This document provides information about available courses for 2019-2020 school year. Please note, however, that Penn College NOW cannot guarantee course delivery and/or teacher approval for any content area.

New partners must offer program area courses during their first year. General education courses (indicated by **) may be added incrementally in subsequent years, subject to availability.

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GENERAL EDUCATION COURSEWORK  NEW PARTNERS IN THEIR FIRST YEAR MAY ONLY OFFER 
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ACR111: Introduction to Refrigeration
Introduction to basic refrigeration systems. Topics include proper and safe use of tools, identification of materials, methods of assembling refrigeration systems, and proper handling of refrigerants. Emphasis on basic system components: evaporators, compressors, condensers, and test equipment. 5 Credits (3 Lecture – 6 Lab) Sophomore-Approved Course

ARCHITECTURAL TECHNOLOGY

ACH135: Architectural Computer Aided Drafting
Introduction and practical application of Computer-Aided Drafting (CAD) techniques and standards used to create two-dimensional architectural drawings. Focus on hardware and software components, operating systems, file management, CAD commands, system variables, drawing setup, creation of lines and shapes, and the editing, saving, and printing of drawings. Advanced topics include external references, layouts, paper space, attributes, dimensioning, text, and the creation of a symbols library. 3 Credits (2 Lecture - 3 Lab)

AUTOMOTIVE

AMT109: Automotive Electrical Fundamentals
Study of the electron theory of electricity. Topics include Ohm's law and Kirchhoff's law; AC and DC principles; series and parallel circuits; test meters; wiring diagrams; basic solid state devices; circuit analysis; and the concepts of capacitance, inductance, and impedance. Overview of integrated circuits and on-board microcomputers. 3 Credits (2 Lecture - 3 Lab) Prerequisite(s): MTH011 or MTH004 or Placement by Examination (qualifying score on math placement exam). Corequisite(s): AMT126 (waiver not available).

AMT112: Brake Systems
Fundamentals of brake hydraulics, including theory and operation of servo and non-servo drum brakes, disc and drum brake machining, operation of disc brakes, operation of power assist brakes, and overview of electronic anti-skid brakes. 3 Credits (2 Lecture - 3 Lab) Prerequisite(s): Placement by Examination or MTH004 (qualifying score on math placement exam) and Placement by Examination or RDG001.

AMT113: Steering and Suspension
Principles of operation of steering and suspension, rack and pinion steering gears, and conventional steering gears. Study includes the theory of operation of power steering gears, steering geometry, wheel alignment principles, and static and dynamic wheel balancing. 3 Credits (2 Lecture - 3 Lab) Prerequisite(s): Placement by Examination or MTH004 (qualifying score on math placement exam) and Placement by Examination or RDG001.
AMT126: Engine Electrical Systems
Principles of engine electrical systems, including testing equipment and procedures. Topics include wiring, connectors, and circuit protection devices; batteries and battery tests; cranking circuits, starter motors, and drives; charging circuits, alternators, and voltage regulators; ignition systems; engine computer controls and electronic fuel injection; and the oscilloscope and other special test equipment. 4 Credits (3 Lecture - 3 Lab) Prerequisite(s): Placement by Examination or MTH004 (qualifying score on math placement exam) and Placement by Examination or RDG001. Corequisite(s): AMT109 (waiver not available).

BIOLOGY

BIO103: Human Anatomy and Physiology Survey **
Overview of human anatomy and physiology designed for non-science majors. Emphasis on the relationships between the structures and functions in each body system as well as the interrelationships among all body systems in the maintenance of homeostasis. Laboratory work complements and reinforces lecture materials. 4 Credits (3 Lecture - 3 Lab) Prerequisite(s): MTH004 or Placement by Examination (qualifying score on math placement exam). Corequisite(s): ENL111.

