Chemical and Molecular Engineering

Chairperson
Michael Dudley, Old Engineering Building 312 (631) 632-8500

Graduate Program Director
Devinder Mahajan, Old Engineering Building 210 (631) 632-1813

Graduate Program Admissions Administrator
Chandrani Roy, Sr. Staff Assistant

Degrees Awarded
M.S. in Chemical and Molecular Engineering; Ph.D. in Chemical and Molecular Engineering

Chemical Engineering

The Chemical and Molecular Engineering program, in the College of Engineering and Applied Sciences, offers graduate work leading to the Master of Science and Doctor of Philosophy degrees.

The main mission of the graduate program is to train the next generation of chemical engineers that will make important discoveries, develop new technologies, and apply innovative approaches to solve problems related to the production or use of drugs, food, chemicals, fuel and other products. Our programs in Chemical and Molecular Engineering offer students an extensive curriculum with the opportunity to pursue advanced studies and gain knowledge of chemical engineering theory and its relationship to related engineering processes, including catalysis, nanotechnology, computational modeling, environmental science, fluid mechanics, rheology, materials processing, polymers, thin films, biochemical, biomedical, biotechnology, separations, transport phenomena, and thermodynamics. The motivating philosophy of the graduate program is to provide the student with a broad knowledge in theoretical and experimental techniques to ensure that students graduate with the skills necessary for professional research and teaching in the chemical engineering field.

The faculty in the Chemical and Molecular Engineering program are actively involved in research in different areas and work with graduate students on projects that have both applied and fundamental aspects.

Research Areas

Research areas for the graduate program include Catalysis, Environmental Engineering, Nanotechnology, Nanotoxicology, Drug Delivery, Polymers, Energy Science and Computational Modelling.

Chemical and Molecular Engineering, MS and PhD

The MS degree in Chemical and Molecular Engineering is primarily a degree for students who wish to equip themselves with a more solid foundation in the principles of chemical and molecular engineering for further advanced study or pursuing a career as professional engineers. Master's degree candidates may elect a thesis or non-thesis option.

The PhD degree in Chemical and Molecular Engineering provides a thorough grounding in the fundamental principles of chemical engineering, as well as an intensive research experience. This degree is mainly designed to prepare students for a research career in academia, government or private laboratories, R&D in industry, or elsewhere.

Admission:-

We are excited that you are considering our Graduate Program. Chemical and Molecular Engineering department offers admission to M.S. and Ph.D. programs. The Ph.D. program is intended for students who wish to pursue a research-oriented career, while M.S. program is intended for students who are looking for advanced positions in industry. Admission to the Ph.D. program is more competitive than the M.S. program.

To apply for Graduate Studies in Chemical and Molecular Engineering at Stony Brook you must fill out and send online application. You can fill out the application online at Graduate School’s web site. Please note that there may be more steps involved than simply filling out the form online. Please note that there are no application fee waivers. Also, when sending the required application documents please include a photocopy of your GRE and TOEFL scores besides having official scores sent.

Requirements

Admission to the M.S. and Ph.D. Programs are handled separately by the departmental Admissions Committee. The requirements for admission to graduate study in CME include:

1. Bachelor's Degree: A bachelor's degree in CME (or a closely related field).
2. A grade average of at least B (i.e., 3.0/4.0) in all mathematics, engineering, and science courses.
3. GRE Examination. All applicants to the MS or PhD program must submit Graduate Record Examination (GRE) scores for the general aptitude tests. Applicants are encouraged to submit GRE test scores for the advanced examination in Computer Science as well.
4. Submission of TOEFL Test scores for all students whose native language is not English. Minimum TOEFL score of 85 is required for general admission and 90 for admission to a doctoral program and to be eligible for consideration for GA/TA support. Masters students that have completed a degree program from a U.S. institution may be eligible for a TOEFL waiver and need to request the waiver from

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our Graduate Program Director. All PhD applicants with a TA stipend whose native language is not English must demonstrate a sufficient level of English-speaking proficiency (TOEFL Speaking score) and may be required to take ESL courses based on these measures.

Deadlines

Listed below are the application deadlines associated with Spring admission. Please be sure to follow them as listed.
October 1: Application deadline for all applications and deadline for supplementary materials for international students
Listed below are the application deadlines associated with Fall admission. Please be sure to follow them as listed.
January 15: Application deadline for international students and PhD applicants
March 1: Deadline for supplementary materials from international students
If you have any questions about these deadlines feel free to contact the department.

Application Instructions

All applications must be submitted online. All additional required documents, such as, official transcripts, recommendation letters, etc. must be sent directly to our department.
Please do not put your additional required documentation in any type of binder, portfolio, or report cover.
Mail your application materials to the following address:
Stony Brook University
Department of Chemical and Molecular Engineering
Engineering, Room 208
Attn: Graduate Program Secretary
Stony Brook, NY 11794-2300
USA

The Graduate School application fee is $100* and is non-refundable. It is required for applicants from all countries.

