

## COURSES

### STEM COURSES

#### ASTRONOMY (AST)

**AST 001 Astronomy (3.0 Lecture) 3.0 UNITS**

This course covers the entire panorama of the universe including early human observations, the solar system, stars, galaxies and cosmology. Grade Only.

**AST 003 Astronomy With Lab (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course covers the entire panorama of the universe including the observations of the night sky, the solar system, stars, galaxies and cosmology. Grade Only.

**AST 003H Astronomy With Lab - Honors (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course covers the entire panorama of the universe including the observations of the night sky, the solar system, stars, galaxies and cosmology. Students cannot get credit for both ASTRO 003 and ASTRO 003H. This section requires enrollment in the Honors Transfer Project. More information and the online application can be found at <http://honors.missioncollege.edu>.

**AST 004 Astrobiology - Life in the Universe (3.0 Lecture) 3.0 UNITS**

This course examines the astronomical influences on life on Earth and the possibility of life other places in the Universe. We study the chemical basis for life, the origin, evolution, and constraints of life on Earth, and the markers of life that may be seen in the Universe.

#### BIOLOGICAL SCIENCES (BIO)

**BIO 001A General Biology: Cells (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite CHM 001A or CHM 001AH Prerequisite MAT 000C or High School Algebra II, or equivalent Prerequisite BIO 010 or BIO 011 ; Advisory CHM 001B or CHM 001BH This course is a comprehensive introduction to cell and molecular biology, and is designed for students pursuing degrees in biology or professional programs such as medicine or pharmacy. Topics addressed in lecture and lab include biochemistry, the structure and function of prokaryotic and eukaryotic cells, cellular metabolism, prokaryotic and eukaryotic gene expression and regulation, and selected topics in human physiology. C-ID # BIOL 130S, BIOL 135S.

**BIO 001AH General Biology: Cells-Honors (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: CHM 001A or CHM 001AH Prerequisite: MAT 000C or High School Algebra II, or equivalent. Prerequisite: BIO 010 or BIO 011 Anti-Requisite: BIO 001A Advisory: CHM 001B or CHM 001BH This honors course is a comprehensive introduction to cell and molecular biology, and is designed for students intending to transfer to majors in the biological sciences as well as for those seeking to enter professional programs such as medicine or pharmacy. Students may not receive credit for both BIO 001A and BIO 001AH. Enrollment in the Honors Transfer Project is required. C-ID # BIOL 130S, BIOL 135S.

**BIO 001B General Biology: Organisms (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: BIO 001A or BIO 001AH This course examines the unity and diversity of multicellular life, ecological and evolutionary principles, and form/function relationships in plants and animals. The course is designed for students majoring in the biological sciences or seeking entry to professional programs such as Medicine, Pharmacy, and Dentistry. C-ID # BIOL 130S, BIOL 135S.

**BIO 004 Microbiology (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: BIO 011 and CHM 030A OR Prerequisite: CHM 001A or CHM 001AH and BIO 011 OR Prerequisite: BIO 011 and CHM 060 OR Prerequisite: CHM 001A or CHM 001AH and BIO 001A or BIO 001AH OR Prerequisite: CHM 030A and BIO 001A or BIO 001AH OR Prerequisite: CHM 060 and BIO 001A or BIO 001AH OR Prerequisite: BIO 010 and BIO 010L and CHM 001A or CHM 001AH OR Prerequisite: BIO 010 and BIO 010L and CHM 030A OR Prerequisite: BIO 010 and BIO 010L and CHM 060 OR Prerequisite: BIO 022 and CHM 001A

or CHM 001AH OR Prerequisite: BIO 022 and CHM 030A OR Prerequisite: BIO 022 and CHM 060 This course is intended for nursing and other health-science majors. Lecture topics include the morphology and physiology of the major groups of microorganisms, microbial genetics, mechanisms of infection and disease, and the human immune response to infection. Laboratory activities focus on the culture and identification of bacteria of medical importance.

**BIO 010 Introduction to Biology (3.0 Lecture) 3.0 UNITS**

BIO 010 is an introductory course in biology designed for the non-biological sciences major. Topics include cell structure and function, energy exchange and life processes, taxonomy, ecology, heredity, diversification and evolution. This lecture course may be taken with or without BIOSC 010L, Introduction to Biology Lab.

**BIO 010L Introduction to Biology Lab (1.0 Lab) 1.0 UNIT**

Corequisite: BIO 010 or Prerequisite: BIO 010 This is an introductory general biology laboratory course designed for non-science majors. It reinforces biological principles presented in BIO 010 using laboratory and field exercises.

**BIO 011 Human Biology (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course is an introduction to biology concepts and principles, using humans as a model. BIOSC 011 satisfies the same general education requirement as BIOSC 010.

**BIO 012 Emerging Infectious Diseases (3.0 Lecture) 3.0 UNITS**

In this introductory biology course, learn how infectious agents cause disease, and what factors are leading to the emergence of new diseases such as mad cow, SARS, and drug-resistant tuberculosis.

**BIO 014 Introductory Neuroscience (3.0 Lecture) 3.0 UNITS**

This course is an introduction to the organization and functions of the nervous system. The physiology of the brain and senses are discussed. Emotions, sleep, language, attention, memory, and a survey of nervous system disorders are explored.

**BIO 014H Introductory Neuroscience - Honors (3.0 Lecture) 3.0 UNITS**

Advisory: ENG 001A and REA 054 OR Advisory: ENG 001AX and REA 054 This honors course is an introduction to the organization and functions of the nervous system. The physiology of the brain and senses are discussed. Emotions, sleep, language, attention, memory and a survey of nervous system disorders are explored.

**BIO 016 Marine Biology (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This four unit course introduces students of all disciplines to ocean ecology and marine life. Topics are explored through classroom learning and seven required field trips to local marine habitats and research facilities in the San Francisco and Monterey Bays. Some field trips may extend beyond regularly scheduled class meeting time. Students arrange their own transportation to the field sites.

**BIO 017 Genetics and Society (3.0 Lecture) 3.0 UNITS**

This course is a broad survey of genetics, with a focus on the societal impacts of topics in genetics such as human genetic disease, biotechnology, reproductive technologies, and evolution. This course is a broad survey of genetics, with a focus on the societal impacts of topics in genetics such as human genetic disease, biotechnology, reproductive technologies, and evolution. It is designed for the general education student.

