

# DOCTOR OF PHILOSOPHY IN CHEMICAL ENGINEERING

The doctoral degree in chemical engineering is awarded in recognition of mastery in chemical/biological engineering and upon demonstration of an ability to make substantial creative contributions to knowledge in chemical engineering. The recipients of these degrees will be capable of a continuing effort toward advancement of knowledge and achievement in research while pursuing an academic or industrial research career.

## Curriculum

Minimum Credits Required	72	
Maximum Transfer Credit	32	
<b>Code</b>	<b>Title</b>	<b>Credit Hours</b>
<b>Program Requirement</b>		<b>(72)</b>
Total Minimum Credit Hours		72
<b>Core Courses</b>		<b>(15)<sup>1</sup></b>
CHE 501	Transport Phenomena	3
CHE 503	Thermodynamics	3
CHE 525	Chemical Reaction Engineering	3
CHE 530	Advanced Process Control	3
or CHE 536	Computational Techniques in Engineering	
CHE 535	Applications of Mathematics to Chemical Engineering	3
<b>Elective Courses</b>		<b>(21-33)</b>
Select 21-33 credit hours of 400-599 courses from any of the following disciplines: CHE, BME, MMAE, ECE, CAE, ENVE, BIOL, CHEM, PHYS and MATH including <sup>1</sup>		21-33
<b>Recommended</b>		<b>(1)</b>
CHE 593	Seminar in Chemical Engineering (Seminar in Chemical Engrng (or general seminars offered in energy and/or sustainability by WISER))	1
<b>Ph.D. Research</b>		<b>(24-36)</b>
CHE 691	Research and Thesis for Ph.D. Degree	24-36

<sup>1</sup> The upper limit for independent study coursework (CHE 597) is 18 credit hours used as elective credit.

Students should consult the Transfer Credit section of this bulletin for rules on how many credit hours may be transferred from another institution.

The graduate students currently enrolled in the program, who have not previously taken the written qualifying exam, become eligible for taking the Ph.D. qualifying exam (under the new process) after they have earned 2 As and 2 Bs (or better) in any four (4) ChBE core courses. Under the new process, the new qualifying exam should be taken no later than the end of the 4<sup>th</sup> semester after the student is enrolled in the Ph.D. program. If a Ph.D. student transfers the graduate level courses taken at other institutions (instead of transferring the entire M.S. degree), a maximum of three core courses may be substituted with similar courses taken at other institutions upon the approval of the adviser, one of the instructors of each course, and the ChBE chair (or the ChBE associate chair of the graduate studies committee). In such cases, student MUST satisfy a minimum average score of 3.5/4.0 in the remaining core courses to be eligible for taking the qualifying exam.

The comprehensive examination is oral and may include a written exam based on the student's performance on the qualifying exam. The exam questions will be formulated by the members of the Ph.D. examining committee. The examination will also include oral presentation and discussion by the student of a journal article selected a priori by the examining committee. The exam must be conducted within a year following completion of the qualifying exam. The Ph.D. examining committee, which may be the same as the Ph.D. thesis committee, should be suggested by the adviser and approved by the chairperson at least three weeks prior to the examination.

The thesis proposal examination, which is diagnostic in nature, should be conducted after the comprehensive exam and at least one year before the final thesis defense. The exam will be oral and will be administered by the Ph.D. thesis committee.

Doctoral research can begin after admission to the Ph.D. program. However, the major portion of the research should not be started until the comprehensive examination is passed and the thesis proposal is approved by the committee. All research must be conducted under the supervision of a full-time department faculty member and in the laboratories of the university. Off-campus research is possible with the approval of the department chairperson. The preliminary thesis draft must meet the approval of all members of the examination committee.

An oral examination in defense of the thesis is given as an open university seminar. The thesis defense must meet with the approval of the examination committee; if it does not, the committee has the authority to determine whether or not to grant a re-examination.