



Harrisburg University of Science and Technology

has a unique concept for designing extensive College in the High School Dual Enrollment opportunities for high school students and traditional Dual Enrollment offerings at university locations in Harrisburg and Philadelphia. Qualified high school teachers who are eligible to become Corporate Faculty and have the appropriate curriculum will be approved and supported by Harrisburg University to offer the following courses for transferrable college credit from their high school classroom.

ADMA 230 - APPLIED ANALOG AND DIGITAL ELECTRONICS

(3 semester hours)

Description: This course is an introduction to analog and digital electronics as it relates to advanced manufacturing through hands-on activities centered around building and logically troubleshooting circuits and devices. The concepts and theories are covered in an industrial and/or an advanced manufacturing setting. Use of instrumentation is stressed with the application of problem-solving techniques.

ADMA 240 - COMPUTER ASSISTED DRAWING

(3 semester hours)

Description: Computer Assisted Drawing is a basic course in computer-aided drawing, which integrates with manufacturing and automation. Content stresses learning major CAD commands and using the graphic user interface. Conceptual drawings, 2D drawings, 3D drawings, and spatial relationships are explored. Additional topics include file maintenance, printing formats, plotting and 3D printing are used to create two and three-dimensional design models.

ADMA 430 - PROGRAMMABLE LOGIC CONTROLLERS AND INTEGRATIONS

(3 semester hours)

Description: This course is the application of a combination of digital and analog logic technologies that will lay down a framework from which programmable logic controllers are programmed. The concepts of inputs, outputs, relay logic and ladder logic are addressed. Industrial robots and automated devices will be introduced, on-line as well as pendant programming, to include tasks such as pick and place, finish application and device integration.

BIOL 102 - GENERAL BIOLOGY

(3 semester hours)

Description: This course introduces the student to the major themes of biology, including properties of living organisms, comparison of eucaryotes vs. prokaryotes, patterns of inheritance, the central dogma, mitosis and meiosis, the diversity of life in both plants and animals, classification of organisms, evolution, metabolism, photosynthesis, cell structures, basic structure of the body, infectious disease, the Hardy-Weinberg principle, biodiversity, ecosystems, and the biosphere. A broad understanding of biology and living organisms in the biosphere is developed through hands-on, multimodal engaged learning opportunities in both the classroom and the companion laboratory component.

BIOL 103 - GENERAL BIOLOGY LABORATORY

(1 semester hour)

Description: Companion laboratory component that demonstrates the major themes of biology presented in BIOL 102.

BTEC 105 - THE ART OF GENES AND FUSION

(3 semester hours)

Description: The student is introduced to molecular concepts regarding DNA, genes, proteins, and chromosome mapping to describe the importance of biotechnology to help combat human diseases and disorders. The student examines links between diseases and genes, such as leukemia and cancer. Lastly, the student will use case studies and contemporary topics in biotechnology and genetic engineering to understand the significance of gene manipulation in technology development.

BTEC 170 - INTRODUCTION TO BIOTECHNOLOGY

(3 semester hours)

Description: Biotechnology explores biological processes to produce raw materials, foodstuffs, and medical treatments for use by humans. The industry is key for generating income worldwide and feeds into the pharmaceutical, textile, food and agricultural industries. The course centers on three main goals: 1) to understand the biological processes involved in biotechnology methods; 2) to identify and criticize the benefits and drawbacks of current methods; and 3) to review new emerging technologies that focus on ecological solutions.

BTEC 210 - FOOD AND NUTRITION

(3 semester hours)

Description: This course provides an overview of the diet and nutritional requirements of protein, energy, whole grains, major vitamins and minerals and other food groups that are determinants of health and diseases in human populations. The sources, recommended intake, role of major nutrients, and metabolism are explored, in addition to case studies that address the impact of nutrition on human growth and development of chronic or acute diseases (i.e. cancer, diabetes, heart disease, etc.).

CHEM 151 - GENERAL CHEMISTRY I LECTURE

(3 semester hours)

Description: This course provides a general introduction to atoms and molecules, stoichiometry, states of matter, solutions, reactions, kinetics and equilibrium which serve as a prerequisite for advanced courses. Three hours of lecture, three hours of laboratory per week.

CHEM 152 - GENERAL CHEMISTRY I LABORATORY

(1 semester hour)

Description: Companion laboratory component that illustrates the general introduction to atoms and molecules, stoichiometry, states of matter, solutions, reactions, kinetics and equilibrium which serve as a prerequisite for advanced courses. Three hours of lecture, three hours of laboratory per week. Offered

CHEM 161 - GENERAL CHEMISTRY II

(3 semester hours)

Description: A study of chemical principles including acid/base chemistry, bonding, thermodynamics and electrochemistry. Three hours of lecture, three hours of laboratory per week.