BUILDING CONSTRUCTION

BCT103: Construction Hand and Power Tools
Survey of hand and power tools typically used to perform construction work. Emphasis on the development of skills needed to effectively perform layout, measurement, cutting, fastening, and finishing operations. Study also includes maintenance of tools and equipment, safe use of hand and power tools, and emerging tool technology. 1 Credit (0 Lecture – 3 Lab). Sophomore-Approved Course.

BCT109: Framing Principles
Theory and application of framing techniques in residential and light commercial construction. Emphasis on basic principles and skills used in hand and machine woodworking operations. 4 Credits (2 Lecture – 6 Lab) Corequisite(s): BBCT103 and BCT104.

BCT234: Masonry Principles
Introduction to masonry construction materials and methods, with an emphasis on the terms, definitions, and methods of construction practices related to concrete block, brick construction, and thin masonry veneer. Topics also include the different types of mortar mixes and their strengths and uses, reinforcement of masonry walls, masonry cleaning, weather protection for masonry, and estimating supplies and materials. 5 Credits (2 Lecture - 9 Lab) Prerequisite(s): BCT102 and BCT103 or BCT103 and BCT104.

PLH113: Mechanical Systems Design and Operation
Study of fluid and gas conveyance within residential construction, with emphasis on the selection and application of tools and materials appropriate for code approved system installation and operation. Additional topics include the study of dynamic and static forces impacting fluid transfer, introductory plan and specification development, and basic material and cost estimating. (Formerly PLH112). 4 Credits (2 Lecture - 6 Lab).

Updated 9/13/19
MGT105: Introduction to Business
Introduction to a variety of business concepts and practices that impact all organizations, as well as the knowledge and skills needed to be successful in an organization. Topics include interpersonal communications, emotional intelligence, economics, accounting, and finance and investments. An integrative approach connects topics and provides context within organizational environments, relevance to current business situations, and advances across various fields of business. 3 Credits (3 Lecture) Sophomore-Approved Course

CHM100: Fundamentals of Chemistry **
Basic principles of chemistry and its practice in the laboratory. Emphasis on the underlying structure of matter (atoms, ions, molecules) and how structure determines properties. Designed to teach chemistry terminology and symbols, as well as to develop analytical and critical thinking skills. Appropriate for non-science majors needing one term of chemistry or to satisfy a lab science requirement. Also appropriate for those who desire background before taking General Chemistry I (CHM111). No prior knowledge of chemistry is assumed, but some algebra skills are needed. 4 Credits (3 Lecture - 3 Lab) Prerequisite(s): Placement by Examination or MTH005 (qualifying score on math placement exam). Sophomore-Approved Course

ABC100: Introduction to Non-Structural Collision Repair
Analysis of basic principles and industry best practices, including issues of human and environmental safety. Theory/overview of removing, repairing, replacing, and adjusting outer body panels; straightening and roughing out of damaged steel panels and preparing them for body filler; and repairing aluminum panels. Study of proper replacement of corrosion protection to the repaired panels and adjustment of panels for proper fit. Introductory theory of cutting and welding of steel. Group interaction/activities; application of assessment tools. 2 Credits (2 Lecture) Corequisite(s): ABC104 (waiver not available).

ABC104: Introduction to Non-Structural Collision Repair Applications
Application of theory, techniques, principles, and industry best practices, including issues of human and environmental safety. Applied skills include removing, repairing, replacing, and adjusting outer body panels; straightening and roughing out damaged steel panels and preparing them for body filler; repairing aluminum panels for proper replacement of corrosion protection; and adjusting panels for proper fit. Group interaction/activities; application of assessment tools. 3 Credits (0 Lecture – 9 Lab) Corequisite(s): ABC100 (waiver not available).
COMPUTER-AIDED DRAFTING

CAD120: AutoCAD - Comprehensive
Comprehensive application of 2D and 3D techniques using AutoCAD® software. Topics include the generation, editing, and analysis of geometry in alignment with industry standards with an emphasis on productivity. 3 Credits (2 Lecture - 3 Lab).