**BIO 017H Genetics and Society - Honors (3.0 Lecture) 3.0 UNITS**

This course is a broad survey of genetics, with a focus on the societal impacts of topics in genetics such as human genetic disease, biotechnology, reproductive technologies, and evolution. The honors component involves an in-depth analysis of specific topics, using current information from research journals. Students cannot get credit for both BIOSC 017 and BIOSC 017H. This section requires enrollment in the Honors Transfer Project. More information can be found at <http://honors.missioncollege.edu>.

**BIO 018 The Biology of Cancer (3.0 Lecture) 3.0 UNITS**

This course introduces the basic principles underlying the development and treatment of cancer. Normal cell biology processes are contrasted with the

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genetic and cellular changes that lead to the development of cancer. Current topics in scientific and clinical research on cancer biology will be explored. Pass/No Pass Option.

### **BIO 018H The Biology of Cancer - Honors (3.0 Lecture) 3.0 UNITS**

This honors course introduces the basic principles underlying the development and treatment of cancer. Normal cell biology processes are contrasted with the genetic and cellular changes that lead to the development of cancer. Current topics in scientific and clinical research on cancer biology will be explored. This is the honors version of BIO 018. Students cannot get credit for both BIO 018 and BIO 018H. Enrollment in the Honors Program is required. Pass/No Pass Option. More information can be found at <http://honors.missioncollege.edu>

### **BIO 019 Oceans: Life in the Sea (3.0 Lecture) 3.0 UNITS**

This non-majors course surveys the biological principles of marine science. It provides an overview of the ocean environment, diversity of marine life, basic ecological principles and types of marine ecosystems. The relationship between humans and the ocean is emphasized, focusing on conservation biology and sustainability.

### **BIO 022 Anatomy & Physiology for Allied Health Workers (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: MAT 903 or High School Algebra I, or equivalent. This course is an overview of the normal structure and function of the human body and is designed to provide a foundation for the study of disease and dysfunction in the clinical setting. Laboratory work includes dissection of preserved materials. BIO-022 is designed to meet the state board requirements for the vocational nursing and psychiatric technician programs.

### **BIO 025 Environmental Biology (3.0 Lecture) 3.0 UNITS**

This course is designed for student of all disciplines to introduce a wide range of contemporary biological topics that will affect their lives; e.g., population growth and control, environmental problems, genetic manipulation, nutrition, energy issues, etc.

### **BIO 030 Tropical Ecology (3.0 Lecture) 3.0 UNITS**

The amazing diversity of life in the tropics is the subject of this introductory level class. Students explore rainforest inhabitants and their relationships, and learn about their value and conservation. This lecture course may be taken with or without BIOSC 030L, Tropical Ecology Lab.

### **BIO 030L Tropical Ecology Field Studies (1.0 Lab) 1.0 UNIT**

In this introductory level class, students carry out research methods that ecologists use to observe and investigate tropical ecosystems. This lab course may be taken with or without BIOSC 030, Tropical Ecology.

### **BIO 031L Tropical Ecology Field Studies (1.0 Lab) 1.0 UNIT**

Anti-Requisite: BIO 030L In this introductory level laboratory class, students carry out research methods that ecologists use to observe and investigate tropical ecosystems. This course includes a field trip to Costa Rica. Students who take this course are not required to complete BIO 30, the lecture course in Tropical Ecology.

### **BIO 032 California Plants and Animals (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This field course explores the ecology of California flora and fauna through studies of plants and animals in terrestrial and aquatic ecosystems within the San Francisco Bay region.

### **BIO 047 Human Anatomy (3.0 Lecture/2.0 Lab) 4.0 UNITS**

Advisory: Prerequisite: (BIO 001A or BIO 001AH) or BIO 011 or BIO 022 or (BIO 010 and BIO 010L) This course is an in-depth study of the microscopic and gross anatomical structure of the human body, including some corresponding pathology. It is designed to meet the prerequisite for programs in nursing, physical therapy, kinesiology, occupational therapy, etc. Laboratory work includes: examination of models, histological specimens, and animal specimens. Grade only

### **BIO 048 Human Physiology (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Advisory: MAT 000C or High School Algebra II, or equivalent. Prerequisite: BIO 047 and Prerequisite: CHM 001A or CHM 001AH OR Prerequisite: BIO 047 and Prerequisite: CHM 030A OR Prerequisite: BIO 047 and Prerequisite: CHM 060 This course provides students with a basic understanding of the physiological mechanisms underlying body function in order to provide

a foundation for more in-depth study and practical application. With an emphasis on cause and effect, details of the chemical and cellular basis for the workings of the nervous, muscular, cardiovascular, respiratory, renal and digestive systems are emphasized. Laboratory investigations of physiological processes familiarize students with scientific analysis and research techniques. C-ID # BIOL 120B.

### **BIO 048H Human Physiology - Honors (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Advisory: MAT 000C or High School Algebra II, or equivalent. Prerequisite: BIO 047 and Prerequisite: CHM 001A or CHM 001AH OR Prerequisite: BIO 047 and Prerequisite: CHM 030A OR Prerequisite: BIO 047 and Prerequisite: CHM 060 This honors course provides students with a basic understanding of the physiological mechanisms underlying body function in preparation for more in-depth study and clinical application. The chemical and cellular basis for the workings of the nervous, muscular, cardiovascular, respiratory, renal and digestive systems are emphasized. Laboratory investigations of physiological processes familiarize students with scientific analysis and research techniques. The honors component involves an in-depth analysis of specific topics, using current information from research journals. Students cannot get credit for both BIOSC 048 and BIOSC 048H. Enrollment in the Honors Transfer Project is required. C-ID # BIOL 120B.

## CHEMISTRY (CHM)

### **CHM 001A General Chemistry (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: CHM 002 or High School Chemistry with a "B" or better AND Prerequisite: MAT 000C or MAT 00CM or High School Algebra II, or equivalent This course is pre-professional chemistry for students planning a career in science related fields. High school Chemistry with a B or better is required. C-ID # CHEM 110, CHEM 120S.

### **CHM 001AH General Chemistry I - Honors (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: CHM 002 or High School Chemistry with a "B" or better AND Prerequisite: MAT 000C or MAT 000CM or High School Algebra II or equivalent CHM 001AH is the honors version of the first of a two-semester sequence in general inorganic chemistry designed for science majors and those seeking entry to medicine and other professional programs in the health sciences. Topics include atomic structure, theories of chemical bonding, nomenclature, stoichiometry, thermochemistry, gas laws, and the properties of solids, liquids, gases, and solutions. Students cannot get credit for both CHEM 001A and CHEM 001AH. Enrollment in the Honors Transfer Project is required. C-ID # CHEM 110, CHEM 120S.

