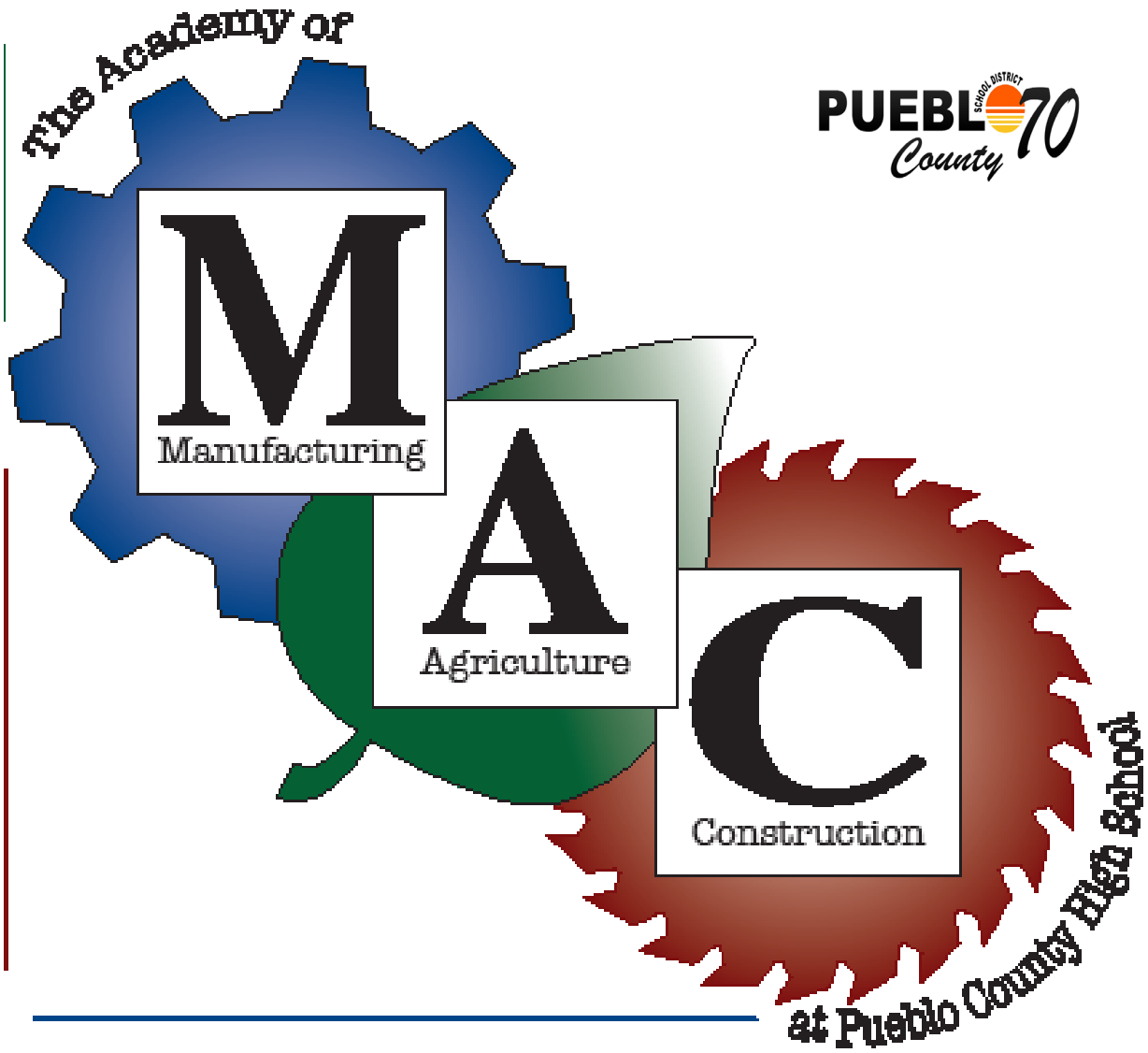
Academy of
Manufacturing, Agriculture, and Construction
at Pueblo County High School

