Course Descriptions

Undergraduate Courses

1121. Chemical Engineering Seminar (1). Prerequisite: For chemical engineering majors only. Readings and discussion of the chemical engineering profession; history, ethics, career paths, and research opportunities.

1305. Engineering Analysis I (3). Prerequisite: CHE 1121 or departmental approval. Prerequisite or corequisite: MATH 1451. Synthesis and analysis of typical engineering problems emphasizing the use of computing tools, spreadsheet and compiler programming.


2410. Introduction to Chemical Processing (4). Prerequisites: CHE 1305, CHEM 1307, ENGL 1301, MATH 1451, and CHE 1121. Prerequisite or corequisite: PHYS 1408. Units and conversions, process variables, material and energy balances, process flow sheet analysis, phase equilibrium, elementary transport processes.

2421. Chemical Engineering Thermodynamics I (4). Prerequisite: CHE 2410; prerequisite or corequisite: MATH 2450. Properties of pure substances, ideal gas behavior, heat effects in industrial reactions, first and second law analyses, energy conversion and power cycles.

3232. Chemical Engineering Transport Laboratory (2). Prerequisites: CHE 2306, 3315, and 3326; prerequisite or corequisite: CHE 3341. Experiments in mass, momentum, and heat transport; statistical analysis of data. (Writing Intensive)

3315. Fluid Mechanics (3). Prerequisites: 2.5 TTU GPA; C or better in MATH 3350 (concurrent enrollment allowed) and CHE 2410. Principles of momentum transport. Application to laminar and turbulent flow, metering, porous media, and settling.

3322. Chemical Engineering Thermodynamics II (3). Prerequisite: CHE 2421. Solution thermodynamics, phase and chemical reaction processes.

3323. Chemical Reaction Engineering (3). Prerequisites: CHE 3322 and 3326. An introduction to the kinetics of chemical conversion processes and the design of chemical reactors.


3330. Engineering Materials Science (3). Prerequisites: CHE 2421, CHEM 1307, and MATH 1452. Engineering properties of metals, ceramics, and polymers; molecular crystal, and microstructure configurations; selection of materials for applications.


4000. Special Problems in Chemical Engineering (VI-6). Prerequisite: Departmental approval. Individual studies in chemical engineering areas of special interest. May be repeated for credit.

4121. Chemical Engineering Research Seminar (1). Prerequisite: Senior standing in chemical engineering. External speakers focus on their current research in chemical engineering and related fields.

4122. Chemical Engineering Review (1). Prerequisite: 2.5 TTU GPA; senior standing in chemical engineering, C or better in IE 2311. Corequisite: CHE 4353. Review of chemical engineering science and engineering courses. Preparation for the chemical engineering portion of the FE exam and the chemical engineering capstone design project.

Combined Bachelor of Science and Master of Science in Chemical Engineering

FIRST YEAR

Fall
ENGL 1301, Essentials of ColI. Rhetoric 3
MATH 1451, Calculus I 4
CHEM 1307 & 1107, Prin. of Chem. I 1
CHE 1121, Chemical Engnr. Seminar 1

Spring
ENGL 1302, Advanced College Rhetoric 3
MATH 1452, Calculus II 4
CHEM 1308 & 1108, Prin. of Chem. II 1
CHE 1305, Engineering Analysis 3
PHYS 1408, Principles of Physics I 4

TOTAL 12 TOTAL 18

SECOND YEAR

Fall
MATH 2450, Calculus III 4
CHEM 3305 & 3105, Organic Chem. I 3
CHE 2411, Intro. to Chemical Process 3
IE 2311, Engineering Econ. Analysis 3
PHYS 2401, Principles of Physics II 4
ENGR 2392, Engineering Ethics 3

TOTAL 16 TOTAL 13

THIRD YEAR

Fall
CHE 2306, Exposition of Tech. Info. 3
CHE 3326, Heat Transfer 3
CHE 3322, Chem. Engr. Thermodyn. II 3
IE 2311, Engineering Econ. Analysis 3

Spring
CHE 3341, Mass-Transfer Operations 3
ENGR 2392, Engineering Ethics 3

TOTAL 12 TOTAL 13

FOURTH YEAR

Fall
CHE 4322, Unit Operations Laboratory 2
CHE 4333, Process Control 3
CHE 4122, Chemical Engineering Rev. 1
Graduate Core Course 3
Graduate Core Course 3
Graduate Core Course 3

Spring
CHE 7121, Graduate Seminar 1
Graduate Core Course 3
Graduate Elective Course 3
CHE 6000, Master’s Thesis** 3
CHE 6000, Master’s Thesis** 3

TOTAL 10 TOTAL 14

FIFTH YEAR

Fall
CHE 7121, Graduate Seminar 1
Graduate Core Course 3
Graduate Elective Course 3
CHE 6000, Master’s Thesis** 3
CHE 6000, Master’s Thesis** 3

Spring
Critical-Path Hours: 132

Additional Requirements:
American Government 6
Creative Arts 1

TOTAL HOURS: 155

* Students who are not adequately prepared for calculus must take appropriate courses (MATH 0301, 0302, 1320, 1321, 1350) before enrolling in MATH 1451.
† Students who are not adequately prepared for chemistry must take CHEM 1301 before enrolling in CHEM 1307.
‡ Students who are not adequately prepared for physics must take PHYS 1304 before enrolling in PHYS 1408. A high school physics course and a year of calculus are recommended as adequate preparation.
§ Choose from the five graduate core courses: CHE 5310, 5312, 5321, 5323, or 5343.
*** One graduate level elective must be a CHE course, the other two may be in any area of engineering, science, or mathematics.
** CHE 5000 for non-thesis option, plus one additional graduate elective and one more CHE 7121 credit.
†† Select a course that is simultaneously listed in the Creative Arts section of the core curriculum requirements and the section specifying courses that satisfy the multicultural requirement.
‡‡ Must include two laboratory courses from approved sophomore or higher courses.

4153. Process Control Laboratory (1). Prerequisite: CHE 4353. Experiments with control equipment and the minicomputer. Professional practice course.

4232. Unit Operations Laboratory (2). Prerequisites: CHE 3322 and senior standing in chemical engineering. Laboratory experiments illustrating the basic principles of unit operations. Includes instruction on experimental methods, equipment scale up, and technical communication. (Writing Intensive)

4315. Experimental Techniques in Fluid Dynamics (3). Prerequisite: CHEM 3315. Prerequisite or corequisite: CHE 3322. Experimental techniques for fluid dynamics, including flow visualization, fluid characterization, image processing and analysis. Analytical modeling and statistical treatment of experimental data. Significant laboratory component.

4340. Polymer Processing (3). Prerequisite: CHE 3315. Structure, processing, and properties for industrial plastics processing operations, including extrusion, mixing, calendaring, blow molding, thermoforming, fiber spinning, compression molding, injection molding, and recycling.

4341. Polymerization Engineering (3). Prerequisites: CHEM 3305 and MATH 2450. Polymerization reactions, mechanisms and