

Program of Study Leading to an A.S. in Chemical Engineering at Hostos

Course Descriptions

First Year- Fall : Credits 17

MAT 210 Calculus I - 4 Credits, 6hrs

Pre-requisite: MAT 160 or by placement

Pre/Co-requisite: ESL 035

This course provides skills in calculus in one real variable. Topics: limits, continuity, differentiation, applications to motion problems, maximum-minimum problems, curve sketching, and antiderivatives, definite integrals, conic sections, polar coordinates and introduction to vectors.

ENG 110 Expository Writing - 3 Credits, 3hrs.

Pre-requisite: Passing CUNY/ACT Reading and Writing tests or Exemption

English 110, a foundational writing course, is designed to strengthen students' composing skills so that they will produce increasingly complex and better-structured essays. Reading and responding to interdisciplinary texts representing various rhetorical modes, students will practice paraphrasing and summarizing these texts, enrich their vocabulary, and improve their writing, revision, and proofreading skills. Additionally, students will be introduced to the use of print and on-line secondary sources. Upon completion of the course, students will be able to respond critically in writing, to a variety of texts, integrating their own ideas with those presented in the readings.

CHE 210 General Chemistry I - 4 Credits, 3hrs. lecture/3hrs. lab/1hr. recitation

Pre-requisite: MAT 030

Co-requisite: MAT 160

The students will analyze data and solve problems related to the principles of modern atomic theory, stoichiometry, oxidation-reduction reaction, gas laws, thermochemistry, electromagnetic radiation and quantum theory, chemical bonding and molecular structure, and properties of solutions. This course is intended for students preparing for careers in the sciences and engineering.

PSY 101 General Psychology - 3 Credits, 3hrs.

Pre-requisite: none

Co-requisite: none

The student will demonstrate familiarity with the areas of psychology, including methods learning and memory, sensation, perception, physiological processes, emotions, drives,

personality, abnormal behavior, psychotherapy, individual differences, social behavior, and growth and development. Offered in English and Spanish.

SOC 101 Introduction to Sociology – 3 Credits, 3hrs.

Pre-requisite: none

Co-requisite: none

The student will demonstrate an understanding of the basic topic of sociology, including social mobility, role status, race and prejudice, and factors leading to social change. Offered in English and Spanish.

HUM 100 Introduction to the humanities – 3 Credits, 3hrs.

Co-requisite: SPA 121 or ENG 091

This course will introduce the student to the richness and variety of the Humanities, presenting the various fields involved: Philosophy, Literature, Art, and History. This will allow the student to discover a sense of relationships among life, work, and circumstances, to understand self and society from different times and places and through different eyes, and to reflect on the way personal origins and beliefs affect actions and values.

First Year-Spring: Credits 14

MAT 220 Calculus II - 4 Credits, 4hrs.

Pre-requisite: MAT 210

Pre/Co-requisite: ESL 035

This course provides skills in differential and integral calculus. Topics: definite integral and its properties, numerical integration, applications of definite integrals to: areas between curves, volume of solids of revolution, arc length, trigonometric, logarithmic, exponential and inverse functions, conic sections, polar coordinates, parametric representations of curves, vectors in the plane, translations and rotation of axes.

ENG 111 Literature and Composition - 3 Credits, 3hrs.

Pre-requisite: ENG 110 or Department permission

English 111, the second semester of freshman composition and a foundational writing course, introduces students to techniques for close reading of literary texts. This course develops students' critical thinking skills through the study of literary elements such as plot, character, setting, point of view, symbolism, and irony. Additionally, students will learn the Modern Language Association (MLA) system of parenthetical citation and how to incorporate quotations into their analysis of literary texts; they will also complete a research paper by consulting both print and on-line sources. By the end of the semester, students will be able to interpret and write critically about each of the three major genres: poetry, fiction, and drama.

CHE 220 General Chemistry II - 4 Credits, 3hrs. lecture/3hrs. lab/1hr. recitation

Pre-requisite: CHE 210

Students will work on laws, concepts and techniques of chemistry including chemical kinetics, ionic equilibria in aqueous solution, thermodynamics electrochemistry, nuclear chemistry, classes of organic and biochemical compounds. This course is intended for students preparing for careers in the sciences and engineering.

VPA 192 Fundamentals of Public Speaking – 3 Credits, 3hrs.

Pre-requisite: ESL 035 or ESL 086

Co-requisite: ENG 091 or ESL 091

The student will present introductions; present impromptu, extemporaneous, and manuscript speeches; perform exercises to improve public speaking technique; limit topics; create outlines; and present informative and persuasive speeches, as well as speeches for special occasions.

