STEM Dual Enrollment Course Offerings

1 **Introduction to Engineering** **ES 101** 2 Credits

This course introduces the various disciplines of engineering, with emphasis on learning concepts and practicing skills are used in engineering and the engineering technology fields. It is designed to develop students' ability to identify and practice the different types of engineering problem solving, make effective written communications and oral presentations, and understand the professional, ethical, and social responsibilities of an engineer. Feasibility and project management concepts are also introduced.

2 **General Chemistry I** **CH 111** 4 Credits

This course is for science, pre-professional, and engineering majors. It covers basic concepts and introductory inorganic chemistry. Topics include: stoichiometry, solubility, atomic and molecular structure, gases, solid structure, quantum mechanics, chemical formulas, reactions, solutions, enthalpy, and bonding theory. Solutions to numerical problems are stressed throughout. Laboratory experiments reinforce theoretical principles.

3 **Biology I** **BS 101** 4 Credits

This course explores the basic study of the principles underlying the science of cells and organisms. Included are topics related to biochemistry, cell structure and function, effects of the physical environment on cells, genetics, genetic engineering, heredity, evolution, and selected biological problems. Laboratory experiments include investigations of physical and chemical life processes, analysis of cellular components, cellular functions, cell reproduction, and heredity.

4 **Biology II** **BS 102** 4 Credits

This course explores the basic study of representative organisms of the five kingdoms, with an emphasis on classification, differential features, and reproduction. For the plant and animal kingdoms, it covers fundamentals of development, physiological control systems, organ systems, nutrition, movement, ecology, and selected biological problems of representative organisms. The laboratory sessions include dissections and experimental studies of selected representative organisms for all kingdoms.

5 **Computer Concepts and Applications** **CIS 101** 3 Credits

This course provides the level of knowledge necessary to function as a fluent computer user in today's technological society. Topics include computer terminology, computer hardware and software capabilities, what makes a computer powerful, the societal impact of computers, ergonomics, ethical computing behavior, information privacy, and computer security. Class time and open lab are used to complete hands-on projects encompassing Microsoft Windows, Microsoft Office (Word, Excel, and PowerPoint), as well as an information literacy project focusing on effective use of the Web. Students with no computing experience are encouraged to complete a computing keyboarding course (CIS 103) before taking this course. For non-majors only.

6 **Programming Fundamentals** **CIS 108** 3 Credits

This course introduces the students to the core of programming basics. Topics include data types, control structures, algorithm development, and program design with functions via the Python programming language. It discusses the fundamental principles of Object-Oriented Programming, as well as in-depth data and information-processing techniques. Students will analyze, design, and solve problems. They will explore real-world software development challenges and create practical and contemporary applications.

7 **Internet/E-commerce Technologies** **CIS 152** 3 Credits

Offered nights only in Fall.

This course introduces students to the concepts of the internet, the Web, and E-commerce and emphasizes the technology infrastructures needed to conduct the E-commerce and business strategies required to establish online business successfully. Topics such as Internet marketing and advertising, operating online auctions, virtual communities, serving as a web portal to facilitate social and business networking, and legal issues effecting E-commerce systems are discussed. In addition, topics such as Web page creation and publication are introduced.

8 **Introduction to Graphic Design** **GD 110** 3 Credits

This course trains students to apply the principles and elements of design to create original work in advertising, editorial, and promotional print materials and presentations. Students will explore typography and how it relates to the layout and design of information, as well as portfolio presentation and preparing work for print. Students will be exposed to software used by graphic designers including Adobe PhotoShop, InDesign, Illustrator, and QuarkXPress.

9 **College Algebra** **MA 108** 3 Credits

This course covers the study and application of the concept of sets, relations, functions, and the real number system. Topics include polynomials, rational expressions, and radicals. Emphasis is placed on solving polynomial and rational equations as well as linear systems, and graphing linear, quadratic, exponential, logarithmic, and rational functions.

10 **Pre-Calculus Mathematics** **MA 109** 4 Credits

This course prepares students for calculus. Topics include the study of functions, and emphasis is placed on the properties of inverse, trigonometric, and exponential functions and analytic geometry.

11 **Principles of Astronomy and Space** **SC 105** 4 Credits

In this course, students will study astronomy and the qualitative and quantitative means of describing the general nature of the physical universe and its dynamic process. It includes a study of the planets, the solar system, the stars and galaxies. In addition, it covers the laws of physics and chemistry that govern the movements and composition of the physical universe and historical aspects of the development of the science of astronomy.

12 **Basic Statistics** **MA 103** 3 Credits

This course covers the development and application of statistical concepts including descriptive statistics, probability, normal distribution, tests of hypothesis testing differences, sampling theory, and correlation.

13 **Environmental Science** **SC 104** 4 Credits

This course explores the science principles associated with environmental studies and the causes of environmental problems. Topics include air, land, and water resources, energy, ecological principles, waste management, and human impact on the environment. The laboratory component will include the scientific method, collection and analysis of data, field study methods, computer simulations, and field trips.

Passaic County Community College

STEM Program

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