### **CHM 001B General Chemistry (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: CHM 001A or CHM 001AH. This course is a continuation of CHM 001A (General Chemistry I) and is intended for majors in chemistry, biological sciences, engineering, and professional programs in medicine and pharmacy. Topics include chemical kinetics, chemical equilibrium, thermodynamics, electrochemistry, chemistry of the transition elements, and selected topics in nuclear chemistry. C-ID # CHEM 120S.

### **CHM 001BH General Chemistry II - Honors (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: CHM 001A or Prerequisite: CHM 001AH This course is a continuation of CHEM 001A (General Chemistry I) and is intended for majors in chemistry, biological sciences, engineering, and professional programs in medicine and pharmacy. Topics include chemical kinetics, chemical equilibrium, thermodynamics, electrochemistry, chemistry of the transition elements, and selected topics in nuclear chemistry. Students cannot get credit for both CHEM 001B and CHEM 001BH. This section requires enrollment in the Honors Transfer Project. More information and the online application can be found at <http://honors.missioncollege.edu>. C-ID # CHEM 120S.

### **CHM 002 Introductory Chemistry (3.0 Lecture) 3.0 UNITS**

Prerequisite: MAT 000C or High School Algebra II, or equivalent CHM 002 is designed specifically to prepare students for CHM 001A (general chemistry). It introduces the principles of atomic structure, gas laws, solutions, and acid-base theories. There is heavy emphasis on problem solving, chemical formulas, equations and quantity relationships. C-ID # CHEM 101.

### **CHM 002L Introductory Chemistry Laboratory (1.0 Lab) 1.0 UNIT**

Prerequisite or Co-requisite: CHM 002 This course is a laboratory component to accompany CHM 002: Introductory Chemistry. C-ID # CHEM 101.

**CHM 012A Organic Chemistry I (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: CHM 001B or CHM 001BH. This course is a study of the fundamentals of organic chemistry with emphasis on underlying concepts. It is recommended for chemistry majors, chemical engineering majors, and most biology majors, pre-pharmacy, pre-medical and pre-dental students. C-ID # CHEM 150, CHEM 160S.

**CHM 012AH Organic Chemistry I - Honors (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: CHM 001B or CHM 001BH This course is a study of the fundamentals of organic chemistry with emphasis on underlying concepts. It is recommended for chemistry majors, chemical engineering majors, and most biology majors, pre-pharmacy, pre-medical and pre-dental students. Students cannot get credit for both CHEM 012A and CHEM 012AH. Enrollment in the Honors Transfer Project is required. C-ID # CHEM 150, CHEM 160S.

**CHM 012B Organic Chemistry II (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: CHM 012A or CHM 012AH. This course is the continuing study of the fundamentals of organic chemistry with emphasis on underlying concepts. It is recommended for chemistry majors, chemical engineering majors, and most biology majors, pre-pharmacy, pre-medical and pre-dental students. C-ID # CHEM 160S.

**CHM 012BH Organic Chemistry II - Honors (3.0 Lecture/2.0 Lab) 5.0 UNITS**

Prerequisite: CHM 012A or CHM 012AH This honors course is the continuing study of the fundamentals of organic chemistry with emphasis on underlying concepts. It is recommended for chemistry majors, chemical engineering majors, and most biology majors, pre-pharmacy, pre-medical and pre-dental students. Students cannot get credit for both CHEM 012B and CHEM 012BH. Enrollment in the Honors Transfer Project is required. C-ID # CHEM 160S.

**CHM 030A Fundamentals of Chemistry (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: MAT 903 or High School Algebra I, or equivalent CHM 030A is an introductory chemistry course designed for nursing and allied-health majors. Topics include dimensional analysis, inorganic nomenclature, atomic and molecular structure, bonding, chemical reactions, gas laws, solutions, acids-bases, oxidation-reduction, equilibrium and electrolyte systems. This course is not recommended for students majoring in biology or chemistry or for those seeking entry to professional programs in medicine or pharmacy.

**CHM 060 Survey of General, Organic, and Biological Chemistry (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: MAT 903 or High School Algebra I, or equivalent. OR Prerequisite: MAT 903M or any higher math Chemistry 060 is a one-semester survey of General, Organic, and Biological Chemistry designed for students majoring in health sciences such as nursing or physical therapy.

**COMPUTER INFORMATION SYSTEMS (CIS)****CIS 001 Introduction to Computer Science and Technology (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course is an introduction to the concepts of computer science and information technology. It covers computer architecture, the Internet and networking, and basic programming and data manipulation. Students develop a practical, realistic understanding of computer science and information technology. This course is recommended for students in any major who want to learn about computers and programming.

**CIS 007 Python Programming (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This is an introductory course in programming using Python. No prior programming experience required. Students learn to design, code, and execute programs using the Python programming language. This class covers basic programming concepts, object-oriented programming and GUI programming concepts and topics. C-ID # COMP 112.

**CIS 008 Advanced Python Programming (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This is an advanced course in Python programming that covers features of the language and its libraries. Students learn about advanced data structures

such as linked lists, binary search trees, hash tables and directed and undirected graphs and design patterns in Python.

**CIS 033 Robotics and Embedded System (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIS 037A This course is an introduction to microcontrollers and interfacing. It covers the basic hardware components such as LEDs, switches, motors and sensors needed to build a robot and introduces the components needed for the drone hardware. In addition it includes programming of the microcontroller.

**CIS 034 Intermediate Robotics and Embedded System Design (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIS 033 This is an intermediate course in Robotics and embedded systems. This course covers Raspberry PI and Python programs to control the robot camera, get sensor information and send control signals to the robot. It covers remote communication using zigbee, graphical LCD, locating robot using GPS, interfacing I2C and SPI devices. Robot Operating System (ROS) and artificial intelligence applied to robots is introduced.

**CIS 037A Introduction to C Programming (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course is an introduction to the concepts and methods of computer programming using the C language. The course covers data types, expressions, control structures, functions, sequential files, arrays, pointers, strings, string library and ADTs. It also covers low-level programming elements such as memory manipulations, pass-by reference pointers, structs and bit-level manipulation.

**CIS 039 Introduction to Computer Systems and Assembly Language (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIS 037 This course provides a solid introduction to computer systems and machine language programming. Students learn the inner working of computer systems, instruction sets, assembly language programming, and data representation. Students also learn how to understand the code that a compiler generates, the memory layout and hierarchy, and the details of linking and loading. C-ID # COMP 142.

**CIS 040 C++ Programming (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIS 037A This is an introductory course in programming using C++. Students learn to design, code, and execute programs using the C++ programming language. This class includes control structures, functions, object-oriented programming concepts and topics.

