

GRADUATE PROGRAM IN CHEMICAL ENGINEERING

The department participates in [graduate education](#) leading to the master of professional studies (M.P.S.), master of science (M.S.) and doctor of philosophy (Ph.D.) degrees in Paper and Bioprocess Engineering. Four options are available within this program:

- [Paper Science and Engineering \(PSE\)](#)
- [Bioprocess Engineering \(BPE\)](#)
- [Biomaterials Engineering \(BME\)](#)
- [Sustainable Engineering Management \(SEM\)](#)

The graduate program allows students to investigate a diverse range of topics in the area of pulp and paper design, process and product development, and manufacturing, as well as the production of chemicals, energy and other products from sustainable raw material sources using both chemical and biological methods. The overall objective of the option is to educate students at the M.P.S., M.S. and Ph.D. level in the development of new processes and products that can be produced in an ecologically sound and sustainable manner.

Options

Paper Science and Engineering Option

The PSE program offers these areas of study:

- Pulping and Bleaching Processes (M.S., Ph.D.)
- Colloidal Chemistry and Fiber Flocculation (M.S., Ph.D.)
- Fiber and Paper Physics (M.S., Ph.D.)
- Process and Environmental Systems Engineering (M.P.S., M.S., Ph.D.)
- Pulp and Paper Technology (M.P.S.)

Bioprocess Engineering Option

Projects conducted in the department under this option develop fundamental knowledge of biorefinery processes for application in the production of a wide spectrum of industrial products and fuels from bioresources, primarily lignocellulosics.

Research is also supported by various U.S. federal and N.Y. state governmental agencies, sometimes in conjunction with private industrial partners.

The BPE program offers areas of study in:

- Biocatalysis and Bioreaction Engineering (M.S., Ph.D.)
- Bioseparations Engineering (M.S., Ph.D.)
- Bioprocess Design, Simulation and Control (M.S., Ph.D.)
- Bioenvironmental Engineering (M.S., Ph.D.)
- Renewable Energy and Biofuels (M.S., Ph.D.)
- Biopharmaceuticals (M.S., Ph.D.)
- Industrial Biological Processes (M.S., Ph.D.)
- Bioprocess Engineering (M.P.S.)

Biomaterials Engineering (BME) Option

The BME option in the Paper and Bioprocess Engineering program offers areas of study in:

- Biocomposite Materials, Biopolymers (M.S., Ph.D.)
- Bioactive Materials and Biosensors (M.S., Ph.D.)
- Nanocomposites and Nanostructured Materials (M.S., Ph.D.)

Sustainable Engineering Management (SEM) Option

The program in Sustainable Engineering Management allows students to investigate a variety of science and engineering topics together with courses in business, management, policy, law and other fields to form a Professional Science Master's program (PSM) recognized by the Council of Graduate Schools.

Students in this program must complete a total of 36 credit hours. The topical core of the program consists of 21 credit hours of courses in their technical field. An additional 12 credits of courses in business, management, policy, law and other areas constitute the "plus" courses in the degree. An integrative experience (3 credit hours) in the form of an internship or research experience is also required. The selection of the "plus" courses as well as technical electives allows students to develop study programs tailored to their individual interests and strengths.

The M.P.S. program in Sustainable Engineering Management is intended for students who:

- have a B.S. degree in an appropriate STEM field and wish to extend their technical knowledge in this area together with obtaining professional skills characterized by the "plus" courses
- have worked in the industry and wish to return for a professional degree that incorporates business skills into the program.

Students entering the M.P.S. program should have a B.S. degree in a science- or engineering-related field. In terms of coursework, students should have the necessary prerequisites to take the courses that are required for the degree or be prepared to take these courses prior to taking the required courses. In general, students should have taken as part of their undergraduate program at least two semesters of calculus, two semesters of general chemistry, a semester of physics and a semester of biology. Additional chemistry, biology, and computer science courses, while not required, would be helpful.

The SEM M.P.S. offers areas of study in:

- Bioprocess Engineering
- Paper Engineering

Wood Science Options

Ph.D. and M.S. Options in Wood Science

Applicants for the M.S. or Ph.D. degrees in the wood science option are required to have a bachelor's degree in science, engineering or related degree. Applicants must have completed at least one semester of coursework in chemistry, biology, physics and calculus.

Areas of study in Wood Science include: Wood drying, wood anatomy and ultrastructure, wood durability and decay, tropical timbers, wood preservation. Applicants must have the appropriate undergraduate degree for the area of study they pursue.

M. P. S. Options in Wood Science

The M.P.S. in Wood Science is open to students with a demonstrated interest in wood science or the wood products industry. A bachelor's degree in science or engineering is strongly recommended. Applicants to the M.P.S. in wood science and technology should have completed at least one semester of coursework in chemistry, biology, physics, and calculus.

Two coursework options are available:

M. P. S. Coursework

Core courses (12-21 credits), construction management courses (3-9 credits), application electives (3-9 credits), professional experience/synthesis (3-6 credits). Courses are selected in consultation with and with approval of the steering committee.

Core courses (12-21 credits):

Construction Management courses: (3 to 9 credits) (or others with committee approval)

Required Courses

CME 587

CME 596

CME 682

CME 686	Wood-Water Relationships	3
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CME 770	Biodegradation of Wood	3
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MCR 580	Microtechnique of Wood	3
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MCR 680	Fundamentals of Microscopy	3
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Required Courses

CME 543	Construction Estimating	3
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CME 653	Construct Plan/Scheduling	3
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CME 654	Construction Project Mgt	3
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Application Electives: (3-9 credits) (courses selected with committee approval)

Professional Experience/Synthesis (3-6 credits):

Required Courses

CME 898	Prof Experience/Synthesis	1 - 6
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* **Special Course Codes** (Code indicates course meets certain program or accreditation requirements. Ignore if there is no relevance to this program of study.) **G** = General Education Course (GenEd), **E** = Engineering, **ES** = Engineering Sciences, **M** = Mathematic, **NS** = Natural Sciences, **PE** = Professional Education, **S** = Summer-only