CAD122: 3D Parametric Modeling Using Autodesk Inventor®
Study and application of solid and surface modeling using Autodesk Inventor® parametric modeling software. Topics include the generation and editing of mechanical parts and assemblies, analysis of mass properties, rendering and animation, and the development of physical models using rapid prototyping (additive manufacturing) equipment. Also included are basic 3D-to-2D documentation techniques. 3 Credits (2 Lecture - 3 Lab).

CCD103: Technical Drawing I
Basic principles and skills of drafting as a graphic using the parametric modeling approach. Topics include technical sketching, SolidWorks® CAD operations and procedures, shape description, geometric construction, multiview projection, sectional views, auxiliary views, revolutions, threads and fasteners, and application of dimensions and tolerancing. Other topics include detail views, part drawings, assembly drawings, manufacturing processes, surface finishing, descriptive geometry, and the use of vendor part catalogs. ANSI/ASME drawing standards and practices are emphasized. 4 Credits (3 Lecture - 3 Lab) Corequisite(s): CCD104 (waiver not available).

CCD104: Detailing I
Technical drawing procedures using SolidWorks® CAD operations in compliance with the ANSI standards to develop finished drawings. Drawing assignments involve technical sketching, shape description, geometric construction, multiview projection, sectional views, auxiliary views, revolutions, threads and fasteners, application of dimensions and tolerancing, detail views, part drawings, and assembly drawings. Other topics will include manufacturing processes, surface finishing, descriptive geometry, and acquiring and using vendor part catalogs. ANSI/ASME drawing standards and practices are emphasized. 3 Credits (0 Lecture - 9 Lab) Corequisite(s): CCD103 (waiver not available).

COMPUTER TECHNOLOGY

BWM150: Introduction to Web Page Development
Introductory coverage of the Internet and online Web technologies. Skills learned include how to plan, create, and maintain static web pages. 3 Credits (3 Lecture) Prerequisite(s): Placement by Examination or MTH004 (qualifying score on math placement exam) and Placement by Examination or RDG111.

CSC112: Introduction to Gaming and Simulation
Introductory topics include gaming industry history, game development processes, game genres, storyboarding, game environment, character design, interface design, game play, AI, the psychology of game design, and professionalism. Study provides overall view of the gaming and simulation components. Practical hands-on
application includes using a simple game design environment to design and write simple games. 3 Credits (3 Lecture) (formerly CIT112).

**CIT160: Introduction to Programming**
Introduction to problem-solving techniques, elementary programming, and the application of these techniques in developing structured programs. A current high-level language is used to illustrate the implementation phase of program development. 3 Credits (3 Lecture) Prerequisite(s): Placement by Examination or MTH006 (qualifying score on math placement exam).

**EET145: Networking I**
Fundamental concepts of operation, installation, and configuration of the hardware and operating system software for computer networks. Emphasis on the hands-on, practical experiences needed to service enterprise computing systems used in industry. Network topologies, protocols, cabling systems, and server operating system software installation and service configuration are covered, with an emphasis on entry-level skills for network professionals. 4 Credits (3 Lecture - 3 Lab) Prerequisite(s): Placement by Examination or MTH006 (qualifying score on math placement exam).

**CULINARY ARTS/HOSPITALITY**

**FHD118: Sanitation**
Integration of the Applied Foodservice Sanitation Certification Course as approved by The Educational Foundation of the National Restaurant Association. Topics include the principles of food microbiology, applied measures for the prevention of food borne illness, and emphasis on working through people to maintain a sanitary foodservice operation. Hazard Analysis Critical Control Point (HACCP) fundamentals and steps for implementation is a key component of the course. Course work prepares students for the ServSafe® certification test and is part of the Professional Management series of the National Restaurant Association. 1 Credit (1 Lecture).

**FHD137: Introductory Baking**
Fundamental principles and procedures used to prepare a variety of bakery products and desserts. A study of ingredients and mixing methods for producing various baked goods. 3 Credits (1 Lecture - 6 Lab) Corequisite(s): FHD118 (waiver not available).