Course Guide 2019-2020

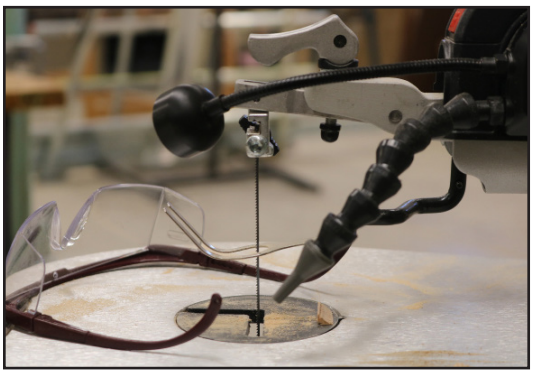


PUEBLO 70 County SCHOOL DISTRICT

Success in the Working World

February 24, 2019

SkillsUSA



AMAC

Pueblo County School District 70 and Pueblo County High School are proud to announce the launching of the Academy of Manufacturing, Agriculture, and Construction (AMAC) for the 2019-2020 school year. This academy is envisioned as a school-to-work program that provides students with pathways into careers that are in high demand within our community and will be modeled after the two current academies that now exist at Pueblo County High School, the School of Engineering and Biomedical Science and The Arts Academy, as well as the District 70/Parkview Hospital School to Employment Program model (STEP). Understanding that we must prepare our students to be productive members of the skilled workforce, a main thrust of this program will be to develop close working partnerships with not only our area businesses and industries, but PEDCO as well.

Through participation in this academy, students can choose to complete pathway requirements in strands such as: building construction, integrated manufacturing, metal fabrication, welding, and machining. The agricultural component of this new program will feature strands specializing in animal science, agricultural power and technology, as well as plant science and natural resources. Integrated and specialized math and language arts courses will be a part of the academy's curriculum making learning meaningful and relevant to the student's course of study. Students will have the opportunity to obtain industry recognized certifications, participate in internships and apprenticeships, develop entrepreneurial enterprises, earn college credit, and gain valuable skills that are certain to prepare them for the national and global job market.

Ginger Andenucio, Assistant Superintendent of District 70, endorsed this project with the following comment: "District 70 is committed to implement the Academy of Manufacturing, Agriculture, and Construction at Pueblo County High School. We are very excited to partner with industries and our local higher education entities to provide opportunities for secondary students to develop skills that will prepare them for the local and global workplace. We are also pleased that we can be of assistance to our community by providing a much-needed skilled workforce in the areas of manufacturing, agriculture, and construction."

Manufacturing

This four-year program is designed to intro- he manufacturing process and associated skills who complete this program are trained and experienced in using state of the art tools and machinery associated with the manufacturing industry. The manufacturing strand within AMAC contains curriculum and learning opportunities in both the woods and metal fabrication environments.

This project-centered educational approach uses cabinet making as an entry level platform to teach skills that are transferable to any manufacturing industry career. After the introductory level course work students may choose between staying in the woods manufacturing pathway or entering into the metal fabrication pathway, which includes opportunities to begin the process of obtaining certification in welding or machining.

Opportunities after high school range from immediate job placement to apprenticeships as well as two / four-year college programs and graduate programs.
Certificates may be earned in layout, sawing, milling, shaping, joinery, Computer Numerical Control (CNC), finishing, tools and machines to name a few. There are over 30 certifications possible.

Career Option Opportunities include: fabricator, machinist, manufacturing production technician, cabinet maker, engineering technologist, CNC programmer/operator, cabinet manufacturing installer, mechanical engineering technician.

Manufacturing Coursework Sequence by Pathway (Class of 2023)

Grade 9	Grade 10
Math (Algebra 1 or higher)	Math (Geometry or higher)
Integrated Woods Manufacturing Focus: Cabinet Manufacturing 1	Integrated Woods Manufacturing Focus: Cabinet Manufacturing 2
Integrated Metal Manufacturing Focus: Cabinet Manufacturing 1, or AFNR (Agriculture) or Principles of Construction(Construction)	Integrated Metal Manufacturing Focus: Metal Fabrication
Earth Science	Biology
English 1 or higher	English 2 or higher
US History	World History
Mechanical Drafting 1	Elective●
Elective●	Elective●
Grade 11	**Grade 12**
Math (Mat 108, Algebra 2 or higher)	Math Elective suggested
Integrated Woods Manufacturing Focus: Cabinet Manufacturing 3	Integrated Woods Manufacturing Focus: Cabinet Manufacturing 4 Capstone
Integrated Metal Manufacturing Focus: Welding or Machining at PCHS (2 classes)	Integrated Metal Manufacturing Focus: Welding or Machining at PCC (2 classes)
Science to satisfy graduation requirement	English 4, Technical English Career Prep or higher
English 3 or higher	Post Secondary Option (PSO) course or elective●
American Government / Economics	Post Secondary Option (PSO) course or elective●
Post Secondary Option (PSO) course or elective●	Elective●

