (research path). Applicants are reviewed by the chemical engineering and chemistry faculties and are evaluated based on their academic merit, desire to do research, and research topic interests.

Application for Enders Students who wish to be considered for the Enders Fellowship should submit the following materials as a single *.pdf file to the Engineering Dean's Office by February 15th of the year they would like to receive the fellowship:

1) Curriculum Vitae / Resume (1-2 pages)

2) Personal statement (1-2 pages, explain your goals in pursuing a masters and how the fellowship would help you)

3) Statement of Research Interests (1-2 pages on your previous research experience, future projects of interest, and potential faculty you could work with)

4) Transcript for bachelor's degree (can be "unofficial" from DTSS)

Students may reapply for the fellowship. Students will be notified of their award by the end of March and must accept or reject the fellowship offer in writing to the Engineering Dean's Office by April 15th.

Guidelines for Master's Thesis

1. Graduate students conduct their thesis work under the close supervision and guidance of a full-time faculty member of the School of Engineering. The thesis advisor and Dean approve all copies of the thesis report after it has been successfully defended.
2. The master's thesis is defended through an oral presentation during the fall or spring semesters only. This defense summarizes the content of the thesis and is open to all interested persons. School-wide distribution of an invitation should go to all engineering faculty, graduate students, and seniors within your major at least two weeks before the defense. An invitation should be submitted to the Dean's Office for posting. If needed, the Dean's Office will guide you through the preparation.
3. One digital copy of the thesis for faculty review must be made available in the Dean's office a minimum of two weeks before the thesis defense.
4. After a thesis is successfully defended and the thesis report is finalized with the student's advisor:
   a. Make sure your thesis follows the format outlined on the Cooper website.
   b. The advisor should sign the thesis and you should email a searchable pdf file of your approved thesis to Beth Slack (beth.slack@cooper.edu). Alternatively, you can also email a dropbox link where the file can be downloaded.
   c. Your thesis should be digitally archived following instructions provided on the Cooper website, choosing the ProQuest Open Access Publishing Plus option. Please make sure to include the scanned copy of the signature page prior to submitting.
   d. Purchase any copies of the thesis through the ProQuest website.
5. The Office of the Registrar submits the list of engineering Master's Degree candidates to the School of Engineering Committee on Academic Standards. The Committee in turn presents the recommended list of candidates to the engineering faculty at the semester-end faculty meeting, and to the Board of Trustees' December/May meeting for approval of conferment of the Master of Engineering degree.

Engineering Minors

The Albert Nerken School of Engineering offers four minors to undergraduate students: Bioengineering Minor, Chemistry Minor, Computer Science Minor, and a Mathematics Minor. Students can also obtain a Humanities and Social Science (HSS) Minor from our HSS Program. Please see below for further information.

BIOENGINEERGING MINOR (BEM) The Departments of Mechanical and Chemical Engineering offer a minor in Bioengineering that is accessible to undergraduate engineering students across all majors. The Bioengineering Minor is flexible in that students, in consultation with their faculty advisor, can individually tailor their own minor by selecting elective courses from the list of available courses to better fit their major. Those who complete the requirements for the minor will have that indicated on their transcript.

The Minor in Bioengineering will provide graduates with the following knowledge and skills:

- Knowledge of molecular and cellular biology and physiology.
- The ability to apply principles of engineering to solve bioengineering problems, including those associated with the interaction between living and non-living systems.
- The ability to make measurements on and interpret data from living systems.
- Preparation for advanced studies and research opportunities in bioengineering-related fields.

CHEMISTRY MINOR (CM) The Department of Chemistry offers a minor in Chemistry to all undergraduate students in the School of Engineering. Students must complete General Chemistry (Ch110, 3 credits) and General Chemistry Laboratory (Ch111, 1.5 credits) as well as 16 additional credits from a list of approved courses. At least 2 credits must come from a 200+ level Chemistry laboratory course and at least 2 courses must be "advanced" courses, as determined by the Department.
No more than 4 credits may be used towards the fulfillment of any specific degree requirements, and no more than 6 credits may be chosen from Ch 391-398 and Ch 491-494.

Students who complete the Minor in Chemistry will:

- demonstrate a broad understanding of introductory chemistry concepts and analytical laboratory techniques,
- develop intermediate-level training and hands-on capabilities in modern experimental chemistry,
- gain skills and knowledge within one or more of the principal subfields of modern chemistry according to their interests and professional goals, and
- have opportunities to participate in undergraduate research in chemistry.

COMPUTER SCIENCE MINOR (CSM) The Department of Electrical Engineering offers a minor in Computer Science to all engineering students. Students seeking a minor in Computer Science must complete Data Structures & Algorithms I (ECE 264), Data Structures & Algorithms II (ECE 365), or a course selected from a list of alternative courses, and 12 additional credits at the 300 or 400 level from a list of approved courses. At most six credits of 300 level courses that are required in the major can be applied toward the requirements for the Computer Science Minor. For students receiving both the Math Minor and the Computer Science Minor, at most three credits can be used to satisfy both minor requirements. Any 400 level courses used to fulfill the requirements for the Computer Science Minor cannot be used to fulfill the requirements for the Master of Engineering degree. The minimum cumulative GPA for the set of courses (including ECE 264) used to fulfill the requirements for the Computer Science Minor is 3.0.

MATHEMATICS MINOR The department of Mathematics offers a minor in mathematics. Students seeking a minor in mathematics must complete at least 15 credits of mathematics coursework in addition to the 17 credits required by every engineering department. These additional credits must include Mathematical Analysis I and II (Ma 350, 351), Linear Algebra (Ma 326), Modern Algebra (Ma 347) and an elective course in mathematics at or above the 300 level. An overall G.P.A., at graduation, of at least 3.0 among the mathematics portion (32 credits) of the program is required to obtain a minor in mathematics.

HUMANITIES AND SOCIAL SCIENCE MINOR The Faculty of Humanities and Social Sciences offers students minors in a variety of fields and topics. For more information, please visit the HSS minor website.

CHEMICAL ENGINEERING

Mission Statement

The Cooper Union's Department of Chemical Engineering is committed to the development of chemical engineers and technically-minded professionals. The department will teach students science and engineering fundamentals and guide the application of this knowledge to the ethical, professional practice of chemical engineering. This will be undertaken in a supportive environment that encourages lifelong learning and is responsive to new technologies and research.

Program Educational Objectives

- Our graduates will attain careers where they apply their abilities to solve problems and meet current challenges in engineering and non-engineering fields
- Our graduates will transition easily into their careers and/or graduate studies by using their technical knowledge and non-technical skills
- Our graduates will continue to grow in their careers by participating in professional and personal development activities

Student Outcomes

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

Program Description

The education of the chemical engineer requires a strong foundation in chemistry and physics, which must be applied through the medium of mathematics to the solution of design, modeling, scale-up and control problems. A thorough knowledge is required of chemical structures, together with the energetic and kinetic relationships predicted in chemical reactions and molecular transport. The chemical engineer deals with the application of these principles to processes carried out on a variety of scales from micro-reactors to an industrial scale, in which matter undergoes changes in physical state, chemical composition or energy content. Emphasis is placed on developing creative ability; facts and theories are presented primarily to stimulate further thought and study in all fields of chemical engineering. Formal instruction is supplemented by visits to several plants and companies where the contribution of engineers can be observed and understood with respect to equipment, utilities, safety, costs, environmental impact, labor and supervision. The students get first-hand experience in the chemical engineering laboratory in applying engineering analysis to equipment performance, and in learning limitations of theoretical concepts. In the senior year, the student learns how to design chemical plants from fundamental data on new processes and to recognize areas of limited knowledge from the results of the design, and thus recommend pilot plant studies, if necessary.

Chemical engineering graduates find employment in a wide variety of areas. In addition to the chemical and petroleum industries, chemical engineers are involved heavily in the biomedical, materials and environmental fields. A chemical engineering education can also be easily applied to other interdisciplinary areas such as biochemical and biomedical engineering, energy resources, environmental engineering and materials science. As a result, chemical engineers are also finding employment in non-industrial institutions such as government, research think tanks, policy study groups and even publishing companies.

Program Accreditation

The Chemical Engineering Program is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Criteria for the Chemical, Biochemical, Biomolecular and Similarly Named Engineering Programs.

Chemical Engineering Curriculum

Fall 2024 and Later

Freshman Year Credits

Fall Semester:	Credits
ESC000.1 Professional Development Seminar	0
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
Ch 110 General Chemistry	3
EID 101 Engineering Design and Problem Solving	3
EID 102 Engineering Graphics	1
CS 102 Computer Programming for Engineers	2
HSS-1 Literary Forms and Expressions	3
Total Credits Fall Semester	18

Spring Semester:	Credits
ESC000.2 Professional Development Seminar	0
Ma 113 Calculus II	4
Ph 112 Physics I: Mechanics	4
Ch 111 General Chemistry Laboratory	1.5
Ch 161 Physical Principles of Chemistry	4
HSS-2 Texts and Contexts: Old Worlds and New	3
Total Credits Spring Semester	16.5

Sophomore Year Credits

Fall Semester:	Credits
ESC000.3 Professional Development Seminar	0
ChE 222 Material and Energy Balances	4
Ma 223 Vector Calculus	2
Ph 213 Physics II: Electromagnetic Phenomena	4
Ph 291 Introductory Physics Laboratory	1.5
Ch 231 Organic Chemistry I	3
HSS-3 The Making of Modern Society	3
Total Credits Fall Semester	17.5

Spring Semester:	Credits
ESC000.4 Professional Development Seminar	0
Ma 240 Ordinary and Partial Differential Equations	3
Ch 232.1 Organic Chemistry II	2
Ch 233 Organic Chemistry Laboratory	2
ChE 233 Chemical Engineering Thermodynamics	4
HSS-4 The Modern Context: Figures and Topics	3
ChE 210 Materials Science for Chemical Engineers	4
Total Credits Spring Semester	18

Junior Year Credits

Fall Semester:	Credits
Ma 224 Probability	2
Ch 351 Instrumental Analysis Laboratory	2
Ch 363 Physical Chemistry	4
ChE 341 Fluid Mechanics and Flow Systems	3
Math, Science, or Engineering Elective	3
Humanities or Social Sciences Elective	3
Total Credits Fall Semester	17

Spring Semester:	Credits
ChE 332 Chemical Reaction Engineering	3
ChE 342 Heat and Mass Transfer	4
ChE 352 Process Simulation and Mathematical Techniques for Chemical Engineers	3
Engineering Elective	3
Humanities or Social Sciences Elective	3
Total Credits Spring Semester	16

Senior Year Credits

Fall Semester:	Credits
ChE 371 Chemical Engineering Laboratory I	2
ChE 381 Process Evaluation and Chemical Systems Design I	3
ChE 351 Separation Process Principles	3
ChE 361 Chemical Process Dynamics and Control	3
Math, Science, or Engineering Elective	3
Free Elective	3
Total Credits Fall Semester	17

Spring Semester:	Credits
ChE 372 Chemical Engineering Laboratory II	2
ChE 382 Process Evaluation and Chemical Systems Design II	4
Engineering Elective	3
Math, Science, or Engineering Elective	3
Humanities/Social Sciences Elective	3
Total Credits Spring Semester	15

Total credits required for degree	**135**

Prior to Fall 2024

Freshman Year Credits

Fall Semester:	Credits
ESC000.1 Professional Development Seminar	0
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
Ch 110 General Chemistry	3
EID 101 Engineering Design and Problem Solving	3
EID 102 Engineering Graphics	1
CS 102 Computer Programming for Engineers	2
HSS 1 Literary Forms and Expressions	3
Total Credits Fall Semester	18

Spring Semester:	Credits
ESC000.2 Professional Development Seminar	0
Ma 113 Calculus II	4
Ph 112 Physics I: Mechanics	4
Ch 111 General Chemistry Laboratory	1.5
Ch 160 Physical Principles of Chemistry	3
HSS 2 Texts and Contexts: Old Worlds and New	3
Total Credits Spring Semester	15.5

Sophomore Year Credits

Fall Semester:	Credits
ESC000.3 Professional Development Seminar	0
ChE 221 Material and Energy Balances	3
Ma 223 Vector Calculus	2
Ph 213 Physics II: Electromagnetic Phenomena	4
ChE 211 Materials Science for Chemical Engineers	3
Ph 291 Introductory Physics Laboratory	1.5
Ch 231 Organic Chemistry I	3
HSS 3 The Making of Modern Society	3
Total Credits Fall Semester	19.5

Spring Semester:	Credits
ESC000.4 Professional Development Seminar	0
Ma 240 Ordinary and Partial Differential Equations	3
Ph 214 Physics III: Optics and Modern Physics	3
Ch 232.1 Organic Chemistry II	2
Ch 233 Organic Chemistry Laboratory	2
ChE 232 Chemical Engineering Thermodynamics	3
HSS 4 The Modern Context: Figures and Topics	3
Total Credits Spring Semester	16

Junior Year Credits

Fall Semester:	Credits
Ma 224 Probability	2
Ch 351 Instrumental Analysis Laboratory	2
Ch 361 Physical Chemistry I	3
ChE 331 Chemical Engineering Thermodynamics II	3
ChE 341 Fluid Mechanics and Flow Systems	3
Engineering Elective	3
Total Credits Fall Semester	16

Spring Semester:	Credits
Ch 362 Physical Chemistry II	2
ChE 332 Chemical Reaction Engineering	3
ChE 342 Heat and Mass Transfer	4
ChE 352 Process Simulation and Mathematical Techniques for Chemical Engineers	3
Engineering or Science elective	3
Free Elective	3
Total Credits Spring Semester	18

Senior Year Credits

Fall Semester:	Credits
ChE 371 Chemical Engineering Laboratory I	2
ChE 381 Process Evaluation and Chemical Systems Design I	3
ChE 351 Separation Process Principles	3
ChE 361 Chemical Process Dynamics and Control	3
Engineering or Science Elective	3
Humanities/Social Sciences Elective	3
Total Credits Fall Semester	17

Spring Semester:	Credits
ChE 372 Chemical Engineering Laboratory II	2
ChE 382 Process Evaluation and Chemical Systems Design II	4
Engineering or Science Elective	3
Free Elective	3
Humanities/Social Sciences Elective	3
Total Credits Spring Semester	15
Total credits required for degree	**135**

The Chemical Engineering Department does not permit the substitution of any courses as outlined in the Course Substitutions and Credits section of the Bachelor of Engineering curriculum.

Elective Definitions "Engineering Elective" means an engineering or computer science course by the ABET definition: EID, ECE, ChE, CS, ME, or CE course codes. No math, science, HSS, Art, Architecture, or any other course code. "Math, Science, or Engineering Elective" means science, engineering, or math: "Engineering" above plus Ma, Ch, Ph, Bio, ESC, and VIP. Cannot be HSS, Art, Architecture, Art History, or any other course code not listed here. "Humanities or Social Sciences Elective" means HSS, HUM, HTA, or SS; any course offered by the Faculty of Humanities and Social Sciences. "Free" means free—any course offered at The Cooper Union. Electives can be taken in any order, subject to approval by the student's advisor.

Minors

A chemical engineering student can minor in math, bioengineering (administered by both the Chemical and Mechanical Engineering Departments), chemistry, computer science, or humanities and social sciences by completing the requirements for those minors, typically 15 credits of elective coursework. The courses require permission of the student's advisor and are listed in other parts of The Cooper Union catalog. Note that some may require prerequisites or permission of the instructor. It is not necessary to obtain a minor in any field to graduate with a Bachelor of Engineering in Chemical Engineering.

Upon completion of the minor, students should submit a list of courses that they wish to be considered for certification according to the posted procedures. Successful completion of the minor will be acknowledged by a certificate from the school.

Masters Program—Chemical Engineering

The Department of Chemical Engineering offers a thesis option in pursuing the Master of Engineering (M.E.) with concentration in Chemical Engineering degree. It does not offer a non-thesis option at this time.

Qualified students may apply for the Enders Fellowship to support their research.

To receive the M.E. degree, graduate students in chemical engineering must complete a minimum of 30 graduate-level credits beyond their baccalaureate degree. Six of these credits must be for a thesis project on an approved topic (ChE499). It is recommended that students take ChE421 (Advanced Chemical Reaction Engineering), ChE/ME/EID440 (Advanced Fluid Mechanics), ChE/EID441 (Advanced Heat and Mass Transfer) and/or Ch460 (Statistical Mechanics and Computational Chemistry) if they are offered.

18 credits of the 30 must be from Chemical Engineering graduate courses, i.e. ones with course codes ChE4XX. This includes the ChE499 requirement above. The remaining 12 credits of the 30 may be from other graduate engineering or science electives (e.g. Ch4XX, EID4XX, Bio4XX, etc.) All coursework must be approved by the student's thesis research advisor.

A thesis candidate must choose a full-time Cooper Union faculty member from either the chemistry or chemical engineering departments as one of their thesis research advisors by the end of their first semester. Thesis projects may be co-advised by up to two faculty members. Before choosing a thesis topic, students should meet with each faculty member in the chemistry and chemical engineering departments to discuss potential projects and each professor's research interests.

Research interests of chemical engineering faculty members include nature-inspired chemical engineering, polymeric biomaterials for medical applications, drug delivery, environmental engineering, evaluation of sustainability, life cycle assessment, batch process design and optimization, pollution prevention and mitigation, optimization (linear and non-linear programming), particle technology, multiphase flow and fluidization, pharmaceutical engineering and processes, identifying reaction mechanisms for energy applications, design of carbon dioxide adsorbents, and energy systems and processes.

Applicants to the M.E. program who did not receive their baccalaureate degree in chemical engineering are expected to have taken coursework in material and energy balances, thermodynamics, reaction engineering /advanced chemical kinetics OR transport phenomena, and computer programming /scientific computing. Students lacking this coursework will be required to take undergraduate courses to complete the program.

CIVIL ENGINEERING

Mission Statement

To prepare our students as civil engineering professionals who will have the depth and breadth of knowledge, sense of social and ethical responsibility, commitment to a safe and sustainable environment, and a desire to serve society in leadership positions.

Program Educational Objectives

- Our civil engineering graduates are engaged in life-long learning to stay abreast of the latest body of knowledge and professional practices in civil engineering and allied disciplines throughout their careers.
- Our graduates are excelling in teamwork, interdisciplinary concepts, organizational skills, and problem-solving methodologies in their professional careers.
- Our graduates have attained positions of leadership as professional practitioners, government officials, academicians, inventors, researchers, etc., during their professional careers.
- Our graduates are committed to excellence, independent thinking, innovation, and modern professional practices throughout their careers.
- Our graduates are committed to professional and ethical responsibility during their careers.
- Our graduates who pursue careers in engineering have successfully achieved professional licensure in their chosen field.

Student Outcomes

The Civil Engineering Department has established the following set of outcomes that our undergraduate students are expected to achieve by the time of graduation:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- 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
- An ability to communicate effectively with a range of audiences

- 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
- 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
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Program Description

Civil engineering, earliest of the engineering professions, has evolved into a broad spectrum of specialties: structural, geotechnical, hydraulic, environmental, transportation, urban planning, construction management, sustainable design, urban security, and infrastructure rehabilitation. Depending on his or her interests and abilities, the modern civil engineer may also become involved in research, design, and development related to projects in alternative energy sources, space structures, protection against natural and man-made disasters, etc. The civil engineer also studies and develops new materials, new structural systems, and new strategies for optimizing design. Basic research, especially in the areas of applied and experimental mechanics, often arises either as a preliminary or adjunct requisite to these studies.

The civil engineer who wishes to practice creatively in any of these fields must be thoroughly grounded in the basic sciences, mathematics and applied mechanics, structures and structural mechanics, engineering sciences and computer applications. Members of the civil engineering faculty are actively engaged in research in their specialties, which include modern advances in structural engineering and materials, geotechnical engineering, alternative energy sources, green design of buildings, water pollution control technologies, water resources engineering, and urban security.

As a student at Cooper Union, you'll have the opportunity to delve into our faculty's research. Earn up to three credits per semester through Independent Studies or engage in summer research and Graduate Thesis projects.

Internships with Top NYC Firms: Our Civil Engineering department is highly regarded among NYC's leading design and construction firms. It's common for our students to land sought-after internships during the summer of their Sophomore, Junior, or Senior years. Our job fairs are a testament to this, with dozens of civil engineering construction and design firms actively seeking our relatively small number of students.

Global Learning Opportunities: Broaden your horizons with our study abroad program. Spend a summer or a semester at an international university, gaining a global perspective on your studies. Countries include Germany, Iceland, Singapore, Guatemala etc.

Our work-study program offers you the chance to gain practical experience as Teaching and Lab Assistants, Tutors, and contributors to initiatives like Summer STEM, the AACE lab, The Saturday Program, and IT labs.

Most of our seniors typically apply and gain acceptance into our esteemed Graduate program. You have the flexibility to pursue it full-time, or you can opt for part-time study with our convenient evening graduate classes, allowing you to balance your studies with day-time work.

Our program prepares graduates to apply knowledge of at least four recognized technical areas of civil engineering. This is accomplished through required courses in the following areas:
1. Structural engineering
2. Water resources engineering
3. Geotechnical engineering
4. Environmental engineering

Additional areas covered through required or elective courses are:
- Transportation Planning/Engineering
- Construction Management
- Urban Security
- Sustainability

Graduate Program

Completion of the master of engineering degree program with a concentration in civil engineering is important for entry into the profession in any of the specialized areas discussed above. The civil engineering department offers many graduate level courses in the cited areas, such as structural, geotechnical, hydraulic and environmental engineering.

Program Accreditation The Civil Engineering Program is accredited by the Engineering Accreditation Commission of ABET, under the General Criteria and Program Criteria for the Civil and Similarly Named Engineering Programs.

Employers Who Have Hired Our Graduates:

- ARUP
- Guy Nordenson and Associates
- H&H
- Mott MacDonald (Global engineering and management consultants)
- Mueser Rutledge (Geotechnical & Foundation Engineering)
- NYC Metropolitan Transportation Authority (MTA)
- Skanska
- Turner Construction Company
- Thornton Tomasetti
- WSP
- UrbanTech
- TESLA, the U.S. Army Corps of Engineers, WeWork, and numerous others across NYC, the U.S., and globally

Graduate Schools Where Our Graduates Have Been Accepted Over the Past Decade

- Columbia University
- MIT
- Stanford University
- Technische Universiteit Delft
- University of California, Berkley
- University of Texas at Austin
- NYU Law School
- Princeton University and many more

Civil Engineering Curriculum

Freshman Year Credits

Fall Semester:	Credits
ESC000.1 Professional Development Seminar	0
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
Ch 110 General Chemistry	3
EID 101 Engineering Design and Problem Solving	3
EID 102 Engineering Graphics	1
CS 102 Computer Programming for Engineers	2
HSS-1 Literary Forms and Expressions	3
Total credits fall semester	18

Spring Semester:	Credits
ESC000.2 Professional Development Seminar	0
Ma 113 Calculus II	4
Ph 112 Physics I: Mechanics	4
Ch 111 General Chemistry Laboratory	1.5
CE 151 Urban Transportation Planning	3
HSS-2 Texts and Contexts: Old Worlds and New	3
Total credits spring semester	15.5

Sophomore Year Credits

Fall Semester:	Credits
ESC000.3 Professional Development Seminar	0
Ma 223 Vector Calculus	2
Ma 224 Probability	2
Ph 213 Physics II: Electromagnetic Phenomena	4
Ph 291 Introductory Physics Laboratory	1.5
ESC 200 Engineering Mechanics	3
ESC 210 Materials Science	3
HSS-3 The Making of Modern Society	3
Total credits fall semester	18.5

Spring Semester:	Credits
ESC000.4 Professional Development Seminar	0
BIO 250 Biotechnology in Environmental Systems	3
Ma 240 Ordinary and Partial Differential Equations	3
Ph 214 Physics III: Optics and Modern Physics	3
ESC 201 Mechanics of Material	3
CE 220 Fundamentals of Civil Engineering	3
HSS-4 The Modern Context: Figures and Topics	3
Total credits spring semester	18

Junior Year Credits

Fall Semester:	Credits
CE 321 Structural Engineering	4.5
CE 344 Environmental Systems Engineering	4.5
ESC 330 Engineering Thermodynamics	3
ESC 340 Fluid Mechanics and Flow Systems	3
Humanities/Social Sciences Elective	3
Total credits fall semester	18

Spring Semester:	Credits
CE 322 Structural Engineering II	3
CE 331 Introduction to Geotechnical Engineering	4.5
CE 343 Water Resources Engineering	4.5
CE 341 Design of Steel Structures	3
Humanities/Social Sciences Elective	3
Total credits spring semester	18

Senior Year Credits

Fall Semester:	Credits
CE 342 Design of Reinforced Concrete Structures	3
CE 363 Civil Engineering Design I	3
CE 332 Introduction to Foundation Engineering	3
CE 346 Hydraulic Engineering	3
Engineering or Science Electives	3
Total credits fall semester	15

Spring Semester:	Credits
CE 361 Civil Engineering Experimental Projects	2
CE 364 Civil Engineering Design II	3
CE 348 Environmental and Sanitary Engineering	3
Engineering or Science Electives	6
Total credits spring semester	14
Total credits required for degree	**135**

Masters Program—Civil Engineering

The Department of Civil Engineering offers both the thesis and non-thesis option in pursuing a Master of Engineering degree with a concentration in Civil Engineering. If the thesis option is chosen, the student is required to take 24 credits of course work and six credit so thesis. If the non-thesis option is chosen the student is required to take 30 credits of course work and submit a report from one of the courses.

Completion of the Master of Engineering degree program with a concentration in civil engineering is important for entry into the profession.

Within the civil engineering program, students may elect to pursue specialized study through an appropriate choice of electives in two areas:

- **Structural and Geotechnical Engineering**
- **Water Resources and Environmental Engineering**

The student must complete a coherent concentration of graduate-level courses approved by the department.

Total Credits: 30

Thesis Requirements

The 30 credits offered for the thesis program degree must satisfy the following distribution:

- Major: Complete a minimum of 12 credits of graduate level courses in one of the two specialized areas
- Complete a minimum of 12 further credits of graduate level courses
- Thesis Project: 6 credits

Non-Thesis Requirements

The 30 credits offered for the non-thesis program degree must satisfy the following distribution along with a special project requirement::

- Major: Complete a minimum of 18 credits of graduate level courses in one of the two specialized areas
- Non-thesis projects should produce an individual report in a civil engineering graduate course within the same specialized areas. The report must include substantial design and research, and take at least 6 weeks to complete.
- Complete a minimum of 12 further credits of graduate level courses

More details can be found here.