**DENTAL HYGEINE**

**DEN110: Dental Terminology**
Survey of terminology related to the science of dentistry. Designed to develop the reading, comprehension, and writing skills necessary to function and communicate effectively within the dental field. 1 Credit (1 Lecture)
**DIESEL**

DSM119: **Fuel Systems**
Basic introduction to the theory and operation of mechanical and electronic fuel injection systems as they apply to the heavy-duty diesel engine field, with a focus on operation, maintenance, troubleshooting, and repair, and safety. 2 Credits (2 Lecture).

DSM141: **Heavy Duty Brake Systems**
Explanation and theory of brake systems common to heavy duty vehicles and equipment. Selected topics include air, hydraulic, and anti-lock systems with emphasis on troubleshooting and practical applications of repair and maintenance. 2 Credits (2 Lecture) Corequisite(s): DSM142 or DSM155

**ELECTRICAL TECHNOLOGY**

ELT116: **Construction Lab I: Residential**
Introduction to residential wiring, plans, specifications, and codes. Theory and lab assignments covering procedures for wiring basic lighting and receptacle circuits, installing special purpose circuits and switching circuits, and producing accurate wiring diagrams. Blueprint reading and the understanding and utilization of the National Electrical Code (NEC) are strongly emphasized in the course. 5 Credits (3 Lecture - 6 Lab) Corequisite(s): ELT111 or RET111.

**ELECTRONICS/ENGINEERING TECHNOLOGY**

EET114: **Introduction to Digital Electronics**
Study of basic digital logic devices and systems. Device Symbology, Boolean logic expressions, truth tables and timing diagrams will be examined. Combinational logic circuits and their applications will be analyzed. 3 Credits (3 Lecture) Corequisite(s): EET115 (waiver not available)

EET115: **Digital Circuits Applications**
Construction of prototype logic circuits. The measurement of static and dynamic electronic characteristics of devices and systems will be studied. 1 Credit (3 Lab) Corequisite(s): EET114 (waiver not available)

EET116: **Electronic Circuits and Devices I**
Introduction to the basic principles of electronics and common solid state devices. Emphasis on basic electronic parameters such as current, voltage, resistance, inductance, and capacitance. Additional topics include series, parallel, and series/parallel circuits as well as discrete solid state devices, including rectifying diodes, light emitting diodes, photodiodes, zener diodes, bipolar transistors, and thyristors. 5 Credits (3 Lecture – 6 Lab) Prerequisite(s): MTH004 or Placement by Examination (qualifying score on math placement exam).

EET124: **Engineering, Technology, and Society**
Introduction to the basic concepts and applications of computer and engineering technologies and the effects on professional and casual users, their employers and employees, and society. Applied skills include the use of current computer technology for data/information collection and organization; visualization, analysis, and interpretation of numeric computations; and the dissemination and presentation of solutions to engineering technology problems. 3 Credits (2 Lecture - 3 Lab) Sophomore-Approved Course

Updated 9/13/19
EMERGENCY MANAGEMENT

BEM101: Introduction to Emergency Management Operations
Introduction to the theories, principles, and organized approaches to emergency management at local, state, and federal levels. Topics include the history of human vulnerability to natural, man-made, and technological hazards; the advent of emergency management professions; and an examination of current emergency response systems. 3 Credits (3 Lecture)

BEM103: The History and Evolution of Emergency Management
Analysis of the history and evolution of emergency management in the United States. Topics trace events that have impacted and motivated change in approach to EM with analysis of the situations within its governing body. 3 Credits (3 Lecture).