Second Year- Fall: Credits 18

MAT 310 Calculus III - 4 Credits, 4hrs

Pre-requisite: MAT 220

Pre/Co-requisite: ESL 035

This course provides skills in infinite series, geometry in the plane and space, and integral calculus in several variables. Topics: infinite series, solid analytical geometry, partial derivatives, and multiple integral with applications, Taylor's theorem and convergence tests.

ChE 22800 Intro. to Chemical Engr. Principles and Practice - 4 Credits, 3 hrs.

Pre-requisite: CHE 220 (min. C)

Pre/Co-requisite: MAT 310 (C min)

Introduction to the techniques of chemical engineering. Basic calculations. Conservation of mass and the use of material balances. Major equipment types: functionality and linear models. Linear material balances for recycle processes. First law of thermodynamics and the use of energy balances. Reaction stoichiometry and energetics.

CHE 310 Organic Chem I - 3 Credits, 3hrs. lecture/1hr. recitation

Pre-requisite: CHE 220

This course will provide the student with a thorough understanding of the basic concepts of organic chemistry. Molecular structure and bonding will be introduced at a theoretical level. Students will become familiar with molecular orbitals and their use in understanding chemical phenomena, hydrocarbons, stereochemical (3-dimensional) aspects of structure; strategies of

organic synthesis will be emphasized by means of problem solving. This course is intended for chemistry, biochemistry, molecular biology, chemical engineering, and other students on scientific or professional careers paths.

CHE 312 Organic Chemistry I Lab - 2 Credits, 4hrs lab

Pre/Co-requisite: CHE 310

The student will perform exercise involving the preparation and purification of carbon compounds.

PHY 210 General Physics I - 4 Credits, 3hrs. lecture/2hrs. lab/2hrs. recitation

Pre/Co-requisite: MAT 220

Students will study vectors, Newton's Laws and their application to one-and two-dimensional motion, work and energy, momentum, collisions, torque, angular momentum, periodic motion, fluids, heat and thermodynamics processes. This course is intended for students preparing for careers in the sciences and engineering.

Second Year – Spring: Credits 16

MAT 360 Ordinary Differential Equations** - 3 Credits, 3hrs.

Pre-requisite: MAT 310

Pre/Co-requisite: ESL 035

The student will formulate and solve differential equations of the first and higher order linear equations with constant coefficients, undetermined coefficients, variation of parameters, applications; Euler's equation, Laplace Transforms, series solutions, linear systems; elementary partial differential equations and separation of variables; Fourier series. **Some sections of courses identified with double asterisks (**) are restructured in the sense that they are taught using Graphing Calculators or Computer Systems, in a collaborative learning mode with the assistance of peer tutors.

MAT 320 Linear Algebra with Vector Analysis – 3 Credits, 3hrs.

Pre/requisite: MAT 310

Pre/Co-requisite: ESL 035

The student will study VECTOR CALCULUS, matrix algebra, system of homogeneous and non-homogeneous linear equations, concepts of vector space, subspace, basis and dimension of a vector space, linear transformation, and Eigen values and Eigenvectors for a linear transformation.

CHE 320 Organic Chemistry II - 3 Credits 3hrs. lecture/1hr. recitation

Pre-requisite: CHE 310 and CHE 312 or CHE 314

Co-requisite: CHE 322 or CHE 324

The objective of this course is to give students of chemical, physical sciences and molecular biological sciences a complete and in-depth understanding of organic chemistry. The chemistry of the remaining functional groups not covered in CHE 310 will be discussed including nomenclature, stereoisomerism, and stereoselectivity of reactions. Organic functional groups will be introduced and discussed in detail. Problem solving will be used to give the student a working understanding of multi-step reaction mechanisms, modern reagents used for organic synthesis, and synthetic strategy. Polyfunctional compounds and interactions between functional groups will also be covered, as well as applications of organic chemistry in biochemistry, biotechnology, and materials science. Modern organic analytical methods, such as mass spectrometry and nuclear magnetic resonance will be covered in detail.

PHY 220 General Physics II - 4 Credits, 3hrs. lecture/2hrs. lab/2hrs. recitation

Pre/requisite: PHY 210

Pre/Co-requisite: MAT 310

Students will study waves and acoustics, optics, diffraction, electricity, D.C. circuits, magnetism, electromagnetism and their application, power and A.C. circuits. This course is intended for students preparing for careers in the sciences and engineering.

ENG 202 Writing for Engr. - 3 Credits, 3hrs.

Pre-requisite: Eng 111

In this course, students will perform tasks related to the technical writing process in order to write effectively on the job. In addition to learning to generate written documents for the technical and business professions, this course will focus on skills such as defining purpose, understanding readers, understanding clients, constructing effective sentences and paragraphs, composing drafts, testing drafts and revising the quality of finished documents. At the completion of the course, students will be able to create communications that will succeed in the workplace.