Graduate students with a concentration of civil engineering become equipped with the theoretical and practical knowledge needed to solve many problems facing both our built and natural environments. Coursework grounded in the principles of mathematics, structural mechanics, fluid mechanics, soil mechanics, environmental sciences, and computer applications prepares students for careers in structural engineering, construction management, infrastructure rehabilitation, geotechnical engineering, water resources and environmental engineering.

Graduate level courses in these areas are available to seniors with superior academic records as indicated in the following lists:

Structures and Geotechnical Engineering:

CE 422, Finite Element Methods
CE 425, Structural Dynamics
CE 426, Advanced Structural Design
CE 427, Behavior and Design of Prestressed Concrete Structures
CE 428, Advanced Structural Steel Design
CE 431, Foundation Engineering I
CE 432, Foundation Engineering II
CE 433, Lateral Earth Pressures and Retaining Structures I
CE 434, Lateral Earth Pressures and Retaining Structures II
CE 435, Special Topics in Geotechnical Engineering I
CE 436, Special Topics in Geotechnical Engineering II
CE 438, Forensic Geotechnical Engineering
CE 450, Civil Engineering Construction
CE 470, Urban Security
CE 471, Engineering Risk Analysis
CE 472, Mass Timber Design
CE 473, Earthquake and Wind Engineering
CE 481, Bridge Engineering
CE 482, Resilient Civil Infrastructure
CE 483, Building Information Modeling
CE 484, Civil Engineering Project Management

Water Resources and Environmental Engineering:
CE 437, Geo-Environmental Engineering
CE 414, Solid Waste Management
CE 440, Industrial Waste Treatment Design
CE 441, Water and Waste Water Technology
CE 442, Open Channel Hydraulics
CE 444, Hydrology
CE 446, Pollution Prevention or Minimization
CE 447, Stream and Estuary Pollution
CE 448, Environmental and Sanitary Engineering
CE 449, Hazardous Waste Management
CE 485, Green Sustainable Cities
CE 486, Urban Megaprojects and Environmental Impacts
CE 487, Alternative Energy Projects

The civil engineering program is accredited by the Engineering Accreditation Commission of ABET.

Employers of our graduates include: Thornton Tomasetti, Arup, Mueser Rutledge, Metropolitan Transportation Authority, Skanska, Gilbane, Port Authority of New York & New Jersey, and the NYC Department of Design and Construction.

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Graduate level courses are taught by a combination of full-time faculty members as well as carefully selected adjunct faculty members with a P.E. and years of professional experience within the field of Civil Engineering. Current adjunct professors include chief engineers, senior project managers, directors, senior principal engineers, and senior vice presidents at NYC companies such as Tutor Perini Corporation, WSP, Thornton Tomasetti, MTA and DeSimone among others.

COMPUTER SCIENCE

Overview

The Computer Science (CS) Program, with its inaugural class beginning in September 2025, will be housed in the Albert Nerken School of Engineering. Designed to be leading edge, nimble, and able to rapidly evolve, the program will be uniquely Cooper and will ultimately lead to the degree of a Bachelor of Science (BS). It will be closely aligned with the mission and reputation of the school and will interface closely with the other programs at The Cooper Union, providing benefit to the institution as a whole.

Key Features of the Program

Rigor. The program reflects the high standards of the other programs at The Cooper Union and will prepare students for technological leadership in industry as well as graduate school. The program will provide a solid foundation in mathematics, science, and theoretical aspects of computer science, reinforced through experiential learning. There will be high expectations for students, enabling opportunities for advanced coursework and challenging projects as undergraduates.

Project Oriented Curriculum. The program will strongly emphasize problem solving and project organization skills, and the binding of theory to practice. All students will undertake significant project work every year during their studies.

- First year CS students will take EID101 Engineering Design and Problem Solving, the same introductory projects course taken by all engineering students. They will work, from the beginning, on multidisciplinary teams.
- Each year includes standalone CS Project courses. In these courses, students will work in groups to develop practical solutions to challenging problems. Strong emphasis is placed on group dynamics, project management, techniques such as agile development and debugging, and presentation skills. The methodologies developed in these courses are modeled on those used by software engineering teams in industry. These courses provide a venue for CS students working with engineering, art, and architecture students on cross-disciplinary projects.
- The first year includes two CS Project courses. First, students take a Survey course that introduces students to different areas within computer science and have their first exposure to working in software teams. The second course is a focused introduction to programming where, in addition to learning the syntax of a language, students develop code. An important aspect of this is debugging, communication, and an introduction to industry standards. Both courses are mentored by upper-class students.

- The second and third years each include one stand-alone CS Projects course, where students undertake projects of increasing scope and complexity, enhancing their skills and exposure to methodologies. The junior course is a Software Design Studio, where the emphasis is on understanding existing code, debugging, reuse, and code reviews.
- The senior year includes a capstone design project that spans two semesters, aligned with the capstone projects of the engineering majors. Student teams select a project to work on for the full year, and collaborate with students in other majors (engineering, art, or architecture).
- Having a dedicated and continuous thread of project-based courses throughout the four-year experience is unusual for a BS CS major. Although other courses will typically include programming projects, those are of necessity focused on specific topics. The standalone courses, by contrast, will emphasize methodology, connection to societal issues, and provide a venue to develop forward thinking and leadership skills.

Collaborative Education. A hallmark of the education at The Cooper Union is the close interaction among students and faculty. A central focus of the BS CS major will be creating a learning environment that emphasizes collaboration and teamwork.

- Small class sizes: There are no large classes. Class sizes are normally capped at 30, never exceeding 35, and in many cases (especially in project courses) the classes will be smaller than that.
- Projects and independent studies: Students work closely with faculty on projects. In addition to the standard projects courses, the program provides ample opportunities for other close interactions with faculty, including research and development projects, Vertically Integrated Projects (VIP), and independent studies on advanced topics that are otherwise not normally offered as stand-alone courses.
- Student Mentoring: An important feature of the program is the use of Student Mentors. Upper-level students will be able to take a course on CS Mentoring, for credit. Student mentors will be used in the first and second projects courses as leaders of software teams. They will not just help students with coding but will also lead stand up sessions to introduce students to modern industry practices. The Student Mentors will be instructed by faculty. This is not just to ensure they receive proper training in interacting with first- and second-year students, but also to develop leadership skills through practice with proper guidance.

- Microlab Staff: Students will be responsible for the computing facilities in the department, under the supervision of faculty and IT staff; the Microlab Staff will assist students and faculty with issues including computer hardware, networks, and software installations. By serving as Student Mentors and/or members of the Microlab Staff, students will have the opportunity not only to develop experience as members of project teams, but also as leaders of project teams.
- The Student Mentors and Microlab Staff will foster a sense of community, serve as role models, and provide support for students who may find the program challenging.

Large Number of Electives. The requirements for the BS CS major include a substantial number of computer science, technical and free elective credits.

- Technical electives include CS courses as well as, more broadly, courses in engineering, math, and science.
- Free electives include courses in humanities, social sciences, art, and architecture as well courses that qualify as technical electives.

The curriculum provides opportunities for electives as early as the junior year, and perhaps earlier if students have advanced standing. Students can choose to specialize more deeply in a specific area of computer science or branch-out to other areas.

An Innovative First-Year Experience. The traditional approach to first-year courses taken by CS majors is to focus on programming and syntax. Although delivering technical content is important, our proposed first-year experience is designed to achieve two very important additional goals:

- Attract and retain a diverse student population.
- Provide a foundation in the various areas of computer science, and in the best practices and methodologies used in the profession.

To achieve these goals, the first year reflects three themes:

1. Curriculum. Focus on breadth in an introductory course that touches on the many aspects of computer science.
2. Community. Encourage peer tutoring and availability of faculty.
3. Collaboration. Promote teamwork with group projects and opportunities to collaborate with different majors.

CS students will take two courses in the first year: a survey course in the Fall, and a programming intensive course in the Spring.

- The survey course introduces students to a variety of topics in computer science via modules that ask students to solve a specific problem by working in teams using ideas from computer science.
- The programming intensive course has a significant focus on the skills necessary to be an effective team player in computer science.
- Each course utilizes peer tutoring. The upper-class tutors are trained to be effective in the technical aspects of computer science, to lead standup meetings and to be inclusive mentor.

Focus Areas. Through available electives, areas of expertise of the faculty, and opportunities for project work, students can acquire significant depth in a chosen area of interest.

While the full complement of focus areas will be determined after the hiring of the new CS faculty, there exists current expertise in the faculty from which we will build upon, including areas of Artificial Intelligence, Cybersecurity, Robotics, Distributed Systems, and User-Centric Computing. With the emergence of ChatGPT, DALL-E, and Bard, there is increasing student interest to deeply understand and lead the development of new applications of generative AI. We already have a focus on generative AI, both internal to the School of Engineering and in interdisciplinary offerings with Architecture and Art, that will only be strengthened by the new CS Program.

Computer Science Curriculum

Freshman Year Credits

Fall Semester:	Credits
ESC000.1 Professional Development Seminar	0
HSS 1 Literary Forms and Expressions	3
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
CS 101 Survey of CS	3
ECE150 Digital Logic Design	3
EID101 Engineering Design & Problem Solving	3
Total credits fall semester	18

Spring Semester:	Credits
ESC000.2 Professional Development Seminar	0
HSS 2 Texts and Contexts: Old Worlds and New	3
ECE251 Computer Architecture	3
CS 160 Introduction to Procedural Programming	3
MA 113 Calculus II	4
PH 112 Physics I: Mechanics	4
Total credits spring semester	17

Sophomore Year Credits

Fall Semester:	Credits
ESC000.3 Professional Development Seminar	0
HSS 3 The Making of Modern Society	3
Ma 225 Vector Calculus	3
MA 226 Probability	3
PH 213 Physics II: Electromagnetic Phenomena	4
PH 291 Introductory Physics Laboratory	1.5
CS 261 Data Structures and Algorithms	3
CS 291 CS Sophomore Projects	1.5
Total credits fall semester	19

Spring Semester:	Credits
ESC000.4 Professional Development Seminar	0
HSS 4 The Modern Context: Figures and Topics	3
PH 214 Physics III: Optics & Modern Physics	3
MA 336 Mathematical Statistics	3
CS 361 Advanced Data Structures and Algorithms	3
CS 331 Data Visualization	3
Technical Elective	3
Total credits spring semester	18

Junior Year Credits

Fall Semester:	Credits
CS 357 Operating Systems	3
CS 371 Introduction to Artificial Intelligence & Machine Learning	3
CS 366 Software Engineering	3
ECE 352 Computer Hardware & Electronics	3
MA 326 Linear Algebra	3
Free Elective	3
Total credits fall semester	18

Spring Semester:	Credits
ECE 303 Communication Networks	3
CS 321 Distributed and Cloud Computing	3
CS 394 CS Junior Projects	3
CS 211 Ethics of CS	3
MA 352 Discrete Mathematics	3
CS Elective	3
Total credits spring semester	18

Senior Year Credits

Fall Semester:	Credits
CS 395 Senior CS Projects I	3
HSS elective	3
CS elective	3
Technical elective	3
Free elective	3
Total credits fall semester	15

Spring Semester:	Credits
CS 396 Senior CS Projects II	3
HSS elective	3
Technical Elective	3
Free Elective	3
Total credits spring semester	12

Total credits required for degree	**135**

ELECTRICAL ENGINEERING

Electrical Engineering comprises the physical systems, devices and processes that form the backbone for the Information Age, including: electronic devices and materials, integrated circuits, signal analysis and processing for communication and multimedia applications, computer architectures and processes, embedded and distributed systems and networks, machine learning, and biomedical engineering.

The Cooper Union offers both a Bachelor of Engineering in Electrical Engineering and a Master of Engineering degree with a concentration in Electrical Engineering.

Electrical engineering alumni from The Cooper Union have been very successful as professionals and leaders for the new economy emerging in the Information Age. Many pursue careers in other areas such as business and finance, law, medicine, applied mathematics and science.

The dedicated faculty and high faculty to student ratio ensure that students aren't just names on a list, but get to know the faculty as soon as they step into Cooper Union.

Mission Statement

To develop a highly trained, consummate engineer: able to lead, to practice in a professional manner, to grow with technological advances, to express himself or herself in written and in oral form, to function as a project engineer immediately upon graduation and to pursue graduate studies in a variety of professional fields.

Program Educational Objectives

- Our graduates will have positions where they function as first-class project engineers.
- Our graduates will have positions that require exceptional technical knowledge and professional design skills.
- Our graduates will engage in activities that involve professional-level written and oral expression.
- Our graduates will engage in activities that require demonstrating leadership skills.
- Our graduates will engage in activities that demonstrate a commitment to lifelong learning, research, independent thinking and innovation.

Student Outcomes

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

Program Accreditation The Electrical Engineering Program is accredited by the Engineering Accreditation Commission of ABET, under the commission's General Criteria and Program Citeria for the Electrical, Computer, Communications, Telecommunication(s) and Similarly Named Engineering Programs Criteria.

Electrical Engineering Curriculum

Some aspects of the electrical engineering curriculum changed beginning in the fall 2021 semester. See below for the pre-fall-2021 curriculum.

Fall 2021 and Later

Signal Processing and Electronics Track

Freshman Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
Ch 110 General Chemistry	3
EID 101 Engineering Design and Problem Solving	3
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
HSS-1 Literary Forms and Expressions	3
Total Credits Fall Semester	15
Spring Semester:	
ESC 000.1 Professional Development Seminar	0
Ch 111 General Chemistry Laboratory	1.5
ECE 150 Digital Logic Design	3
ECE 160 Programming for Electrical Engineers	3
Ma 113 Calculus II	4
Ph 112 Physics I (Mechanics)	4
HSS-2 Texts and Contexts: Old Worlds and New	3
Total Credits Spring Semester	18.5

Sophomore Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
ECE 240 Circuit Analysis	3
ECE 291 EE Sophomore Projects	1
Ma 223 Vector Calculus	2
Ma 240 Ordinary & Partial Differential Equations	3
Ph 213 Physics II: Electromagnetic Phenomena	4
Ph 291 Introductory Physics Laboratory	1.5
HSS-3 The Making of Modern Society	3
Total Credits Fall Semester	17.5

Spring Semester:	
ESC 000.1 Professional Development Seminar	0
ECE 210 MATLAB Seminar: Signals and Systems	0
ECE 211 Signal Processing	3
ECE 241 Electronics I	3
ECE 251 Computer Architecture	3
Ma 224 Probability	2
Ph 214 Physics III: Modern Physics	3
HSS-4 The Modern Context: Figures and Topics	3
Total Credits Spring Semester	17

Junior Year Credits

Fall Semester:	Credits
ECE 300 Communication Theory	3
ECE 310 Digital Signal Processing	3
ECE 311 Hardware Design	3
ECE 342 Electronics II	4
ECE 393 Electrical Engineering Junior Projects I	2
Ma 326 Linear Algebra	3
Total Credits Fall Semester	18
Spring Semester:	
ECE 302 Probability Models & Stochastic Processes	3
ECE 303 Communication Networks	3
ECE 335 Engineering Electromagnetics	4
ECE 345 Integrated Circuit Engineering	3
ECE 394 Electrical Engineering Junior Projects II	3
Humanities / Social Sciences Elective	3
Total Credits Spring Semester	19

Senior Year Credits

Fall Semester:	Credits
ECE 395 Electrical Engineering Senior Projects I	3
Technical electives	6
Humanities / Social Sciences Elective	3
Free Elective	3
Total Credits Fall Semester	15
Spring Semester:	
ECE 396 Electrical Engineering Senior Projects II	3
Technical Electives	9
Free Elective	3
Total Credits Spring Semester	15
Total credits required for Bachelor's degree	**135**

Computer Engineering Track

Freshman Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
Ch 110 General Chemistry	3
EID 101 Engineering Design and Problem Solving	3
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
HSS-1 Literary Forms and Expressions	3
Total Credits Fall Semester	15

Spring Semester:	
ESC 000.1 Professional Development Seminar	0
Ch 111 General Chemistry Laboratory	1.5
ECE 150 Digital Logic Design	3
ECE 160 Programming for Electrical Engineers	3
Ma 113 Calculus II	4
Ph 112 Physics I: Mechanics	4
HSS-2 Texts and Contexts	3
Total Credits Spring Semester	18.5

Sophomore Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
ECE 240 Circuit Analysis	3
ECE 291 EE Sophomore Projects	1
Ma 223 Vector Calculus	2
Ma 240 Ordinary & Partial Differential Equations	3
Ph 213 Physics II: Electromagnetic Phenomena	4
Ph 291 Introductory Physics Laboratory	1.5
HSS-3 The Making of Modern Society	3
Total Credits Fall Semester	17.5

Spring Semester:	
ESC 000.1 Professional Development Seminar	0
ECE 210 MATLAB Seminar: Signals and Systems	0
ECE 211 Signal Processing & Systems Analysis	3
ECE 241 Electronics I	3
ECE 251 Computer Architecture	3
ECE 264 Data Structures & Algorithms I	2
Ma 224 Probability	2
Ph 214 Physics III: Modern Physics	3
HSS-4 The Modern Context: Figures and Topics	3
Total Credits Spring Semester	19

Junior Year Credits

Fall Semester:	Credits
ECE 300 Communication Theory	3
ECE 310 Digital Signal Processing	3
ECE 342 Electronics II	4
ECE 357 Operating Systems	3
ECE 365 Data Structures & Algorithms II	2
ECE 393 Electrical Engineering Junior Projects I	2
Total Credits Fall Semester	17
Spring Semester:	
ECE 302 Probability Models & Stochastic Processes	3
ECE 303 Communication Networks	3
ECE 366 Software Engineering & Large Systems Design	3
ECE 394 Electrical Engineering Junior Projects II	3
Ma 352 Discrete Mathematics	3
Humanities / Social Sciences Elective	3
Total Credits Spring Semester	18

Senior Year Credits

Fall Semester:	Credits
ECE 395 Electrical Engineering Senior Projects I	3
Technical Electives	6
Humanities /Social Sciences Elective	3
Free Elective	3
Total Credits Fall Semester	15
Spring Semester:	
ECE 396 Electrical Engineering Senior Projects II	3
Technical Electives	9
Free elective	3
Total Credits Spring Semester	15
Total credits required for Bachelor's degree	**135**

Prior to Fall 2021

Signal Processing and Electronics Track

Freshman Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
Ch 110 General Chemistry	3
EID 101 Engineering Design and Problem Solving	3
EID 102 Engineering Design Graphics	1
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
HSS-1 Literary Forms and Expressions	3
Total Credits Fall Semester	16

Spring Semester:	
ESC 000.1 Professional Development Seminar	0
Ch 111 General Chemistry Laboratory	1.5
ECE 150 Digital Logic Design	3
ECE 160 Programming for Electrical Engineers	3
Ma 113 Calculus II	4
Ph 112 Physics I: Mechanics	4
HSS-2 Texts and Contexts: Old Worlds and New	3
Total Credits Spring Semester	18.5

Sophomore Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
ECE 240 Circuit Analysis	3
ECE 291 EE Sophomore Projects	1
Ma 223 Vector Calculus	2
Ma 240 Ordinary & Partial Differential Equations	3
Ph 213 Physics II: Electromagnetic Phenomena	4
Ph 291 Introductory Physics Laboratory	1.5
HSS-3 The Making of Modern Society	3
Total Credits Fall Semester	17.5

Spring Semester:	
ESC 000.1 Professional Development Seminar	0
ECE 210 MATLAB Seminar: Signals and Systems	0
ECE 211 Signal Processing	3
ECE 241 Electronics I	3
ECE 251 Computer Architecture	3
Ma 224 Probability	2
Ph 214 Physics III: Modern Physics	3
HSS-4 The Modern Context: Figures and Topics	3
Total Credits Spring Semester	17

Junior Year Credits

Fall Semester:	Credits
ECE 300 Communication Theory	3
ECE 310 Digital Signal Processing	3
ECE 311 Hardware Design	3
ECE 342 Electronics II	4
ECE 393 Electrical Engineering Junior Projects I	2
Ma 326 Linear Algebra	3
Total Credits Fall Semester	18
Spring Semester:	
ECE 302 Probability Models & Stochastic Processes	3
ECE 303 Communication Networks	3
ECE 335 Engineering Electromagnetics	4
ECE 345 Integrated Circuit Engineering	3
ECE 394 Electrical Engineering Junior Projects II	3
Humanities / Social Sciences Elective	3
Total Credits Spring Semester	19

Senior Year Credits

Fall Semester:	Credits
ECE 395 Electrical Engineering Senior Projects I	3
Technical Electives	6
Humanities / Social Sciences Elective	3
Free Elective	3
Total Credits Fall Semester	15
Spring Semester:	
ECE 396 Electrical Engineering Senior Projects II	3
Technical Electives	9
Free Elective	3
Total Credits Spring Semester	14
Total credits required for Bachelor's degree	**135**

Computer Engineering Track

Freshman Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
Ch 110 General Chemistry	3
EID 101 Engineering Design and Problem Solving	3
EID 102 Engineering Design Graphics	1
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
HSS-1 Literary Forms and Expressions	3
Total Credits Fall Semester	16

Spring Semester:	
ESC 000.1 Professional Development Seminar	0
Ch 111 General Chemistry Laboratory	1.5
ECE 150 Digital Logic Design	3
ECE 160 Programming for Electrical Engineers	3
Ma 113 Calculus II	4
Ph 112 Physics I: Mechanics	4
HSS-2 Texts and Contexts	3
Total Credits Spring Semester	18.5

Sophomore Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
ECE 240 Circuit Analysis	3
ECE 291 EE Sophomore Projects	1
Ma 223 Vector Calculus	2
Ma 240 Ordinary & Partial Differential Equations	3
Ph 213 Physics II: Electromagnetic Phenomena	4
Ph 291 Introductory Physics Laboratory	1.5
HSS-3 The Making of Modern Society	3
Total Credits Fall Semester	17.5

Spring Semester:	
ESC 000.1 Professional Development Seminar	0
ECE 210 MATLAB Seminar: Signals and Systems	0
ECE 211 Signal Processing	3
ECE 241 Electronics I	3
ECE 251 Computer Architecture	3
ECE 264 Data Structures & Algorithms I	2
Ma 224 Probability	2
Ph 214 Physics III: Modern Physics	3
HSS-4 The Modern Context: Figures and Topics	3
Total Credits Spring Semester	19

Junior Year Credits

Fall Semester:	Credits
ECE 300 Communication Theory	3
ECE 310 Digital Signal Processing	3
ECE 342 Electronics II	4
ECE 357 Operating Systems	3
ECE 365 Data Structures & Algorithms II	2
ECE 393 Electrical Engineering Junior Projects I	2
Total Credits Fall Semester	17
Spring Semester:	
ECE 302 Probability Models & Stochastic Processes	3
ECE 303 Communication Networks	3
ECE 366 Software Engineering & Large Systems Design	3
ECE 394 Electrical Engineering Junior Projects II	3
Ma 352 Discrete Mathematics	3
Humanities / Social Sciences Elective	3
Total Credits Spring Semester	18

Senior Year Credits

Fall Semester:	Credits
ECE 395 Electrical Engineering Senior Projects I	3
Technical Electives	6
Humanities / Social Sciences Elective	3
Non-Technical Elective	3
Total Credits Fall Semester	15
Spring Semester:	
ECE 396 Electrical Engineering Senior Projects II	3
Technical Electives	8
Non-Technical Elective	3
Total Credits Spring Semester	14
Total credits required for Bachelor's degree	**135**

Masters Program—Electrical Engineering

The Department of Electrical Engineering offers a Master of Engineering degree with a concentration in Electrical Engineering. Students have the option of doing a thesis, or pursuing a non-thesis option.

The thesis track requires 24 credits of approved graduate level coursework (400-level classes), plus 6 credits of thesis (ECE499). The non-thesis track requires 30 credits of approved graduate level coursework (400-level classes), plus an identified special project (as described below). The Master of Engineering program with a concentration in Electrical Engineering challenges students to pursue one or more areas of specialization in depth, combining rigorous theory and enhancement of analytical skills together with a significant project experience. An essential aspect of the program is the close working relationship between the student and faculty advisor.

Possible areas of concentration or thesis research topics are numerous and reflect the diverse interests of the faculty. Some examples are: digital signal processing (including speech, audio, image, video and biomedical signals); wireless communications and networks; big data, machine learning, natural language processing, and artificial intelligence; reconfigurable and distributed computing; autonomous systems and smart cities; and cross-disciplinary applications (e.g., sustainable engineering, connections with art and architecture).

Students are admitted into the thesis or non-thesis option, that is, this choice must be specified as part of the application to the program. Once admitted, students in the non-thesis option may petition the department to transfer into the thesis track. However, students following the thesis option may not switch to the non-thesis option.

Thesis Option The candidate must choose a full-time Cooper Union faculty member from the electrical engineering department as one of his or her thesis advisors. In addition to supervising the thesis, that advisor, in consultation with the other faculty in the department, approves the set of courses used to fulfill the requirements for the Master's degree. There may also be a co-advisor for the thesis, approved by the principal thesis advisor and the electrical engineering department chair. Any co-advisor who is not a member of the full-time faculty of the school of engineering must also be approved by the Dean of Engineering.

Non-Thesis Option The candidate must choose a full-time Cooper Union faculty member from the electrical engineering department as the faculty advisor. The faculty advisor, in consultation with other faculty in the department, approves the set of courses used to fulfill the requirements for the Master's degree. As part of the requirements for the degree, the student must work on a substantial project in at least one of the classes taken. Most graduate level courses involve project work, and the student in conjunction with the faculty advisor will ensure that at least one of the

course projects will satisfy the requirement. The grade for the selected project must be at least a B, taken from a course with grade of at least a B. Documentation for the project, approved by the advisor, will be provided to the Engineering Dean's Office to verify that the candidate for the degree has completed this requirement.

General Requirements As noted above, the advisor approves the set of courses used to fulfill the requirements for the master degree, subject to the following constraints. For each course, the course grade must be at least a C, and the overall GPA for the credits used to fulfill the master of engineering degree must be at least 3.00. A limited set of non-ECE courses may be permitted, but the overall course plan should indicate a strong concentration in some area within the broad discipline of electrical engineering.