MEDICAL TERMINOLOGY

MTR100: Medical Terminology Survey
Introduction to the basic structures and rules of interpreting medical terminology, designed to develop the ability to read, understand, and write the medical language. 1 Credit (1 Lecture)

MTR104: Basics of Medical Terminology
Foundation for the use of the language of medicine, with emphasis on correct pronunciation and spelling, various word parts, abbreviations and symbols, and terms pertaining to body systems. Etiology, symptomatology, pathology, and diagnostic procedures for identifying various disease processes provide an increased understanding of medically related conditions and procedures. 3 Credits (3 Lecture)

HORTICULTURE

HRT101: Introduction to Ornamental Horticulture
Overview of the diverse ornamental horticulture industry, including the worldwide scope and economic impact of the industry in today's marketplace. Emphasis on information access through the Internet, trade journals, trade organizations, the horticulture industry, guest speakers, and visitations to various horticultural businesses. Exploration includes products, services, and information used in the industry; production and marketing (wholesale and retail) of horticultural products and services; and traditional and nontraditional career paths within the industry. 1 Credit (1 Lecture)

HRT113: Ornamental Plants
Introduction to the fields of study of horticulture. Outdoor identification of annuals, perennials, woody shrubs and trees, weeds, and wildflowers. The use of these plant materials in the landscape is stressed. 3 Credits (2 Lecture - 3 Lab)
INDUSTRIAL DESIGN

BIX110: Introduction to Industrial Design
Introduction to industrial design techniques, aesthetic concepts, and practical rendering skills. Integration of aesthetics, ergonomics, material selection, and safety principles into product design. Creative solutions to design problems using two and three dimensional renderings in sketches, clay models, and optional castings of designs. (Formerly BID 110) 3 Credits (2 Lecture - 3 Lab)

MACHINIST GENERAL & MACHINE TOOL TECHNOLOGY

MTT118: Mill Applications
Introduction to the theory and practical applications of basic metalworking. Emphasis on mill applications, industrial shop safety, material selection, job planning, bench-work, quality control, and inspection. (Manual) Milling machines, hand tools, drill presses, pedestal grinders, band saws, and precision-measuring equipment are used to complete required projects. 4 Credits (1 Lecture - 9 Lab).

MTT119: Lathe Applications
Introduction to the theory and practical applications used to safely set up and operate a metal turning engine lathe. Operations such as turning, facing, boring, grooving, drilling, turning tapers, single-point threading, and performing cut-off procedures are implemented. Three and four-jaw chucking techniques and turning between centers are used to complete required projects. 4 Credits (1 Lecture - 9 Lab).

PLASTICS AND POLYMER TECHNOLOGY

PPT115: The Plastics Industry
Overview of the plastics industry, including materials and processes. Topics include the many types of career opportunities in the industry, inviting individual interest-based exploration. Discussion also covers the nature of plastic product manufacturers, including size, work environment, and typical processes used. 2 Credits (2 Lecture). Sophomore-Approved Course.

PPT118: Polymer Processing Survey – Lecture
Introduction to polymer processing techniques, including injection molding, extrusion, blow molding, rotational molding, and thermoforming. 3 Credits (3 Lecture).
POLITICAL SCIENCE

PSC131: American Government-National **
Federal government, its power, and organization. Functions of legislative, executive, and judicial branches. Students examine the historical development of our federal system and analyze the relationships between social forces, government, and political action. 3 Credits (3 Lecture). Course requires additional instructor qualification. Course has AP equivalency and specific structure requirements.

PSC141: State and Local Government **
State and local government institutions, their functions and responsibilities; intergovernmental relations. 3 Credits (3 Lecture) Course requires additional instructor qualification. Course has AP equivalency and specific structure requirements.

PSYCHOLOGY

PSY111: General Psychology **
Introduction to the science of human behavior and mental processes. Students examine the relation between the nervous system and behavior, learning, perception, language, personality, intelligence, and psychopathology. 3 Credits (3 Lecture). Course requires additional instructor qualification. Course has AP equivalency and specific structure requirements.

