

# COURSES FOR CHEMICAL AND BIOLOGICAL ENGINEERING

## Chemical and Biological Engineering Courses

### CHE512 Polymer Materials Engineering

Hours 3

Introduction to the manufacture, processing, and applications of organic polymeric materials. This course covers the chemistry of polymer manufacture, the molecular structures of polymers, and the structure-property relationships for thermoplastic and thermosetting polymers.

### CHE514 Computer Methods in Chemical Engineering

Hours 3

A survey of common software, data processing, and statistical analysis tools applied to chemical engineering, science, and general interest topics. This course covers the fundamentals of computer programming (coding) and problem solving for chemical engineering students. Offered primarily in the fall semester.

### CHE516 Stem Cell Bioengineering

Hours 3

This course will give introductory knowledge of stem cell biology and various bioengineering approaches used for their study and application.

### CHE518 Tissue Engineering

Hours 3

Tissue engineering is an emerging dynamic, experimental science in which engineering and biological science principles are used to develop techniques for improving or restoring the structure and function of tissue.

### CHE540 Health Safety Chem Process Ind

Hours 3

Health and safety in the chemical process industry that will introduce chemical engineering students to health and safety, regulations and the designs and procedures to meet them in the chemical process. Advanced topics will also be introduced, including current relevant topics such as recent accidents and ways and means of preventing a reoccurrence, advanced models of spills and advanced safety analysis. Several loss prevention topics are more complex than typically assigned to the undergraduate chemical engineering students. Advanced topics may include recent accidents and ways and means of preventing a reoccurrence, advanced models of spills and advanced safety analysis. Greater analysis, synthesis and evaluation-of-knowledge skills will be required.

Prerequisite(s): two courses from (CHE 304, CHE 305, CHE 306, CHE 324, CHE 354)

### CHE545 Introduction to Biochemical Engineering

Hours 3

Study of biological processes, application of chemical engineering skills to areas including enzyme kinetics, fermentation, cell growth, and metabolic processes.

Prerequisite(s): CH 231

### CHE551 Adv Thermodynamics I

Hours 3

Application of thermodynamic principles to chemical and phase equilibria.

### CHE552 Transport Phenomena

Hours 3

Development of the analogy between momentum, energy, and mass transport, with applications.

### CHE553 Computation In Chem Engr

Hours 3

Chemical-engineering applications of advanced calculus, numerical methods, and digital computer techniques, with emphasis on expressing physical situations in mathematical language.

### CHE554 Chemical Reaction Engr

Hours 3

Chemical kinetics theory and experimental techniques. Industrial reactor design by advanced methods.

### CHE570 Chemical and Biological Engineering Research Techniques

Hours 1

This course is an introduction to research skills required to perform scientific research in Chemical and Biological Engineering. Topics covered will primarily be related to research skill development, such as literature search, data processing, scientific critical analysis and effective scientific communication, both written and oral. Students will receive structured guidance from the class instructor (s), chemical engineering faculty, and their class peers throughout the semester.

Prerequisite(s): Qualified graduate students

### CHE591 Special Problems

SP

Hours 1-4

Open to properly qualified graduate students. Enhanced learning in a specific area. Credit is based on the amount of work completed.

Special Topics Course

### CHE592 Special Problems

SP

Hours 3

Open to properly qualified graduate students. Advanced learning in a specific area.

Special Topics Course

### CHE593 Chem & Biol Engr Practicum

Hours 3

This course is designed for Ph.D. students to further gain classroom and laboratory experience under supervised conditions. Tasks may include exploring design and development of course materials, grading for selected courses, structured lecturing, laboratory monitoring, utilizing modern instructional technology, and other related pedagogical exercises.

Prerequisite(s): MS and PhD students enrolled in The University of Alabama Chemical and Biological Engineering graduate program.

### CHE595 Seminar

Hours 1

Discussion of current advances and research in chemical engineering, presented by graduate students and other speakers.

**CHE598 Non-Thesis Research**

Hours 1-6

*No description available*

**CHE599 Thesis Research**

Hours 1-12

This independent research course partially fulfills required master's-level research thesis hours toward the master's degree in chemical engineering. The course is conducted under the guidance of the thesis advisor. Material covered will be of an advanced nature aimed at providing master's students with an understanding of the latest research and current developments within the field. Discussion and advisor guidance will be directed towards readings of research articles and development of research methodology, with the aim of producing an original research contribution that represents a novel development in the field, or a novel perspective on a pre-existing topic in the field.

**CHE691 Special Problems**

Hours 1-3

Problems of current research.

**CHE692 Special Problems**

Hours 1-3

Problems of current research.

**CHE693 Chem & Biol Engr Practicum**

Hours 3

This course is designed for Ph.D. students to further gain classroom and laboratory experience under supervised conditions. Tasks may include exploring design and development of course materials, grading for selected courses, structured lecturing, laboratory monitoring, utilizing modern instructional technology, and other related pedagogical exercises.

Prerequisite(s): CHE 593

**CHE695 Seminar**

Hours 1

Presentations of dissertation research.

**CHE698 Non-Dissertation Research**

Hours 1-6

*No description available*

**CHE699 Dissertation Research**

Hours 1-12

This independent research course partially fulfills required doctoral-level research dissertation hours toward the doctoral degree in chemical engineering. The course is conducted under the guidance of the dissertation advisor. Material covered will be of an advanced nature aimed at providing doctoral students with an understanding of the latest research and current developments within the field. Discussion and advisor guidance will be directed towards readings of research articles and development of research methodology, with the aim of producing an original research contribution that represents a novel development in the field, or a novel perspective on a pre-existing topic in the field.