Undergraduate students at The Cooper Union are permitted to take graduate level courses as long as prerequisite requirements are met. Those who take additional courses at the graduate level beyond those required for the Bachelor of Engineering degree, who then enter the Master of Engineering program, may apply those additional credits towards the requirements for the Master degree, subject to the approval of the advisor.

Students entering the Master of Engineering program with a concentration in electrical engineering are expected to have a bachelor's degree in electrical engineering or a related field from an accredited institution. The exception is that Cooper Union undergraduates or alumni with an engineering degree in a major other than electrical engineering, including the Bachelor of Science of Engineering degree, would be considered for admission into the Master of Engineering program with a concentration in electrical engineering if they have a demonstrated preparation for advanced studies in the field.

Undergraduate Program

The following describes the undergraduate electrical engineering program for students who enter Fall 2021 or later. For those who started the program before Fall 2021 see the previous undergraduate program.

Basic engineering courses along with core math, science and humanities courses are taken in the first and second years. Students are strongly encouraged to meet with a departmental faculty advisor as early as possible, preferably in the first year.

The foundation of electrical engineering in the curriculum is based on these three courses:

Gateway Courses: (9 credits)

ECE150 (F/S) Digital Logic Design	3 credits
ECE240 (F) Circuit Analysis	3 credits
ECE211 (S) Signal Processing	3 credits

In particular, students take ECE150 Digital Logic Design in their first year. It provides an introduction not only to the subject matter but also an early laboratory and design experience. Also, EE students take a C based programming course (ECE160) in their first year. Both ECE150 and ECE160 run in the fall and spring semesters.

From the second through the fourth year, students take a sequence of projects courses totaling 12 credits. Students following either track take these projects courses together, in order to foster interaction and multi-disciplinary work. The Electrical Engineering curriculum does not contain standard laboratory courses- these are project courses. That is, students do not perform prepackaged, rote experiments, but instead develop innovative designs, solve open-ended problems, and investigate topics not covered in required courses. The EE senior design courses are open only to students majoring in Electrical Engineering. Students in other majors may work with electrical engineering students on interdisciplinary projects, but they register for the capstone design project courses in their major, or EID362/363 Interdisciplinary Projects.

Sophomore, Junior & Senior Projects Courses:	(12 credits)
ECE291 (F) Electrical Engineering Sophomore Projects	1 credit
ECE393 (F) Electrical Engineering Junior Projects I	2 credits.
ECE394 (S) Electrical Engineering Junior Projects II	3 credits
ECE395 (F) Electrical Engineering Senior Projects I	3 credits
ECE396 (S) Electrical Engineering Senior Projects II	3 credits

In addition to the courses listed above, the following courses are taken by all students, regardless of the chosen track. These courses (with the exception of the general studies electives noted below) should be completed during the first two years of study:

Basic Math, Science & Engineering Courses	(32.5 credits)
MA110 (F) Introduction to Linear Algebra	2 credits
MA111 (F) Calculus I	4 credits
MA113 (S) Calculus II	4 credits
MA223 (F/S) Vector Calculus	2 credits
MA224 (F/S) Probability	2 credits
MA240 (F/S) Ordinary & Partial Differential Equations	3 credits
CH110 (F) General Chemistry	3 credits
CH111 (S) Chemistry Laboratory	1.5 credits
PH112 (S) Physics I (Mechanics)	4 credits
PH213 (F) Physics II (Electromagnetic Phenomena)	4 credits
PH214 (S) Physics III (Optics & Modern Physics)	3 credits
PH291 (F) Introductory Physics Laboratory	1.5 credits
EID101 (F) Engineering Design & Problem Solving	3 credits

Technical Electives (15 credits)

Most courses offered by the School of Engineering, other than those required for the EE degree, can be taken as "Technical Electives". The term "Technical Elective" elsewhere may appear as "Engineering and Science", but regardless this category includes courses in mathematical, computer science, and even other subjects such as entrepreneurship and finance, as long as the course is offered by the School of Engineering. Students in one EE track can take courses from the other track as technical electives. There are certain courses, however, that can be used free electives only (described below), not as technical electives. Other courses offered by the School of Engineering may count towards the Bachelor of Engineering degree, at all. These exceptions are found on Technical and Free Electives.

General studies:	(24 credits)
HSS-1, HSS-2, HSS-3, HSS-4 Core Humanities & Social Sciences	12 credits
Electives in Humanities and Social Sciences	6 credits
Free Electives:	6 credits

Most courses offered at The Cooper Union, including Art, Architecture, Humanities & Social Sciences as well as courses offered by the School of Engineering, qualify as "Free Electives." There are a few exceptions, specifically courses that cannot be used towards the credits needed for the degree of Bachelor of Engineering. These exceptions include courses with significant overlap with required courses, and most math and science courses offered outside the School of Engineering.

MECHANICAL ENGINEERING

Mission Statement

The mission of The Cooper Union's Department of Mechanical Engineering is to inspire our graduates to solve problems and make positive contributions in their careers and lives. Together with our faculty and staff, our students will develop a commitment toward lifelong interdisciplinary learning, fulfill their potential for responsible, forward-thinking leadership, and embrace collaborative efforts to address the critical challenges and opportunities of our time.

Program Educational Objectives

Within a few years of graduation, our graduates will:

- Apply their broad education and acquired technical and professional skills to responsible, forward-thinking problem-solving.
- Embrace leadership and collaborative roles that address critical challenges and opportunities in workplace, professional or civic communities.
- Engage in lifelong interdisciplinary learning and respond to evolving needs of industry and society.

Student Outcomes

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

Program Description

Creativity, problem-solving, and design are all at the heart of Mechanical Engineering, the broadest of the engineering disciplines. Cooper students build a strong foundation and have the flexibility to study an expansive range of theoretical and technological interests, including mechanics and materials, thermo-fluid sciences, combustion, vibrations and acoustics, dynamics and control systems, robotics, design, digital fabrication, CAD/CAM and manufacturing. From building the world-largest Rubik's-style cube to working with doctors to design next-generation surgical instruments, Cooper mechanical engineering students create what seems impossible and use acquired knowledge and skills to improve the world. Our students learn by doing, using our campus as an energy efficiency testbed, designing novel musical instruments, creating overdose-reversing wearable drug delivery devices, building a Formula-style racecar from scratch, and designing drones to help firefighters. Our Mechanical Engineers are valued for their analytical and problem-solving abilities and go on to prestigious graduate programs and careers in aerospace, automotive, ocean and marine engineering, biomedical engineering, energy, finance, law, and medicine.

Undergraduate Program

The sequences of courses shown in the undergraduate curriculum table emphasize the fundamental engineering sciences as well as their applications in the analysis and solution of contemporary engineering problems. By the selection of electives and of their design and research projects, students have a large degree of flexibility in exploring their own interests.

Graduate Program

Areas of research include computer-aided design/engineering/manufacturing, robotics, biomedical engineering, automotive systems, modern control systems, mechatronics, sustainable building systems, thermoelectric power generation, vibrations and acoustics, combustion and other interdisciplinary areas of engineering.

Program Accreditation The Mechanical Engineering Program is accredited by the Engineering Accreditation Commission of ABET, under the General Criteria and Program Criteria for the Mechanical and Similarly Named Engineering Programs.

Mechanical Engineering Curriculum

Fall 2021 and Later

Freshman Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
Ch 110 General Chemistry	3
EID 101 Engineering Design and Problem Solving	3
EID 102 Engineering Graphics	1
CS 102 Computer Programming for Engineers	2
HSS-1 Literary Forms and Expressions	3
Total Credits Fall Semester	18
Spring Semester:	
ESC 000.2 Professional Development Seminar	0
Ma 113 Calculus II	4
Ph 112 Physics I: Mechanics	4
EID 103 Principles of Design	3
Ch 111 General Chemistry Laboratory	1.5
ME 103 Statics	2
ME 104 Measurements Laboratory	1
HSS-2 Texts and Contexts: Old Worlds and New	3
Total Credits Spring Semester	18.5

Sophomore Year Credits

Fall Semester:	Credits
ESC 000.3 Professional Development Seminar	0
Ma 223 Vector Calculus	2
Ma 240 Ordinary and Partial Differential Equation	3
Ph 213 Physics II: Electromagnetic Phenomena	4
Ph 291 Introductory Physics Laboratory	1.5
ME 200 Dynamics	3
ESC 210 Materials Science	3
HSS-3 The Making of Modern Society	3
Total Credits Fall Semester	19.5

Spring Semester:	
ESC 000.4 Professional Development Seminar	0
Ph 214 Physics III: Optics and Modern Physics	3
ESC 221 Basic Principles of Electrical Engineering	2
ESC 201 Mechanics of Materials	3
ESC 330 Engineering Thermodynamics	3
ME 211 Design and Prototyping	2
ESC 251 Systems Engineering	3
HSS-4 The Modern Context: Figures and Topics	3
Total Credits Spring Semester	19

Junior Year Credits

Fall Semester:	Credits
Ma 224 Probability	2
ESC 340 Fluid Mechanics & Flow Systems	3
ME 300 Stress and Applied Elasticity	3
ME 351 Feedback Control Systems	3
ME 352 Process Control Laboratory	1
Engineering or Science Elective	3
Humanities/Social Sciences Elective	3
Total Credits Fall Semester	18
Spring Semester:	
ME 301 Mechanical Vibrations	3
ME 342 Heat Transfer	3
ME 360 Engineering Experimentation	3
Engineering or Science Elective	3
Humanities/Social Sciences Elective	3
Total Credits Spring Semester	15

Senior Year Credits

Fall Semester:	Credits
ME 312 Manufacturing Engineering	3
ME 331 Advanced Thermodynamics	3
ME 393 Mechanical Engineering Projects	3
ME 300- or 400-level Lecture Course*	3
Free Elective	3
Total Credits Fall Semester	15
Spring Semester:	
ME 394 Capstone Senior Mechanical Engineering Design	3
ME 300- or 400-level Lecture Course*	3
Free Electives	6
Total Credits Spring Semester	12
Total credits required for degree	**135**

Prior to Fall 2021

Freshman Year Credits

Fall Semester:	Credits
ESC 000.1 Professional Development Seminar	0
Ma 110 Introduction to Linear Algebra	2
Ma 111 Calculus I	4
Ch 110 General Chemistry	3
EID 101 Engineering Design and Problem Solving	3
EID 102 Engineering Graphics	1
CS 102 Computer Programming for Engineers	2
HSS 1 Literary Forms and Expressions	3
Total Credits Fall Semester	18
Spring Semester:	
ESC 000.2 Professional Development Seminar	0
Ma 113 Calculus II	4
Ph 112 Physics I: Mechanics	4
EID 103 Principles of Design	3
Ch 111 General Chemistry Laboratory	1.5
ME 102 Statics	3
HSS 2 Texts and Contexts: Old Worlds and New	3
Total Credits Spring Semester	18.5

Sophomore Year Credits

Fall Semester:	Credits
ESC 000.3 Professional Development Seminar	0
Ma 223 Vector Calculus	2
Ma 240 Ordinary and Partial Differential Equation	3
Ph 213 Physics II: Electromagnetic Phenomena	4
Ph 291 Introductory Physics Laboratory	1.5
ME 200 Dynamics	3
ESC 210 Materials Science	3
HSS 3 The Making of Modern Society	3
Total Credits Fall Semester	19.5
Spring Semester:	
ESC 000.4 Professional Development Seminar	0
Ph 214 Physics III: Optics and Modern Physics	3
ESC 221 Basic Principles of Electrical Engineering	2
ESC 201 Mechanics of Materials	3
ESC 330 Engineering Thermodynamics	3
ME 211 Design and Prototyping	2
ESC 251 Systems Engineering	3
HSS 4 The Modern Context: Figures and Topics	3
Total Credits Spring Semester	19

Junior Year Credits

Fall Semester:	Credits
Ma 224 Probability	2
ESC 340 Fluid Mechanics & Flow Systems	3
ME 300 Stress and Applied Elasticity	3
ME 351 Feedback Control Systems	3
ME 352 Process Control Laboratory	1
Engineering or Science Elective*	3
Humanities/Social Sciences Elective	3
Total Credits Fall Semester	18
Spring Semester:	
ME 301 Mechanical Vibrations	3
ME 342 Heat Transfer	3
ME 360 Engineering Experimentation	3
Engineering or Science Elective*	3
Humanities/Social Sciences Elective	3
Total Credits Spring Semester	15

Senior Year Credits

Fall Semester:	Credits
ME 312 Manufacturing Engineering	3
ME 331 Advanced Thermodynamics	3
ME 393 Mechanical Engineering Projects	3
ME 300- or 400-level Lecture Course*	3
Free Elective	3
Total Credits Fall Semester	15
Spring Semester:	
ME 394 Capstone Senior Mechanical Engineering Design	3
ME 300- or 400-level Lecture Course*	3
Free Electives	6
Total Credits Spring Semester	12
Total credits required for degree	**135**

* Please note independent studies cannot be used to fulfill ME 300- or 400-level Lecture Course requirement (must be a course with its own catalog description that meets for 3 contact hours).
* Engineering or Science Electives may be any course in the School of Engineering with BIO/Ch/ChE/CE/CS/ECE/EID/Ma/ME/Ph/VIP prefix.

Masters Program—Mechanical Engineering

The Department of Mechanical Engineering offers both the thesis and non-thesis option in pursuing a Master of Engineering degree. If the thesis option is chosen, the student is required to take 24 credits of course work and six credits of ME499 for their thesis project work. If the non-thesis option is chosen the student is required to take 30 credits of course work and submit a report that fulfills the special project requirement. The student must complete a coherent concentration of graduate-level courses approved by the department.

Thesis requirements and non-thesis requirements are outlined in the master's degree requirements. Pursuing the thesis option gives students the opportunity to work under the guidance of a faculty adviser on research or an original investigation of a problem in mechanical engineering. Writing and defending a thesis describing the results of their work prepares student for further doctoral study and research and project work in industry. For some students, such as those working while completing their degree requirements, the non-thesis option is preferred.

Through course projects, research, and consulting opportunities, graduate students in the Department of Mechanical Engineering explore design and innovation, robotics, mechatronics, energy and sustainability, nanotechnology, dynamic systems and control, vibration and acoustics, biomedical engineering and cutting-edge computational methods. Courses balance analytical rigor and creative design, thereby preparing graduates for a variety of careers.

Graduates are valued for their strong project-based design skills and analytical abilities. They have successful careers as entrepreneurs and innovators in the aerospace, automotive, biomedical, energy and construction industries. They often pursue doctoral studies in a range of mechanical engineering fields.

Specialization and Research Areas Computer-aided design and engineering, computational fluid dynamics, combustion, refrigeration, robotics, biomedical systems, respiratory biomechanics, automotive systems, mechatronics, thermoelectric power generation, energy-efficient buildings, vibration and acoustics

Employers of our Graduates Arup, Boeing, Bloomberg LP, Consolidated Edison, Credit Suisse, Exxon, General Dynamics, General Motors, Google, Honda, IBM, Merck, NASA, Raytheon, Southwest Research Institute, SpaceX, Stryker, United States Patent and Trademark Office

To apply see application information and master's degree requirements for further details.

CHEMISTRY

The Department of Chemistry offers a wide range of courses that are necessary for the understanding of the various engineering disciplines. All first-year engineering students enroll in General Chemistry (a general quantitative and descriptive overview of chemistry) and General Chemistry Laboratory (chemical preparation and analysis, data recording, report writing and safety). Students majoring in chemical or civil engineering also take Physical Principles of Chemistry (a quantitative treatment of chemical thermodynamics, electrochemistry and kinetic theory) during their first year.

Sophomore and junior level courses required for chemical engineering majors can also be taken as electives by those wishing to further their knowledge in the areas of analytical chemistry, biochemistry, organic chemistry and physical chemistry.

In addition, advanced elective courses in biochemistry, inorganic chemistry, theoretical chemistry and nanoscience are available, and are suitable for students interested in bioengineering, chemistry, materials engineering, nanotechnology, or pre-medical studies. Research at the undergraduate and master's levels can be conducted under the supervision of the chemistry faculty. Interested students should meet with the department faculty to discuss possible research areas.

The Department operates laboratories in general chemistry, organic chemistry, instrumental analysis, bioorganic chemistry, computational chemistry and nanochemistry for instruction and research projects.

Chemistry Laboratories include:
Rm. 403 Chemistry Research Laboratory & Stockroom
Rm. 404 General/Freshmen Chemistry Laboratory
Rm. 405 Balance/Gas Chromatography Laboratory
Rm. 406 Organic Chemistry Laboratory
Rm. 407 Instrumental Analysis Laboratory

MATHEMATICS

The primary responsibility of the Department of Mathematics is the maintenance and delivery of the core mathematics curriculum for the School of Engineering. This consists of a sequence of required courses given in the first two years covering calculus, linear algebra, probability, vector calculus and differential equations. In addition to the core courses, there are a variety of elective mathematics courses, some of which are computer-related. The mathematics curriculum will more than adequately prepare the student for professional work as well as graduate study in engineering and applied mathematics.

The faculty of mathematics strives to develop in the student a firm foundation in, and an appreciation of, the structure and methods of mathematics. Students interested in mathematics research should consult the chair for specific areas of expertise.

Minor in Mathematics

The department of mathematics offers a minor in mathematics. Students seeking a minor in mathematics must complete at least 15 credits of mathematics coursework in addition to the 17 credits required by every engineering department. These additional credits must include Mathematical Analysis I and II (Ma 350, 351), Linear Algebra (Ma 326), Modern Algebra (Ma 347) and an elective course in mathematics at or above the 300 level. An overall G.P.A., at graduation, of at least 3.0 among the mathematics portion (32 credits) of the program is required to obtain a minor in mathematics.

PHYSICS

The Department of Physics provides a sequence of introductory courses devised to introduce students in engineering to fundamental physical concepts that underlie all the engineering disciplines. All first-year engineering students enroll in Physics I: Mechanics. All second-year engineering students enroll in Physics II: Electromagnetic Phenomena, Introductory Physics Lab, and Physics III: Optics and Modern Physics. The Physics Department occasionally offers elective courses such as General Relativity, Physics Simulations, and Deterministic Chaos, that have been designed to provide an enhanced understanding of specially selected fields of interest in engineering science.

Physics Laboratories include:

- Rm. 301 The Richard C. Extermann Physics Laboratory
- Rm. 609 The Complex Fluids Physics and Engineering (CoPhFE) Laboratory

COURSES

CHEMICAL ENGINEERING

Undergraduate

ChE 221: **Material and Energy Balances**
Introduction to the principles and techniques used in chemical engineering. Basic concepts of mathematics, physics, and chemistry are applied to solving problems involving stoichiometry, analysis of chemical process systems, and material and energy conservation equations. Also includes methods for estimation of thermodynamic and chemical properties of real fluids for engineering calculations, basic chemical equilibrium, and unsteady-state balances. *Prerequisite: Ch 160. Credits: 3*

ChE 222: **Material and Energy Balances**
Introduction to the principles and techniques used in chemical engineering. Mathematics, physics, and chemistry are applied to solving problems involving the laws of conservation of mass and energy. Includes analysis of real chemical processes, methods for estimation of the thermodynamic and chemical properties of fluids, solution of real systems of linear and nonlinear algebraic equations, chemical and vapor/liquid equilibrium, energy balances on reacting systems with heat and work, and unsteady-state balances on reacting systems.
Prerequisites: Ma 110, Ma 111, Ch 161. Credits: 4.

ChE 331: **Chemical Engineering Thermodynamics II**
This is a continuation of the first course. It introduces the student to the principles of multiphase equilibrium and the calculation of phase compositions using the concepts of chemical potential, fugacity, activity coefficients, and various equations of state for both ideal and real systems. Other topics include refrigeration system, chemical equilibrium, and applied phase equilibrium. *Prerequisites: ChE 232. Credits: 3*

ChE 341: **Fluid Mechanics and Flow Systems**
Introductory concepts of fluid mechanics and fluid statics. Development and applications of differential forms of basic equations. Dynamics of inviscid and viscous fluids, flow measurement and dimensional analysis with applications in fluid dynamics. Friction loss and friction factor correlation; design of piping systems.
Prerequisites: ChE 221. Credits: 3

ChE 351: **Separation Process Principles**
This three-credit course covers a few of the multitude of methods used to separate chemical mixtures, particularly in industrial applications. Separation processes are often the most complicated component of real chemical process design/operation because of the many options and degrees of freedom. We will apply thermodynamic and transport concepts to the design of continuous-contact and staged separation processes and discuss the limitations of mass transfer theory and empiricism in real chemical plant design/operation. In order gain a better understanding of the subject, we will focus in-depth on a few processes, primarily on distillation, absorption and membranes. However, throughout the course, a wide variety of separation processes will be included to broaden the discussion. *Prerequisites: ChE 331 and ChE 342. Credits: 3*

ChE 361: **Chemical Process Dynamics and Control**
The course is concerned with operating a plant such that the product quality and production performance are met in safe and reliable fashion. To achieve this, an extensive and expansive knowledge of the process plant is required. Often times it may not be possible to carry out 'runs' to gain this knowledge, thus, the need to formulate and solve models as time-dependent functions of the process—process dynamics. With the knowledge of the process coupled with the process plant objectives, various flow rates are, in most cases, adjusted in order to maintain operation (e.g., important levels, flows, pressures, temperatures and compositions) near the desired values. This course is meant to the student to this interesting and important field of engineering.
Prerequisite: ChE 352. Credits: 3

ChE 371: **Chemical Engineering Laboratory I**
This first laboratory course emphasizes the application of engineering fundamentals to real manufacturing processes and unit operations. The experiments cover traditional engineering applications in fluid flow, reactors, and separations, as well as newer technologies that students may encounter in industry. The course is designed to provide hands-on experience which complements theories and principles discussed in chemical engineering courses. The course will emphasize statistics and design of experiments. Preparation of detailed lab reports, posters, oral presentations, and other technical communications are important components of the course.
Prerequisites: ChE 332 and ChE 342. Prerequisite and Corequisite: ChE351. Credits: 2

ChE 381: **Process Evaluation and Chemical Systems Design I**
The course uses design projects to explore process flow diagrams and initial equipment design estimates based on process and unit operation material and heat balances. Studies include equipment cost estimation methods that are developed into process economic evaluations and profitability analysis. The course concludes with process and equipment design using Aspen and an examination of optimization techniques.
Prerequisites: ChE 332 and ChE 342. Corequisite: ChE 351. Credits: 3

Graduate

ChE 421: **Advanced Chemical Reaction Engineering**
Principles of chemical reaction systems and the practices of industrial reactor designers. Emphasis is on heterogeneous chemical kinetics, biochemical reaction engineering, polymerization reactions, and reactor scale-up. Modeling and computer simulation of systems are extensively applied. *Prerequisite: ChE 332. Credits: 3*

ChE 471: **Selected Topics in Chemical Engineering**
Advanced topics in chemical engineering, selected according to student and instructor interest. *Prerequisite: permission of instructor. Credits: 3*

CIVIL ENGINEERING

Undergraduate

CE 321: **Structural Engineering I**
Discussion of materials, loads and forms of structures. Analysis of determinate structures. Displacements of structures and their importance in applications. Experimental aspects of materials behavior in structural applications. Emphasis is placed on basic experimental techniques, design of experiments, selection and use of appropriate instrumentation and interpretation of results. *Prerequisite: ESC 201 Credits: 4.5 (3 hours of lecture, 3 hours of laboratory)*

CE 332: **Introduction to Foundation Engineering**
Layout of subsurface investigation program, SPT (Standard Penetration Test), Dutch-cone penetrometer. Analysis and design of spread footings on cohesive and cohesion less soil by stability and settlement procedures, combined footings, strap footings, floating foundations and pile foundations. Settlement analysis due to deep-seated consolidation. *Prerequisite: CE 331. Credits: 3*

CE 342: **Design of Reinforced Concrete Structures**
Study of the behavior and design of structural concrete components and their connections. Understanding and development of design requirements for safety and serviceability, as related to latest specifications by the American Concrete Institute (A.C.I.). Current design, fabrication and construction practices. Introduction to prestressed concrete. *Prerequisite: CE 322. Credits: 3*

CE 344: **Environmental Systems Engineering**
Qualitative and quantitative treatment of water and wastewater systems as related to domestic and industrial needs and their effect on the environment. Introduction to air pollution sources and control and solid/hazardous waste engineering. Design of water and wastewater treatment plants. Field and laboratory techniques for measurement of water quality parameters. Laboratory analysis of representative waters and wastewaters for commonly determined parameters as related to applications in water environment. *This course is the same as EID 344. Corequisite: ESC 340. 4.5 credits (3 hours of lecture, 3 hours of laboratory)*

CE 346: **Hydraulic Engineering**
An integration and application of the principles of fluid mechanics to problems concerned with water supply and distribution. Open channel flow and design of hydraulic structures. *Prerequisite: CE 343 or EID 343. Credits: 3*

CE 363: **Civil Engineering Design I**
Individual or group design projects based upon the interests of the students and with the approval of the instructor. Final engineering reports and formal oral presentations are required for all projects. Lectures by faculty and professional practitioners cover the following topics: engineering, environmental and economic feasibility assessment issues; preparation of plans and specifications; cost estimates; progress chart and critical path; interfacing with community, etc. Field visits to major New York City projects under construction. *Prerequisite: permission of instructor. (Students are required to have taken introductory CE subject(s)) related to project). Credits: 3*

Graduate

CE 425: **Structural Dynamics**
Dynamic behavior and design of structures subjected to time-dependent loads. Included in the load systems are earthquakes, blasts, wind and vehicles. Shock spectra and pressure impulse curves. Special applications in blast mitigation design. *Same as EID 425. Prerequisite: CE 322. Credits: 3*

CE 426: **Advanced Structural Design**
Discussion of principal design codes (AISC, ACI and AASHTO) as they relate to ASCE Standards, the International Building Code (IAC) and NYC Building codes Advanced materials behavior. Strength and serviceability requirements. Design of composite girders and slabs. Limit state response and formation of plastic hinges in steel and concrete structures. Structural upgrade and retrofit of existing structures. *Prerequisite or corequisite: CE 341. Credits: 3*

