**Mechanical Engineering Science Electives**

**BNG-255: *Biology for Engineers***

Credits 3 (Honors section is offered)

Lecture / 3 hours per week

Principles of biology at the biology/engineering interface. The course will discuss biological principles that can inform an approach to engineering that is more in harmony with living systems and it will present engineering analyses of the structure and function of human tissue. Topics include an introduction to molecular biology, evolution and design, cell structure and function, the mechanics of tissues, sensing and signal transmission in the nervous system, biological energy generation and transduction, chemical detoxification and waste handling, and tissue defense mechanisms.

**CHM-152: *Principles of Modern Chemistry II***

Credits 3 (Honors sections are offered)

Lecture / 4 hours per week

**Requirements: Pre-req:** At least C- in CHM 151 or CHM 153

A continuation of CHM 151. The details of the behavior of solids, liquids, & gases, the types of intermolecular forces, colligative properties, gaseous equilibrium, aqueous equilibrium, thermodynamics, electrochemistry, kinetics, and nuclear chemistry are emphasized and discussed in light of modern scientific theories. For science and engineering majors.

**CIS-115: Computer Programming with C**

Credits 3

Lecture / 2 hours per week; Lab / 2 hours

Algorithm development, syntax and semantics of a high level programming language, debugging and verification of programs, concepts of structured programming, arrays, subroutines, and elementary system concepts (compilation, time-sharing). Topics covered in the course include C Compilers and Standards, Variables and Assignments, Branches (if, if-else, switch statements), input/output (read from user, print to user, read from/write to file, loops (for, while, do-while), recursion, arrays and pointers.

**CIS-180: *Object Oriented Programming I***

Credits 4

Lecture / 3 hours per week; Lab / 2 hours

Basic concepts in programming, and introduction to the object paradigm. The course introduces the concept of the object paradigm and teaches how to design and implement simple programs in an object-oriented language. The course also covers the basics of how to use a computer and basic software tools, including libraries of components, in the process of developing programs.

**CIS-190: *Introduction to Procedural Programming***

Credits 4

Lecture / 3 hours per week; Lab / 2 hours

**Prerequisites:** At least C in CIS 180

Procedural Programming (C/C++) under Unix. Data types, variable declarations, arithmetic expressions, conditional statements, macros, function prototypes, standard libraries, file processing, pointers, structures, unions, and dynamic memory management are discussed. Unix file system, shell scripts, input/output redirection, piping, programming with standard I/O, and unix system calls are covered.

**Mechanical Engineering Science Electives**

**ECE-160: Foundations of Computer Engineering I**

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| Credits 4  Lecture / 3 hours per week; Lab / 2 hours  **Prerequisites:** Engineering student or permission of instructor  Algorithm development, syntax and semantics of the C programming language stressing computer systems concepts. Concepts of the machine model, procedural programming and program development including coding, debugging and testing of programs are covered. The use of libraries, header files and macros are covered. Engineering examples are used. Variables, operators, control, input/output, arrays, structures, functions, pointers, and files are covered using engineering examples. |

**MLS-211: *Fundamentals of Human Physiology***

Credits 4

Lecture / 4 hours per week

**Requirements: Pre-req:** Successful completion of MLS 121 C- or better or permission of instructor  
Introduction to the general physiological principles involved in human body functions with homeostasis as the unifying theme. Enrollment requires a minimum grade of C- in all MLS courses.

**PHY-115: *Introduction to Classical Physics***

Credits 3

Lecture / 3 hours per week

**Prerequisites:** PHY 111 or 113

This course treats topics in classical physics from the areas of waves, optics, and thermodynamics. Two oral presentations with technical write-ups are required.

**PHY-213: *Applied Modern Physics***

Credits 3

Lecture / 3 hours per week

**Prerequisites:** PHY 112 or 114

A first course in modern physics designed for engineering and physics students. It deals with light waves, diffraction, interference, and basic matter waves with an introduction to the Schrödinger equation. Basic atomic and nuclear physics is also introduced.

**PHY-343: *Mathematical Physics I***

Credits 3

Lecture / 3 hours per week

**Prerequisites:** MTH 211 and PHY 234

Development of the mathematical tools useful in physics. Vector calculus, linear algebra, matrices, operators, orthogonal functions.