**CIS 043 Software Development With Java Programming (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIS 007 or CIS 037A. This course is an introduction to the concepts and methods of computer programming with an emphasis on OOP, (Object-Oriented Programming). Java programming language concepts include data types, selection, loops, arrays objects and classes. This course also includes GUI (graphical user interface), Graphics, files and exception handling. C-ID # COMP 122.

**CIS 044 Intro to Data Structures Using Java (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course is an advanced course in Java Programming Language. It covers basic data structures such as stacks, lists, dynamic arrays, trees, and the algorithms of their implementation.

**CIS 044A Perl Programming 4.0 UNITS**

Advisory: MATH 903 or MATH 903M, Eligibility for ENGL 001A and READ 053. This is an introductory course in Perl programming. This course includes instruction on the basic features of Perl scripting/programming. It covers regular expressions, operators, arrays, functions, file handlers, system interface and exception handling. Pass/No Pass Option.

**CIS 045 Linux Essentials I (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This is an introductory course in the Linux operating system. Students learn the basics of Linux commands and utilities, including files, editors and scripting. This course covers the Unix Bash language scripting including variables, expressions, control structure, files, subroutines, and the "awk" and "sed" commands.

**CIS 047 Linux System Administration (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIS 045 This is a course in Linux system administration. Students learn hands-on skills for Linux administration, including system initialization, file system management, user and services administration and network configuration. It covers file systems, file sharing, mail server, LDAP, DNS, fire wall, web server and network security. C-ID # ITIS 155.

**CIS 051 Introduction to Data Analysis (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIS 007 This is an introductory course on data analysis. It provides a foundation for understanding data analysis principles, tools and applications. Topics include data loading and storage, data manipulation, data cleaning and preparation, data wrangling, plotting, visualization and analysis. Students will use Python programming language and Python libraries such as NumPy, Pandas, Matplotlib in the course.

**CIS 052 Data Visualization (3.0 Lecture/1.0 Lab) 4.0 UNITS**

In this course students will learn how to become a master at communicating business-relevant implications of data analyses. After finishing this course, students will be able to effectively import data, clean and transform it and convey the results of the analysis to the stakeholders. Students will learn how to best convey the story behind the data using the most effective visuals as well as using Tableau to make effective and interactive dashboards.

**CIS 053 Introduction to Machine Learning (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIS 051 This course is an introductory course in machine learning and predictive analytics. Students will learn the fundamentals of developing models with cleaned and prepared data. They will gain an understanding of the algorithms of machine learning and learn to build predictive models using Python. Topics included-supervised learning, forecasting numeric values with multiple linear regression, decision trees and unsupervised learning. Students will use machine learning Python libraries such as scikit-learn to implement machine learning algorithms.

**CIS 055 Database Management Systems I (2.5 Lecture/0.5 Lab) 3.0 UNITS**

Advisory: CIS 001 This course is the first of two courses that covers the current, classical database systems, database design, and architecture. Entity-relationship and enhanced entity models. Relational model, normalization techniques, emerging standard of SQL query language, XML, embedded, and dynamic SQL. Introduces students to widely used database systems such as Oracle, Microsoft SQL server, and MySQL. Students will work in groups to implement and design a commercial database application project.

**CIS 056 Database Management Systems II (2.5 Lecture/0.5 Lab) 3.0 UNITS**

Advisory: CIS 055 This course is the second of two courses that covers database management and SQL programing, stored procedures, functions, packages, and database triggers, relational database systems, object-oriented data model, database trends, web database topics, architectures, introduction to interface languages. Students will work in groups to implement a commercial database application project.

**CIS 060 Mobile Apps Programming - iOS (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory CIS 040 or CIS 043 This course is an introduction to programming iOS applications using an object-oriented paradigm. Students learn to develop simple to more advanced applications using Swift, Model-View-Control framework, graphical-user interface, classes, methods, and messages.

**CIS 063 Mobile Apps Programming - Android (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course is an introduction to programming applications for the Android operating system. Students learn to develop simple to more advanced applications using the latest Java technologies and the Android SDK.

**CIS 064 Advanced Android Apps Development (2.0 Lecture/1.0 Lab) 3.0 UNITS**

Advisory CIS 063 This is an advanced course on Android application development that builds upon CIS 063, Mobile Apps Programming-Android. Topics include broadcast, services, custom views, widgets, SMS, and device hardware features.

**COMPUTER INFORMATION TECHNOLOGY (CIT)****CIT 011 Introduction to Computer Hardware and Software (A+) (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course covers the fundamentals of computer hardware and software and advanced concepts such as security, networking, mobile devices such as tablets and smartphones, client-side virtualization, and the responsibilities of an IT professional. It helps students prepare for entry-level career opportunities in ICT and the CompTIA A+ certification. It also provides a learning pathway to Cisco CCNA. Hands-on lab activities are an essential element of the course. The Virtual Laptop and Virtual Desktop are stand-alone tools designed to supplement classroom learning and provide an interactive "hands-on" experience in learning environments with limited physical equipment. The use of Packet Tracer supports alignment with the new CompTIA A+ certification objectives. C-ID # ITIS 110.

**CIT 012 Introduction to Networking (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course introduces the fundamental building blocks that form the modern network, such as protocols, media, topologies and hardware. It then provides in-depth coverage of the most important concepts in contemporary networking, such as TCP/IP, Ethernet, wireless transmission, virtual networks, security and troubleshooting. This course helps students prepare for entry-level career opportunities in ICT and the CompTIA Network+ certification. It also provides a learning pathway to Cisco CCNA. C-ID # ITIS 150.

**CIT 013 AWS 1 Cloud Practitioner- Foundational (2.5 Lecture/0.5 Lab) 3.0 UNITS**

Prerequisite: CIT 021 This introductory course provides an overall understanding of cloud computing concepts, AWS core services, security, architecture, storage, networking, pricing, and support.

**CIT 014 AWS 2 Solutions Architect- Associate (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: CIT 013 This course will help students develop technical expertise in cloud computing and prepare them for the AWS Certified Solutions Architect – Associate certification exam. The curriculum is delivered through instructor-led classes, knowledge assessments, hands-on labs, and project work. The course covers AWS Cloud, management console, S3 storage, Networking and VPC, cloud migration, continuity, Scalability, database.

**CIT 016 CyberSecurity and Ethical Hacking (3.0 Lecture/1.0 Lab) 4.0 UNITS**

This course is an introduction to IT security and ethical hacking using the latest operating systems, security techniques, and wireless standards. It also covers the fundamentals of system security, network infrastructure, access control, assessments and audits, cryptography, and organizational security. Students gain hands-on experience with various ethical hacking methods and techniques. C-ID # ITIS 160.