Checking on the Status of your Application

Fall applications are reviewed in February. If your application file is missing anything, you will receive an e-mail from the department. Due to the high volume of applications we receive, we can’t respond to e-mails checking on status until AFTER April 10th.
Offer letters will begin to be mailed out in March. We ask that you do not send us numerous e-mails checking on the status of your application or telephone us regarding application status.
If you do NOT receive a letter of offer from us by April 10th, you should then contact us if you have any questions.
We appreciate your patience during this busy time of year.

Financial Support

Admitted Ph.D. students are typically offered financial support in the form of teaching or research assistantships, which include full tuition. Admission into this program is very competitive, though, and you must have the intention of completing this program. M.S. students are typically admitted with no financial aid. Information regarding tuition and other costs can be found from the Graduate School.

Transfer of credits into M.S. or Ph.D. programs

Students may transfer up to 9 credits of graduate courses obtained from another US accredited university. The following conditions and procedure is required to transfer any credits.
In order to be counted towards graduation, the credits must be evaluated by CME graduate director or one of our faculty members. The evaluation must establish equivalence between a course being transferred from another institution and a CME course in Stony Brook, which is accepted as part of the graduation requirements. The faculty member must be one of those who are teaching the corresponding graduate course on a regular basis. The professor typically evaluates the course materials/contents, student transcripts, etc. The approval is not automatic and we generally take a very careful look at such transfer requests.
Graduate courses that do not meet the previous requirement can be transferred without being counted towards graduation. This can sometimes be useful because students who have earned 24 graduate credits of any kind need to be registered for only 9 credits (instead of 12) in order to have full status. Therefore, gaining this status early might reduce tuition liability.

**M.S. to Ph.D**

A student in the M.S. program can subsequently apply for admission into the Ph.D. program, but should keep in mind the higher standards for entry into the Ph.D. program. The CME Ph.D. program recognize M.S. degree from other accredited US institutions, person that has M.S. degree in CME can be exempt from the mandatory course requirements for the PhD, totaling 24 credits. The student will be accepted as G5 level student and expected to complete remaining credits and requirements towards the Ph.D. degree.

University Labs and Centers:

- SensorCat New York State Center for Advanced Technologies
- Geospatial Center
- Trace Element Laboratory
- Trace Organic Chemical Mass Spectrometry Laboratory
- Flax Pond Marine Laboratory

Southampton Marine Station

Advanced Energy Research and Technology Center

Center of Excellence in Wireless and Information Technology

External Labs and Facilities:

- National Synchrotron Light Source (NSLS) II, Brookhaven National Lab.
- Center for Functional Nanomaterials (CFN), Brookhaven National Lab.

**Requirements for the MS in Chemical and Molecular Engineering**

In addition to the minimum requirements of the Graduate School, the requirements for the M.S. degree in the Program for Chemical and Molecular Engineering can be satisfied by either one of the two following options:

**M.S. Non-Thesis Option**

A. **Election**

The election of this option must be made by the student upon admission to the program and is considered a terminal degree.

B. **Coursework**

- A minimum of 30 graduate credits with a grade point average of 3.0 or better in all graduate courses taken is required to graduate. All credits must be from coursework.
- The 30 credits must include the following four core courses: CME 501,502,503 and 504.
- Only nine credits of CME 696 Special Problems in Chemical Engineering are allowed.
- All courses taken outside the Department require permission from the Graduate Program Director.

**M.S. Thesis Option**

A. **Election**

The election of this option must be made by the student upon admission to the program and is normally considered part of the Ph.D. sequence. Students may not transfer to the Non-Thesis Option while registered for a Thesis Master’s or a Ph.D. degree.

B. **Coursework**

- A minimum of 30 graduate credits is required to graduate. These include: At least 24 credits must be from coursework, a maximum of 6 credits of research, and a maximum of 6 credits of special topics.
- The 30 credits must include the following four core courses: CME 501,502,503 and 504.
- In addition, all students who are supported as Teaching Assistants must complete CME 555 Teaching and Mentoring Techniques and CME 698 Practicum in Teaching.
- All courses taken outside the Department require permission from the Graduate Program Director.

C. **Thesis**

For the student who elects to complete a thesis for the M.S. degree, the thesis must be approved by three faculty members, at least two of whom are members of the Department of Materials Science and Engineering, including the research advisor.

D. **Final Recommendation**
Upon fulfillment of the above requirements, the Graduate Program Committee will recommend to the Dean of the Graduate School that the Master of Science degree be conferred or will stipulate further requirements that the student must fulfill.

E. Transfer to Other Options
Transfer to another degree option in the Department can be made only with the written permission of the Graduate Program Director.

Requirements for the Ph.D. Degree in Chemical and Molecular Engineering

A. Plan of Work
Before completion of one year of full-time residence, the student must have selected a research advisor who agrees to serve in that capacity. The student will then prepare a plan of further coursework. This must receive the approval of the student’s advisor and of the Graduate Program Committee.