CHEM 162 - GENERAL CHEMISTRY II LABORATORY

(1 semester hour)

Description: Companion laboratory component that illustrates the study of chemical principles including acid/base chemistry, bonding, thermodynamics and electrochemistry. Three hours of lecture, three hours of laboratory per week.

CISC 103 - INTRODUCTION TO COMPUTERS & INFORMATION SCIENCES

(4 semester hours)

Description: This course serves as an introduction to computing and information systems. It uses both lecture and laboratory practice to introduce the student to the use of computers to solve problems. The student is presented the techniques, concepts, analysis, and reports on experiences and technologies and trends. This includes the concepts of hardware, software, networking, computer security, programming, database, e-commerce, decision support systems, and other emerging technologies. The student is introduced to techniques that search, evaluate, validate, and cite information found online. Widely used applications including word processing, spreadsheets, databases, presentation, and web development software are also studied.

CISC 120 - PROGRAMMING I

(4 semester hours)

Description: This course introduces the concepts and techniques of computer programming. Emphasis is placed on developing the student's ability to apply problem-solving strategies to design algorithms and to implement these algorithms in a modern, structured programming language. Topics include fundamental programming constructs, problem solving techniques, simple data structures, Object- Oriented Programming (OOP), program structure, data types and declarations, control statements, algorithm strategies and algorithm development.

COMM 110 - SPEECH

(3 semester hours)

Description: This course builds on the skills acquired in ENGL 105 or ENGL 106. The student continues to study the process of effective communication, based on an understanding of purpose and audience using speaking techniques such as enunciation and modulation. The student builds an understanding of the basic skills needed to communicate across disciplines.

ENGL 105 - COLLEGE COMPOSITION

(3 semester hours)

Description: This first-year composition course is an introduction to college-level writing strategies. By reading various writing styles and genres, the student will contemplate how purpose and audience guide the writing process. Writing assignments are to be completed according to a deadline with a goal of improving style, grammar, and diction.

ENVS 101 - INTRODUCTION TO ENVIRONMENTAL SCIENCE

(4 semester hours)

Description: Environmental science is the study of natural ecosystems, human impacts on the environment, and sustainable management of the Earth's resources. Processes of the physical and biological environment are used as a basis for consideration of current environmental topics. Other areas covered include energy consumption and global warming, water and air pollution, waste management, impacts of deforestation on biodiversity, and other environmental changes occurring on a global scale. Three hours of lecture, three hours of laboratory per week.

ENVS 104 - OUR OCEAN WORLD

(3 semester hours)

Description: This course investigates the historical, geological, physical, chemical, and biological characteristics of the ocean environment. The basic language of marine science, and its underlying principles, are explored. The student pursues an understanding of the underwater history of the planet and the importance of the sciences, including the scientific method of research.

FORS 125 - FORENSIC SCIENCE

(3 semester hours)

Description: This course explores the science and art of forensic investigations and the identification, proper collection and recognition of evidence. The student looks at a variety of specialty areas such as firearms, tool marks, fiber tracing, hair paint, toxicology and photography. Crime scenes are explored using critical thinking skills to produce alternative strategies by thinking creatively. Experts in forensics are guest presenters. Fundamentals of the science behind the crime are explored. Case studies are presented as group projects and the student is expected to provide several scenarios and evidence for alternative conclusions.

FORS 270 - CRIME SCENE INVESTIGATION

(3 semester hours)

Description: This is a fundamental course in forensic death investigations. The areas of specialized focus include the causes, manner, physical circumstances, and mechanisms of both natural and unnatural deaths. Death scenes are examined, and investigations reviewed, with evidence pertaining to how people die. In addition, the course looks at the various legal considerations and methods germane to concluding equivocal death determinations.

GSTC 106 ST

(2 semester hours)

This course will contain the content required to pass the FAA exam, which includes topic area modules related to Remote Pilot Certification knowledge and an overview of common Geospatial Technology applications of drones, such as mapping and multi-spectral sensing. Numerous field days will be included to provide hands-on drone flying experiences and piloting principles. It is expected that the students will be prepared to pass the FAA Part 107 Remote Pilot Certification exam at the end of the course. In addition to certification knowledge and geospatial applications, students will be introduced to aspects of starting a drone business and the pathways to careers in manned aircraft and airport operations.

This initial offering will be a Train the Teacher effort to prepare High School Teachers to deliver the content as a College in the High School (CiHS) course for Harrisburg University credits.

