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

# Course Descriptions

## First Year – Fall: Credits 13

### MAT 210 Calculus I - 4 Credits, 5hrs.
**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, oxidationreduction 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.

### 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.

*PSY 101 General Psychology - 3 Credits, hrs.*
**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.


## *First Year – Spring: Credits 15*

*MAT 220 Calculus II - 4 Credits, 4.5hrs.*
**Pre-requisite: MAT 210**
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.

*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.

### CHE 220 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.

### ME 145 Computer-Aided Drafting – 2 Credits, 1 hr. class/ 2hrs lab
**Pre-requisite: None**

Basic theory of space geometry, with applications in computerized drafting. Students develop skills of spatial analysis, visualization and interpretation through reading existing drawings and freehand sketching. Conventional drafting practices are introduced, including orthographic projections, auxiliary and sectional views, isometric and orthographic projections and basic dimensioning. Computer-aided drafting software is used to produce engineering drawings.

## _Second Year – Fall: Credits 17_

### MAT 310 Calculus III - 4 Credits, 4.5hrs.
**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.

### 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: ENG111**

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

### *ENGR 204 Electrical Circuits – 3 Credits, 3hrs.*
**Pre-requisite: PHY 210** (min. C grade)
**Pre/Co-requisite: MAT 310** (min. C grade)
Basic circuit laws. Methods of circuit analysis. Circuit theorems. Operational amplifiers. Capacitatiors and inductors. Sinusoids and phasors. Sinusoidal steady state analysis. Frequency response.

### HIS 210 United States History: Through the Civil War – 3 Credits, 3 hrs.
**Pre-requisite: ENG 110**
Major currents in United States history from colonial times to the end of the Civil War are examined in this course. Emphasis is placed on the development of slavery and the abolition movement, the origins and character of the American Revolution, and the experiences of Native Americans, immigrants, and women.

### HIS 211 United States History: Reconstruction to the Present – 3 Credits, 3hrs.
**Pre-requisite: ENG 110**
This course examines major issues in United States history from the Reconstruction Era (1866-76) to the present. Emphasis will be placed on the role of women, labor, immigrants, and racial and ethnic minorities in key developments such as urbanization, the Great Depression, and the Civil Rights Movement.

## *Second Year – Spring: Credits 18*

### *MAT 360 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 Eigenvalues and Eigenvectors for a linear transformation.

### 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.

### ME 24600 Engineering Mechanics I – 3 Credits, 3hrs.
**Pre/requisite: MAT 220** (min. C grade), **PHY 210** (min. C grade)
**Pre/Co-requisite: ME 14500 or BME 22000.**
Vector concepts in mechanics. Equivalent force systems. Centers of gravity and pressure. Equations of equilibrium for two- and three-dimensional systems. Static determinacy. Analysis of trusses, frames, machines and cables. Frictional forces. Properties of surfaces and rigid bodies. Particle kinematics: path variables, cylindrical coordinates and relative motion. Recitation periods integrated with classroom work.

### 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.