**CIT 017 Cyber Security Essentials (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: CIT 021 The Cybersecurity Essentials course develops foundational understanding of cybersecurity and how it relates to information and network security. This course explores the importance of cybersecurity, data confidentiality, and best practices for using the internet and social media safely. This course introduces students to characteristics of cybercrime, security principles, technologies, and procedures to defend networks. Through interactive, multimedia content, lab activities, and multi-industry case studies, students build technical and professional skills to pursue careers in cybersecurity.

**CIT 018 CCNA Cyber Security Operations (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: CIT 017 The CCNA Cybersecurity Operations course provides an introduction to the knowledge and skills needed for a Security Analyst working with a Security Operations Center team. It teaches core security skills needed for monitoring, detecting, investigating, analyzing and responding to security events, thus protecting systems and organizations from cybersecurity risks, threats and vulnerabilities.

**CIT 021 Cisco Network Fundamentals (CISCO-1) (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Introduction to Cisco Networks (ITN) is the first course in the CCNA curriculum. It covers the architecture, structure, functions and components of the Internet and other computer networks. Students achieve a basic

understanding of how networks operate and how to build simple local area networks (LAN), perform basic configurations for routers and switches, and implement Internet Protocol (IP). C-ID # ITIS 150.

**CIT 022 Switching, Routing, and Wireless Essentials (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: CIT 021 Switching, Routing, and Wireless Essentials (SRWE) course is the second course in the CCNA curriculum. It covers the architecture, components, and operations of routers and switches in small networks and introduces wireless local area networks (WLAN) and security concepts. Students learn how to configure and troubleshoot routers and switches for advanced functionality using security best practices and resolve common issues with protocols in both IPv4 and IPv6 networks.

**CIT 023 Enterprise Networking, Security, and Automation (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: CIT 022 Enterprise Networking, Security, and Automation (ENSA) is the third course in the CCNA curriculum. It describes the architecture, components, operations, and security to scale for large, complex networks, including wide area network (WAN) technologies. The course emphasizes network security concepts and introduces network virtualization and automation. Students learn how to configure, troubleshoot, and secure enterprise network devices and understand how application programming interfaces (API) and configuration management tools enable network automation.

**CIT 024 Implementing and Administering Cisco Networking Technologies (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: CIT 023 The course is advanced course that provides students with the required knowledge to develop a comprehensive foundation for designing, securing, operating, and troubleshooting modern computer networks, on the scale from small business networks to enterprise networks, with an emphasis on hands-on learning and essential career skills like problem solving and collaboration.

**CIT 078 Microsoft Server Essentials 1 (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIT 011 This course focuses primarily on the installation, storage, "compute features and functionality" and the "networking features and functionality" available in Windows Server 2016. It covers general installation tasks and considerations and the installation and configuration of Nano Server, in addition to the creation and management of images for deployment. It also covers DFS and BranchCache solutions, high performance network features and functionality, and implementation of software-defined networking (SDN) solutions, such as Hyper-V Network Virtualization (HNV) and Network Controller. C-ID # ITIS 155.

## ENGINEERING (EGR)

**EGR 010 Introduction to Engineering (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: MAT 903 or MAT 903M or High School Algebra I, or equivalent. This course exposes students to the field of engineering and the various engineering disciplines. The course presents the basic skills necessary to succeed as an engineering student. The nature of engineering work and the roles of engineers are explored. The Engineering Design Process is addressed through multiple team-based projects and engineering problem-solving topics. Communication skills for technical presentations and reports are developed through practical engineering scenarios. Guest speakers from local engineering firms and tours to local companies are included. C-ID # ENGR 110.

**EGR 010H Introduction to Engineering - Honors (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: MAT 903 or MAT 903M or High School Algebra I, or equivalent. This course is the honors version of Introduction to Engineering. This course exposes students to the field of engineering and the various engineering disciplines. The course presents the basic skills necessary to succeed as an engineering student. The nature of engineering work and the roles of engineers are explored. The Engineering Design Process is addressed through multiple team-based projects and engineering problem-solving topics. Communication skills for technical presentations and reports are developed through practical engineering scenarios. Guest speakers from local engineering firms and tours to local companies are included. Students may

not receive credit for both EGR 010 and EGR 010H. Enrollment in the Honors Transfer Project is required. C-ID # ENGR 110.

**EGR 023 Mechanics - Statics (3.0 Lecture) 3.0 UNITS**

Prerequisite: MAT 003B or any higher level math, and Prerequisite: PHY 004A This course applies the principles of mechanics to evaluate the static equilibrium of two- and three- dimensional engineering structures. C-ID # ENGR 130.

**EGR 024 Introduction to Circuit Analysis (3.0 Lecture) 3.0 UNITS**

Prerequisite: MAT 003B Prerequisite: PHY 004B Advisory: MAT 004A This is an introductory course in the analysis of DC and AC electric circuits using techniques based on Kirchoff's laws, Ohm's law, and Thevenin's and Norton's Theorems.

**EGR 024L Introduction to Circuit Analysis Laboratory (1.0 Lab) 1.0 UNIT**

Prerequisite: MAT 003B Prerequisite: PHY 004B Corequisite: EGR 024 This course is an introduction to the construction and measurement of electrical circuits. Students use electrical test and measurement instruments including multimeters, oscilloscopes, power supplies, and function generators. Some labs require the use of circuit simulation software. This course is primarily for engineering transfer students.

**EGR 025 Engineering Graphics and Design (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: MAT 000D ; or Prerequisite: MAT 002 ; or Prerequisite: MAT 003A ; or Prerequisite: MAT 003AH Engineering graphics based on conceptual sketching and computer aided design (CAD) are used to develop visualization tools for design. Graphics principles are taught and integrated into the design projects. C-ID # ENGR 150.

**EGR 026 Engineering Materials (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Prerequisite: CHM 001A Prerequisite: PHY 004A This course presents the internal structures and resulting behaviors of materials used in engineering applications, including metals, ceramics, polymers, composites, and semiconductors. The emphasis is upon developing the ability both to select appropriate materials to meet engineering design criteria and to understand the effects of heat, stress, imperfections, and chemical environments upon material properties and performance. Laboratory work is included. C-ID # ENGR 140B.

**EGR 030 Introduction to Computing for Engineers (3.0 Lecture/1.0 Lab) 4.0 UNITS**

Advisory: CIS 002, MAT 003A. This course introduces students to engineering problem solving using computer programming. A high level language, such as C/C++, is used. C-ID # COMP 122.