CE 428: **Advanced Structural Steel Design**
The course covers AISC Steel Design requirements at a more advanced level than typically encountered in an undergraduate steel design course. Biaxial bending of symmetrical and unsymmetrical sections. Design for torsion per AISC Design Guide 9. Plastic design and moment redistribution. Design of plate girders. Design of beam-columns for P-Δ and P-δ effects. Design of eccentric bolted and welded connections. Beam and moment connections. Design of column base plates. Composite steel-concrete constructions. *Prerequisite: CE 341. Credits: 3*

CE 433: **Lateral Earth Pressures and Retaining Structures I**
Introduction to classical lateral earth pressure theories (Rankine and Coulomb). Analysis and design of cantilever and gravity retaining walls, cantilevered and anchored sheetpile bulkheads, anchorage systems (individual and continuous deadmen, grouted tiebacks) and braced cofferdams. Gravity Wall Systems (Gabion Walls, Criblock Walls and Double Wall). *Prerequisite: CE 331. Credits: 3*

CE 437: **Geo-Environmental Engineering**
Discussion of pertinent regulations and regulatory programs relevant to contaminated soil. Identification and characterization of contaminated soils, discussion of current treatment technologies both ex-situ and in-situ. Geotechnical design of waste facilities, closure and improvement of waste facilities. Utilization of waste for engineering purposes. Reuse and recycling of contaminated soil.
Prerequisites: ESC 340, CE 331, CE 344, and permission of instructor. Credits: 3

CE 442: **Open Channel Hydraulics**
This course covers the theoretical foundations and practical applications of open channel flow analysis, including channel design and sediment transport. It also includes design calculations for hydraulic structures such as bridges and culverts.
Prerequisite: CE 343. Credits: 3

CE 481: **Bridge Engineering**
Codes and Applicability. General forms and components- trusses, segmental, cable-stayed and suspension. Primary loads and load combinations. Serviceability vs. strength. Consideration of extreme events. Design of superstructures-deck design, girder design, floor-beam design. Design of substructures-piers, abutments, frames and foundations. Scour and other adverse considerations. Wind, seismic and pushover analyses. Bearings, expansion joints and barriers.
Prerequisite CE 322 or permission of instructor. Credits: 3

CE 482: **Resilient Civil Infrastructure**
Hazard mitigation including quantification of resilience. Multi-scale and/or multi-hazard risk assessment. Smart/adaptive systems to protect against natural and human-created hazards. Predictive science toward forecasting infrastructure response to climate change or extreme events. Development of frameworks for optimization of infrastructure networks. Complex systems approach to the analysis of the interconnected nature of civil infrastructure and its interdependencies.
Prerequisite: permission of instructor. Credits: 3

CE 484: **Civil Engineering Project Management**
This course provides an overview of the guiding principles of civil engineering project management. Five groups of project management processes will be considered: initiating, planning, executing, monitoring and controlling, and closing. The focus will be on developing the core competencies and skill sets required for planning and controlling civil engineering projects and understanding interpersonal issues that drive successful project outcomes. *Prerequisite: Permission of instructor. Credits: 3*

ELECTRICAL AND COMPUTER ENGINEERING

Undergraduate

ECE 150: **Digital Logic Design**
Theoretical and practical issues concerning design with combinational and sequential logic circuits, and programmable logic devices. Number systems, Boolean algebra, representation and simplification of Boolean functions, universal logic families. Finite-state machines, state tables and state diagrams, flip-flops, counters, registers. Adders, decoders, comparators, mltiplexers, memories and applications. Programmable devices: PLA, PLD, etc. Principles of analog circuits are presented in the context of real world problems, such as 'glitches,' power and ground bounce, contact bounce, tri-state logic and bus interfacing, timing circuits, asynchronous versus synchronous circuit components. Characterization of electronic and logical properties of digital circuits. Course work involves individual and team projects in which: digital circuits are designed and prototypes are constructed and tested on breadboards; designs involving programmable logic devices are developed using CAD tools. The projects, approximately 50 percent of the course grade, are used to assess technical writing, oral presentation, teamwork and project management skills.
Open to all students. Credits: 3

ECE 240: **Circuit Analysis**
Circuit components, dependent and independent sources, Kirchhoff's laws, loop and nodal analysis. Superposition, Thevenin and Norton equivalent circuits, and other techniques for circuit simplification. Time-domain analysis of RLC circuits, initial conditions, transient response and steady-state. Phasor analysis, complex power. Ideal op-amps. *Prerequisite: Ma 113. Ma 240 is a suggested corequisite. Credits: 3*

ECE 264: **Data Structures & Algorithms I**
An introduction to fundamental data structures and algorithms, with an emphasis on practical implementation issues and good programming methodology. Topics include lists, stacks, queues, trees, hash tables and sorting algorithms. Also an introduction to analysis of algorithms with big-O notation. Assignments include programming projects and problem sets. *Prerequisite: CS102 (Fall 2018 or later) or ECE 160. Credits: 2*

ECE 291: **Electrical Engineering Sophomore Projects**
This course focuses on one particular complex system (e.g., music synthesizer, wireless transceiver, radar) to introduce a wide range of electrical engineering principles such as frequency response, noise, feedback, loading and interfacing. In a laboratory setting, students investigate the design of subsystems that may include amplifiers, oscillators, RF or opto-electronic circuits, A/D and D/A converters, and power circuits. By measuring the impact of the operating conditions on circuit performance, students learn the principles of systems engineering, development of a testbench, and proper documentation. By the end of the semester, the class will have developed a complete functioning system through reverse engineering.
Prerequisite or corequisite: ECE150. Corequisite: ECE240. Credits: 1

ECE 300: **Communication Theory**
Information theory: entropy, information, channel capacity, rate-distortion functions, theoretical limits to data transmission and compression. Error control coding: block, cyclic and convolutional codes, Viterbi algorithm. Baseband and bandpass signals, signal constellations, noise and channel models. Analog and digital modulation formats (amplitude, phase and frequency), MAP and ML receivers, ISI and equalization. Coherent and non- coherent detection, carrier recovery and synchronization. Performance: computation of SNR, BER, power and bandwidth requirements. Multiple access schemes. OFDM. *Prerequisites: Ma 224 and ECE 211. Credits: 3*

ECE 310: **Digital Signal Processing**
Review of Laplace and z-transforms. Minimum-phase and all-pass functions. Multidimensional signals, systems and Fourier analysis. Analog filter design, digital IIR and FIR filter design. Sampling, multirate systems and filterbanks, A/D and D/A converter models. Discrete-time state-space. Filter structures, quantization effects and design to mitigate quantization effects. DFT and FFT. Spectral analysis of deterministic and random signals. Introduction to adaptive filters. Differential coding, transform coding. Speech, audio and video signals. Extensive use of MATLAB.
Prerequisites: Ma 240 and ECE 211. Credits: 3

ECE 311: **Hardware Design**
Development methodologies for signal processing hardware systems: RTL, HDL, synthesis and verification. Special processors including FPGA, multicore, ARM and GPU. ADC and DAC, interchip and intrachip communication, mixed-signal systems, clock and power distribution, loading, sensors and actuators, embedded systems. PCB and surface mount devices. Systems engineering. Course work including projects involving hardware realizations, simulation and emulation, and software tools for system design. *Prerequisite: ECE 211, ECE 241, ECE 251. Credits: 3*

ECE 342: **Electronics II**
MOS circuits: DC operation and analysis. Single stage MOS amplifiers, circuit design, DC and small signal analysis. Cascode amplifier. Current mirrors, active loads. BJT and MOS differential amplifiers. Monolithic operational amplifiers. Output stages. Frequency response. Introduction to feedback theory, amplifier topologies. Circuit design and analysis are supplemented with industry standard CAD software.
Prerequisites: ECE 241 and ECE 211. Credits: 4

ECE 357: **Computer Operating Systems**
Theory and implementation of modern computer operating systems. Message based and multiprocessor kernels. Networking and interprocess communication. Security, auditing and authentication. Device drivers, interrupt handling, task switching, virtual memory, memory management, scheduling, synchronization and locking. File systems, resource allocation and management. Real-time, fault-tolerant and high security operating systems. User environment and interface issues. Projects in operating system design and programming, case studies. *Prerequisites: ECE 251 and either ECE160 or CS102 (Fall 2018 or later). Credits: 3*

ECE 365: **Data Structures & Algorithms II**
A continuation of ECE 264, also with an emphasis on practical implementation issues and good programming methodology. Topics include graphs, graph-related algorithms and dynamic programming techniques. Also an introduction to some advanced topics such as Turing machines, computability and NP-complete systems. Assignments include programming projects and problem sets. *Prerequisite: ECE 264. Credits: 2*

ECE 393: **Junior Electrical Engineering Projects I**
A continuation of electronic laboratory techniques and principles of project engineering covered in ECE291, incorporating material covered in the electronics sequence (ECE240, 241, 342), with topics from ECE211 (such as frequency response) as needed. The semester focuses on the design, testing and performance analysis of a complete system. Using off-chip resistors, capacitors, diodes and transistors (BJT or MOSFET as warranted by the design), student teams develop sub-blocks such as amplifiers. Circuit simulation using CAD tools accompany the physical realizations. Students give several formal and informal presentations that include performance analysis and assessment of the design and testing experience. *Prerequisites: ECE211, ECE241, ECE291. Co-requisite: ECE342. Credits: 2*

ECE 395: **Senior Electrical Engineering Projects I**
ECE 395 and ECE 396 constitute the year-long senior design project. Students work in small groups on projects chosen with the advice and consent of the faculty adviser. Projects may be oriented towards research or product development, and may be in any area of electrical and computer engineering, such as in: computer engineering, signal processing (imaging, sensor arrays, multimedia), telecommunications, computer networks, microwaves, optics, advanced electronics, VLSI chip design, or an interdisciplinary area such as robotics or bioengineering. Students perform all aspects of project management, such as scheduling, budgeting, system design and developing milestones, as well as technical work including hardware and software implementation, testing and performance evaluation. Students also give several spontaneous and rehearsed oral presentations and prepare written reports. Students attend weekly lectures covering: social, economic, legal and ethical issues; safety and laboratory practice; design methodologies; technical writing; preparation of multimedia presentations and tailoring presentations to target audiences. *Prerequisite: ECE 394. Credits: 3*

Graduate

ECE 371: **Data Visualization** (same as CS 371)
Exploring, discovering, and creating narratives using data science, design, and storytelling. Introduction to techniques to provide new and innovative approaches to explore, discover, and create narratives from and for the evolving artistic, social, political, scientific and technological landscapes. Introduction of a progressive framework for data and design. Real world examples and applications of the tools and methodologies introduced will be presented. *Prerequisites CS 102/ECE 160. Credits: 3*

ECE 399: **Selected Topics in Electrical & Computer Engineering**
Subjects may include seminars on topics related to advances in technology, current research areas. Also individual research, design and development or study of subjects in electrical and computer engineering. Prerequisite: permission of instructor.
Credits: 1-3

ECE 431: **Microwave Engineering**
Passive circuits, open-boundary waveguides, perturbation theory, coupled modes, waveguide junctions, microstrip. Two- and three-terminal devices; varactor diodes, Gunn diodes; IMPATT and MESFET technology. Design of RF amplifiers and phase-shifters. Computer-aided simulation and design.
Prerequisite: ECE 335. Credits: 3

ECE 437: **Fourier Optics**
This course will provide an introduction to optical propagation and diffraction using a scalar wave approach and Fourier theory of imaging. Topics introduced will include pupil function, point spread function and line spread function, optical transfer function, image formation with coherent and incoherent light, holography and diffractive optical elements. *Requisites: Complete Ph 214, Ma 223, Ma 224, and ECE 211 or ME 251. Must be completed prior to taking this course. Credits: 3*

ECE 447: **Digital VLSI System Design**
This course focuses on the top-down, automated digital system design flow using CMOS logic: RTL design/simulation, timing/power driven circuit synthesis, automated place-and-route, and post-layout simulation with emphasis on test/manufacturability in deep sub-micron technologies. The course culminates with the tape-out of a large design project covering functional specification to sign-off layout.
Prerequisites: ECE 251, ECE 342. Credits: 3

ECE 467: **Natural Language Processing**
This course focuses on computer applications that involve the processing of written or spoken human languages. The exact content may vary from year to year. The course is divided into three parts. Topics from conventional, statistical natural language processing will likely include text normalization, N-grams, part-of-speech tagging, information retrieval, and text categorization. Topics from conventional computational linguistics will likely include grammars, parsing, and semantic representations. Topics from deep learning and NLP will likely include word embeddings, feed-forward neural networks, recurrent neural networks, sequence-to-sequence models, attention, and transformers. Course work will include programming projects and quizzes.
Prerequisite: ECE 264. Credits: 3.

ECE 471: **Selected Topics in Machine Learning**
Advanced topics in machine learning, selected according to student and instructor interest. Prerequisite: permission of instructor. *Open to all students. Credits: 3*

ECE 472: **Deep Learning**
Differentiable directed acyclic graphs covering applications in unsupervised learning, as well as generative and discriminative modeling. Gradient-based methods for optimization (stochastic gradient descent, Nesterov momentum, adam). Fast gradient computation for arbitrary computational graphs (automatic differentiation). Exploding and vanishing gradient problems. Convolutional networks. Arbitrary graphs for regression, classification and ranking. Autoencoders, adversarial networks and variations for unsupervised representation learning, generative modeling and other applications. Focus on applications in computer vision, speech processing and research problems in communication theory.
Prerequisites: MA223, MA224 and either ECE211, ChE352 or ME251. Credits: 3

ECE 474: **Bayesian Machine Learning**
Machine learning from a primarily Bayesian perspective. Conjugate priors. Bayesian linear regression, model evidence, linear classification using generative models, logistic regression and the Laplace approximation. Kernel methods and Gaussian process regression. Mixture models, expectation maximization, hidden Markov models, sampling methods and Markov chain Monte Carlo.
Prerequisites: MA 223, MA 224; either ECE 211, ChE 352 or ME 251. Credits: 3

MECHANICAL ENGINEERING

Undergraduate

ME 200: **Dynamics**
This course introduces the general principles of kinematics (the description of motion) and kinetics (the relationship between motion and the forces that cause it) that are necessary to understand, design, and analyze the motion of engineering systems. Topics include Newton's laws of motion; two and three dimensional kinematics and kinetics of particles and rigid bodies; relative motion; work and energy relations; impulse and momentum relations; introduction to vibrations. Laboratory modules focus on numerical solutions of equations of motion. *Prerequisites: ME 103 and ME 104. Credits: 3*

ME 300: **Stress and Applied Elasticity**
Three-dimensional theory of elasticity; state of stress, state of strain, elastic stress-strain relations. Applications include elementary three-dimensional problems, plane stress and plane strain, Saint Venant's long cylinder, beams and plates. Computer-aided design projects. *Prerequisite: ESC 201. Credits: 3*

ME 310: **Design Elements**
Application of the principles of mechanics to the design of basic machine elements; study of components subjected to static, impact and fatigue loading; influence of stress concentration; deflection of statically determinate and indeterminate structures by the energy method. Design projects apply basic criteria to the design of shafts, springs, screws and various frictional elements; design projects make use of computer, experimental and modeling techniques. *Prerequisite: ME 300. Credits: 3*

ME 312: **Manufacture Engineering**
Study of metal processing theory and application with emphasis on casting, machining, and metal deformation processes; plastic forming; special processing techniques; work-holder design principles. Specific are as studied include stages of processing, mathematical modeling of processes, equipment determination, relationship of plant layout, tooling, metrology, and product design to product cost. *Same as EID 312. Prerequisites: ESC 210, ME211, and ME342. Credits: 3*

ME 313: **Introduction to Industrial Design**
The collaborative relationship between art, engineering and industrial design, academically and professionally, is a pivotal relationship in the development of new ideas. This course serves as an introduction to the world of industrial design and its wide-ranging applications. The students will learn about the history of design and design concepts and methodology through lectures, discussions, and small projects; and will explore, develop, and execute a term design as part of a class project as the course progresses. The main goals of this course are to develop a better understanding of the perspective of an industrial designer and to gain experience in the practice of industrial design. *Prerequisite: ME 211 or permission of instructor. Open to all students. Credits: 3*

ME 331: **Advanced Thermodynamics**
Equations of state; properties of pure substances; ideal and real gas and gas vapor mixture properties, fundamental process and cycle analysis of ideal and real systems; modern gas and vapor power cycles and refrigeration cycles. Computer applications to problem solving. *Prerequisite: ESC 330. Credits: 3*

ME 351: **Feedback Control Systems**
Modeling and representation of dynamic physical systems: transfer functions, block diagrams, state equations, and transient response. Principles of feedback control and linear analysis including root locus and frequency response methods. Practical applications and computer simulations using MATLAB. Discussions of ethics will be integrated into the curriculum. *Prerequisite: ME 251. Credits: 3*

ME 352: **Process Control Laboratory**
An introduction to process control using DC motor, liquid-level tank, and heat exchanger experimental rigs. Students will characterize systems, implement on-off control and PID-control, and apply various tuning methods. Practical applications and assignments cover actual heating, ventilation, air conditioning, and building automation systems. *Co-requisite: ME351. Credits: 1*

ME 371: **Data-Driven Problem Solving in Mechanical Engineering**
This course focuses on the implementation of data analysis in mechanical engineering, providing insights, identifying possible problems in engineering systems, and providing solutions to identified problems. The course will discuss how to: 1) visualize and classify information; 2) identify problems in engineering systems using data analysis and machine learning tools; 3) predict characteristics of engineering systems; provide data-driven solutions for engineering problems using data mining; and design products and structures informed by data trends. A broad range of applications within mechanical engineering will be discussed. *Prerequisite or co-requisite: ME200. Credits: 3*

ME 393: **Mechanical Engineering Projects**
Original investigations, involving design and experimental work which allow the application of engineering sciences to the analysis and synthesis of devices or systems and permit the deepening of experience in engineering decision making. Projects are carried out in small groups and are supervised by the instructor in accordance with professional practice. *Prerequisite: ME300, ME342, ME351, and ME360. Credits: 3*

Graduate

ME 408: **Introduction to Computer Aided Engineering (CAE)**
Theory and practical applications of computer aided engineering methodologies, and use of multiphysics software, in mechanical engineering practices. Topics include principal modeling and solution techniques, computational geometry applications, modeling of mechanical engineering problems, and non-linear and dynamic problem solving. Students use typical commercial software packages to work on practical case studies.
Prerequisite: ESC 201. Credits: 3

ME 422: **Fundamentals of Aerodynamics**
Theory and application of advanced fluid mechanics in aerospace engineering; airplane wing geometry, general governing equations of aerodynamics, potential flow theory, theory of lift for the wing, comparison of theory to wind tunnel experiments, the boundary layer and drag. *Prerequisite: ESC 340. Credits: 3*

ME 453: **Energy Efficient Building Systems**
Equipment fundamentals, energy management and control systems used in buildings to manage heating, ventilating, and air conditioning systems and components. Proper commissioning, operation and maintenance and their impact on efficiency, equipment life, energy consumption and carbon footprint. Students will perform energy savings calculations, learn processes to identify and correct building operational problems that lead to waste, identify energy conservation measures and analyze trend data and historical operation. Technical projects and site visits provide exposure to open-ended problems related to actual HVAC and building management systems.
Prerequisites: ESC 330, ESC 340, and ME 352 or permission from instructor. Open to all students. Credits: 3

ME 465: **Sound and Space** (same as EID 465)
Fundamentals of acoustics, including sound waves, room and hall acoustics, and metrics of sound. Audio engineering, including microphones, signal processors, amplifiers and loudspeakers. Applications of psychoacoustics including virtual acoustic environments over headphones and loudspeakers.
Prerequisites: ESC 251 or ECE 211 or equivalent or prior approval of the instructor. Credits: 3

ME 493-494: **Selected Advanced Topics in Mechanical Engineering**
These courses will deal with current advanced technological developments in various fields of mechanical engineering. Projects and design will be emphasized.
Prerequisites: ME faculty permission and graduate standing. Credits: 3

ENGINEERING SCIENCES

Undergraduate

ESC 000.1-000.4: **Engineering Professional Development Seminars**
The Engineering Professional Seminars and Workshops offer students an introduction to the profession of engineering as well as deal with their development as students. The Cooper Union's CONNECT program is an integral part of these courses and provides intensive training in effective communications skills. A wide range of topics is covered in addition to communications skills including ethics, environmental awareness, life-long learning, career development, conflict resolution, entrepreneurship, marketing, work-place issues, team dynamics, professional licensure and organizational psychology.
Each successfully completed semester of ESC 000 will be noted on the student's external transcript. Failure to participate in ESC 000, or failure to successfully complete one or more semesters of the program will not be noted on any external transcript (such as is provided to employers or graduate schools)

ESC 200: **Engineering Mechanics**
Equivalent system of forces, distributed forces; forces in structure; friction forces. Particle and rigid body mechanics; kinematics, kinetics. Newton's laws of motion; work and energy; impulse and momentum. *Prerequisite: Ph 112. Credits: 3*

ESC 210: **Materials Science**
The objective of this course is to promote an understanding of the relationship between the molecular structure of a material and its physical properties. Topics include bonding in atoms and molecules, crystallinity, metals and alloys, polymers, mechanical properties of inorganic materials and composite materials.
Prerequisites: none. Credits: 3

ESC 330: **Engineering Thermodynamics**
Rigorous development of the basic principles of classical thermodynamics. Zeroth, first and second laws of thermo-dynamics and their applications to open and closed systems. Analysis of thermodynamic processes, properties of real substances and thermodynamic diagrams. *Prerequisite: Ph112. Credits: 3*

ESC 340: **Fluid Mechanics and Flow Systems**
Introductory concepts of fluid mechanics and fluid statics. Development and applications of differential forms of basic equations. Dynamics of inviscid and viscous fluids, flow measurement and dimensional analysis with applications in fluid dynamics. Friction loss and friction factor correlation; design of piping systems.
Prerequisite: ChE 221. Credits: 3

INTERDISCIPLINARY ENGINEERING

Undergraduate

EID 101: **Engineering Design and Problem Solving**
Students work on cutting-edge, exploratory design projects in interdisciplinary groups. Oral and visual presentations as well as formal written reports are required for all projects. Professional competencies, teamwork, ethics, and sustainability are discussed in the context of the engineering design process. *Open to all students. Credits: 3*

EID 102: **Engineering Graphics**
An introduction to graphical representation of 3-dimensional objects. After learning the principles of technical drawing using precision hand tools, students utilize CAD software to create professional caliber engineering drawings. An introduction to solid modeling is given. Topics include orthographic projections, linetypes, geometric dimensioning and tolerancing, layers, layouts, solid modeling, part assemblies and finite element analysis. *Prerequisites: none. Credits: 1*

EID 210: **Engineering Design Graphics**
In this class, Building Information Modeling (BIM) is used to create both Architectural and Structural models. Along the way, students learn about the Revit Program's user interface & modeling tools essential for working with 3D models. Other topics include creating Sheets, Custom Building Elements, Topography, Landscaping, Perspectives, Rendering & Animation. As students gain expertise in using Revit, they are assigned various Structural & Architectural projects to develop and present to the class. At the end of the semester, a Final Independent Design Project is presented by each student using the Revit Modeling Program. *Open to all students. Credits: 3*

EID 222: **Biomaterials**
The course is a study of both natural and synthetic materials and how they interact with the human body. Topics covered include mechanical properties, design considerations, biocompatibility, the immune response, potential for allergic response and carcinogenic ramifications, mechanical compatibility, effects of long-term implantation, and government regulations. Students will develop a vocabulary for different classes of biomaterials and explore how atomistic properties influence larger scale morphology and macroscopic behavior inside the human body. After a general introduction to biomedical materials, case studies involving physiological systems are considered, and design of artificial parts and materials are investigated. Prerequisite: sophomore standing. *Credits: 3*

EID 233: **Environmental Technologies for the Built Environment: Fundamentals**
This interdisciplinary course introduces the fundamentals of building technology and the dynamic relationship of buildings to their environment. Students will learn the thermodynamics of buildings to understand building energy flows and design possibilities in response to specific climates and comfort goals. This course covers environmental and life safety systems as they affect program and building form including mechanical (heating, cooling, ventilating), water supply and disposal, electrical, lighting, acoustics, vertical transportation, communication, security, and fire protection. Course modules will focus on energy in buildings, lighting, acoustics and vibration, and passive and active systems. *Prerequisites: Ch110. Credits: 3*

EID 255: **Food Science: Frozen Desserts** (same as Ch255)
Fundamentals of food science with an emphasis on frozen desserts. Study of ice cream as a complex mixture of air, water, fat, proteins, sweeteners, stabilizers, emulsifiers, and flavors. Discussion of the chemical composition and functional role of each ingredient. Discussion of the thermodynamic principles of heat transfer, phase transitions and colligative properties. Pasteurization, cryogenic methods, storage. Packaging and labeling, sanitation and food safety, regulatory compliance. Artificial vs natural ingredients, allergens, and plant-based alternatives. Hands-on projects will include formulation, ingredient optimization, and small-batch production. Evaluation of final product by physical, chemical, and sensorial methods.
Prerequisites: Ch 110 and Ch 111. Credits: 3

EID 270: **Engineering Economy**
Comparison of alternatives in monetary terms; meaning and use of interest rates; results evaluation including intangibles; risk in alternatives; principles underlying the determination of economic life; depreciation and depreciation accounting; financing business ventures; financial statement analysis; replacement of capital assets. *Credits: 3*

Graduate

EID 424: **Bioengineering Applications in Sports Medicine**
Application of engineering principles to athletic performance and injury. Topics include athletic training; mechanical causes of sport injuries; methods of injury prevention; design of protective and prophylactic sport devices; proper application of wound dressing, taping and bandaging; first aid for musculoskeletal sports injuries and healing and rehabilitation. Students will work in teams on case studies and projects. *Prerequisite: EID101. Credits: 3*

BIOLOGY

Bio 201: **Biology for Engineers I**
This course will examine in depth the genetics, molecular and cellular biology, pathology, toxins, microbiology and environment as they relate to humans and disease using organ-based or systems biology approaches (e.g., gastrointestinal pulmonary, cardiovascular, urinary endocrine, etc.) Major assignments will be individualized to student's interests and majors when possible. As such, this course will provide the biological fundamentals for further study in biotransport, biochemistry, graduate school in biomedical engineering, etc. Combined with Biology 202 and Biochemistry, it will provide a solid foundation for medical school.
Prerequisites: Ch 110 or permission of the instructor. Credits includes lab experience. Credits: 3

