

# CHEMICAL ENGINEERING

## Graduate Programs

The School of Chemical Engineering offers programs leading to the Master of Science and Doctor of Philosophy. A program of independent study and research on a project under the direction of a member of the Graduate Faculty will be satisfactorily completed by all graduate students. For the Master of Science candidate, the project will result in a thesis. For the Doctor of Philosophy candidate, the project will result in a dissertation.

## Admission Requirements

Admission to either the Master of Science or Doctor of Philosophy degree program requires graduation from a chemical engineering curriculum approved by the ABET or a recognized equivalent from any international program.

Students with undergraduate degrees in other engineering disciplines or closely-related fields, such as chemistry, physics, mathematics, or biological sciences, are evaluated on an individual basis and a specific plan of study is developed for each student. This plan may include an additional 10 – 15 semester credit hours of undergraduate courses in Chemical Engineering. Admission is competitive based on undergraduate GPA, GRE and TOEFL (for international students), statement of background and goals, research experience and interests, and recommendations.

## The Master of Science Degree

A MS degree in Chemical Engineering from Oklahoma State University signifies that the recipient has demonstrated advanced knowledge of fundamental chemical engineering topics. In addition, an MS graduate has exhibited the ability to integrate this knowledge to solve complex quantitative problems in a logical manner.

## Course Requirements

The general credit requirement is 30 credit hours beyond the BS degree, including 24 credit hours of classwork and six credit hours of thesis research. Students must be enrolled in CHE 6010, Chemical Engineering Seminar, during the Fall and Spring semesters. The courses taken must include:

Code	Title	Hours
CHE 5123	Advanced Chemical Reaction Engineering	3
CHE 5213	Advanced Transport Phenomena	3
CHE 5743	Chemical Engineering Process Modeling	3
CHE 5843	Principles of Chemical Engineering Thermodynamics	3
CHE 5303	Introduction to Science and Engineering Research	3

## The Doctor of Philosophy Degree

A PhD in Chemical Engineering from Oklahoma State University signifies that the recipient has demonstrated a breadth of advanced knowledge in the subjects that form the foundation of chemical engineering. In addition, the graduate will have demonstrated the ability to independently and efficiently make creative, relevant, significant contributions at the forefront of knowledge in traditional or emerging fields within the Chemical Engineering discipline. The program is designed to prepare

the graduate with the widest possible career opportunities as a leader in industry and academia.

Breadth of advanced knowledge is demonstrated primarily by completion of a carefully prescribed “core” of class work. Additional courses may be selected by the candidate and/or prescribed by the Advisory Committee to assist in improving the candidate’s fundamental knowledge base or to allow the candidate to acquire specialized knowledge for the completion of a dissertation research project. A “Qualifying Examination” is used to show that a student has the necessary core knowledge and the potential to carry out independent research to successfully complete a PhD in chemical engineering.

The PhD experience allows the candidate to develop and demonstrate the independent, self-directed, and creative productivity of an accomplished professional. As such, the PhD experience must go well beyond directed classroom instruction, in which the professor chooses the content, assigns specific homework and grades short-term projects. Personal attributes developed during the PhD program include curiosity, perseverance, creativity, productivity, leadership, effective communication, interpersonal skills, and the ability to develop a comprehensive understanding of a study and its relation to societal needs. Accordingly, qualifications for undertaking the PhD degree are predicated on attributes such as the above, plus indications that the candidate can meet the expectations of independent, accomplished, and creative engineering work. A formal “Preliminary Examination” is administered to determine the student’s readiness to undertake the research component of the PhD program.

From the Preliminary Examination through the Final Defense of the Dissertation, the candidate develops and demonstrates the ability to: independently identify an area in which research is needed; assemble the relevant existing knowledge; develop the requisite experimental, computational, or theoretical skills; synthesize the existing knowledge, available skills and facilities into a scientifically defensible research plan; pursue the plan in an efficient and timely manner to realize a significant result; and organize and communicate his/her ideas and results in a professionally acceptable manner.

## Course Requirements

The general credit requirement is 60 credit hours beyond the BS degree, including 24 credit hours of research and 36 credit hours of classwork. Students must be enrolled in CHE 6010, Chemical Engineering Seminar, during the Fall and Spring semesters. The courses must include:

Code	Title	Hours
CHE 5123	Advanced Chemical Reaction Engineering	3
CHE 5213	Advanced Transport Phenomena	3
CHE 5743	Chemical Engineering Process Modeling	3
CHE 5843	Principles of Chemical Engineering Thermodynamics	3
CHE 5303	Introduction to Science and Engineering Research	3

The emphasis in coursework during a graduate degree is on depth of understanding of subject matter and on preparing students for careers in the areas of interest. Depth is obtained through “core” courses that address knowledge that is expected of all chemical engineers, while other courses are targeted toward a student’s research and specific career interests. The core areas include fundamentals and applications of mathematical modeling, thermodynamics, chemical reaction engineering,

and transport phenomena. The courses are structured to expand and add depth to a students' undergraduate knowledge.

The Introduction to Science and Engineering Research course is designed to accelerate student development towards the ability to define a research problem and develop a plan for its solution. Additional "elective" courses must be selected from graduate-approved courses in any department, with the advice and consent of a student's Research Advisor. During the Fall and Spring semesters, students will participate in a seminar class that will give them an overview of – and appreciation for – the wide range of chemical engineering knowledge and applications. Students also complete "research" courses, which includes working with their research Advisors on their MS thesis or PhD dissertation research projects.