## MATH (MAT)

**MAT 000B Plane Geometry 4.0 UNITS**

Prerequisite: MATH 903 or satisfactory score on an appropriate Mathematics Placement Exam. Basic concepts of plane geometry for lines, planes, triangles and spheres and an introduction to deductive reasoning. Pass/No Pass Option.

**MAT 000C Intermediate Algebra (5.0 Lecture) 5.0 UNITS**

Prerequisite: Completion of the Mission College Placement Assistance Tool prior to registration. The student will study fundamental laws of exponents and radicals, quadratic equations, graphical representations, complex numbers, functions and inverses, logarithmic and exponential functions, conic sections, sequences and series, linear systems and inequalities, and applied problems.

**MAT 000CM Intermediate Algebra (MAPS) (5.0 Lecture) 5.0 UNITS**

Prerequisite: Completion of the Mission College Placement Assistance Tool prior to registration. Co-Requisite: MAT 00CMX The MAPS program offers students a team approach to succeed in elementary and intermediate algebra. This program is designed for students who have had difficulty in their math course in the past and is the second course in the MAPS sequence. The students study fundamental laws of exponents and radicals, quadratic equations, graphical representations, complex numbers, functions and

## COURSES

inverses, logarithmic and exponential functions, conic sections, sequences and series, linear systems and inequalities, and applied problems. Concurrent enrollment in MAT 00CMX is mandatory. Pass/No Pass Option.

### **MAT 000D Trigonometry (3.0 Lecture) 3.0 UNITS**

Prerequisite: MAT 000C or High School Algebra II, or equivalent OR Prerequisite: MAT 000CM or High School Algebra II, or equivalent OR Prerequisite: MAT 00CMX or High School Algebra II, or equivalent Course topics include trigonometric functions, including applications to triangles, circular functions, radian measure, graphs, polar coordinates, trigonometric identities, inverse trigonometric functions, vectors, and complex numbers. C-ID # MATH 851, MATH 955.

### **MAT 000G Mathematics for the Liberal Arts Student (4.0 Lecture) 4.0 UNITS**

Prerequisite: MAT 000C or High School Algebra II, or equivalent OR Prerequisite: MAT 000CM or High School Algebra II, or equivalent OR Prerequisite: MAT 00CMX or High School Algebra II, or equivalent. This course fulfills the graduation competency requirement for Associate degree and the general education requirement in mathematics for the CSU system. It introduces critical thinking techniques in areas of mathematics that include, but not limited to sequences and series, probability and statistics, countable and uncountable sets, cryptography and number theory, history of mathematics, mathematics in art and nature, the Pythagorean Theorem, and methods of proof, and game theory. There is an emphasis on general problem solving techniques as the class explores mathematics that may will be unfamiliar to most students, and communicate mathematics through class activities and write-ups.

### **MAT 001 College Algebra (4.0 Lecture) 4.0 UNITS**

Prerequisite: MAT 000C or Prerequisite: MAT 000CM or Prerequisite: MAT 00CMX or High School Algebra II, or equivalent. This is a college-level course in preparation for the Calculus sequence. Its contents include real and complex number systems, polynomials, algebraic fractions, exponents and radicals, linear and quadratic equations, simultaneous equations, inequalities, functions, theory of equations, exponential and logarithmic equations, sequence and series, induction and the binomial theorem. C-ID # MATH 955.

### **MAT 002 Precalculus and Trigonometry (6.0 Lecture) 6.0 UNITS**

Prerequisite: MAT 000C or Prerequisite: MAT 000CM or Prerequisite: MAT 00CMX or High School Algebra II, or equivalent. This is an intensive course covering those topics traditionally found in the separate courses of college algebra (MATH 001) and trigonometry (MATH 000D). This course is designed for the highly motivated and very well-prepared student who desires to fulfill the requirements of MATH 000D and MATH 001 in one semester. It prepares the student for the Calculus 003A/B sequence.

### **MAT 003A Analytic Geometry and Calculus I (5.0 Lecture) 5.0 UNITS**

Prerequisite: MAT 002 or placement into the course by the Mission College Mathematics Placement Exam. ; or Prerequisite: MAT 000D or higher or satisfactory score on an appropriate Mathematics Placement Exam. and Prerequisite: MAT 001 or placement into the course by the Mission College Mathematics Placement Exam. This is the first part of the three-semester calculus sequence. Topics include functions, limits, continuity, differentiation and integration, and applications for polynomial and transcendental functions. C-ID # MATH 210.

### **MAT 003AH Analytic Geometry and Calculus I - Honors (5.0 Lecture) 5.0 UNITS**

Prerequisite: MAT 002 or placement into the course by the Mission College Mathematics Placement Exam. ; or Prerequisite: MAT 000D or placement into the course by the Mission College Mathematics Placement Exam. and Prerequisite: MAT 001 or placement into the course by the Mission College Mathematics Placement Exam. This course is the honors version of the Calculus I course and is the first part of the three-semester calculus sequence for math, physics and engineering majors. Course topics include functions, limits, continuity, differentiation and integration, maxima, minima, and other applications, and the relationship between calculus and analytic geometry for polynomial and transcendental functions. Students may not receive credit for both MATH 003A and MATH 003AH. Enrollment in the Honors Transfer Project is required.

### **MAT 003B Analytic Geometry and Calculus II (5.0 Lecture) 5.0 UNITS**

Prerequisite: MAT 003A or Prerequisite: MAT 003AH This is the second part of the three-semester calculus sequence. Topics include infinite series, vectors in the plane, parametric equations, conic sections, polar coordinates and integration techniques with applications. C-ID # MATH 220.

### **MAT 004A Multivariable Calculus (5.0 Lecture) 5.0 UNITS**

Prerequisite: MAT 003B This course is the third part of the three-semester calculus sequence for math, physics, and engineering majors. Students study and demonstrate knowledge and understanding of vectors in two- and three-dimensional space, vector-valued functions, calculus of functions for several variables, differentials, gradients, Lagrange Multipliers, multiple integrals, line integrals, and an introduction to Green's Theorem, Divergence Theorem, and Stokes' Theorem. C-ID # MATH 230.

### **MAT 004B Differential Equations (4.0 Lecture) 4.0 UNITS**

Prerequisite: MAT 003B Topics include ordinary differential equations, with emphasis on linear equations, and partial differential equations. Methods include Laplace Transforms, power series, Fourier series, numerical solutions and applications. C-ID # MATH 240.