Bio 422: **Protein Expression, Purification and Analysis**
Lectures cover chemical properties of proteins, protein folding, solubility, charge, structure, posttranslational modifications; protein synthesis, recombinant protein expression including cloning strategies, expression plasmids, expression systems; chromatography techniques for protein purification. Laboratory work involve making gels and SDS-PAGE electrophoresis, purification of native proteins with ion exchange and salting out technique; purification of GST tagged proteins on glutathione agarose column and His-tagged proteins on Ni-NTA column; measuring of protein concentration and assays for protein activity; Western blot. *Prerequisites: Bio 201, Ch 110, and Ch 111. Credits: 3*

CHEMISTRY

Undergraduate

Ch 110: **General Chemistry**
An introduction to the general scientific principles associated with chemistry. This course will deal with fundamental ideas such as the concept of the atom, the molecule, the mole and their applications to chemical problems. The classical topics include: dimensional analysis and significant figures; atomic weights; periodic properties; chemical reactions and stoichiometry; redox reactions; ideal gas law and real gas equations of state; the liquid state and intermolecular forces; solution concentrations; chemical equilibrium and equilibrium constants; acids and bases; solubility equilibria; nomenclature of inorganic and organic compounds. The topics for atomic and molecular properties include atomic structure and the quantum theory; electronic structure of atoms; the covalent bond and bond properties; molecular geometries and hybridization; molecular orbital theory. *Open to all students. Credits: 3*

Ch 111: **General Chemistry Laboratory**
Methods of quantitative analysis are used to explore chemical reactions and analyze unknowns. Modern chemical instrumentation as well as 'classic' wet chemistry analytical techniques are covered. Statistical analysis of the experimental data is used to analyze results. Chemical laboratory safety and industrial chemical regulations are covered, as are the fundamentals of writing a technical report. *Prerequisite: CH110. Credits: 1.5*

Ch 231: **Organic Chemistry I**
Bond types and strengths, structural theory, bond angles and hybrid bonds; covalent bonds, polarity of bonds and molecules; dipole moments; molal refraction; melting points and boiling points relative to properties and natures of molecules; solubilities based on structures; functional groups; critical temperature, pressure and volume as a function of structure and functional groups, prediction of vapor pressure curves, latent heats. Nomenclature isomers and properties. Resonance and delocalization of charge phenomena; acidity and basicity (Lewis concept). *Prerequisite: Ch 160. Credits: 3*

Ch 255: **Food Science: Frozen Desserts** (same as EID 255)
Fundamentals of food science with an emphasis on frozen desserts. Study of ice cream as a complex mixture of air, water, fat, proteins, sweeteners, stabilizers, emulsifiers, and flavors. Discussion of the chemical composition and functional role of each ingredient. Discussion of the thermodynamic principles of heat transfer, phase transitions and colligative properties. Pasteurization, cryogenic methods, storage. Packaging and labeling, sanitation and food safety, regulatory compliance. Artificial vs natural ingredients, allergens, and plant-based alternatives. Hands-on projects will include formulation, ingredient optimization, and small-batch production. Evaluation of final product by physical, chemical, and sensorial methods.
Prerequisites: Ch 110 and Ch 111. Credits: 3

Ch 351: **Instrumental Analysis Laboratory**
Fundamental principles of instrumental methods will be covered, including laboratory applications and limitations in scientific research. Specific methods include electrometric, such as polarography, electro-gravimetry and potentiometry; optical (such as visible and ultraviolet absorption), spectroscopy, emission spectroscopy and infrared spectroscopy; and other techniques such as chromatography and mass spectroscopy shall be included. *Prerequisite: Ch 160 and Ch 233. Credits: 2 (4 laboratory hours)*

Ch 361: **Physical Chemistry I**
With an emphasis on the basic theoretical justifications underlying observed physical phenomena, quantum mechanics will be developed and applied to the study of chemical systems with an emphasis on interpreting spectroscopic data. Modern methods of computational molecular modeling are introduced. Statistical mechanics is introduced as a link between quantum mechanics and thermodynamics.
Prerequisites: Ch 160 and Ph 214. Credits: 3

Ch 370: **Inorganic Chemistry**
The vast and fascinating chemistry of inorganic compounds and materials will be covered. Atomic structure and the periodic table; molecular symmetry and spectroscopy selection rules; coordination chemistry; lig and-field theory and other electrostatic bonding models; superacids; reaction mechanisms; organometallic chemistry; chemistry of the heavy elements; nuclear chemistry. Chemistry and physics of ionic and molecular solids; atomic and molecular clusters; chemisorption and physisorption of surface-bound species; cage compounds and catalysts; bioinorganic chemistry. A useful course for chemical engineers to extend their knowledge of inorganic chemistry beyond the content of Ch 110. Strongly recommended for students interested in graduate work in chemistry.
Prerequisite: Either Ch 160 or Ch 161; Pre- or corequisite: Ch 231. Credits: 3

COMPUTER SCIENCE

CS 101: **Survey of Computer Science**
Introduction to computer science using the Python programming language. Programming constructs covered include variables, loops, functions, Python dictionaries, etc. Introduction to some basic algorithms and data structures. The course emphasizes an application-oriented approach to solving tasks using data analysis, data visualization, and embedded systems. Other topics covered include graphical user interface development, introduction to numerical techniques such as linear systems and optimization, introduction to databases, and introduction networking. The course will provide an overview of Python libraries. *Credits: 3*

CS 102: **Introduction to Computer Science**
Concepts in computer science are presented in the context of programming in C, with a brief introduction to Python. Topics include variables, selection statements, loops, functions, structures, pointers. Multiple programming projects are assigned.
Credits: 2

MATH

Undergraduate

Ma 110: **Introduction to Linear Algebra**
Vectors in two- and three-dimensions, vector algebra, inner product, cross product and applications, analytic geometry in three dimensions (lines, planes, spheres); matrix algebra, the solution of systems of linear equations, determinants, inverses, and basic properties of the complex number system.
Prerequisites: none. Credits: 2

Ma 111: **Calculus I**
Functions; limit of functions, continuity. The derivative and its applications: curve sketching, maxima and minima, related rates, velocity and acceleration in one dimension; trigonometric, exponential, logarithmic and hyperbolic functions. Definite and indefinite integrals; area, the fundamental theorem, techniques of integration.
Prerequisites: none. Credits: 4

Ma 113: **Calculus II**
Applications of definite integrals: area, volume, improper integrals, work, arc length, surface area, centroid. Polar coordinates. Parametric curves in two and three dimensions: velocity, speed and accelerations. Partial derivatives and the chain rule, properties of the gradient. Maxima and minima. Sequences and series: convergence of sequences and series, Taylor and Maclaurin series, power series.
Prerequisite: Ma 111; prerequisite or corequisite: Ma 110. Credits: 4

Ma 223: **Vector Calculus**
Double and triple integrals and their applications. Vector fields. Gradient, divergence and curl. Line integrals. Green's Theorem. Path independence of line integrals.
Prerequisites: Ma 110 and Ma 113. Credits: 2

Ma 224: **Probability**
Sample spaces. Random variables. Probability. Distribution and density functions. Expectation. Mean and variance. Moments and generating functions.
Prerequisite: Ma 113; Prerequisite or corequisite: Ma 223. Credits: 2

Ma 240: **Differential Equations**
Ordinary differential equations of the first order, linear equations of higher order with constant coefficients, eigenvalues and eigenvectors, first-order systems of linear equations, phase plane analysis for nonlinear two-dimensional systems, Laplace transformation, and Fourier series. *Prerequisite: Ma 113. Prerequisite or Corequisite: Ma 223. Credits: 3*

Ma 326: **Linear Algebra**
Finite-dimensional vector spaces. Linear independence. Dimension. Basis. Subspaces. Inner product. Matrices. Rank. Determinant. Systems of linear equations. Matrix algebra. Coordinate transformation. Orthogonal matrices. Linear transformation. Eigenvalues and eigenvectors. Quadratic forms. Canonical form.
Prerequisite: Ma 223. Credits: 3

Ma 350: **Mathematical Analysis I**
Sets and functions, topological properties of real line, continuity and uniform continuity, differentiability, mean value theorems, the Riemann-Stieltjes integral and Taylor's theorem. *Prerequisite: Ma 223. Credits: 3*

PHYSICS

Undergraduate

Ph 213: Physics II: **Electromagnetic Phenomena**
Oscillations; transverse and longitudinal waves. Electric fields; Gauss' Law; electric potential; capacitance; D.C. circuits; magnetic fields; Faraday's law; inductance; A.C.circuits; electromagnetic waves. *Prerequisite: Ph 112 and Ma 223; Corequisite: Ma 223. Credits: 4*

Ph 291: **Introductory Physics Laboratory**
Physical measurements and analysis of experimental data. The experiments test and apply some basic principles selected from the following fields: mechanics, sound, electromagnetism, optics and modern physics. Experiments and topics may vary each semester. Digital and analog laboratory instruments; computer acquisition and analysis of data. Estimate of systematic and random error, propagation of error, interpretation of results. This course complements three lecture courses, Ph 112, Ph 213, Ph 214.
Prerequisite: Ph 112 and Ph 213; corequisites: Ph 213. Credits: 1.5

VERTICALLY INTEGRATED PROJECTS

VIP 381A: **Smart Cities**
The Autonomy of "Smart" Cities is a cross-disciplinary course that is dedicated to finding technology-based solutions to some of the most pressing issues that are currently facing our cities. This course will focus on closed-loop systems in order to explore a more sustainable transportation, energy, and urban agricultural structures that promote the autonomy of our communities and enhance the livability of our cities. Students will be expected to develop complete solutions (design and implementation) integrating ideas and concepts from different disciplines such as: design, ML, Robotics, IoT, hardware design, vision, lighting, and control theory.
Example Projects:
- Self-Drive: an autonomous vehicle project.
- Net-Zero-Surrey: designing a sustainable transportation solution for more livable future cities.
- Urban Agriculture: enabling the urban community to produce their own food.
- Robotics Arms: modeling human motion with robotics arms.
- Drones: sling load and cooperative drones

Advisors: Neveen Shlayan, Mili Shah, Dirk Luchtenburg, Ben Davis. Credits: 1

VIP 381B: **Solar Decathlon**

The Solar Decathlon course forms a cross-disciplinary team that engages in a design phase and a build phase of highly efficient and innovative buildings powered by renewable energy. Students are expected to prepare creative solutions for real-world issues in the building industry. The focus of this course will be High-performance building design includes comprehensive building science, energy efficiency, optimized structural and mechanical systems, indoor air quality, resilience, and water conservation while maintaining the highest spatial design standards. Engineering students will be working closely with Architects to design an efficient and innovative system to support the functional and aesthetic characteristics of their projects while experimenting with the use of standard as well as unconventional materials. Students will be taught the basics of statics, strength of materials, structural analysis and design. Teams will be expected to participate in the Solar Decathlon Design and Build Challenge.

Course Objectives:

- Introduce students to state of the state-of-the-art industry standard technology to better prepare them to enter the workforce.
- Allow students to engage with their specialized knowledge and skills in the contexts of a team-based research project.
- Provide students with the opportunity to conduct research at an early stage to better prepare them for possible academic careers.
- Enable students to work in multidisciplinary teams in the pursuit of designing effective solutions to modern complex issues.

Advisors: Cosmas Tzavelis, Lorena Del Rio, David Wooton, Neveen Shlayan. Credits: 1

VIP 381C: **Motorsports**

The goal of the VIP is to successfully participate in the Formula SAE® competitions that challenge teams of university students to conceive, design, fabricate, develop, and compete with small, formula style vehicles. Formula SAE® is an engineering education competition that requires performance demonstration of vehicles in a series of events, both off track and on track against the clock. Each competition gives teams the chance to demonstrate their creativity and engineering skills in comparison to teams from other universities around the world. Teams are to assume that they work for an engineering firm that is designing, fabricating, testing, and demonstrating a prototype vehicle.

Prerequisites: Students must be pursuing their undergraduate degree in order to enroll in VIP for credit. Enrollment is based on a rolling application process with a decision made before the beginning of each semester. Credits: 1

VIP 381D: **Frontiers of Bioengineering**
This interdisciplinary VIP will focus on building models for biological systems that focus on finding creative solutions to common problems in healthcare. This will include both computational and physical explorations of various body systems. The goal will be to have a better understanding of complex biological environments through creating databases of information in which to improve society.
Students must be pursuing their undergraduate degree in order to enroll in VIP for credit. Enrollment is based on a rolling application process with a decision made before the beginning of each semester. *Credits: 1*

VIP 381E: **Autonomous Vehicles**
Compete in the IGVC event and conduct autonomous vehicles research at Cooper Union. *No prerequisite courses required, but AI/ML/etc. are helpful for the technical team. Credits: 1*

ADMINISTRATION, FACULTY AND STAFF

Administration

Barry L. Shoop
Dean; Professor, Electrical Engineering
B.S., Electrical Engineering, Pennsylvania State University; Ph.D., Electrical Engineering, Stanford University

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Ph.D., M.S., Chemistry, Yale University; B.E., Chemical Engineering, The Cooper Union

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Senior Purchasing Associate

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Adjunct Professor, Mechanical Engineering

Jake Zweiback
Exam Scheduler

Full-Time Faculty

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Leo Argiris
Civil Engineering

Michael Bambino
Mechanical Engineering

Robert Barrett
Mechanical Engineering

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Dong Chang
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Moni Chauhan
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Anastasia Chorna
Mathematics

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Shivam Mevawala
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Jeremy Moon
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AR Omar
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Professor Emeritus

Eleanor Baum
Dean Emeritus

Simon Ben-Avi
Professor Emeritus

John L. Bové
Professor Emeritus

Irving (Irv) Brazinsky
Professor Emeritus
Former Professor of
Chemical Engineering

Wallace Chinitz
Professor Emeritus

Toby Cumberbatch
Professor Emeritus

Vito A. Guido
Professor Emeritus
Former Professor/
George Fox Chair
of Civil Engineering

Ralph L. Knapp
Professor Emeritus

Melvin Sandler
Professor Emeritus

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Chemical Engineering

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of Mathematics

C. Stan Wei
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Research Scientist, Student
Project Coordinator, and
Adjunct Professor

Miller Kaplan
Makerspace Coordinator/
STEM Teacher

John Osburn
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Communication Workshops

Revans Ragbir
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Estuardo Rodas
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Adjunct Professor
Mechanical Engineering

Jessica Shen
Electrical Engineering
Lab Technician

Max Summers
Student Shop Technician
School of Engineering Shops

Subalekha Udayasankar
Director of Student Success,
Engineering
Adjunct Instructor

Engineering Advisory Council

In 2020, the Albert Nerken School of Engineering assembled an advisory council of experts from industry, academia, and government for the School of Engineering as a whole and the four ABET accredited engineering majors: Chemical Engineering, Civil Engineering, Electrical Engineering, and Mechanical Engineering. The purpose of the Engineering Advisory Council (EAC) is to provide direct input to the School of Engineering and individual departments regarding current and future needs for our graduates. The EAC will:

Provide insights and recommendations that can assist in the development, execution and attainment of the strategic direction of the Albert Nerken School of Engineering.

Provide insights and recommendations that can assist each of the academic departments within the School of Engineering.

Periodically evaluate individual ABET accredited degree-granting department's program educational objectives for meeting graduate's needs within a few years of graduation.

Provide feedback on specific aspects of modern engineering programs, leading-edge educational pedagogy and their current outcomes.

Members

Leah Jamieson, Chair EAC
John A. Edwardson Dean Emerita of Engineering and Ransburg Distinguished Professor of Electrical and Computer Engineering, Purdue University. Member National Academy of Engineering.

Bernie Meyerson
Chief Innovation Officer Emeritus at IBM Corporation. In that role he supports IBM in key client relationships, as well as in the extensive series of volunteer engagements he engages in to support global entities, both government and commercial. He continues to be co-chair of the annual joint Scientific American/World Economic Forum effort identifying the top 10 emerging technologies.

Rick Stamper
Provost and Vice President of Academic Affairs, Rose-Hulman Institute of Technology. Previous positions include area manager at Proctor & Gamble and Design Team Leader at General Electric, and he also formed a small company to develop medical devices. He was named one of America's 'Best 300 Professors' in 2012 by Princeton Review.

Chemical

Lynn Cusack ChE '04
Corporate Strategy Director, Infineum USA L.P.

Heather Kulik ChE '04
Associate Professor of Chemical Engineering, Massachusetts Institute of Technology

Lisa Liu ChE '13
Leaders for Global Operations Fellow, Massachusetts Institute of Technology

Margot Vigeant
Professor of Chemical Engineering, Bucknell University. Fellow of the American Society for Engineering Education.

Civil

Gregory L. Biesiadecki CE '81, MCE '83 – Principle, Langan Engineering & Environmental Services; As a geotechnical engineer he leads the waterfront and marine engineering team. Former Chair of the American Society of Civil Engineers (ASCE) Metropolitan Section Geotechnical and Forensics Groups and former member of the Board of Directors and Treasurer.

Jessica Friscia CE '11
Project Environmental Engineer, Langan Engineering & Environmental Services. ME MIT. Named a Beverly Willis Architecture Foundation Emerging Leader and received the CREW NY Impact Award for Economic and Community Improvement.

Nicholas Tsapatsaris
President & CEO, Nick Tsapatsaris & Associates. BSCE 1986 and MSSE 1987 Worcester Polytechnic Institute (WPI). MS in Real Estate, MIT. Large scale architecture, engineering, construction and ownership of real estate. Member of WPI's Architectural Engineering Advisory Board and the Engineering Dean's Council.

Anne Dudek Ronan CE '83, MCE '84
Ph.D. Stanford University, Industry Professor at the NYU Tandon School of Engineering. 2015 recipient of the NYU School of Engineering Distinguished Teacher Award which is the university's highest teaching honor.

Electrical

Sankar Basu
Program Director at the National Science Foundation. Prior to NSF at the IBM T. J. Watson Research Center. After receiving a PhD from the University of Pittsburgh he served on the faculty of Stevens Institute of Technology. Served on editorial boards of about 10 journals including being the Editor-in-Chief of the IEEE Transactions on Circuits and Systems, and currently serves on the editorial board of Proceedings of the IEEE. Fellow of IEEE and AAAS.

Bryan Conroy EE, MEE '05
Senior Research Scientist, Philips Hospital & Health Care. Ph.D. EE Princeton University, 2010.

Kamran Mahbobi
EE '89, MEE '91 – Cofounder and Managing Director of MaXentric Technologies, LLC. Previously, Chief Technology Officer of Tetra Tech Wireless. 2009 Cooper Union President's Citation Award.

Nadia Pervez EE '99
COO Chromation. Former CEO. PhD in Electrical Engineering, UCSB. Postdoc at Columbia University, 2008-2010.

Mechanical

David Barrett
Professor of Mechanical Engineering, Olin College. Previously Vice President of Engineering at the iRobot Corporation, Director of the Walt Disney Imagineering Corporation, Research Engineer at MIT's Artificial Intelligence Laboratory, and Technical Director at Draper Laboratory.

Neil Muir ME '14, MME '16
Arup (Arup is an independent firm of designers, planners, engineers, architects, consultants and technical specialists, working across every aspect of today's built-environment).

Gunnar Tamm ME '96
Professor of Mechanical Engineering, U.S. Military Academy, West Point, NY. MS Rutgers University, Ph.D. University of Florida.

Paige Holland Thielen ME '11
Lead Avionics Operations & Automation Engineer, Satellite R&D at SpaceX. MSME University of Washington

FACULTY OF THE HUMANITIES AND SOCIAL SCIENCES

Mission

The Cooper Union is committed to the principle that an education in the Humanities and Social Sciences (HSS) provides the ethical, social and humanistic framework crucial to personal development, professional excellence, and engaged citizenship. Through their work in HSS disciplines, students will gain a deeper awareness of the world in which they must live and act. They learn to think, write and speak clearly and effectively. Most significantly, an education in the liberal arts offers students the opportunity to become attentive to the social and humanistic implications of their professional work and to acquire the basis for a satisfying cultural and intellectual life.

Curriculum

All students take a four-semester core curriculum of required courses in the humanities and social sciences. In addition, students in the School of Art take a required sequence in art history. The core curriculum is a prerequisite to all elective offerings in Humanities and Social Sciences. During the third and fourth years, students have considerable latitude to explore the humanities and social sciences through elective courses. All students are expected to take core curriculum courses at The Cooper Union.

Minor

The Faculty of Humanities and Social Sciences offers a minor for students from all three schools.

The Irwin S. Chanin School of Architecture Architecture students in good academic standing with advance permission who complete a minimum of 15 upper-division credits in a specific field of liberal arts may qualify for a Minor in that field of humanities and social sciences. HSS Minors are offered and will be designated on student transcripts in the following fields: Art History; Economics and Public Policy; History and Society; Literature; and Science, Technology, and Society.

Students must apply in advance of completing their coursework to be considered for the Minor. Approval of the dean of the school of architecture is required for the Minor. Please find an HSS ARCH Advisory worksheet here to download and fill out to send to HSS Academic Advisor Ninad Pandit: ninad.pandit@cooper.edu

Albert Nerken School of Engineering Students who complete a minimum of 12 upper-division credits with a grade of B or higher in a specific field of liberal arts may qualify for a minor in that field of Humanities and Social Sciences. Minors are offered and may be designated on student transcripts in the following five fields: (click on each field for details)

- Art History
- Literature
- Economics and Public Policy
- Philosophy, History and Society
- Interdisciplinary Studies

The HSS Minor's 12 credits must consist of elective credits, in addition to the HSS Core Curriculum required of all Engineering majors. HSS-4 does not count toward a Minor unless it is taken a second time for elective credit and when the course topic contributes significantly to the program of the student's minor area, subject to approval of both the course instructor and the HSS Dean. Please find an HSS ENG Advisory worksheet here to download and fill out to send to HSS Academic Advisor Ninad Pandit: ninad.pandit@cooper.edu

School of Art Minors in the Humanities and Social Sciences are offered and may be designated on student transcripts in the following five fields: Literature and Philosophy; History and Society; History and Theory of Art; Economics; Interdisciplinary Studies.

- Literature and Philosophy
  At least 4 courses (12 credits) in literature or philosophy, with a grade of B or higher. These courses are normally electives. One independent study (3 credits maximum) in a relevant field can count towards the Minor if previously approved by both the student's Academic Advisor in the SOA and Minor Advisor in HSS.

- History and Society
  At least 4 courses (12 credits) in the areas of history, sociology, cultural studies, gender studies, or political science, with a grade of B or higher. These courses are normally electives. One independent study (3 credits maximum) in a relevant field can count towards the Minor if previously approved by both the student's Academic Advisor in the SOA and Minor Advisor in HSS.

- History and Theory of Art
  At least 7 courses (14 credits) in art history, aesthetics, or cultural studies, with a grade of B or higher. It should be noted that HTA offers 2-credit courses. These courses are electives, they do not include HTA-101-102, which is mandatory for all art students. One independent study (2 credits maximum) in a relevant field can count towards the Minor if previously approved by both the student's Academic Advisor in the SOA and Minor Advisor in HSS.

- Economics
  At least 4 courses (12 credits) in Economics or Public Policy, with a grade of B or higher. Courses must include both SS334 (Microeconomics) and SS347 (Macroeconomics). One independent study (3 credits maximum) in a relevant field can count towards the Minor if previously approved by both the student's Academic Advisor in the SOA and Minor Advisor in HSS.

- Interdisciplinary Studies
  At least 12 credits in the areas of literature, philosophy, history, sociology, economics, cultural studies, gender studies, political science, or art history, with a grade of B or higher. 3 of the above credits can be taken in areas outside of HSS with the approval of the student's Academic Advisor in the SOA and Minor Advisor in HSS. Most of these courses are electives. One independent study (3 credits maximum) in a relevant field can count towards the Minor if previously approved by both the student's Academic Advisor in the SOA and Minor Advisor in HSS. This option cannot be undertaken without the guidance of the student's Academic Advisor in the SOA and Minor Advisor in HSS.

In all cases above, the HSS Minor's credits must consist of elective credits, completed after the HSS Core Curriculum (HSS-1, HSS-2, HSS-3, HSS-4) and the HTA Core Curriculum (HTA-101, HTA-102) required of all School of Art majors.

In certain situations, students may take HSS-4 a second time for elective credit with permission from the HSS academic advisor. This request will be approved only if the course topic contributes significantly to the program of the student's minor area.

Please find an HSS ART Minor Advisory worksheet here to download and fill out to send to HSS Academic Advisor Ninad Pandit: ninad.pandit@cooper.edu

HSS Program Level Objectives

The objective, supporting The Cooper Union's overarching mission, is to instill an understanding of the breadth and richness of intellectual discovery across the humanities and social sciences. This includes developing a familiarity with representative literary texts, major historical themes and ideas, and analytical methods. Students will learn how to relate this humanistic knowledge to their professional, civic, and personal lives. This broad objective might be further articulated as:

- Developing in the student skills in critical analysis within a range of disciplinary structures
- Developing in the student skills necessary for engaged citizenship
- Developing an appreciation of world cultures and of America within a global context
- Developing in the student skills in writing and non-written expression enabling that student to take part in active citizenship and to compete effectively in her or his professional arena

HSS Course Objectives

HSS Core

By the end of the four-course sequence, we expect students will be able to:

- Analyze literary texts as both aesthetic objects and cultural artifacts
- Contextualize cultural understanding within a set of political, economic, and scientific developments
- Identify transformations in political, economic, social, scientific, and civic experience over time
- Consolidate analytical, contextual, and historical understanding through argumentation, comparison, and research

HSS-1: The Freshman Seminar

HSS-1 develops college-level skills in reading and writing, analysis, and argumentation through engagements with major texts and themes. Through close reading and extended discussion, students learn to craft evidence-based arguments in written and spoken form. Students experience one of four tracks that share the common goals of encouraging aesthetic understanding of the literature of major historical periods and developing the writing and speaking skills necessary for college-level work.