Cabinet Making 1 (number pending)

Corequisite: Algebra 1 or higher | Fees: $25

Full year, 1.0 Elective Credit | Grade Level: 9 (First year)

Students learn and master the techniques of lean manufacturing, which is the systematic method of eliminating waste within a manufacturing environment. All students will manufacture the same part at the same time, working in teams of two, demonstrating manufacturing efficiency. Students will demonstrate the safe operation of all tools and machinery. Students master the use of a multitude of tools and machines to build high-quality products in a state-of-the-art lab environment. Some of the tools and machines students learn to use in the course are: upcut saw, table saw, band saw, routers, sanders, and drill press. In addition, students learn to identify different types of lumber and their uses. Students will complete a cabinet casework with tapered legs, drawer, door, and top.

In addition, students will learn more advanced uses of the tools and machines. Students will also be introduced to computer numerical control (CNC) machines during this course. Students will access a Fully-equipped computer lab utilizing V-Carve Desktop to create 2-D models and tool paths to drive a CNC router. Students will build a small profile mortise-&-tenon table from solid hardwoods.

Mechanical Drafting 1 (number pending)

Corequisite: Algebra 1 or higher | Fees: $25

Full year, 1.0 Elective Credit | Grade Level: 9 (First year)

This hybrid class will incorporate the basic skills of board and hand drafting with the digital design process of parametric modeling. Students will go through the process of learning how to draw, read and apply the concept of creating shop drawings and renderings. Geometric constructions and the application of math principles will enhance the student's understanding of applicable topics.

•Electives must include graduation requirements for PE and Health. Four-year colleges recomend two years of study in a foreign language.

Cabinet Making 2 (number pending)

Prerequisites: Cabinet Making 1	Fees: $25
Full year, 1.0 Elective Credit	Grade Level: 10 (Second year)

Students will continue to increase and refine their manufacturing skills. They will be introduced to a Skills USA-type of competitive project so they can compete at local, state, and national events. They will also begin to use CAD-based software to design their projects. During this course, students will manufacture an advanced cabinet that requires critical thinking in the design and construction, and devise installation options that would be common on standard job sites. Students will use all the skills learned in Cabinet Making 1. Students will then begin taking the Woodwork Career Alliance (WCA) Passport Exams. Students who complete this course and pass the 10 required exams will receive a WCA Passport. This passport is quickly becoming recognized as the top certification for wood products manufacturing. In addition to testing for their passports, students will begin to work on project orders by actual customers. Students will learn to gather project information, generate drawings using CAD-based software, generate material lists, determine costs, and produce a bid for the project. Students will then manufacture the product and complete an installation for the customer, filling the roles of cabinet manufacturing professionals (e.g., engineer, estimator, production supervisor, machine operator).

Metal Fabrication (number pending)

Prerequisites: Cabinet Making 1, or AFNR, or Principles of Construction	Fees: $25
Full year, 1.0 Elective Credit	Grade Level: 10 (Second year)

Metal Fabrication is a course that provides students a comprehensive overview of metal fabrication techniques with opportunities to examine safety and technical information in metal fabrication and to participate in hands-on activities in the laboratory. Topics include career opportunities, safety, identification and selection, metal preparation and finishing, metal cutting, shielded metal arc welding (SMAW) as well as an introduction to the CNC process. This course is intended to prepare students in this pathway for success within the welding or machining programs offered to Third and Fourth year students. It is designed to encourage critical thinking, the integration of technology, development of student leadership skills, and application of knowledge and skills related to practical questions and problems.

Technical English Career Prep (number pending)

Prerequisites: English 3	Fees: none
Full year, 1.0 English Credit	Grade Level: 12 (Fourth year)

Technical English Career Prep (TECP) is an English course designed to use real world tasks and scenarios in order to present students with English from a variety of technological fields while incorporating the advanced grade English standards. Tasks and standards are presented to students through projects and a progressive portfolio. Through the use of interest-specific articles, smaller traditional readings, and smaller writing components that build into the final portfolio, students will develop communication skills that will prepare them for the workforce.