B. Coursework
- An average grade of B or higher is required for all courses.
- A minimum of 24 graduate course credits is required to graduate (excluding CME 599, 697, 698, and 699).
- The 24 course credits must include the following four core courses: CME 501, 502, 503 and 504. If the student does not receive a minimum of a B in a core course, he or she may repeat that course one other time.
- All students must complete CME 555 Teaching and Mentoring Techniques.
- The student must pass at least three credits of CME 698 Practicum in Teaching and six credits of CME 699 Dissertation Research on Campus.
- All courses taken outside the Department require permission from the Graduate Program Director.
- All PhD students must act as teaching assistants for five semesters (regardless of support), and they must register for CME 698 Practicum in Teaching - 0 credits for four semesters, 3 credits for one semester.

C. Preliminary Examination
The preliminary examination must be taken before the beginning of the student’s fifth semester. This is an oral examination designed to test the student’s ability to utilize his or her chemical engineering background to carry out research in a chosen field of study, and to make clear written and oral presentations of research. At least ten days prior to the examination, the candidate should submit a research proposal (10-15 pages) to the examiners that places the research in context of other work in the area, demonstrates original thought, clearly outlines its broader impact, and provides a sustainable timeline for its completion.

The examination committee will consist of three Chemical and Molecular Engineering faculty members, and one member from another department or institution. If a second examination is required, it must be completed by the tenth week of the fifth semester.

Once the student has advanced to candidacy, the student must report to the committee at least once a year before the end of the spring semester on progress towards his/her dissertation.

D. Advancement to Candidacy
After the student has successfully completed all requirements for the degree, other than the dissertation, he or she is eligible to be recommended for advancement to candidacy. This status is conferred by the Dean of the Graduate School upon recommendation of the Chairperson and the Graduate Program Director.

E. Dissertation
The most important requirement of the Ph.D. degree is the completion of a dissertation, which must be an original scholarly investigation. The dissertation shall represent a significant contribution to the scientific literature, and its quality shall be compatible with the publication standards of appropriate and reputable scholarly journals. At least two semesters should elapse between the preliminary exam and submission of the dissertation.

F. Defense
The candidate shall defend the dissertation before the examining committee.

G. Time Limit
All requirements for the Ph.D. degree must be completed within seven years after completing 24 credit hours of graduate courses in the program.

Faculty

Distinguished Professors
Rafailovich, Miriam, Ph.D., 1980, Stony Brook University: Polymer nanocomposites; thin film wetting phenomena; atomic force microscopy; biomaterials; electrospun scaffolds; biomechanics; PEM fuel cells; BHJ solar cells; flame retardant materials.

Professors
Gersappe, Dilip, Graduate Program Director. Ph.D., 1992, Northwestern University: Polymer theory and simulation.

Mahajan, Devinder, Ph.D., 1979, University of British Columbia: Inorganic chemistry; fuel cells; catalysis; renewable energy.

Tannenbaum, Rina, Ph.D., 1982, Swiss Federal Institute of Technology: Chemical Engineering.

**Associate Professors**

Koga, Tadanori, Ph.D., 1998, Kyushu University, Japan, Physics: green nanofabrication of polymer thin films; chemical recycling of waste plastics and methane hydrate as a future energy resource.

**Assistant Professors**

Meng, Yizhi, Ph.D., 2003, Cornell University: Designing novel biomaterials for tissue engineering and nanotherapeutics.

Kim, Tae-Jin, Ph.D., 2007, Lehigh University: Energy and Environmental Heterogeneous catalysis, In-situ and Operando characterization, Reaction Engineering and Kinetics.

**Research Assistant Professor**


**Visiting Professor**

Garti, Nissim, Ph. D., 1974, Hebrew University of Jerusalem: Organic Chemistry; pharmaceuticals; nutraceuticals; drug delivery vehicles.

**Adjunct Faculty**

Butcher, Tomas, Ph.D., 1987, State University of New York at Stony Brook: Heat exchange units; biofuels; renewable energy.

DiMarzio, Donald, Ph.D., 1987, Rutgers University: Nanotechnology, nanocomposites.

Jurukovski, Vladimir, Ph.D., 1999, Stony Brook University: Cell and Molecular Biology.

Koga, Maya, Ph.D., 2005, Kyoto University: Polymer Physics; x-ray scattering; block copolymers; polymer rheology.

Pinkas-Sarafova, Adriana, Ph.D., 1990, Institute of Molecular Biology, Academy of Sciences, Bulgaria: Cell and Molecular Biology; GMP education and protocol development.

Zaitsev, Vladimir, Ph.D., 1992, Moscow State University, Russia: Chemistry.

*NOTE: The course descriptions for this program can be found in the corresponding program PDF or at COURSE SEARCH.*