### **MAT 004C Linear Algebra (4.0 Lecture) 4.0 UNITS**

Prerequisite: MAT 003B Advisory: MAT 004A This course covers basic linear algebra including systems of linear equations, Gaussian elimination, determinants, matrices, vector spaces, transformations, eigenvalues, and eigenvectors. C-ID # MATH 250.

### **MAT 005 Programming and Problem-Solving in MATLAB (2.0 Lecture/1.0 Lab) 3.0 UNITS**

Prerequisite: MAT 003A or Prerequisite: MAT 003AH or higher. This course utilizes the MATLAB environment to provide students with a working knowledge of computer-based problem-solving methods relevant to mathematics, science and engineering. Topics include procedural and object-oriented programming, two- and three-dimensional graphing, data import and export, curve fitting, recursion and applications in engineering, physics, and mathematics. C-ID # ENGR 220.

### **MAT 009 Integrated Statistics II (5.0 Lecture) 5.0 UNITS**

Prerequisite: MAT 909 This is the second of two courses in the Statway sequence. Students study probability, descriptive and inferential statistics including probability distribution, hypothesis testing, linear regression and applications. Current statistical technology packages are used. This sequence is recommended for students with majors that require no mathematics beyond freshman-level statistics. Successful completion of both Math 909 and Math 009 is required to satisfy CSU and UC transferability.

### **MAT 00CMX Intermediate Algebra MAPS Extra (3.0 Lecture) 3.0 UNITS**

Prerequisite: Completion of the Mission College Placement Assistance Tool prior to registration. Co-Requisite: MAT 000CM This lecture course is a corequisite for MAT 000CM. It is part of the MAPS program and provides additional time to help students succeed by participating in enhanced and innovative learning strategies and activities.

### **MAT 00CP Prep Trig/Bus Math 2.0 UNITS**

Prerequisite: MATH 000C or satisfactory score on an appropriate Mathematics Placement Exam. This is an accelerated review of all the material from Intermediate Algebra. The course will concentrate on those areas of Intermediate Algebra which require additional work. Pass/No Pass Only.

### **MAT 010 Elementary Statistics (4.0 Lecture) 4.0 UNITS**

Prerequisite: MAT 000C or Prerequisite: MAT 000CM or Prerequisite: MAT 00CMX or High School Algebra II, or equivalent. Students study and demonstrate knowledge and understanding of descriptive and inferential statistics including data analysis, correlation and linear regression, probability, probability distributions and assorted hypothesis testing. Particular emphasis is placed on applications. Current statistical computer packages are used. C-ID # MATH 110.

### **MAT 010H Elementary Statistics - Honors (4.0 Lecture) 4.0 UNITS**

Prerequisite: MAT 000C or Prerequisite: MAT 000CM or Prerequisite: MAT 00CMX or High School Algebra II, or equivalent. This course is the honors version of the Elementary Statistics course. The course provides students with a comprehensive introduction to statistical methods and research.

Topics include descriptive and inferential statistics, correlation and linear regression, probability, probability distributions and assorted hypothesis testing. Particular emphasis is placed on applications and data analysis. Current statistical computer packages are used. Students may not receive credit for both MAT 010 and MAT 010H. Enrollment in the Honors Transfer Project is required. C-ID # MATH 110.

**MAT 010X Elementary Statistics with Additional Support (6.0 Lecture) 6.0 UNITS**

Students study and demonstrate knowledge and understanding of descriptive and inferential statistics including data analysis, correlation and linear regression, probability, probability distributions and assorted hypothesis testing. Particular emphasis is placed on applications. Current technology is used. Areas of support will include review of arithmetic and algebra topics that underlie statistical procedures and concepts, hands-on activities that promote a deeper understanding of statistical ideas, and study skills that promote success in statistics.

**MAT 012 Calculus for Business (4.0 Lecture) 4.0 UNITS**

Prerequisite: MAT 000C or Prerequisite: MAT 000CM or Prerequisite: MAT 00CMX or High School Algebra II, or equivalent. Course topics include the intuitive concept of a limit, and simple techniques of differential and integral calculus and their most common applications in business. This course is not equivalent to MAT 003A. C-ID # MATH 140.

**MAT 014 Math for Elementary School Teachers (Number Systems) 3.0 UNITS**

Prerequisite: MATH 000C or MATH 000CM or successful placement into the course based on the Mission College Mathematics Placement Exam. Advisory: MATH 000B. This course covers systems of numbers, emphasizes patterns and relationships, presents mathematical models and real-world applications, and provides algorithms for estimating and finding exact answers when doing calculations. Appropriate problem solving, critical thinking, and communication are included. The course is designed for students who intend to become elementary school teachers. Pass/No Pass Option.

**MAT 019 Discrete Mathematics (4.0 Lecture) 4.0 UNITS**

Prerequisite: MAT 001 or MAT 002 The student studies and demonstrates knowledge and understanding of the discrete mathematics appropriate for computer applications. Topics may include graphs, sets, logic, mathematical induction, functions and relations, sequences and series, matrices, combinatorics, Boolean algebra and algebraic structures such as groups, rings and fields. Computer implementations of these mathematical techniques are incorporated throughout the course. C-ID # MATH 160.

**MAT 900DX Math Skills for Success in Trigonometry (2.0 Lecture) 2.0 UNITS**

Prerequisite: MAT 000C or MAT 000CM or High School Algebra II, or equivalent. Corequisite: MAT 000D Math Skills for Success in Trigonometry is for students concurrently enrolled in MAT 000D. In this course students will review algebraic and basic geometric topics that underlie Trigonometry concepts and practice reading skills and other study skills that promote success in MAT 000D. Concurrent enrollment in MAT 000D is required.

**MAT 901X Math Skills for Success in College Algebra (2.0 Lecture) 2.0 UNITS**

Prerequisite: MAT 000C or MAT 000CM or High School Algebra II, or equivalent. Corequisite: MAT 001 Math Skills for Success in College Algebra is for students concurrently enrolled in MAT 001. In this course students will review algebraic and basic geometric topics that underlie College Algebra concepts and practice reading skills and other study skills that promote success in MAT 001. Concurrent enrollment in MAT 001 is required.

**MAT 902 Pre-Algebra (4.0 Lecture) 4.0 UNITS**

Prerequisite: Completion of the Mission College Placement Assistance Tool prior to registration. This course is designed for those students who have a solid foundation in arithmetic skills but need to develop those skills further before taking Algebra.

**MAT 903 Elementary Algebra (5.0 Lecture) 5.0 UNITS**

Prerequisite: Appropriate placement by Multiple Measures. Course topics include operations with real numbers; properties of real numbers and signed exponents; solving and graphing linear equations; solving linear inequalities; functions; factoring polynomials; solving quadratic equations by factoring;

simplifying rational expressions; solving rational equations; applications of linear, quadratic, and rational equations; and working with scientific notation.

