DEPARTMENT OF CHEMICAL ENGINEERING

Chemical engineering encompasses the translation of molecular information into discovery of new products and processes. It involves molecular transformations—chemical, physical, and biological—with multi-scale description from the submolecular to the macroscopic, and the analysis and synthesis of such systems. The chemical engineer is well prepared for a rewarding career in a strikingly diverse array of industries and professional arenas. Whether these industries are at the cutting edge—e.g., nanotechnology or biotechnology—or traditional, they depend on chemical engineers to make their products and processes a reality. The effectiveness of chemical engineers in such a broad range of areas begins with foundational knowledge in chemistry, biology, physics, and mathematics. From this foundation, chemical engineers develop core expertise in engineering thermodynamics, transport processes, and chemical kinetics, creating a powerful and widely applicable combination of molecular knowledge and engineering problem solving. To cope with complex, real-world problems, chemical engineers develop strong synthetic and analytic skills. Through creative application of these chemical engineering principles, chemical engineers create innovative solutions to important industrial and societal problems in areas such as development of clean energy sources, advancement of life sciences, production of pharmaceuticals, sustainable systems and responsible environmental stewardship, and discovery and production of new materials.

The Department of Chemical Engineering at MIT offers four undergraduate programs. Course 10 leads to the Bachelor of Science in Chemical Engineering through a curriculum that prepares the graduate for a wide range of career pursuits. Course 10-B leads to the Bachelor of Science in Chemical-Biological Engineering, which includes the basic engineering core from the Course 10 degree and adds material in basic and applied biology. Course 10-ENG leads to the Bachelor of Science in Engineering, a more flexible curriculum that supplements a chemical engineering foundation with an area of technical specialization. Course 10-C leads to the Bachelor of Science without specification; this non-accredited degree requires fewer chemical engineering subjects. Undergraduates have access to graduate-level subjects in their upper-level years. Undergraduate students are also encouraged to participate in research through the Undergraduate Research Opportunities Program (UROP) (*http://web.mit.edu/urop*).

The department offers a broad selection of graduate subjects and research topics leading to advanced degrees in chemical engineering. Multidisciplinary approaches are highly valued, leading to strong ties with other MIT departments. In addition, the department maintains alliances, arrangements, and connections with institutions and industries worldwide. Areas for specialization include, but are not limited to: biochemical engineering, biomedical engineering, biotechnology, chemical catalysis, chemical process development, environmental engineering, fuels and energy, polymer chemistry, surface and colloid chemistry, systems engineering, and transport processes. Additional information may be found under Graduate Education (*https://catalog.mit.edu/mit/graduate-education*) and on the department's website (*http://web.mit.edu/cheme*).

The School of Chemical Engineering Practice, leading to five-year bachelor's and master's degrees, involves one term of work under the direction of an Institute staff member resident at Practice School sites. This program provides students with a unique opportunity to apply basic professional principles to the solution of practical industrial problems.