SOCIOLOGY

SOC111: Introduction to Sociology **
Introduction to the theories, principles, concepts, and major research in sociology. Study includes society’s impact on human behavior and consciousness as well as the ways in which individuals and groups affect cultures and their social structures. A comparison of different cultures and subcultures provides an understanding of the relativity and universality of social values, norms, and beliefs. 3 Credits (3 Lecture) Course requires additional instructor qualification.

WELDING

WEL114: Shielded Metal Arc I
Introduction to the principles and practices of basic Shielded Metal Arc Welding (SMAW) using various types of mild steel electrodes in multiple positions with emphasis put on the flat and horizontal positions. The fundamentals of AC and DC current and various types of power sources are covered. 2 Credits (1 Lecture – 3 Lab). Corequisite(s): WEL116 (waiver not available). Sophomore-approved course.

WEL116: Shielded Metal Arc II
The theory introduced in WEL 114 will be applied in this course. Development of practical hands-on techniques with various power sources using AC and DC current in multiple positions with the emphasis on flat and horizontal position. 2 Credits (0 Lecture - 6 Lab). Corequisite(s): WEL114 (waiver not available) Sophomore-Approved Course
WEL120:  Gas Metal Arc I
Principles and applications of Gas Metal Arc Welding (GMAW), applied to ferrous metals. An introduction to single and multi-pass welds using a variety of electrode wire types, diameters, and transfer modes. 2 Credits (1 Lecture - 3 Lab). Corequisite(s): WEL124 *(waiver not available)*.

WEL123:  Gas Tungsten Arc I
Introduction to the Gas Tungsten Arc Welding (GTAW) process. Theory is applied to related equipment, electrical concepts, material properties, arc characteristic, puddle control, and appropriate application of filler materials. Welding of ferrous and non-ferrous metals in all positions is covered. 2 Credits (1 Lecture - 3 Lab). Corequisite(s): WEL129 *(waiver not available)*.

WEL124:  Gas Metal Arc II
Continued laboratory practice of Gas Metal Arc Welding (GMAW) introduced in WEL 120. Activities include fundamental applications on ferrous metals in all positions using various modes of metal transfer and wire electrodes. 2 Credits (0 Lecture - 6 Lab). Corequisite(s): WEL120 *(waiver not available)*.

WEL129:  Gas Tungsten Arc II
Laboratory activities, with emphasis on the welding of ferrous and non-ferrous metals in various joint configurations. Welding will be done using all positions. Joining dissimilar metals and metal identification is covered. 2 Credits (0 Lecture - 6 Lab). Corequisite(s): WEL123 *(waiver not available)*.

WEL132:  Flux Cored I
Advanced theory on the advantages and disadvantages of Flux-Cored Arc Welding (FCAW) will be emphasized. The American Welding Society's (AWS) numbering system for FCAW will be explained. Other topics, which will be covered, are technical terms, gases, their mixtures, and the various types of fluxes used. 2 Credits (1 Lecture - 3 Lab). Corequisite(s): WEL136 *(waiver not available)*.

WEL136:  Flux Cored II
Continuation of the hands-on activities introduced in WEL132. Weld with the flux-cored arc welding process using semi-automatic machines in all positions with a variety of electrode wires, diameters and gases. 2 Credits (0 Lecture - 6 Lab). Corequisite(s): WEL132 *(waiver not available)*.
General Education Coursework

New partners in their first year may only offer Technical and/or Program Area courses. General education courses may be added incrementally in subsequent years, subject to availability.

BIO103: Human Anatomy and Physiology Survey
CHM100: Fundamentals of Chemistry
PSC131: American Government-National
PSC141: State and Local Government
PSY111: General Psychology
SOC111: Introduction to Sociology

Sophomore-Approved Courses

ACR111: Introduction to Refrigeration
BCT103: Construction Hand and Power Tools
CHM100: Fundamentals of Chemistry
EET124: Engineering, Technology, and Society
MGT105: Introduction to Business
PPT115: The Plastics Industry
WEL114: Shielded Metal Arc I
WEL116: Shielded Metal Arc II