Technical Mathematics (Mat 108)

Prerequisites: Geometry | Fees: None

Full year, 1.0 Math Credit | Grade Level: 11 (Third year)

This course from Pueblo Community College covers material designed for career technical or general studies student who needs to study particular mathematical topics. Topics may include measurement, algebra, geometry, trigonometry, graphs, and/or finance. These are presented at an introductory level and the emphasis is on applications.

Cabinet Making 3 (number pending)

Prerequisites: Cabinet Making 1 and 2 | Fees: $25

Full year, 1.0 Elective Credit | Grade Level: 11 (Third year)

Students will put into practice the concepts and skills of quality control, supervision, industrial accounting, marketing, technical writing, estimating and planning, production control and improvement, drafting and blueprint reading under the ospice of running their own cabinet business. In addition, the course will introduce to and allow them to explore various career options in manufacturing.

Cabinet Manufacturing 4 Capstone (number pending)

Prerequisites: Cabinet Makine 1, 2 and 3 | Fees: $25

Full year, 1.0 Elective Credit | Grade Level: 12 (Fourth year)

Cabinet Manufacturing 4 will be a time to complete several Woodwork Career Alliance (WCA) Passport exams for certification. Completing manufacturing projects for the community, manage others, as well as working with an industry partner in a paid internship and completing a Senior Capstone project. Possible job placement or continuing education can be determined at this stage.

PCC Welding – (application required for admission to program)

The PCC Welding program, held in partnership with District 70, is intended to allow accepted students to start the process of obtaining their Associate (AAS) Degree in welding. Each semester of the program covers two of the required courses for the AAS degree.

The first year of this concurrent credit welding program is housed within the welding / metal's facility at Pueblo County High School. Listed below are the courses required during the first year:

- 1st Semester
  - o Wel 102 – Oxyacetylene Joining Process
  - o Wel 103 – Basic Shielded Metal Arc I
- 2nd Semester
  - o Wel 104 - Basic Shielded Metal Arc II
  - o Wel 124 – Introduction to Gas Tungsten Arc Welding

During their second year of this program, students are exposed to an advanced set of skills required for the certification process. Second-year classes are housed at both the PCC facility and at PCHS.

- 1st Semester
  - o Wel 125 – Introduction to Gas Metal Arc Welding
  - o Wel 233 – Horizontal Pipe A.P.I.
- 2nd Semester
  - o Wel 225 – Advanced Gas Metal Arc Welding
  - o Wel 250 – Layout and Fabrication

NOTE: Qualifying students may enroll in the ACCENT program after their second year to continue working toward degree completion.

Agricultural Sciences

The Agricultural Sciences strand has two different pathways. The Animal Science pathway prepares students for a variety of careers in the animal industry, from production agriculture to companion animals. Professional skill development is enhanced with involvement in the FFA on the chapter, district, state and national levels. Emphasis is given to work-based learning through individual entrepreneurial enterprises, internships, apprenticeships or other placement opportunities. Research activities and/or service learning related to career objectives are encouraged. Personal financial literacy is part of the work-based and career exploration facets of the pathway. Careers reltaed to this pathway include Animal Nutritionist, Ranch Manager, Animal Feeder, Animal Breeder, Pet Store Owner, and Chef/Baker.

The Agriculture Power & Technology Pathway prepares students for a variety of careers and/or further specialized training. Students will explore career opportunities, work hands on to develop skills in welding and fabrication, carpentry and wood working, plumbing, electrical, concrete, equipment maintenance and operation. Emphasis is placed on career development, entrepreneural enterprises, work study, internships and/or apprenticeships. Professional skill development is enhanced with involvement in the FFA on the chapter, district, state and national level. Careers related to Agriculture, Power and Technology include Welder, Plumber, Electrician, Diesel Mechanic, Auto Mechanic, and Carpenter.

Agricultural Sciences Coursework Sequence by Pathway (Class of 2023)

Grade 9	Grade 10
Math (Algebra 1 or higher)	Math (Geometry or higher)
Animal Science Pathway and Agriculture Power and Technology Pathway: Introduction to AFNR	Animal Science Pathway: Animal Science
	Agriculture Power and Technology Pathway: Agricultural Mechanics
Earth Science	Biology
English 1 or higher	English 2 or higher
US History	US History
Health/ Fitness	World History
Elective●	Elective●
Grade 11	**Grade 12**
Math (Math 108, Algebra 2 or higher)	Math Elective suggested
Animal Science Pathway: Food Science and Safety	Animal Sceince and Agriculture Power and Technology Pathways: Agricultural Research & Development
Agriculture Power and Technology Pathway: Advanced Agricultural Mechanics	
English 3 or higher	English 4, Technical English Career Prep or higher
American Government / Economics	Post Secondary Option (PSO) course or elective●
Post Secondary Option (PSO) course or elective●	Post Secondary Option (PSO) course or elective●
Post Secondary Option (PSO) course or elective●	Elective●
Elective●	Elective●

●Electives must include graduation requirements for PE and Health. Four-year colleges recomend two years of study in a foreign language.

