

## MASTER OF SCIENCE, MASTER OF ENGINEERING, AND DOCTOR OF PHILOSOPHY IN CHEMICAL ENGINEERING WITH SPECIALIZATION IN SURFACE ENGINEERING

Students in the graduate program in chemical engineering with specialization in surface engineering will be required to take a significant course load in surface engineering fundamentals where they will advance knowledge from science and basic engineering to surface engineering. Students will also have the opportunity to explore applications in surface engineering through coursework and research.

Upon completion of a graduate degree in chemical engineering with specialization in surface engineering, students will demonstrate:

- a) The ability to apply experimental and/or calculation based techniques in order to solve a research question in the field of surface engineering
- b) The ability to apply science and basic engineering to the field of surface engineering in order to solve upper level problems
- c) The ability to effectively present their research visually and orally through oral presentations, posters, and research publications

## MASTER OF SCIENCE IN CHEMICAL ENGINEERING WITH SPECIALIZATION IN SURFACE ENGINEERING

The M.S. Program has the following requirements:

- 1) The student must select a committee of at least three faculty with the majority of the faculty members being from inside the department. The committee must include the student's research advisor and academic advisor, which may be the same faculty member.
- 2) The MS degree requires 30 credit hours beyond the B.S. with the following requirements:
  - a minimum of 6 hours of thesis
  - a maximum of 3 hours of directed study
  - a minimum of 12 hours of 500-level or above, which must include at least 9 hours of core courses
  - a minimum of 6 hours outside of chemical engineering
- 3) The students graduate committee, the department chair, and the graduate dean must approve the course work used for the degree.
- 4) The student must write and successfully defend a thesis of their research in an oral public defense before their graduate committee.

## MASTER OF ENGINEERING IN CHEMICAL ENGINEERING WITH SPECIALIZATION IN SURFACE ENGINEERING

The M. Eng. Program has the following requirements:

The MEng degree requires 30 credit hours beyond the B.S. with the following requirements:

- a maximum of 3 hours of directed study
- a minimum of 12 hours of 500-level or above, which must include at least 9 hours of core courses
- a minimum of 6 hours outside of chemical engineering

## DOCTOR OF PHILOSOPHY IN CHEMICAL ENGINEERING WITH DISSERTATION IN SURFACE ENGINEERING

The Ph.D. requirements include the following:

1) Select a graduate committee that shall consist of a minimum of four members: (a) an academic advisor from the Chemical Engineering department, and (b) at least three other members, one of which must be from outside the department assigned. The research advisor may be the academic advisor or another member of the committee.

2) The PhD degree requires 48 credit hours beyond the M.S. degree with the following requirements:

- a minimum of 24 hours of dissertation
- a maximum of 6 hours of directed study
- a minimum of 12 hours of 500-level courses, which must include 9 hours of core courses
- a minimum of 6 hours outside of chemical engineering
- passing a written examination of chemical engineering fundamentals as well as a proposal defense prior to the end of their 2<sup>nd</sup> year of residency

3) 72 credit hours beyond the B.S. degree with the following requirements:

- a minimum of 24 hours of dissertation
- a maximum of 9 hours of directed study
- a minimum of 6 hours outside of chemical engineering
- a minimum of 24 hours of 500-level courses, which must include 18 hours of core courses

-passing a written examination of chemical engineering fundamentals as well as a proposal defense prior to the end of their 2<sup>nd</sup> year of residency

4) All course work must be approved by the student's graduate committee, the Chemical Engineering Department Chair, and the Dean of Graduate Studies.

5) Pass a preliminary exam composed of 3 written exams covering core areas of surface engineering. The exam must be taken by the end of the third semester. The student must pass all three exams individually. If the student fails one of the three exams, they may retake that exam the following semester and they must pass it to move on.

6) After passing the preliminary exam, the student must present a proposal of their research to their committee in a public forum and satisfactorily, to the committee, answer questions regarding their research. The research proposal must be attempted before the end of the semester after passing the preliminary exam. If a student fails, they may have one attempt to pass the exam taken the semester after the first attempt. If the student fails the exam, they may appeal to the department chair and/or graduate dean.

7. The admission to candidacy to the Ph.D. degree requires that the qualifying and candidacy examinations be passed and approved by the graduate committee; after which the student may enroll in CHE 5xx: Dissertation.

8. The student must write a final dissertation and defend it in an oral public defense before the student's graduate committee.

Additional requirements include the New Mexico Institute of Mining and Technology Graduate Program requirements.

#### CHEMICAL ENGINEERING CORE GRADUATE COURSES (\* indicates courses already offered at Tech)

CHE 5xx: Surfaces, Interfaces, and Colloids\* 3 cr, 3 cl hrs

CHE 5xx: Heterogeneous Catalysis 3 cr, 3 cl hrs

CHE 5xx: Design and Analysis of Experiments\* 3 cr, 3 cl hrs

CHE 5xx: Interfacial Transport Phenomena\* 3 cr, 3 cl hrs

CHE 5xx: Advanced Mathematics 3 cr, 3 cl hrs

CHE 5xx: Advanced Separation Processes 3 cr, 3 cl hrs

CHE 5xx: Surface Characterization Techniques 3 cr, 3 cl hrs

(5xx courses have not yet had a final course number assigned to them.)