GSTC 140 - INTRODUCTION TO GIS

(4 semester hours)

Description: This course focuses on the first of three primary Geospatial Technologies, Geographic Information Systems, but also introduces the student to Remote Sensing and Global Positioning Systems (GPS). The course includes both lecture on concepts and applications as well as laboratory exercises designed to develop the student's abilities in core GIS functionality. GIS exercises include spatial data capture, storage, query, analysis display and map output using the industry standard, ArcGIS software. Practical applications of GIS to areas such as environmental analysis, land use planning, emergency management and fundamental mapping techniques. The student finishes the course by completing a custom mapping project on a topic of interest.

IMED 105 - INTRODUCTION TO GAME MODDING

(2 semester hours)

Description: Many video game companies are actively promoting "modding" (the modification of) existing video games, a trend sweeping the industry. This course is a mix of game design and game play. Skills needed to create maps, import models, and mod nearly every aspect of the game experience are taught. Once completed, the student leaves with the latest tips and tricks to begin a career path in game design and development.

IMED 110 - INTRODUCTION TO DIGITAL DESIGN

(2 semester hours)

Description: Digital design introduces the essentials of visual computing, graphics, web technologies, and the design disciplines (graphic, information, game, social, and interactive) to the student interested in interactive media. Emphasis is placed on image manipulation, HTML/CSS design, crafting interactive experiences, and 3D modeling. By reviewing these fields of interest, the student is more prepared to choose a focus for continued study.

IMED 170 - VISUAL DESIGN FUNDAMENTALS

(3 semester hours)

Description: This course introduces the basic concepts of design on print and time-based digital media. The principles of composition and color theory, and how these are affected by movement, duration and display, are covered. Vector and bitmap manipulation tools are explored in relation to graphic production across the design fields.

IMED 250 - VIDEO PRODUCTION I

(2 semester hours)

Description: This course explores the fundamental theory and practice of creating digital media. The course also prepares the student for creative expression and technology application in all aspects of media for effective message communication, whether it is for a specific product, a game or entertainment site, instruction, or eCommerce. New and emerging digital media tools are used to create, store, transmit and sell products and services. The student employs these new skills to develop portfolio-ready pieces.

IMED 251 - VIDEO PRODUCTION II

(2 semester hours)

Description: This course builds on digital video production skill development. The student uses visual design principles, motion graphics, sound design, and creative camera techniques and editing to produce client-based projects. This course also includes considerable training on the use of studio equipment, including its care and maintenance.

IMED 255 - AUDIO PRODUCTION

(3 semester hours)

Description: Audio production can make or break media-based projects. Understanding how sound is created, recorded, processed, and managed in digital formats is at the heart of crafting interactive experiences. This course is designed as an introduction to computer-based recording, editing, mixing and production of sound. A software purchase is required.

IMED 350 - DIGITAL PHOTOGRAPHY

(3 semester hours)

Description: This course is designed to introduce three major components of digital photography; camera mechanics, image composition and digital photo editing. The student is expected to confidently control the photographic process and produce a portfolio of work that has been carefully imagined, executed, edited, and presented. A digital SLR camera and Adobe Creative Cloud license are required for this course.

ISIT 140 - INTRODUCTION TO INFORMATION SYSTEMS

(3 semester hours)

Description: Businesses rely on data-driven information to thrive and succeed. Information systems provide the means and the medium to collect, store, safeguard, retrieve, share, analyze, and present the data; therefore, information systems play an important role in our modern world. Almost all services ranging from banking to travelling to complex healthcare applications exploit information systems for data manipulations. In this course, the core concepts of any information system, namely people, processes, and technology, are discussed, and their social and organizational roles are explored. In this course, an overview of fundamental concepts of information systems, definition of key terms and current trends, the role and importance of information and information systems for businesses and management, social and organizational implications, along with some applications of information systems are explored and discussed through lectures and case studies.

MATH 120 - COLLEGE ALGEBRA

(3 semester hours)

Description: This course is designed for the student with an elementary knowledge of algebra. Topics include properties of real numbers, problem-solving using equations and inequalities, algebraic functions, graphing, systems of equations and inequalities, polynomial functions and graphs, exponents and radicals, the binomial theorem, zeros of polynomials, inverse functions, and applications and graphs. Free on-line graphing and calculating utilities are used in lieu of a graphing calculator. This course meets a total of 4 hours per week to permit active learning activities each week driven by student interests or needs.

MATH 210 - DISCRETE MATHEMATICS I

(3 semester hours)

Description: This course provides the student with an understanding of multiple mathematical concepts and methods which shape the foundation of modern information science in a form that is relevant and useful. Discrete mathematics plays a fundamental role for computer science, which is similar to that played by calculus for physics and engineering. Many concepts in computer science are best understood from a perspective that requires expertise with mathematical tools and certain reasoning skills associated with mathematical maturity. The topics covered draw on current material from several mathematical disciplines: graph theory, mathematical logic, and set theory.