HSS-2: Text and Contexts: Old Worlds and New

Through the semester students will:

- Engage with foundational texts in the creation of the Modern age through close reading and class discussion. Students develop further their skills in reading and interpreting a range of texts in a range of genres (letter, report, treatise, essay, drama, non-fiction narrative)
- Describe how course texts differently perform, reflect upon, elide or otherwise register the major social, political, and intellectual developments of their respective periods, in particular a) the transformations and conflicts produced by European expansion, b) the movement of ideas, people, and commodities across oceans, c) the reception of ideas and impact of migration and commerce within regions and emerging national contexts
- Distinguish, and provide critical definitions for, the major periods and movements in the Early Modern Period, specifically History—Renaissance Humanism, the Reformation, the Puritan Revolution and the Enlightenment—with an appreciation for the problems of periodization
- Outline the contribution of the Scientific Revolution to the nature of knowledge, and describe in more detail the role of one major figure such as Bacon, Galileo, Descartes or Newton

- Trace and analyze, by citing specific authors and historical experiences, the changing conceptions of the political realm, including the development of the modern state; the relationship between politics and religion; and the rise of political individualism

HSS-3: The Making of Modern Society

The Making of Modern Society is a history course in which students explore the key political, social and intellectual developments of the nineteenth and twentieth centuries. The course is organized chronologically, beginning with the Industrial and French Revolutions and ending with the transformations brought about by the end of the Cold War and the challenges of twenty-first century violence and globalization. Lectures provide students with an analysis of particular events and a survey of change over time. In their work in sections students discuss how assigned readings, including contemporary texts, illuminate the complexities of historical experiences of modernity. Throughout the semester students will use a textbook that outlines the historical links and comparisons between Europe, Asia, Africa, the Americas, and the Middle East. Students will learn:

- To identify and trace the transformations in politics brought about by challenges to the old regime in Europe and the Americas and changing ideals of political, civil and human rights
- To identify and trace the transformations in society, economy and politics brought about by urbanization, industrialization, and the rise of industrial capitalism
- To identify and trace experiences of empire, war, and genocide, and their contemporary legacy, in Europe, Asia, Africa and the Americas. With the goal of broadening historical understanding, developing clear communication skills, and improving research skills students will write analytic essays, read texts, and speak and discuss with each other about issues that engage them as professionals in training and citizens of their local, national, and global communities.

HSS-4: The Modern Context: Figures and Topics

HSS-4 introduces students to the process of writing and research in the humanities and social sciences by focusing on a critical figure or topic from the modern period for the duration of the semester, cultivating depth of understanding rather than breadth of knowledge. Toward this end, the course develops the skills that students need to:

- Produce a substantial research essay with an original argument
- Marshal a variety of secondary sources (e.g., books, journal articles, images, Internet resources, interviews) in support of the argument
- Present research findings in oral form
- Engage in collaborative research activities (e.g., peer review, group projects)
- Master the conventions of citing both primary and secondary sources

CURRICULUM

Core Curriculum

Peter Cooper believed that a truly practical education should offer students a means of livelihood and a sense of intellectual curiosity as well as encouraging involvement in the cultural and political life of the city and the nation. So important did he hold the education of the citizenry to be that courses in the social sciences were to be considered preeminent. The core curriculum offered by the Faculty of Humanities and Social Sciences continues Peter Cooper's commitment to liberal learning, social awareness and active citizenship. Through critical examination and discussion of primary materials students develop a broad understanding of the origins of modern society and the conflicts within it. The courses encourage conversation and collaboration to engender a community of inquiry and expertise, preparing students for professional careers and for active participation in society.

The core curriculum of Cooper Union is a required four-semester sequence from HSS-1: The Freshman Seminar through HSS-4: The Modern Context: Figures and Topics. The core curricu-lum requirement is satisfied by completing these four semesters in order. HSS-1 and HSS-3 are offered in fall semesters; HSS-2 and HSS-4 are offered in spring semesters.

HSS-1: The Freshman Seminar A literature course concentrating on poetry and drama. Selected texts from antiquity and the Renaissance are common to all sections.

HSS-2: Texts and Contexts: Old Worlds and New A study of texts and topics from 1500 to 1800. Sections read common texts and some selections by individual instructors, with emphasis on literary expression and cultural context. Requirements include written analysis and class discussion.

HSS-3: The Making of Modern Society A study of the key political, social and intellectual developments of modern Europe in global context. This course is organized chronologically, beginning with the Industrial and French Revolutions. It meets twice weekly—once with their individual section and once in a group lecture format. All HSS-3 students must attend this weekly, in-person lecture held in the Frederick P. Rose Auditorium on Mondays from 11 am–12 pm.

HSS-4: The Modern Context: Figures and Topics A study of important figures or topics from the modern period whose influence extends into Contemporary culture. Requirements include individual research and writing projects. In choosing a section, students should consider its figure or topic for study.

Art History (HTA-101, 102) While contributing to the required curriculum of students enrolled in the School of Art, both the Art History Core and art history electives are also available to students in the other Schools.

HTA-101, 102 Modern to Contemporary: An Introduction to Art History This two-semester art history core course, developed as part of the Foundation year for students in the School of Art but open to all students, is organized around a set of themes running through the history of modernity from the 18th century to the present. Within specific themes, significant works, figures, and movements in art/design will be presented chronologically. Students will be able to identify and critical evaluate significant works, figures, and movements in art/design in the modern period; be able to describe the main social and political contexts for the changes in art/design over the last two hundred years; and engage, in writing and class discussion, with theoretical perspectives on art/design production. The course will involve museum visits. Grading will be based on class participation, papers, and exams.

Electives

The Faculty of Humanities and Social Sciences offers a varied and flexible elective program that provides rigorous study while responding to the changing needs of students. The complete Cooper Union course catalog with course descriptions, academic standards and other useful information is available online and maintained by the Registrar's office.

HUMANITIES AND SOCIAL SCIENCES MINOR

The Faculty of HSS offers students Minors in various fields and topics in the Humanities, Social Sciences, and Art History. Students from all three schools may apply for an HSS Minor after consulting the HSS Academic Advisor.

In order to qualify for an HSS Minor, students must complete the HSS Core (HSS-1–4) and then complete a predetermined number of credits. Please see below the relevant links for more information about credit requirements for your school.

A student's fourth semester is the best time to start an HSS Minor. Please set up a meeting with the HSS Academic Advisor.

School of Architecture

Irwin S. Chanin School of Architecture students in good academic standing (3.0 GPA or better) who complete a minimum of 15 elective credits (in addition to the HSS-1–4 core sequence) in a specific field of HSS may qualify for a Minor in that field. Students must earn a B or better grade in these elective courses.
Architecture students entering in AY 2024–2025 and onwards must complete a minimum of 12 elective credits for these Minors. All other criteria remain the same.
Architecture students may apply for HSS Minors in the following fields:

1. Art History
2. Economics and Public Policy (see note below)
3. History and Society
4. Literature
5. Science, Technology, and Society

A student's fourth semester is the best time to start an HSS Minor.
Please set up a meeting with the HSS Academic Advisor, to start the process.

Notes:

- Students must apply in their fourth year at the latest to be considered for the Minor. HSS will not accept requests after this time.
- Double Minors are permitted and encouraged.
- Economics and Public Policy: Coursework for this Minor must include both SS-334 (Microeconomics) and SS-347 (Macroeconomics).
- Transfer Credits: Upon approval, up to 3 transfer credits from another institution may be applied towards an HSS Minor.
- Approval from the Dean of the School of Architecture is required for the Minor.
- If awarded, the Minor will be designated on student transcripts at graduation.

School of Engineering

Albert Nerken School of Engineering students in good academic standing (3.0 GPA or better) who complete a minimum of 12 elective credits (in addition to the HSS-1–4 core sequence) in a specific field of HSS may qualify for a Minor in that field.
School of Engineering students may apply for HSS Minors in the following fields:

1. Art History (12 credits—see notes below)
2. Literature (12 credits—read on for permitted sequences)
    a. The Classics: 9 credits in Greek, Roman, or in non-Western classical literature and 3 credits in a post-classical literature through the Renaissance
    b. The Moderns: 6 credits from courses on Prose and 6 credits from courses on Poetry
    c. Theater and Cinema Studies: 6 credits from courses on Theater and 6 credits from courses on Cinema
3. Economics and Public Policy (12 credits—see notes below)
4. Philosophy, History and Society (12 credits—read on for permitted sequences)
    a. Philosophy: 3 credits in ancient or Eastern philosophy, 6 credits in modern and contemporary philosophy, 3 credits in aesthetics or in cultural studies
    b. History: 6 credits in pre-20th century history and 6 credits in 20th century–present history
    c. Political Sciences: 6 credits in sociological studies and 6 credits in political sciences
5. Interdisciplinary Studies (12 credits—see notes below)

A student's fourth semester is the best time to start an HSS Minor. Please set up a meeting with the HSS Academic Advisor, for HSS to start the process.

Notes:

- Students must apply at the latest in their third year to be considered for the Minor. HSS will not accept requests after this time.
- Double Minors are permitted, and students are encouraged to try and double Minor in HSS.
- Art History: HTA-101 and HTA-102 are allowed as part of the Art History Minor for students in the School of Engineering.
- Economics and Public Policy: Coursework for this Minor must include both SS-334 (Microeconomics) and SS-347 (Macroeconomics).
- Interdisciplinary Studies: Interdisciplinary Studies Minor is only available with explicit approval from the HSS Academic Advisor. Students will need to submit a 250-word proposal for a specific and clearly articulated Interdisciplinary research project that they expect to complete for this Minor. School of Engineering Students interested in an Interdisciplinary Minor must apply to the HSS Academic Advisor in their second year at Cooper for approval.
- If awarded, the Minor will be designated on student transcripts at graduation

School of Art

School of Art students in good academic standing (3.0 GPA or better) who complete a set number of elective credits (in addition to the HSS-1–4 core sequence and HTA-101–102) in a specific field of HSS may qualify for a Minor in that field. Students must earn a B or higher in all courses for them to be considered for the HSS Minor.

Art students may apply for HSS Minors in the following fields:

1. Literature and Philosophy (12 credits)
2. History and Society (12 credits)
3. Interdisciplinary Studies (12 credits—see note below)
4. History and Theory of Art (14 credits—see note below)
5. Economics (12 credits—see note below)

A student's fourth semester is the best time to start an HSS Minor. Please set up a meeting with the HSS Academic Advisor, to start the process.

Notes:

- Students must apply in their third year at the latest to be considered for the Minor. HSS will not accept requests after this time.
- Double Minors are permitted and encouraged.
- Interdisciplinary Studies: Interdisciplinary Studies Minor is only available with explicit approval from the HSS Academic Advisor. submit a 250-word proposal for a specific and clearly articulated interdisciplinary research project that they expect to complete for this Minor. School of Art Students interested in an Interdisciplinary Minor must apply with the HSS Academic Advisor in their second year at Cooper for approval.
- History and Theory of Art: 14 credits. Both HTA-101–102 are required courses for School of Art students and do not count towards HSS Minors.
- Economics: Coursework for this Minor must include both SS-334 (Microeconomics) and SS-347 (Macroeconomics).
- Students may use up to 1 approved independent study with an HSS Faculty (maximum 2 credits) for a Minor.
- If awarded, the Minor will be designated on student transcripts at graduation.

HSS Independent Study Policy

An Independent Study is designed by a student and a faculty member to deepen an investigation in a field or specialization not offered in the scheduled course offerings. The course of study and assignments for a 2-credit independent study typically consists of a reading list comparable to that required for a regular 2-credit course (HTA electives, for example), which can range from 30-50 pages of reading per week and a total of 12 pages of polished writing for the semester.
A 1-credit independent study requires 2 hours of work outside of class per week; a 2-credit independent study requires 4 hours of work outside of class per week.
An Independent Study cannot exceed 2 credits.

Eligibility requirements:

- Juniors, seniors, or 5th year Architecture students;
- cumulative GPA of 3.0 or higher;
- successful completion of a previous course with the supervising faculty member

Other considerations:

- a maximum of 4 credits over the course of a student's undergraduate career can be taken as Independent Studies
- students can only take one Independent Study per semester

The primary consideration in approving proposals for Independent Studies is the educational value of the study project within the structure of degree requirements. Independent Studies may not be used to satisfy the credits for the core curriculum. An Independent Study may be supervised only by full-time or part-time faculty members who have taught in HSS for at least 6 semesters. If an HSS full-time or part-time faculty member is willing to supervise an Independent Study, the student should work with them to complete this form and submit the signed application to the HSS Dean's Office for approval no later than the end of the first week of the semester. The Dean will update the applicant regarding the status of the proposal. Late applications will not be accepted.
The work cannot begin unless the Independent Study is approved by the Dean.

HSS Policy on Plagiarism and Academic Dishonesty

Plagiarism is the presentation of another person's words, phrases, ideas, or conclusions as your own—even when the identity of the person is not known, as is often the case with sources on the Internet. Ethically, plagiarism is false assumption of authorship: the act of taking another person's language or thought—or language or thought from an anonymous source—and presenting it as your own. Plagiarism or academic dishonesty may take any of the following forms:

- Repeating another person's sentences or phrases as your own
- Presenting another person's argument or central ideas as your own
- Letting another person write your paper
- Copying or downloading a paper (or part of a paper) from the Internet
- Misrepresenting in any way how the work was actually done in the submission of a research report
- Purchasing a paper for submission under your own name
- Selling or otherwise distributing any written material with the intent or understanding that another person may submit the work as his or her own
- Cheating on a written examination, such as referring to notes, books, laptop computers (or other electronic devices) without the explicit permission from the instructor
- Submitting work written or prepared for one course to fulfill requirements for a second course without prior permission from the instructors in both courses (regardless of whether the courses are taken in the same semester)

These are all acts of plagiarism or academic dishonesty whether they are done intentionally or unintentionally, on any essay, examination, exercise, report (including oral reports), or other type of writing assignment.

The means to prevent plagiarism in essays are:

- quotation marks around passages taken verbatim from sources;
- names of sources cited frequently in paraphrases or summaries;
- and complete documentation of sources in the text of essays and in footnotes, endnotes, or lists of "works cited" or "references," including language or ideas taken from an Internet source.

Students uncertain how to avoid plagiarism should discuss plagiarism with their instructors or with associates in the Center for Writing and Learning.

In the Faculty of Humanities and Social Sciences at The Cooper Union, the guidelines for cases of plagiarism, whether intentional or unintentional, are as follows:

The essay or examination will receive a grade of **F**.

The instructor will inform the Dean of The Faculty of Humanities and Social Sciences, who will report the plagiarism to the appropriate academic Dean in the School in which the student is enrolled.

At the discretion of the instructor, the student may be allowed to rewrite the essay or examination on acknowledgement of plagiarism and instruction on plagiarism in The Center for Writing and Learning.

At the discretion of the instructor, the student may be withdrawn immediately from the course and given a grade of **F** in it. In such cases, further action may be taken, such as probation, suspension, or dismissal.

Every Faculty member is obligated to report all cases of plagiarism to the Dean of the Faculty of Humanities and Social Sciences so that appropriate action may be taken.

Academic Regulations

Credits Unless otherwise noted, HSS courses with the prefixes HUM and SS carry three credits and courses with the prefix HTA carry two credits.

Prerequisites The prerequisites for all courses with the prefixes HUM and SS are HSS-1, 2, 3 and 4. HTA-101 and 102 are prerequisites for HTA electives. Exceptions may be granted by special permission of the Dean.

Grades At the end of every semester, each student receives a grade for their semester's work in each subject. Grades, with their official significance, are as follows:
A Outstanding performance **B** Very good performance **C** Average performance
D Passing but unsatisfactory **F** Failure to meet minimum requirement.

Indicators of plus (**+**) and minus (**-**) are used with the grades A, B, C and D. (The grade of A+ is, however, not given.) These indicators are included in computing grade point averages.

Grade of Incomplete (**I**) Work of the course not completed and assignment of grade and credit postponed. This designation will be given only in cases of illness (confirmed by authorized physician's letter) or of other documented extraordinary circumstances beyond the student's control, and only with the approval of the Dean of the Faculty of Humanities and Social Sciences.

The deadline for removal of an **I** designation will be determined by the instructor, but will not be later than six weeks after the start of the spring semester for students who receive such a grade in the fall semester and not later than two weeks after the start of the fall semester for students who receive such a grade in the spring semester. If the **I** is not removed within the set time limit, either by completing the work in the subject or by passing a reexamination, the **I** will automatically become an **F** unless the Dean of the Faculty of Humanities and Social Sciences extends the time or the student withdraws from school.

W Withdrawal (see below)

WU Unauthorized withdrawal (see below)

Indicators of plus (+) and minus (-) are used with the grades A, B, C and D. (The grade of A+ is, however, not given.) These indicators are included in computing grade point averages.

Change of Program

Adding a Course A student is permitted to add a course only during the first week of a semester, during the drop/add period, and only with their advisor's approval. Adding a course after the drop/add period is not permitted even if the student has been attending the class.

Dropping a Course A student may drop a course during the first week of the semester, during the drop/add period, with their advisor's approval. A course dropped during the first week of the semester will be deleted from the transcript.

Withdrawing from a Course A student anticipating inability to continue an assigned program should immediately see their advisor. After the drop/add period a student may withdraw from a course through the eighth week of the semester. It is the student's responsibility to obtain the necessary permission from their advisor and to notify the instructor in order to withdraw from a course. A grade of **W** will appear on the transcript. A student who stops attending a course without permission of their advisor will receive a grade of **WU**. However, if the student is failing the course at the time of the unauthorized withdrawal, the instructor is free to record a grade of **F**. A student is not permitted to drop or withdraw from a course if doing so would impede satisfactory progress towards the degree.

Assignments

Students are required to complete all assignments and examinations on time. In the case of schedule conflict or an unavoidable delay in completing an assignment, the student should discuss the problem with their instructor. Failure to complete assignments on time may result in an **F** grade for the course.

Attendance
Students are expected to attend all classes. No more than the equivalent of one week of unexcused absences will be permitted. In the event of absence, a student should contact the instructor in advance. Students who miss more than the equivalent of one week of classes in any one course may receive a reduction of the final grade or, at the discretion of the instructor, may be required to withdraw from the course.

Lateness
Students are expected to be punctual. Late students may be refused entry to a class. Chronic, unexcused lateness may result in a reduction of the final grade or in failure.

Academic Integrity
The Faculty of Humanities and Social Sciences expects all students to demonstrate the highest levels of academic integrity. Violations of academic integrity have consequences, including, but not limited to, failure of the course. The Dean of the student's school will be notified. A paper copy of the policy may be obtained from the HSS Dean's office.

Student Behavior
Students are expected to conduct themselves in accordance with the guidelines in the Code of Conduct.

Transfer Credit
Transfer students may be placed out of some courses based on their previous undergraduate work. Credit for HSS courses will be awarded only when the course taken elsewhere is similar in form and content to the course given at Cooper Union, and when the grade received in that course is a B or higher. AP, non-academic, and online courses are not accepted.

Any student interested in transferring credits must make an appointment with the HSS Academic Advisor who will review the syllabus of the completed course and a copy of one completed assignment. Students must ensure that they have those documents ready when they come in for their appointment.

Independent Studies
Independent Studies are voluntary agreements between individual full-time or part-time faculty members and individual students, in which students complete a course of study and assignment. Only juniors, seniors, and fifth-year Architecture students in good academic standing (defined as having earned a minimum of 3.0 GPA overall) are eligible for Independent Study. They cannot exceed 2 credits. Faculty conduct Independent Studies with students who have already completed a class or other educational/research activity under their supervision. The course of study and

assignment for a 1 or 2-credit Independent Study typically consist of a reading list and assignment comparable to that required for a 1 or 2-credit course. Independent Studies are intensive activities. Faculty members regard them as a significant commitment. The major consideration in approving proposals for Independent Studies is the educational value of the study project within the structure of degree requirements. Independent Studies may not be used to satisfy the credits for the core curriculum.

If an HSS full-time or part-time faculty member is willing to supervise an Independent Study, the student should ask the faculty member to complete this form and submit the signed application to the HSS Dean's Office no later than the end of the first week of the semester for approval. Late applications will not be accepted. The work cannot begin unless the Independent Study is approved by the Dean.

Advanced Placement Credit

The Faculty of Humanities and Social Sciences rarely grants AP credit. However, a student who has attained a grade of 5 in an AP course may petition the dean for permission to waive a core requirement and to substitute an appropriate elective course.

COURSES

Core Curriculum

HSS 1: **Freshman Seminar**
A literature course concentrating on poetry and drama. Selected texts from antiquity and the Renaissance are common to all sections, with works from other genres, periods and cultures chosen by individual instructors. The course develops aesthetic appreciation of literary texts and encourages a range of critical responses. Through close reading, and extended discussion, students learn to articulate their responses in written and spoken form. *Credits: 3*

HSS 3: **The Making of Modern Society**
A study of the key political, social and intellectual developments of modern Europe in global context. This course is organized chronologically, beginning with the Industrial and French Revolutions. Students develop an understanding of the political grammar and material bases of the present day by exploring the social origins of conservatism, liberalism, feminism, imperialism and totalitarianism. In discussions and in lectures students learn to study and to respond critically in written and spoken form to a variety of historical documents and secondary texts. Students must register for HSS3 L1 as well as one HSS3 section. All students enrolled in HSS3 must view the asynchronous HSS3 lecture in advance of their section meeting. *Credits: 3*

History and Theory of Art, Core

HTA 101: **Modern to Contemporary: An Introduction to Art History**
This two-semester art history core course, developed as part of the Foundation year for students in the School of Art but open to all students, is organized around a set of themes running through the history of modernity from the 18th century to the present. Within specific themes, significant works, figures and movements in art/design will be presented chronologically. Students will be able to identify and critically evaluate significant works, figures and movements in art/design in the modern period; be able to describe the main social and political contexts for the changes in art/design over the last two hundred years; and engage, in writing and class discussion, with theoretical perspectives on art/design production. The course will involve museum visits. Grading will be based on class participation, papers, and exams. *Credits: 3*

Humanities & Social Sciences

HUM 305: **Leonardo, Scientist and Engineer**
This course uses the life and work of Leonardo da Vinci (1453–1519) to explore science, medicine, engineering and art in Renaissance Europe. We will use Leonardo's notebooks, work of his contemporaries and writing about his interests across the centuries to examine the institutions and influences that served Leonardo's imagination, his inventiveness, and his arts. *Same as SS 305. Credits: 3*

HUM 352: **The Personal Essay**
In this course we will study and discuss essays in Philip Lopate, ed., The Art of the Personal Essay, and we will also write our own, on any topics we choose, on all manner of subjects—the daily round, pleasures and pains, taking a walk, solitude, friendship, social issues, in short, our personal responses to any number of topics and situations, enlarging ourselves in the process. *Credits: 3*

HUM 358: **Studies in Cinema**
A seminar based on a special topic in the study of cinema. The seminar may be repeated for credit with the permission of the dean of the Faculty of Humanities and Social Sciences. The course combines weekly film screenings with readings in literature, gender studies, film theory, anthropology, psychoanalysis, and philosophy, we will, first, identify and analyze the potentialities and limits of the couple form, and, second, develop analytical tools needed to understand and elucidate film form. Students are expected to participate fully in class and keep a running journal. Class assignments will include 2 quizzes, a short response paper, and a final 8–10-page term paper. *Credits: 3*

HUM 373: **Seminar in Humanities**
Seminar giving close attention to special topics in the Humanities. The seminar may be repeated for credit with the permission of the dean of the Faculty of Humanities and Social Sciences. *Credits: 3*

HUM 374: **Contemporary Culture and Criticism**
A survey of the cultural climate since the 1950s, including the influence of works by such writers as Benjamin and Bakhtin and the concern with contemporary life in terms of fundamental shifts in community, representation, identity and power. *Credits: 3*

HUM 381: **Post-Colonial Studies**
This course engages with the legacy of colonialism in literature and theory. Topics include the relationship between colonizer and colonized, independence, apartheid and immigration in novels from South Asia, the Caribbean and Africa. Works by Rudyard Kipling, E.M. Forster, Aime Cesaire, Salman Rushdie, Nadine Gordimer, Jhumpa Lahiri and Zadie Smith will be addressed. *Credits: 3*

SS 318: **Seminar in Social Science**
Seminar giving close attention to special topics in the Social Sciences. Recent topics have included sustainability and the economy. The seminar may be repeated for credit with the permission of the dean of the Faculty of Humanities and Social Sciences. *Credits: 3*

SS 340: **Cause and Effect**
Every day, we hear news reporters, podcast hosts, TV show hosts, and even professors talking about various issues, and along the way, they make causal claims that do not necessarily make sense. They are simply confusing correlation with causation, a common logical fallacy. Think about the following question: Does getting your master's degree cause you to earn higher income? By how much would those two additional years in school increase your earnings? Most people would say, "Yes, of course." Having a master's degree leads to a higher paying job. You can get data on various individuals, their educational attainments, and their earnings. You can examine the relationship between these two variables. But are you actually measuring the impact of having a master's degree on earnings? There are many other questions that you can try to think about in the same manner – questions related to individual decisions, business decisions, and government policies. In this course, we will learn how to think about these questions in a systematic way. The course will make you think critically about many claims that are being thrown at you by news reporters and even your professors. The course will also teach you how to work with various types of datasets to answer various questions in economics, psychology, business, politics, and sciences. You will learn common ways to summarize and present data and find relationships between different variables. *Credits: 3*

SS 345: **The Raymond G. Brown Seminar: Varying Topics**
A seminar in the Social Sciences on a topic central to the interests of the late Professor Raymond G. Brown. *Credits: 3*

SS 347: **Macroeconomics**
In Macroeconomics, we explore answers to questions related to the performance of the US economy. What is unemployment? How is it related to the living standard? Why is there very high inflation? We examine why the economy experiences good days and bad days and what the government can do to minimize the negative effects of the bad days. We also address other interesting questions like why we have inflation and unemployment, and whether they are actually "bad" things. *Credits: 3*