Introduction to Agriculture, Food, and Natural Resources (AFNR) (number pending)

Prerequisites: None | Fees: $25

Full year, 1.0 Science Credit | Grade Level: 9 (First year)

The Introduction to AFNR course is designed for students in either the Animal Science or the Agricultural Power and Technology pathway. Introduction to Agriculture, Food, and Natural Resources (AFNR) exposes students to the range of agricultural opportunities and the pathways of study they may pursue. Science, mathematics, reading, and writing components are woven in the context of agriculture and students will use the introductory skills and knowledge developed in this course throughout either pathway.

Agricultural Mechanics (number pending)

Prerequisites: Introduction to AFNR | Fees: $25

Full year, 1.0 Elective Credit | Grade Level: 10 (Second year)

This course, which is designed for students in the Agriculture, Power and Technology pathway, introduces welding and metal fabrication, carpentry and wood-working and units in equipment maintenance, plumbing, electricity and concrete. Students will have a Supervised Agricultural Experience (outside of school time) and will have the opportunity to be active in the FFA. Personal financial literacy is built into the SAE portion of the course.

Animal Science (number pending)

Prerequisites: Introduction to AFNR | Fees: $25

Full year, 1.0 Science Credit | Grade Level: 10 (Second year)

Animal Science is a foundation-level course engaging Animal Science pathway students in hands-on laboratories and activities to explore the world of animal agriculture. During the course, students develop a comprehensive Producer's Management Guide for an animal of their choice.

Advanced Agricultural Mechanics (number pending)

Prerequisites: Agricultural Mechanics | Fees: $25

Full year, 1.0 Science Credit | Grade Level(s): 11 (Third year)

This course allows students in the Agricultural Power and Technology pathway to explore project fabrication in either metal or wood and to further develop skills needed to advance into careers. Emphasis is placed on internships and/or apprenticeships in some aspect of

Technical Mathematics (Mat 108)

Prerequisites: Geometry	Fees: none
Full year, 1.0 Math Credit	Grade Level: 11 (Third year)

This course from Pueblo Community College covers material designed for career technical or general studies student who needs to study particular mathematical topics. Topics may include measurement, algebra, geometry, trigonometry, graphs, and/or finance. These are presented at an introductory level and the emphasis is on applications.

Technical English Career Prep (number pending)

Prerequisites: English 3	Fees: none
Full year, 1.0 English Credit	Grade Level: 12 (Fourth year)

Technical English Career Prep (TECP) is an English course designed to use real world tasks and scenarios in order to present students with English from a variety of technological fields while incorporating the advanced grade English standards. Tasks and standards are presented to students through projects and a progressive portfolio. Through the use of interest-specific articles, smaller traditional readings, and smaller writing components that build into the final portfolio, students will develop communication skills that will prepare them for the workforce.

Food Science & Safety (number)

Prerequisites: Intoduction to AFNR and Advanced Animal Science	Fees: $25
Full year, 1.0 Science Credit	Grade Level: 11 (Third year)

Food Science and Safety is an Animal Science specialization course in the Program of Study. Students will complete hands-on activities, projects, and problems that simulate actual concepts and situations found in the food science and safety industry, allowing students to build content knowledge and technical skills. Students will investigate areas of food science including food safety, food chemistry, food processing, food product development, and marketing.

Agricultural Research and Development (number pending)

Prerequisites: Food Science and Safety or Advanced Agricultural Mechanics	Fees: $25
Full year, 1.0 Elective Credit	Grade Level: 12 (Fourth year)

This capstone course is designed for students in either the Animal Science or Agricultural Power and Technology pathway. The course gives students the opportunity to culminate their experiences in agriculture, based on the pathway of study they pursued. Woven throughout the course are projects and problems based in practical applications and designed to develop and improve employability skills of students. Students will further enhance critical thinking and teamwork skills as they expand on content knowledge from previous Agriculture courses.