MATH 220 - CALCULUS I

(3 semester hours)

Description: This course introduces techniques to evaluate limits and covers continuity, special trigonometric limits, absolute value limits and differentiation of algebraic, trigonometric, and logarithmic functions. The course explores intermediate value theorem, mean value theorem, and extreme value theorem. Other topics for exploration are application and formal definition of derivative average rate of change versus instantaneous rate of change, velocity, and the introduction of the definite integral and its applications. A graphing calculator is required for this course.

MATH 280 - INTRODUCTORY STATISTICS

(3 semester hours)

Description: This course covers elementary topics from the probability and statistics of both discrete and continuous random variables. Topics include independence and dependence, mean, variance and expectation, and distributions of random variables. Statistics is applied to hypothesis testing. This course provides the student with a broad, general knowledge and understanding of statistics. The emphasis of this course is on the utility and practical application of statistics rather than on the mathematical derivation of statistical principles.

MEBA 110 - INTRODUCTION TO BUSINESS AND ENTREPRENEURSHIP

(3 semester hours)

Description: The goal of this course is to introduce entrepreneurship concepts by providing insight into entrepreneurial processes-from finding and evaluating good business opportunities to new venture start-up and growth issues-and entrepreneurial behavior, a critical success factor in new venture creation. The student is taught how businesses are structured and study data from business operations. The student will analyze and evaluate business data to make decisions. The student practices how to use spreadsheets for analysis to make informed decisions, use written communication to justify those decisions, and deliver oral presentations to communicate those decisions.

MEBA 201 - INDEPENDENT STUDY

(1 to 4 semester hours)

Description: This course is designed for the student who demonstrates an interest in an area of study not offered or who wishes to pursue a discipline in greater depth than possible through existing courses. An independent study counts as an elective and may not be used for accelerated or remedial credit. A learning contract between the student and instructor defines the responsibilities of the parties and specifies the learning objectives and standards for successful completion of the project. A calendar of meeting times and deadlines shall be a part of that contract.

MEBA 210 - INTRODUCTION TO INTERNET AND WEB TECHNOLOGIES

(3 semester hours)

Description: The main objective of this course is to introduce the current as well as emerging Internet and Web technologies that enable and drive the modern enterprises. The student is exposed to the key building blocks (enterprise applications, computing platforms, databases, and networks) of the modern Internet-Web infrastructure. Through experiments and examples, the main ideas of the Internet, the ISPs, wireless networks, Classical Web, Semantic Web, XML, Web 2.0, social networking, wireless web, and mobile apps are explained. The course exposes the student to the main aspects of web-based software development processes through simple hands-on projects. The student is introduced to the basic software concepts by developing simple web sites by using HTML5 and CSS3 and then using JavaScript, Java applets, XML and XSL to introduce more sophisticated features. The student also has an opportunity to develop a simple web portal that involves simple database queries by using SQL.

MEBA 220 - PRINCIPLES OF BUSINESS MANAGEMENT

(3 semester hours)

Description: The student is provided with analytical tools to understand and synthesize the most current applications of theories and concepts in business management and is exposed to the debate on the dynamic of business environment, evolving business models, economic systems, and scale of domestic and global competition in the marketplace.

MEBA 230 - MARKETING

(3 semester hours)

Description: Marketing is defined as the process of getting the right products to the right people, at the right place, time, and price by using the most effective promotional course of action. Marketing is also defined as providing goods and services that meet or exceed expectations of potential consumers' needs and wants. The student is shown what makes a company embrace ethics in professional decision-making; what encourages corporations to become socially responsible; what the processes are for product concepts, product development, and types of consumer products and services; how companies research the market, configure market segmentation, and target their market; and how companies develop online marketing strategies to target consumers and businesses.

PHYS 210 - GENERAL PHYSICS I

(4 semester hours)

Description: This course provides an introductory treatment of classical Newtonian physics and covers kinematics in one and two dimensions, vector forces, Newton's laws of motion, uniform circular motion, work, conservation of energy, momentum and angular momentum, rotational kinematics and dynamics, and simple harmonic motion. Emphasis is placed on the application of basic concepts through mathematical problem-solving. Applications of physics to problems in medicine are presented and medical technology is highlighted throughout the course. Applications of elementary and differential and integral calculus to physics are introduced. Laboratory experiments provide experience with various measurement technologies and reinforce the theoretical concepts developed.

PHYS 260 - GENERAL PHYSICS II

(4 semester hours)

Description: This course extends the study of classical physics and covers topics in electrostatics, magneto statics, electric circuits, electromagnetic waves, optics, interference and diffraction, and the quantum theories of atomic and nuclear physics. Mathematical problem-solving skills and applied problems in medical technology are emphasized. Applications of elementary and differential and integral calculus to physics are introduced. The course includes laboratory experiments to expose the student to advanced electronic and radiation measurement technologies and enhance the theoretical development of each topic.