SS 351: **20th Century History "What we are talking about when we talk about Fascism?"**
This is a transnational history course that seeks to sharpen our thinking about definitions and resonances of fascism; it examines the past and asks, how such investigation might help us to act in the present when we confront situations that seem to be, or are quickly termed, "fascist." Using theoretical and historical sources, we will study the European origins of fascism beginning with the dramatic upheavals of World War I and the interwar years through World War II, the Holocaust, and its aftermath, and then turn our attention to the development of a new global authoritarian populism and right-wing nationalist xenophobic leaders and regimes in the 21st century. We will examine historical roots and current appeal as well as efforts at resistance, in a variety of contexts from Britain, Western and Eastern Europe to Russia, India, the Middle East, and East Asia. All of our work will require close analysis of entangled categories and experiences of race, class, nation, and gender and reference to "current events" in the United States as well as globally.
General Course description: A study of the dramatic ruptures of Europe's 20th century, haunted by imperialism, war and genocide. Topics include the First World War; modernity and modernism in interwar culture; fascism, National Socialism and the Holocaust; postwar displacements and migrations; decolonization, the cold war and the postwar economic miracle; 1968 and 1989 in both East and West; and the ongoing challenges of integration and multiculturalism. *Credits: 3*

SS 369: **Cognitive Pyschology: Conversations on Consciousness and Attention**
Consciousness is often called the main mystery in cognitive science. At the same time conscious experience seems to be trivial, we don't see changes in our awareness until we make a mistake in a simple cognitive task or someone tells us that we missed something salient. Consciousness studies is a multidisciplinary field in science that includes approaches and methods from neuroscience and physics, philosophy and anthropology, artificial intelligence and linguistics. We will try to learn more about the contribution of all these sciences, all aimed at answering one question: "What does it mean to have consciousness?" Some representative questions we will be discussing

are: What is the function of consciousness? How intelligent is the unconscious? What is the relationship between consciousness and attention? Can a machine ever be conscious? Is consciousness fundamental in the universe (as Eastern philosophies argue) or did it emerge as matter became ever more complex (as Western science insists)? Is there a stream of consciousness or is this just an illusion? What could happen if we didn't have consciousness? The course brings together modern and historical ideas to give a perspective on how the problem of consciousness could be addressed. Each topic presents a question that we will try to answer, each topic includes reading part, demonstration of effects and experiments and a small written review task. *Credits: 3*

SS 384: **Anthropology and the Other**
This course provides an introduction to concepts in social-cultural anthropology. Students will rethink such concepts as culture, race, ethnicity, nationalism, transnationalism, gentrification, power and memory. We will use these concepts to address the questions of human universals and the origins of cultural differences. At the bases of these inquiries will be the question of the "Other." Who are the "Others" in culture or society? *Credits: 3*

History and Theory of Art Electives

HTA 221: **Buddhist Art: Origins to Modernity**
As a part of the ongoing discourse on the tripartite interrelation among art, religion and modernity, this class investigates "Buddhist art," the visual culture of one the world religions, rooted in the premodern societies of India, Central, South East and East Asia and Tibet, from which its distinctive material forms, visual principles and ritual practices developed. More recently, the presence of Asian Buddhist material/visual cultures has asserted itself anew through transnational exchanges and confrontations, particularly between Asia and the modern and contemporary West. This course attempts to historicize this phenomenon by taking a macro approach to Buddhist art (without sacrificing specifics related to individual cases) by investigating two possible constituents of modern/contemporary Buddhist art: its core historical principles carried over from its origins, which have been considered "timeless," and its uniquely "timely" complication of or deviation from its original systems. We will spend half of the course studying some original principles of historical Buddhist art in areas such as visuality, representation, copy, agency, function and performativity, while quickly tracing the geo-historical spread of the religion throughout Asia over a period of more than 2,400 years. In this section, we will visit

selected works and sites that represent some typologies of premodern Buddhist art, such as relics, icons, mandala, pagoda, gardens and "Zen art," and examine them in "context," i.e., concerning their relations to the ritualistic/symbolic practices and fundamental philosophy of the religion. The latter half of the class will explore the issue of collisions in modernity between two claims: an insistence on the immutability and authenticity of persistent premodern systems of Buddhist art and experimentations reflecting the ever changing globalizing identities of the religion and regions in Asia, corresponding to recent social, political and cultural landscapes, including museum displays, temple politics, Orientalizing commodification and appropriation by avant-garde artists. *Credits: 2*

HTA 240: **Asian American Art**
Asian Americans come from vastly diverse paths of migration, socioeconomic conditions, political histories, and cultural backgrounds. Accordingly, the term "Asian American art" remains contested and open-ended. In this course, we will examine how artistic productions by Asian Americans during the twentieth and twenty-first centuries have articulated varying ideas of identity, race, politics, community, and art, while continuing to question whether "Asian American art" can mean something more than art produced by bodies racialized as Asian. We will consider how various sociopolitical and discursive forces have historically shaped (and continue to shape) Asian Americans as a race, and carefully attend to the complexity of Asian American experiences and responses that have informed their artmaking. Beyond the focus on art and artists, we will also discuss how curating Asian American art has helped mold and animate the field. The course will address themes such as: Chinatown and the invention of place, immigration, citizenship, and identity, in/visibility and transparency/opacity, tradition and (self-)orientalism, art and activism from Gidra, Godzilla to Stop AAPI Hate, interraciality and globality, and theories of "yellow women" and "racist love" among others. *Credits: 2*

HTA 278: **Modernism in Latin America: Abstraction in Mexico City**
This course traces the development of modern art in Mexico City during the first half of the twentieth century, addressing art produced by both Mexican and foreign artists. Existing literature places an emphasis on muralism and, with it, figuration. Demonstrating that abstraction and alternative modes of visual expression thrived in Mexico City during these decades foregrounds the individual and group endeavors that challenged artistic convention. In this process, we will reassess the expectations of orthodox abstraction, identifying how Mexico City-based artists productively translated and displaced these tenets. Throughout the course, we will deconstruct

foundational scholarship that frames discussions of Mexican art and identity, considering disciplinary dynamics that have separated "Mexican art" and "modernism." After mapping the coordinates of major movements and trends in Mexican figuration, we will assess responses to Cubism, Concretism, and Surrealism and examine categorically "Mexican abstraction": the group of ex-Surrealists affiliated with the magazine DYN, independent practitioners, Abstract Expressionists from New York temporarily living in Mexico, and Generación de La Ruptura. Interrelated themes including the citation of pre-Columbian art and cosmologies, the relationship between representation and the indigenous identity, and the polarities of nationalism and modernist universalism will structure our inquiry. *Credits: 2*

HTA 300: **Single-Artist Seminar: Louise Bourgeois**
This course will examine the life and work of Louise Bourgeois. From the 1930s through 2010, Bourgeois moved between abstraction and figuration across the mediums of painting, drawing, prints, and most prominently, sculpture. Iconic today, the artist was overlooked for most of her career when she worked prodigiously alongside canonical male artists of late modernism to explore themes of identity, trauma, gender, and motherhood. In this class, we will develop skills of visual analysis, attending closely to the artist's form and iconography (famously, the spider and the cell) as well as her process and materials (including bronze, marble, latex, plaster, fabric, and clothing). We will build a historical and methodological toolkit to engage critically with different aspects of her oeuvre, probing the uses of autobiography and psychoanalysis; the architecture of memory; and the poetics of inside and outside. Finally, we will pose the question of legacy and look at the ways her work has been metabolized in contemporary art by artists like Robert Gober and Kiki Smith or Tracey Emin, Leiko Ikemura, Sarah Lucas, Senga Nengudi, and Rachel Whiteread. *Credits: 2*

HTA 283: **The Global Baroque**
While the study of Baroque art has traditionally been Eurocentric, scholars have increasingly recognized the importance of studying the movement within a global context. This course provides an introduction to Baroque art and architecture from ca. 1600 to 1750 in both Europe and across the world; emphasizing the movement of ideas, images, arts and goods, it underscores the international, dynamic, and hybrid nature of the movement. Starting with an introduction to the key artists, imagery and styles in Europe, the course explores the diffusion and development of the Baroque in the Americas, Asia, and Africa. This course also examines the political, social, and economic ramifications of this exchange and how these Early Modern networks of trade formed the foundation of our current global economy. Featuring a wide range of media—including painting, architecture, print, sculpture, textile, and decorative arts—this course will highlight the diverse nature of the global Baroque, while focusing on the contributions of native artists and the incorporation of local cultures into regional Baroque styles. *Credits: 2*

HTA 305: **Performativity**
Performativity is the capacity of speech, utterance, gesture, and language to impact or create the world. In this course, students will explore the relevance of speech acts to social norms and identity, as well as creative forms of self- and collective fashioning and redress. This course moves from debates around the performative—the study of words which do things—to accounts of gender, race, and sexuality which emphasize their constructedness and thus, their alterability. This course also prioritizes performance art as one among many answers to the problem of embodiment and experiment. Together, we will explore key texts and performances within the field of performance studies to address the generative exchange between art and critical theory. Key words or sites include the relationship of speech to deed; discourse to materiality; inscription to violence; and embodiment to history. Students will have the possibility of exploring their own performance practice in a final project. *Credits: 2*

HTA 313: **Seminar in Art History**
A seminar based on a special topic in the study of Art History. The seminar may be repeated for credit with the permission of the dean of the Faculty of Humanities and Social Sciences. *Credits: 2*

HTA 313-G1: **Digital Art History**
This course analyzes Digital Art History with origins in multiple art fields such as Conceptual art and Fluxus, as well as the fields of cybernetics, computation, and engineering. From conceptual art to artificial intelligence, the course surveys numerous aspects of Digital Art such as innovation in technology throughout the 1950s-present and artists' responses and negotiations to these new technologies. Many exhibitions throughout the 1960s-today reflect this ongoing conversation between art and technology. We will look at not just the theoretical and historical texts, but also a survey of artworks, artists, and exhibitions to better understand how both inform each other. Some fields include net.art, surveillance, bioart, video games, and tactical media. Topics will include feminism, race, and sexuality and we will keep in mind also the male and Western-focused digital art history but also how recent artists challenge these histories. The course asks the following questions: Who gets to participate in these technological innovations? How does technology spark innovation and progress? How is technology fraught with bias that can lead to the oppression of some individuals over others? What is the future of digital technologies and art?

HTA 313-01: **Topics In and Around Color and the Visual Arts**
Color is both a material and a sensorial phenomenon; it is embedded in the scientific, philosophical, economic, and technological conditions of contemporary life. Rather than provide a comprehensive analysis of the history of color, this course approaches issues of color through a range of historical moments in fine art and visual culture from the long nineteenth century into the present. Each week the class will explore a particular issue or question related to color: from the ordering of color in color wheels and charts, to the production of colorants using extractive colonial labor, as well as the racial and gendered biases of color and its technological reproduction in contemporary photography, film and digital media. Through focused discussions in class and in-person visits to galleries and museums, the course will highlight limit conditions and provide openings to question our own conceptions of the stability of our material and perceptual world.

HTA 314: **Art Exchange Across National Boundaries**
The course focuses on the cultural and political geography of artistic production from the mid-20th century to the present. We will engage with artworks, exhibitions, and publications as vehicles of cultural dialogue and tools of political propaganda and cultural imperialism. By studying the geopolitical trajectories of artistic practices and institutional networks, we will ask questions about why and how images and objects travel, and ponder the exchange of art and ideas in the field of global art and culture.
Credits: 2

HTA 324: **Museum as Frame: Art in New York**
Through class meetings and museum visits we will investigate the idea of the museum, its history, cultural significance, meaning and societal influence. In particular, we will consider how the museum experience affects the attitudes and assumptions of museum visitors. We will explore the intellectual under-pinnings of the modern museum since the Enlightenment, with special attention to issues of nationalism and eurocentrism; the complexities of museum sponsorship (public, private, and corporate), and how they shape cultural presentation; and the emergence, since the 1960s, of community-oriented museums alongside the growing importance in society of multi-culturalism and ethnic identity. We will also consider standard art-historical issues of style and society as they relate to the various artworks we see.
Credits: 2

HTA 343: **Expanded Curatorial Practice**

The recent "decolonial" and "global" turn in museums and curatorial practice often ignores the fact that art history provides the disciplinary foundation for the museum as a colonial institution. What would it mean to curate against Euro-American narratives of art history? How do you curate artists and exhibition histories that aren't found in institutional archives? How does curatorial practice offer alternate art historical evidence? This course thinks through such questions by engaging with theories and activist practices of decolonization, postcolonial theory, Black studies and Asian studies to move towards other epistemologies and methods of curatorial practice. It will foreground minoritized artists and transnational exhibition histories across Western Europe and North America, and the global South, while considering alternate epistemologies, aesthetics and collections beyond the hold of both art history and the museum. We will study texts, artists, artifacts, art objects, embodied practices, museum collections, exhibition histories, and modes of display and their relationship to questions of history, temporality, translation, untranslatability, spectatorship, provenance, stewardship and the life of objects. *Credits: 2*

ADMINISTRATION, FACULTY AND STAFF

Administration

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Edner (Billy) Bataille
Adjunct Instructor

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Adjunct Assistant Professor; Editorial Communications Manager

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Buck Wanner
Adjunct Assistant Professor; Writing Associate

Andrew Weinstein
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Center for Writing and Learning,

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GENERAL POLICIES

The Cooper Union reserves the right to change or amend its regulations, curricula, fees and admission procedures without prior notice.

Registration Students are responsible to attend and actively participate in each course they are enrolled in. They are responsible to fulfill the attendance policy established within their school and by the faculty of the humanities and social sciences, as well as the absence policy established by their instructors in their course syllabi.

Attendance

School of Architecture and School of Art Classes and studios are scheduled Monday through Friday between 9 am and 10 pm. Studio facilities usually are available to students on Saturdays and Sundays throughout the academic year.

Each student is required to be punctual and to attend each scheduled class. In the case of unavoidable absence, the student should, on his or her return, report to the instructor to explain the absence and inquire about making up the lost work. All architecture students are provided with studio space and are expected to work in the studio during regular building hours.

School of Engineering Each student is expected to attend all classes and to satisfy other requirements in each course in such ways as the instructor may prescribe. If a student is absent an excessive number of times, they may, at the discretion of the instructor and with the approval of the dean, be asked to withdraw from the course.

After each absence, it is the student's responsibility to consult with the instructor, without delay, to determine the nature of the makeup work required.

Faculty of Humanities and Social Sciences Each student is expected to attend all classes. No more than two unexcused absences will be permitted during any given semester. In the case of an unavoidable absence, the student should, on his or her return, report to the instructor to explain the absence and inquire about making up the lost work. Students who are absent three or more times may receive a reduction of the final grade or, at the discretion of the instructor, be asked to withdraw from the course.

Calendar Changes The academic year at The Cooper Union has fall (Sept–Dec), spring (Jan–May), and summer (late May–Aug) terms. In order to serve the student body most effectively, The Cooper Union cannot modify its calendar or procedures to meet special demands of students.

Academic Standards and Regulations For specific academic standards and regulations of each school, consult the appropriate sections of this catalog.

Dismissal The Cooper Union reserves the right at any time to dismiss a student whose conduct, attendance or academic standing is, in its judgment, unsatisfactory and to grant or withhold credits, certificates, degrees or diplomas. Disciplinary authority is vested in the president's office.

Obligations Students will be held accountable for all individual obligations, financial and other, entered into with The Cooper Union. Students who fail to meet all financial obligations to The Cooper Union will not be permitted to register. No student will be included in the graduating class unless all obligations have been accounted for prior to graduation. The Cooper Union will withhold transcripts and other information about a student who has not met financial obligations.

Transcripts Official transcripts of a student's scholastic record are issued directly to officials of other institutions or examining boards, upon request to the Office of the Registrar. Alumni and former students incur a $12 processing fee for each transcript request. There is no fee for currently enrolled Cooper Union students. Official transcripts requests for students enrolled Fall 2002 and later are processed through Parchment services via the Registrar webpage. For transcripts requests prior to Fall 2002, please contact the Office of the Registrar at registrar@cooper.edu.

Current students have access to their unofficial transcript and registration information on the portal to the school database, once they receive a password and a login at the Computer Center.

Student Property The Cooper Union assumes no responsibility for loss of or damage to the work or property of students.

Student Records

Family Educational Rights and Privacy Act (FERPA)

The Family Educational Rights and Privacy Act ("FERPA"–20 U.S.C. § 1232g; 34 CFR Part 99) is a federal law that protects the privacy of students and limits third-party access to their education records. Education Records are generally defined as records directly related to a student and maintained by an educational agency or institution or by a party acting for the agency or institution. When a student reaches 18 years of age or attends an institution of postsecondary education at any age, the student becomes an "eligible student," and all rights under FERPA transfer from the parent to the student.

FERPA Policy Statement

The Cooper Union for the Advancement of Science and Art follows student records privacy guidelines set forth by the Family Educational Rights and Privacy Act of 1974, FERPA (also referred to as the "Buckley Amendment"). It is the policy of The Cooper Union to comply with all provisions of FERPA, including the rights of eligible students to inspect and review, amend, and limit disclosure of information from their education records. Students will be notified each year of their rights under FERPA through the annual edition of the College Course Catalog (published online) and through the Office of the Registrar webpage.

This policy extends and applies to parents who request access and disclosure of their child's educational records. In accordance with FERPA, The Cooper Union for the Advancement of Science and Art requires that every student who chooses to have the College release copies of grades, transcripts, or any other data pertaining to academic performance to either parents, guardians, spouse, life partners, bill-payers, prospective employers, or governmental agencies must authorize the College to do so. Therefore, all requests to release such information must be accompanied by a written or electronic authorization signed by the student. Without such authorization, the College will not release information.

There are exemptions to FERPA's general consent requirement. An eligible student's record is never released without written or electronic consent, except to college faculty and staff who have demonstrated clear "need to know and legitimate educational interest". Other exceptions include compliance with a judicial order, the Solomon Amendment to respond to a military recruiter request, subpoena or to respond to an emergency involving the health or safety of a student, or another person on the campus-at-large.

For additional information on student rights under FERPA, FERPA definitions and key constructs, and FERPA forms, please visit the Office of the Registrar webpage.

Program Changes During the first several days of a semester, courses may be added to or dropped from a student's program without penalty or fee (program adjustment). Adding of courses after the posted date is not permitted. Students who wish to change their academic programs should consult with appropriate deans. All program changes must be reported by the student to the registrar. A $25 fee will be charged for dropping courses after the drop/add period.

Transfer of Academic Credit Every effort is made to provide admitted students with a preliminary evaluation of their transfer credit. School-wide policies dictate that a grade of B or better must be earned to be eligible for transfer of credit.

To seek credit or if there is a question about whether or not a class taken at a previous institution is eligible for transfer of credit please contact the department chairperson or respective dean of the school to which you are interested in obtaining credit.

Each department/school reserves the right to ask for additional information, i.e., coursework, syllabus, portfolio, etc., before granting transfer credit.

Currently enrolled students must always contact the appropriate department chairperson and dean of school at The Cooper Union prior to registering for classes at other colleges or universities should there be interest in obtaining transfer credit at The Cooper Union. Explicit permission must be granted by the department chairperson and dean of school before registering at another college or university to ensure that the course will be transferable.

Please see pages 37, 53, 76 and 118 for more detailed information about transfer credit.

Health

The Cooper Union requires a report of a physical examination from a licensed physician of the student's choice. The Cooper Union will provide its own medical form for this purpose and the form must be completed in its entirety. This report must include a record of vaccinations and immunizations. In addition, New York state law requires that students respond to a query concerning whether or not they have been immunized against meningitis.

The college reserves the right to exclude from attendance at any time—temporarily or permanently—any student whose physical or emotional condition is such that, in the opinion of an appropriate medical officer, attendance would endanger the health or welfare of other students and/or members of the Cooper Union community or otherwise disrupt the educational environment. A student whose attendance at the Cooper Union has been interrupted by a dismissal or extended leave of absence—for any reason—needs to submit new medical records before he or she resumes attendance.

Likewise, students continuing on to the graduate program at Cooper Union must submit new medical forms at the time of beginning graduate study.
Vaccination and Immunization New York State law requires that all undergraduate and graduate students be immunized against measles, mumps and rubella. The law applies to all students born on or after January 1, 1957.

Proof of immunity consists of:

- Measles: Two doses of live measles vaccine administered after 12 months of age, physician documentation of measles disease or a blood test showing immunity. The exact date of these shots in month-day-year format must be written on the form and certified by the physician.
- Mumps: One dose of live mumps vaccine administered after 12 months of age, physician documentation of mumps disease or a blood test showing immunity. The New York State Assembly is currently considering a proposal to require two mumps shots.
- Rubella: One dose of live rubella vaccine administered after 12 months of age or a blood test showing immunity.

Proof of immunity, including dates of immunizations, must be filed with the Office of Student Affairs prior to each student's initial registration at The Cooper Union. Students who claim a religious objection to being immunized must send a signed letter attesting to this fact to the dean of students by July 15.

Students may not attend any events on campus, including classes and orientation programs, without having submitted these forms.

Meningitis Status New York State Public Health Law Section 2167 requires colleges to distribute information about meningococcal disease and vaccination to all enrolled students.

Meningitis is rare; however, cases of meningitis among young adults have more than doubled since 1991. When the disease strikes, its flu-like symptoms make diagnosis difficult. If not treated early, meningitis can lead to swelling of the fluid surrounding the brain and spinal seizures, limb amputation and even death.

The Cooper Union is required to maintain a record of the following for each student:

- A response to the receipt of meningococcal disease and vaccine information signed by the student or the student's parent or guardian, AND EITHER
- A record of meningococcal meningitis immunization within the past 10 years, OR
- An acknowledgement of meningococcal disease risks and refusal of meningococcal meningitis immunization signed by the student or the student's parent.

Students are asked to provide this information by July 15 of the year they enter The Cooper Union.

Health Insurance It is a requirement that all students (undergraduates who are registered for 6 or more credits and graduate students who are registered for 4.5 or more credits) have health insurance coverage. The Cooper Union provides health insurance for all students through our health insurance company, Wellfleet.

The cost of insurance will be automatically charged to the student's account. The annual cost of health insurance for the 2025–2026 academic year is $3,719. Please notify the Office of Students Accounts at bursar@cooper.edu if you are not planning to be enrolled at The Cooper Union for the full academic year and only require health insurance for a single semester. The cost for the fall 2025 semester (August 15–December 31, 2025) health insurance coverage is $1416, and the cost for the spring 2026 semester (January 1–August 14, 2026) health insurance coverage is $2,303.

The insurance cost for fall 2025 (August 15, 2025 - February 17, 2026) exchange students is $1,906. The insurance cost for spring 2026 (January 1–July 14, 2026) exchange students is $1,987.

Students who are covered under their own or their parent's insurance policy may choose to waive the student health insurance plan. Please be advised that if you wish to waive the insurance coverage, the insurance you provide must be currently active and will be subject to coverage eligibility verification through the health insurance company. Please check your cooper.edu email and follow the instructions from the health insurance company for the health insurance waiver process. The waiver must be filed by October 15! A separate waiver deadline for all students, including exchange students, enrolled for Spring 2026 only is March 17, 2026.

Leave of Absence

Students seeking a Leave of Absence should follow the steps outlined below to ensure that their leave is processed correctly. Skipping any of the following steps may cause disruptions in financial aid and/or inability to enroll for the semester of intended return.

View the full Leave of Absence Policy here.

- A student decides to take a discretionary leave of absence. This may be for family obligations or any number of personal reasons, but it is not for medical reasons.
- The student should submit two documents to their respective dean: a letter, stating the reason for the leave, and the Discretionary Leave of Absence Petition, a PDF form that can be found on the Cooper Union website.

- The student must also meet with their advisor to discuss their interest in the leave of absence, review its potential impact on their program, and plan an adjusted course of study if appropriate. Students should bring their Leave of Absence Petition and a letter requesting leave to the meeting with their advisor.
- If the Dean's office, in coordination with the academic advisor, determines that the leave can be approved, it is forwarded to the Registrar's Office.
- The Registrar will send the petition to the following offices as appropriate: International Student Scholars Office, Financial Aid, Student Accounts, and Housing and Residential Education. Students will be contacted by each office via email to coordinate a meeting, either in person or online, during which they will discuss the proposed leave's effect on the student's academic career, its financial implications, and other potential outcomes.
- The student will receive an email confirmation from the Registrar that their Discretionary Leave of Absence form was received. The email will include a list of offices from which they should expect contact. Please watch carefully for emails from the various offices and respond as soon as possible. Students are responsible for replying to any emails received.
- The student's Petition will be reviewed by each office. The student will receive an email with a status update after each meeting.
- Upon completion of the review by all relevant offices, the student will receive a separate letter asking them to acknowledge that they have been informed how the leave will impact their status and that they wish to proceed.
- The Registrar will submit the completed Petition and the acknowledgment to the Dean's office for final approval.
- If the dean approves the completed form, it will return to the Registrar, who will enter the status change in Self-Service. The student will receive an email confirmation of the change, which will include detailed information on the leave such as the return date, process for return, and any student responsibilities.

Policy on Copyrighted Material

Copyright Infringement The Cooper Union is obligated by federal law to inform its students of its policies and sanctions related to copyright infringement. Unauthorized distribution of copyrighted material, including unauthorized peer-to-peer file sharing (e.g., using BitTorrent to obtain/distribute music or movies) may subject students to civil and criminal penalties, sanctions arising from a violation of Cooper Union's Code of Conduct, and loss of internet services provided by the Cooper Union IT Department. Anyone found to have infringed a copyrighted work may be liable for statutory damages up to $30,000 for each work infringed and, if willful infringement is proven by the copyright owner, that amount may be increased up to $150,000 for each work infringed. In addition, an infringer of a work may also be liable for the attorney's fees incurred by the copyright owner to enforce his or her rights. Willful infringement may also result in imprisonment of up to ten years and fines of up to $250,000 per offense. For more information, please see the website of the U.S. Copyright Office, especially their FAQ's at Copyright and Digital Files (FAQ) | U.S. Copyright Office

Fair Use A limitation on copyright protection is known as "fair use." Permission of a copyright holder is not required (i.e., there is no copyright infringement) where the use is for noncommercial activities such as teaching (including multiple copies for classroom use), scholarship, research, studio work, criticism, comment, or news reporting. [Note that while "teaching" activities may qualify as fair use, the doctrine of fair use has a requirement relating to the "amount and substantiality" of the copyrighted work that does not permit, for example, the copying and distribution of an entire copyrighted textbook to a class.]

The routine use of file sharing programs to obtain music, movies and software does not constitute fair use. For more information on fair use see: copyright.gov/fls/fl102.html

Code of Conduct In addition to the sanctions for copyright infringement provided by federal law, The Cooper Union's Code of Conduct explicitly prohibits:

- "illegally duplicating copyrighted or licensed software" (Category B offense).
- "any unauthorized use of network and/or computer hardware" (Category B offense).