**MAT 903M Elementary Algebra (MAPS) (5.0 Lecture) 5.0 UNITS**

Prerequisite: Completion of the Mission College Placement Assistance Tool prior to registration. Co-Requisite: MAT 903MX The MAPS program offers students a team approach to succeed in elementary and intermediate algebra. This program is designed for students who have had difficulty in their math course in the past. Students study operations of signed numbers, exponents, polynomials and rational expressions; properties of real numbers, equations and exponents; solving and graphing linear equations; applications of linear equations; and factoring of polynomials. Pass/No Pass Option. Concurrent enrollment in MAT 903MX is mandatory.

**MAT 903MX Elementary Algebra MAPS Extra (3.0 Lecture) 3.0 UNITS**

Prerequisite: Completion of the Mission College Placement Assistance Tool prior to registration. Co-Requisite: MAT 903M This lecture course is a co-requisite for MAT 903M. It is part of the MAPS program and provides additional time to help students succeed by participating in enhanced and innovative learning strategies and activities.

**MAT 909 Integrated Statistics I (5.0 Lecture) 5.0 UNITS**

Prerequisite: completion of Mission College Placement Assistance Tool prior to registration. This is the first of two courses in the Statway sequence. Students study probability, descriptive statistics, linear regression and applications. Current statistical technology packages are used. This sequence is recommended for students with majors that require no mathematics beyond freshman-level statistics. Successful completion of both MAT 909 and MAT 009 is required to satisfy CSU and UC transferability.

**MAT 910X Math Skills for Success in Statistics (2.0 Lecture) 2.0 UNITS**

Prerequisite: MAT 000C or MAT 000CM or High School Algebra II, or equivalent. Corequisite: MAT 010 Math Skills for Success in Statistics is for students concurrently enrolled in MAT 010. In this course students will review arithmetic and algebraic topics that underlie statistical procedures and concepts, do hands-on activities that promote a deeper understanding of statistical ideas, and practice reading skills and other study skills that promote success in MAT 010. Concurrent enrollment in MAT 010 is required.

**MAT 912X Math Skills for Success in Calculus for Business (2.0 Lecture) 2.0 UNITS**

Prerequisite: Appropriate Placement; or Prerequisite: MAT 000C; or MAT 000CM and MAT 00CMX Math Skills for Success in Calculus for Business is for students concurrently enrolled in MAT 012. In this course students will review algebraic and basic geometric topics that underlie Calculus for Business concepts and practice reading skills and other study skills that promote success in MAT 012. Concurrent enrollment in MAT 012 is required.

**MAT 970 Problem Solving in Mathematics (1.0 Lecture) 1.0 UNIT**

This course introduces the student to various problem solving techniques, and develops mathematical and critical thinking skills.

## NUTRITIONAL SCIENCE (NTR)

**NTR 015 Human Nutrition (3.0 Lecture) 3.0 UNITS**

Advisory: ENG 001A or ENG 001AX This course introduces scientific principles as they apply to human nutrition. It explores the functions of essential nutrients, the chemical composition of foods, as well as psychological and social issues related to food intake. Students will explore current topics in nutrition and evaluate nutrient intake as it relates to maintaining health and preventing disease throughout the life cycle. C-ID # NUTR 110.

**NTR 040 Nutrition and Disease (3.0 Lecture) 3.0 UNITS**

This nutrition course intended for students interested in entering the health fields with emphasis on physiology, metabolism of nutrients, metabolic diseases, and dietary modification to optimize recovery and health. Students will understand and evaluate dietary intake, nutritional assessment, and nutrition care commonly used at clinics and hospitals.

**PHYSICS (PHY)**

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**PHY 002A      General Physics - Mechanics and Thermodynamics (4.0 Lecture/1.0 Lab)      5.0 UNITS**

Prerequisite: MAT 000D or higher This is a first lecture/lab course in physics for non-majors. Topics covered include Newton's laws of force, the concepts of potential and kinetic energy, momentum, thermodynamics, hydrodynamics, and wave motion. C-ID # PHYS 100S, PHYS 105.

**PHY 002B      General Physics - Electricity, Magnetism And Optics (4.0 Lecture/1.0 Lab)      5.0 UNITS**

Prerequisite: PHY 002A This lecture/lab course is a continuation of PHY 002A as a lecture/lab course with the study of electricity, magnetism, geometrical and wave optics and atomic physics. C-ID # PHYS 100S, PHYS 110.

**PHY 004A      Engineering Physics-Mechanics (4.0 Lecture/1.0 Lab)      5.0 UNITS**

Prerequisite: MAT 003A or MAT 003AH This course in mechanics, the first in a series of engineering physics courses, is a calculus-based study of forces, energy and momentum. Kinematic problems are solved using position, velocity and acceleration. Conservation of momentum and energy is applied to moving and interacting systems, rotational mechanics, simple harmonic motion, gravity, mechanical properties of matter, fluid statics and dynamics. C-ID # PHYS 200S, PHYS 205.

**PHY 004B      Engineering Physics-Electricity and Magnetism (3.0 Lecture/1.0 Lab)      4.0 UNITS**

Prerequisite: PHY 004A Prerequisite: MAT 003B This lecture/laboratory course, the second in the engineering physics series, is a calculus-based study of electricity and magnetism that develops the concepts and applications of Maxwell's equations, including DC and AC circuits. C-ID # PHYS 200S, PHYS 210.

**PHY 004C      Engineering Physics-Light and Heat (3.0 Lecture/1.0 Lab)      4.0 UNITS**

Prerequisite: MAT 003B Prerequisite: PHY 004A This lecture/laboratory course is the third course in the calculus-based engineering physics series. Topics include classical thermodynamics, geometrical and wave optics and modern physics. C-ID # PHYS 200S, PHYS 215.

**PHY 004D      Engineering Physics-Atomic (2.0 Lecture)      2.0 UNITS**

Prerequisite: PHY 004B. This course is an introduction to quantum physics, the electronic structure of atoms, solids, band theory, radiation, and relativity.

**PHY 010      Introduction to Physics (3.0 Lecture/1.0 Lab)      4.0 UNITS**

Prerequisite: MAT 903 or High School Algebra I, or equivalent. This is a conceptual course in physics, including the development of fundamental concepts as applied to everyday phenomena, from a limited mathematical perspective, emphasizing verbal logic, critical analysis, and rational thought. The topics included in this course are mechanics, thermodynamics, electricity and magnetism, optics, and modern physics.