Construction

Students enrolled in courses within Construction Technology strand of the Manufacturing, Agriculture, and Construction Academy will explore the various stages of a residential construction project – from idea to design to production. The courses in this cluster offer the opportunity to explore several different careers, work with hands-on construction projects, and master the skills necessary to pursue an associated career in this area. Opportunities after high school range from apprenticeships and two-year college programs to four-year college and graduate programs. Each course in this strand focuses on specific areas and skills related to the field of construction. The capstone class in this strand could include a paid internship and possible job placement.

The Construction strand includes the possibility of certificates like: OSHA 10 Safety, various hand tools and machines, and core industry certificates. Applicable careers are Construction Manager, HVAC (heating,ventilation,air conditioning), Building Inspector, Architect, Electrician/ Engineer, Woodworker, Plumber/Pipefitter, and Homebuilder.

Construction Coursework Sequence (Class of 2023)

Grade 9	Grade 10
Math (Algebra 1 or higher)	Math (Geometry or higher)
Principles of Construction	Construction Technology 1
Earth Science	Biology
English 1 or higher	English 2 or higher
US History	World History
CADD 1	Elective●
Elective●	Elective●
Grade 11	**Grade 12**
Math (Math 108, Algebra 2 or higher)	Math Elective suggested
Construction Technology 2	Construction Capstone
Science to satisfy graduation requirement	English 4, Technical English Career Prep or higher
English 3 or higher	Post Secondary Option (PSO) course or elective●
American Government / Economics	Post Secondary Option (PSO) course or elective●
Post Secondary Option (PSO) course or elective●	Elective●
Post Secondary Option (PSO) course or elective●	Elective●

●Electives must include graduation requirements for PE and Health. Four-year colleges recomend two years of study in a foreign language.

Principles of Construction (number pending)

Corequisite: Algebra 1 or higher

Fees: $25

Full year, 1.0 Elective Credit

Grade Level: 9 (First year)

All Construction Technology students are required to take this course their first year in the Academy. Safety, hand tools, power tools, building materials, construction math, codes, framing and reading technical drawings are introduced. Students will begin to develop an understanding of the educational requirements and career opportunities in this cluster. Students will leave this course prepared with a certification in the 10 Hour OSHA Construction and in tool usage.

Construction Technology 1 (number pending)

Prerequisites: Principles of Construction | Fees: $25

Full year, 1.0 Elective Credit | Grade Level: 10 (Second year)

Students will be introduced into the several aspects of home building such as: electrical, plumbing, concrete, framing, roofing systems and site preparation, as well as, an in-depth study of foundations, wall and ceiling framing, room framing, windows and doors, and stair layout.

Construction Technology 2 (number pending)

Prerequisites: Construction Technology 1 | Fees: $25

Full year, 1.0 Elective Credit | Grade Level: 11 (Third year)

Students are introduced to exterior and interior finish skills. Students gain advanced knowledge and skills needed to enter the workforce. Real-world experience is gained with the planning of the students' capstone project. Students continue to develop an understanding of the various educational requirements and career opportunities in the field of construction.

Technical English Career Prep (number pending)

Prerequisites: English 3 | Fees: none

Full year, 1.0 English Credit | Grade Level: 12 (Fourth year)

Technical English Career Prep (TECP) is an English course designed to use real world tasks and scenarios in order to present students with English from a variety of technological fields while incorporating the advanced grade English standards. Tasks and standards are presented to students through projects and a progressive portfolio. Through the use of interest-specific articles, smaller traditional readings, and smaller writing components that build into the final portfolio, students will develop communication skills that will prepare them for the workforce.

Technical Mathematics (Mat 108)

Prerequisites: Geometry | Fees: none

Full year, 1.0 Math Credit | Grade Level: 11 (Third year)

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Construction Technology Capstone (number pending)

Prerequisites: Construction Technology 2 | Fees: $25

Full year, 1.0 Elective Credit | Grade Level: 12 (Fourth year)

This course is designed to provide classroom technical instruction or on-the-job training experiences. Safety and career opportunities are included in addition to work ethics and job-related study in the classroom. Instruction may be delivered through laboratory training or through career preparation delivery arrangements. The capstone project will be completed in this final course. Students will prepare for job interviews and take part in a job fair.

The Academy of MAC at Pueblo County High School

Manufacturing Agriculture Construction

PUEBLO County 70 SCHOOL DISTRICT

AMAC

February 24, 2019