A violation of copyright law might also be viewed as an act of academic dishonesty or fraud, which are Category A offenses and punishable by suspension or dismissal.

IT Department Responsibilities In order to receive a Cooper Union computer account, a student is required to sign a document provided by the IT Department in which they promise to respect the rights of copyright holders. While the IT Department does not monitor its networks for content, it may monitor the volume of use (bandwidth) for any computer on its networks. A student who is using excessive bandwidth may have his or her Internet access reduced or terminated.

Students should be aware that representatives of copyright holders routinely search the Internet for infringers, resulting in lawsuits being filed against students. Such lawsuits may be very expensive to settle. Copyright holders have frequently filed notices of copyright violations directly with The Cooper Union, which requires the school to take immediate action to eliminate infringement.

The IT Department advises against installing and/or leaving file sharing programs on any computer attached to a Cooper Union network. While there are legitimate reasons for using such programs (e.g., the distribution of non-copyrighted software), by operating "silently" they may put the owner of the computer in the position of distributing infringing files, and being liable for such distribution, even though he or she has no intent of doing so.

Policy on Religious Observances No student shall be refused admission to or be expelled from The Cooper Union solely because they are unable to participate in any examination, study or work requirement because of religious observances and practices. It is the intent of The Cooper Union to reasonably accommodate individual student and faculty religious obligations and practices without penalty, based on good faith effort and due notice to those relevantly concerned of the anticipated religious observance date. There is a mutual obligation of students and faculty to provide prior notice to each other of anticipated absences. Students absent because of religious observances and practices will be given the opportunity to make up any examination, study or work requirement missed without penalty.

Policy on Smoking In accordance with the New York City Clean Indoor Act, as amended, and New York State Public Health Law Article 13-E, the following Smoking Policy is effective at The Cooper Union September 1, 2009:

Smoking is prohibited at all times in all college owned buildings, including but not limited to auditoriums, classrooms, laboratories, offices and public areas and the Student Residence Hall. Furthermore, smoking is not permitted within 25 feet from a Cooper Union facility entrance.

This smoking policy is intended to keep the air clear of smoke for those within our facilities and for those entering and leaving Cooper Union owned buildings.

The Cooper Union requests and expects your cooperation and assistance in the implementation and enforcement of the smoking prohibition. Those who do not comply with this policy will be subject to disciplinary action up to and including fines and/or expulsion from the college, or termination of employment. Complaints against persons represented by a labor organization will be handled in a manner that is consistent with the applicable collective bargaining unit.

Conflicts related to smoking among employees should be brought to the attention of appropriate supervisory personnel and, if necessary, referred to the equal opportunity officer. To report an incident concerning violation of this policy, please send a written report to the director of facilities management.

Students alleged to be in violation of the policy are subject to disciplinary action through the appropriate student conduct jurisdiction.

In accordance with the law, any individual can voice objections to smoke that gathers in any smoke-free area without fear
of retaliation.

New York State Law regarding alcohol

New York State has very strict laws about alcohol.
Section 65 of the Alcohol Beverage Control Law states:

No person shall sell, deliver or give away or cause or permit to be sold, delivered, or given away any alcoholic beverages to:

1. Any person, actually or apparently, under the age of twenty-one years;
2. Any visibly intoxicated person;
3. Any habitual drunk.

In addition, legislation enacted in November of 1991 specifies that a U.S. or Canadian drivers' license or non-driver identification card, a valid passport, or an identification card issued by the United States Armed Forces must be used as written evidence of age for the purchase of alcoholic beverages. New York State law also prohibits the possession of alcoholic beverages with the intent to consume by a minor and makes it a crime to produce fraudulent proof of age. Students in possession of a phony identification card should know that the antiterrorism measures put in place by the New York City police department have improved the ability to detect fake ids and have resulted in several arrests.

New York State imposes liability on any person who serves alcohol illegally to a minor. This means if someone serves a minor alcohol, the person serving the alcohol can be sued for damages by anyone harmed by that minor, including the parents or family of the minor if the minor himself or herself suffers harm.

Procedures for Use in Serving Alcoholic Beverages at Student Events Approved by The Joint Activities Committee:

1. The serving of hard liquor is not permitted at any college event involving students.
2. Student groups must hire a licensed caterer for the serving of wine and beer at student events. Such serving will be limited to those persons at the legal age in New York State of 21 years. To facilitate quick identification of students of legal age at the point of service, a process of carding that requires the presentation of Cooper Union ID and an ID that complies with the 1991 New York State law will be carried out by a security guard available solely for that purpose and paid for by the sponsoring student club through allocated JAC funds. All student events must be approved by JAC. There are no exceptions to this requirement.

3. Sponsors of JAC-approved events have primary responsibility for ensuring that only those of legal drinking age are served alcohol. Sponsors must include at least two persons 21 years of age or older. Such events must include the serving of food, in sufficient amount for the numbers attending; and the displaying of a variety of non-alcoholic beverages must be featured as prominently as alcoholic beverages and dispensed in the same area.
4. The promotion of alcohol in advertisements for events is not permitted. Other aspects of the event should be emphasized—such as entertainment, availability of food, etc.
5. The serving of alcoholic beverages should be discontinued one hour before the end of the event at a minimum.
6. Event sponsors not only must refuse to serve alcoholic beverages to anyone appearing intoxicated, but also must provide appropriate assistance to such persons. Assistance may include, but is not limited to, providing safe transportation arrangements for intoxicated guests, and medical help.
7. Event must comply with all Federal and New York State Laws.

Procedures for Serving Alcohol at Exhibitions

Students who wish to serve alcohol in connection with a student exhibition opening should consult the appropriate academic dean for the policies and procedures to follow, including ordering a guard. The following rules apply to all exhibitions where alcohol is served.

1. The serving of hard liquor is not permitted.
2. Alcohol service will be permitted at student receptions only when the student presenters are over 21 years of age. In the case of a group presentation the majority of students must be over 21.
3. Coordinators for Exhibitions must hire a licensed caterer for the serving of wine and beer at events. Such serving will be limited to those persons who can prove attainment of the minimum legal drinking age in New York State of 21 years. To facilitate quick identification of students of legal age at the point of service, a process of carding that requires the presentation of a Cooper Union ID will be carried out by a security available solely for that purpose and paid for by the student exhibitors. There are no exceptions to this requirement.

4. Such events must include the serving of food, in sufficient amount for the number attending, and the displaying of a variety of non-alcoholic beverages must be featured as prominently as alcoholic beverages and dispensed in the same area.
5. The promotion of alcohol in advertisements for events is not permitted.
6. Event sponsors must not only refuse to serve alcoholic beverages to anyone who appears intoxicated, but also must provide appropriate assistance to such persons. Assistance may include, but is not limited to, providing safe transportation arrangements for intoxicated guests and arranging for medical help.
7. State law requires that a U.S. or Canadian driver's license or non-driver identification card, a valid passport or an ID issued by the U.S. Armed Forces must be used as written evidence of age for procuring alcoholic beverages.
8. The amount of alcohol permitted shall reflect the number of students over 21 years of age at the event, as approved by the academic dean, and in no case shall exceed 48 (12 oz.) cans or bottles of beer or 12 (750 ml.) bottles of wine.
9. Event must comply with all Federal and New York State Laws.

Campus Security and Safety

The Cooper Union has been fortunate in maintaining an atmosphere where serious criminal activities have not occurred. Our goal remains to encourage the integrity, honesty and responsibility of each individual student to maintain an atmosphere of harmony and mutual respect.

Every incident of behavior that seems inconsistent with our philosophy and principles of safety and security should be reported to appropriate campus authorities. The guards in the lobby of each building should be notified immediately of any emergencies. Depending on the circumstances, it may also be appropriate to call the police at 911.

Students and staff should also file an incident report with either Campus Safety and Security or with the Office of Student Services. Such reports help The Cooper Union respond to breaches in security. The director of Campus Safety and Security maintains a daily log of such incidents. This log is available for inspection in room 111, 41 Cooper Square.

When appropriate, information about such incidents shall be disseminated to the community as a whole via fliers or memoranda.

The Campus Crime Awareness and Campus Security Act of 1990 requires colleges and universities to make available to all current students and employees and to all applicants for enrollment or employment statistics concerning the prevalence of certain types of crime on campus and in the neighborhood. These statistics are published annually in the Campus Safety, Security and Fire Safety Report available on the Cooper Union website and from the Office of Student Affairs, 29 Third Avenue, 3rd floor, New York, NY 10003. Crime statistics are available online.

Code of Conduct

Preamble: As an educational community, The Cooper Union affirms the freedom of its students to pursue their scholarly, artistic and intellectual interests. The Cooper Union has developed policies to safeguard this freedom and to maintain an environment conducive to academic endeavor. These rules are not intended to replace federal, state or municipal laws. All Cooper Union students are responsible for upholding such laws, and any violation of law may result in disciplinary action being taken by The Cooper Union.

In addition to the Standards of Conduct defined below, students are bound by the rules of their individual school or program, and any rules regarding the use of the facilities or equipment at The Cooper Union, including, but not limited to, classrooms, the library, the Great Hall, the Student Residence, the Computer Center, laboratories, shops, studios, and other facilities.

The Cooper Union has established separate policies, published elsewhere, to adjudicate claims of academic dishonesty, and claims of discrimination or harassment against a protected class (e.g., race, sex, and disability).

The Cooper Union reserves the right to modify and/or amend this Code at any time it deems necessary and in accordance with applicable laws.

Part One: Student Rights

Students have certain rights established by federal, state or local statutes or under institutional policy. Among these rights, but not limited to these alone, are:
The freedom to engage in free discussion, inquiry and expression.
The freedom of access to public records.
The freedom of association.
Freedom from assault.
The right to express views on issues of institutional policy.
Freedom of the press.
Freedom from discrimination on the basis of age, race, religion, sex, color, disability, sexual orientation, ethnicity, national origin, or any other legally protected characteristic.
Freedom from discriminatory or sexual harassment.
Freedom from improper academic evaluation.

Part Two: Standards of Conduct for Students

Category A The Cooper Union finds the following violations extremely serious and subject to the highest penalties:

1. Physical assaults resulting in injury, including sexual assaults.
2. The sale of drugs in a manner that violates federal or state law.
3. Possession of drugs, as defined as a felony, under state or federal law.

4. Undermining campus safety by setting off false fire alarms, discharging fire extinguishers, tampering with security systems, or ignoring the instructions of security guards or studio monitors.
5. Possessing or introducing dangerous weapons to campus in the manner prohibited in the Weapons Policy.
6. Violations of campus alcohol policy that result in injury or damage to property or undermine the safety and security of the campus community, including acts of hazing.
7. Acts of fraud. Some examples of these acts, but not limited to the following, are: misrepresentation, falsifying records or documents, assuming the identity of another person, or furnishing fraudulent information.
8. Acts of theft or vandalism (including graffiti) against the property of another student, guest, staff or faculty member or against the property of Cooper Union itself.
9. Reckless behavior involving the interior or exterior structures of campus buildings. Some examples of these acts, but not limited to the following, are climbing the grid of 41 Cooper Square, hanging over terrace balustrades, and accessing the roof of the Student Residence.

For these categories of violation, the sanction will ordinarily be suspension or dismissal. In some cases, the Presidential Right of Summary Suspension will be invoked.

Category B The purpose and ideals of The Cooper Union depend, for their full achievement, on respect, cooperation and integrity among members of the community. The Cooper Union has adopted the following rules of behavior in the interests of maintaining an orderly atmosphere.

1. At all reasonable times, a student shall comply with a request for identification from an employee or security guard of The Cooper Union.
2. Students will respect the building hours and will leave the premises at the appropriate time.
3. Students will cooperate with the staff supervising the facilities of The Cooper Union.
4. Except for actions protected under state or federal law or the institutional governances, a student may not willfully obstruct or disrupt any authorized activities on college premises or other Cooper Union activities, including its public service functions.
5. A student may not engage in libel or slander.
6. A student may not be involved in acts that cause physical or psychological harm.
7. A student may not consume, buy, sell, borrow, possess, lend or give as a gift any drug, narcotic, or alcoholic beverage in such a way that would be a violation of any local, state or federal law or the institutional alcohol policy.

8. When a student has a guest on campus, the appropriate guest procedures must be followed, and the student is responsible for the conduct of his or her guest and for any damages caused by that guest.
9. The use of the computer and network facilities is for the purpose of supporting the educational experience at The Cooper Union. Unauthorized or inappropriate use of these facilities is prohibited. Misuse may include, but is not limited to, damaging or altering records or programs; invading the privacy of other users by using or manipulating directories, files, programs or passwords; engaging in disruptive behavior; illegally duplicating or copyrighted or licensed software; using the facilities in support of a commercial concern or venture or any unauthorized use of network and/or computer hardware, software, accounts or passwords.
10. A student may not gamble for money or other valuables while on the campus of The Cooper Union.
11. A student may not threaten members of the Student Judicial Committee or attempt to tamper with witnesses to the Student Judicial Committee.
12. A student may not smoke within any Cooper Union building or within 20 feet of the entrance to any Cooper Union building.

Category C: Other Complaints. The Student Judicial Committee may also consider complaints that are not delineated under Category A or Category B above, provided that the person against whom the complaint is made is notified in writing as to whether the proceeding will follow the rules of Category A or Category B, delineated below.

Part Three: Presidential Right of Summary Suspension.
Subject to prompt review, the president of The Cooper Union may summarily suspend a student from the college when, in his or her best judgment, such immediate action is necessary for protecting the health and safety of the college and/or any member of the college community. The president will consult with the student's academic dean prior to such action, if time permits. Any person so suspended shall have all the rights as outlined in The Code of Conduct. Summary Suspensions must be reviewed by a judicial panel within seven regular business days of the suspension. Until and unless the accused is found to have violated the Standards of Conduct, his/her status as a member of the Cooper Union community shall not be altered. Any person so suspended shall have the right, if the suspension is not upheld, to excused absences from all classes and examinations during the suspension period.

Part Four: The Cooper Union Student Judicial Committee

1. Jurisdiction. The Student Judicial Committee of the Joint Student Council shall have jurisdiction of all matters involving an alleged violation of the Standards of Conduct stated above.

2. Membership. Each student council shall elect two representatives and two alternates to the Student Judicial Committee and one representative and one alternate to the Judicial Appeals Committee. Student Judicial Committee members must be elected to the Joint Student Council with plurality and cannot be on probation for academic reasons or have been issued a sanction by the Student Judicial Committee. Judicial panels shall ordinarily be chosen from members of the Student Judicial Committee; however, any member of the Joint Student Council eligible to serve on the Student Judicial Committee can serve on a judicial panel if necessary.

3. General Rules. Proceedings conducted by the Student Judicial Committee are completely independent of any civil or criminal proceeding and may occur simultaneously with such court action. The Student Judicial Committee is administrative, rather than criminal or civil, in nature. The standard of proof applied by the Student Judicial Committee shall be "preponderance of the evidence." Judicial Panels do not use technical rules of evidence. Committee members may take notice of any matter in the common experience of Cooper Union students.

Before calling a Judicial Panel, the dean of students shall review the list of eligible panelists for possible prejudice with the complainant and the person being accused. The dean of students shall notify the members of the Judicial Panel as to the time and date of the hearing. This does not preclude the dean of students from acting as witness, if necessary.

Representatives to the Student Judicial Committee may also serve as mediators in informal hearings.

All hearings shall be considered confidential except when applicable law mandates disclosure to the community; the complainant, however, shall have the right to be notified as to the result of the hearing.

Every student charged under The Code of Conduct shall be presumed not to have violated The Code of Conduct until the Judicial Panel arrives at its decision.

If, because of a disability, a student participating in the any stage of the hearings (or subsequent appeals process) in any capacity requires a modification to policies, practices, or procedures, and/or an auxiliary aid or service the student should submit such a request in writing to the dean of students at least five days prior to the scheduled start of the hearing so that the request can be appropriately assessed prior to the start of the hearing.

4. Judicial Panels for Category A Violations. For a Category A offense, the Judicial Panel shall be a subcommittee of the Student Judicial Committee drawing one representative from each student council plus any two administrative officers of The Cooper Union. The associate dean of the school in which the student charged in the complaint is registered shall ordinarily be invited to participate as one of the administrative officers on the Judicial Panel in the Category adjudication. Persons charged with a Category A offense have the right to a representative of his or her choice at his or her expense, but the representative's role will be limited to providing support to the person being charged. Cooper Union may also appoint a lawyer to such committee to serve as an adviser to the committee members.
5. Judicial Panels for Category B Violations. For a Category B offense, the Judicial Panel shall be a subcommittee of three from the Student Judicial Committee, generally one representative from each school.

A Judicial Panel formed under the rules of Category B has the right to stop the hearing and request that the case be heard instead under Category A Rules, so long as the parties are notified and the Category A hearing is scheduled within 7 days.

Part Five: Procedures for Filing Charges

1. Any member of the Cooper Union community may file a written complaint about an infraction of the Standards of Conduct by a student. Such complaint should be addressed to the Student Judicial Committee and delivered to the Office of Student Services, 29 Third Avenue, 3rd floor, New York, NY 10003, Attention: Dean of Students.
2. A complaint must be made within 30 days of the alleged infraction.
3. The complaint must set forth the basic facts of the alleged infraction, including the date, time, and place in which the incident occurred.
4. The dean of students will meet with the complainant to determine if the complaint can be resolved informally or through mediation. The penalties of warning, probation or loss of privileges may be meted out in these cases by the dean of students, with the agreement of all parties concerned.
5. Absent a successful resolution, the dean of students will schedule a hearing within 10 business days. S/he will notify the student being charged by letter of the charges, place and time
of the hearing, and whether it will be conducted as a Category A or B hearing.

Part Six: Procedures for Conducting Hearings

1. The Judicial Panel shall elect one of its members to be chairperson and to preside over the hearing. The person presiding shall exercise control over the proceedings to avoid needless consumption of time and to achieve orderly completion of the hearing. Any person who disrupts a hearing, including the parties to the complaint, may be excluded by the person presiding.

2. The failure of the student charged to appear at the stated time and place shall constitute a waiver of the right to a hearing. The complainant shall have the option of not appearing at the hearing; however, a complainant cannot selectively attend portions of the hearing but must follow the instructions of the chairperson.
3. Any person being charged, having appeared at the hearing, shall have the right to contest the acceptance into the record of any evidence presented in support of the charges.
4. Each party shall have the right to summon witnesses, provided that a list of these is presented to the dean of students 72 hours prior to the hearing. The chairperson of the hearing shall have the right to exclude witnesses who appear to offer redundant testimony.
5. Each party may question the other party's witnesses, under the supervision of the chairperson.
6. The chairperson shall summon witnesses into the hearing room and ask them to withdraw once they finish testifying.
7. Hearings shall be taped on an audio recorder. Tapes shall be destroyed at the expiration of the appeal process.
8. After testimony is concluded, the panel shall come to a decision and present the decision in writing to the person being charged, either by hand or by mail to the last address given by the student.
9. In the event of a disciplinary dismissal, the president shall review the recommendation before it is put into effect.

Part Seven: Disciplinary Sanctions

By majority vote, the Judicial Panel may impose any of the following sanctions. The Student Judicial Committee will retain a written copy of the sanction in its file until the student permanently separates from The Cooper Union.

1. Warning. A warning in writing, in the case of a minor infraction, that further violation of the Standards of Conduct may result in a more severe disciplinary sanction.
2. Loss of Privilege. In cases that involve breaking the rules of a specific facility, students may lose the privilege of using that facility on a temporary or permanent basis or have the hours of their use restricted.

   A student who loses privileges may also be issued a warning or higher penalty.
3. Behavioral Probation. A letter of censure given in instances of more serious violations of the Standards of Conduct. Behavioral probation is a trial period in which a student who has been in difficulty has the opportunity to demonstrate that he or she can be a responsible member of the community. The terms of the probation may be varied to fit the individual circumstances.

4. Suspension. Given in cases where it is judged that the student should be removed from the college community. This penalty is for a stated period of time, either one semester or one year. A suspended student is prohibited from being on any Cooper Union premises during the period of the suspension without written authorization from the Office of the President. A notification of the suspension will be sent to the Office of the Registrar, the Office of the President, and the Office of Buildings and Grounds as well as to the student's academic dean.
5. Dismissal. Subject to the approval of the president of the college before taking effect, a disciplinary dismissal involves involuntary and permanent dismissal from the college. The president shall have the right to accept, reject or modify the proposed dismissal. The dismissal will be a permanent part of the student's file and will be noted on his or her transcript.
6. Other Actions. The Judicial Panel may impose other penalties that it deems appropriate to the infraction. Examples of such penalties are: financial restitution for damages or for medical expenses, letters of apology, community service work, etc.
7. Legal Action. The above listed penalties shall be in addition to any penalties or liabilities pursuant to the laws of the State of New York, both civil and criminal. Cooper Union or its designee may, at its discretion, depending on the gravity of the violation, file a criminal or civil complaint. Filing an action under this Code does not preclude the complainant from also filing a civil or criminal complaint.

Part Eight: Appeal Process

1. Filing an Appeal. Any student found to have violated any of the Standards of Conduct may appeal the decision of the Judicial Panel within 4 business days by writing a letter to his or her academic dean setting forth the reasons why the appeal is being made. The dean will convene an Appeal Board within 5 days of receiving the appeal letter.
2. Composition of the Appeal Board. The board will consist of two students and one academic dean. Ordinarily, the academic dean and one of the students shall come from the same school as the appellant. The remaining student shall be from one of the other schools. Alternates may replace student representatives and have full rights to vote on the appeal board.
3. Limitations of the Authority of the Appeal Board. The Appeal Board shall limit its review to these issues:
—does the record show that the party had a full and fair opportunity to present his or her case?
—was the sanction imposed fair and proper in light of the infraction proved?

4. Decision of the Appeal Board. After considering the record and the letter of appeal, the Appeal Board may:

a. Accept the decision of the Judicial Panel;

b. Return the case to the Student Judicial Committee for a further hearing in keeping with the Appeal Board's instructions;

c. Reverse the Judicial Panel's decision and dismiss the case;

d. Accept the Judicial Panel's decision but reduce the sanction.

The sanction may not be increased.

If the Appeal Board accepts the decision of the Judicial Panel, whether or not it reduces the sanction, the matter shall be deemed final.

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Antoinette Torres, vice president, institutional effectiveness

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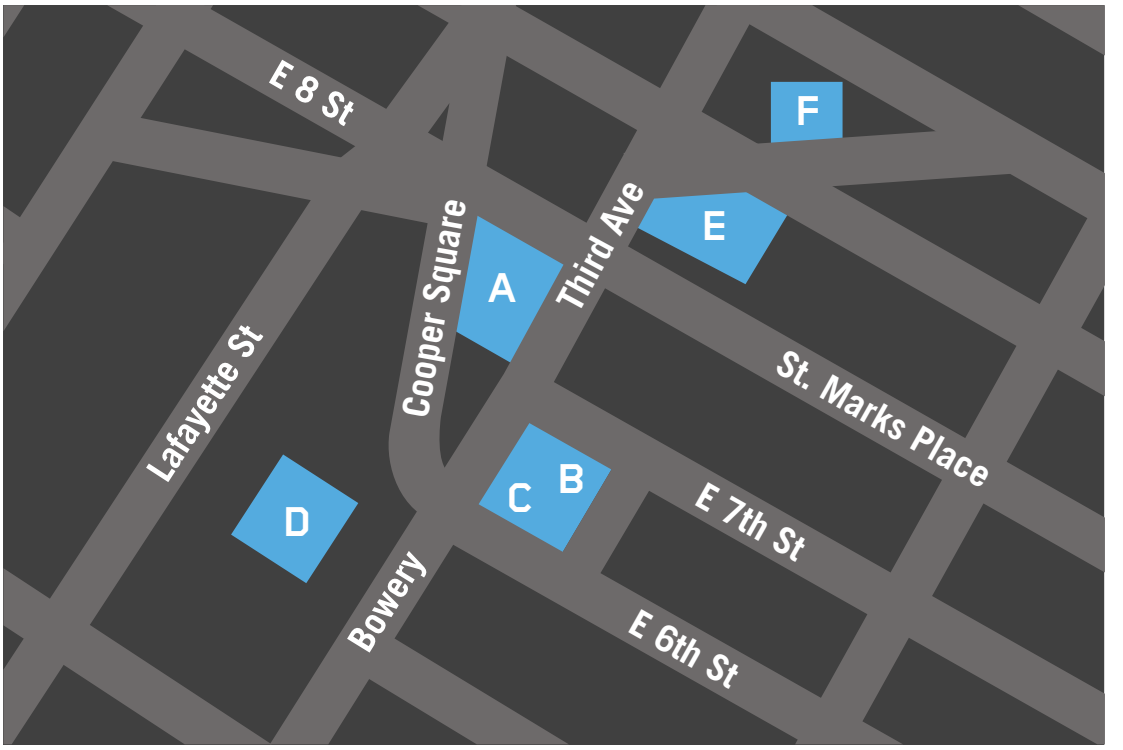
CAMPUS MAP



The Foundation Building (A)
7 East 7th Street
between Third & Fourth Avenues

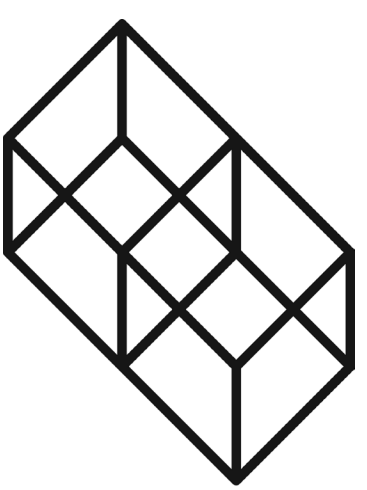
41 Cooper Square (B)
Third Avenue between 6th & 7th Streets

Office of Enrollment
Admissions/The Hub (C)
41 Cooper Square
Entrance on 6th Street

Administrative Offices (D)
30 Cooper Square
Fourth Avenue between 5th & 6th Streets

Residence Hall (E)
29 Third Avenue

Stuyvesant Fish House (F)
21 Stuyvesant Street
View Map



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