

### **Pulaski County Governor's Science, Technology, Engineering and Mathematics (STEM) Academy**

The Pulaski County Governor's STEM Academy will provide rigorous academic content concentrating on five career pathways: Engineering and Technology, Production, Therapeutic Services, Construction, and Law, Public Safety, Corrections and Security. Student learning and achievement will be enhanced through the integration of core academics, a STEM-focused curriculum, applied technology, and increased participation in career and technical student organization leadership events.

The overall goals of the Pulaski County Governor's STEM Academy are to provide students with 21<sup>st</sup> century, STEM-enriched technological skills and the knowledge necessary to succeed in postsecondary education and in the world of work. This will be accomplished through authentic, rigorous, project-based work while building partnerships with parents and community and business leaders to meet these goals.

The Pulaski County Governor's STEM Academy is designed to give students in grades nine through twelve the opportunity to explore several career paths while incorporating Virginia's Workplace Readiness Skills for the Commonwealth. Career pathways prepare students for programs leading to bachelor's degrees, two-year associate degrees, apprenticeships, and employment.

Students may complete a study of the following courses in the Pulaski County Governor's STEM Academy: Welding I, Welding II-Dual Enrollment, Welding III-Dual Enrollment, Electricity I, Electricity II-Dual Enrollment, Electricity III-Dual Enrollment, Carpentry I, Carpentry II-Dual Enrollment, Carpentry III-Dual Enrollment, Drafting I, Drafting II-Dual Enrollment, Drafting III-Dual Enrollment, Manufacturing Systems I and Manufacturing Systems II, Advanced- Dual Enrollment Materials and Processes Technology, Engineering Explorations, Engineering Analysis and Applications II, Introduction to Health and Medical Sciences, Medical Terminology- Dual Enrollment, Health Assisting Careers- Dual Enrollment, Criminal Justice I, and Criminal Justice II.

Students must meet the following criteria to be selected for the Pulaski County Governor's STEM Academy:

- Recommendation from a teacher, school counselor, school administrator, or the Academy director;
- Complete a Pulaski County Governor's STEM Academy application;
- Minimum 2.5 G.P.A.
- Passing scores on the highest level attained on the English and mathematics Standards of Learning tests; and
- Complete the New River Community College online application. (11<sup>th</sup> and 12<sup>th</sup> grade students)

Students who are selected for the Academy will be required to meet the following criteria to complete the program successfully:

- Maintain a minimum 2.5 overall grade-point average;
- Recommendation from the Academy program area teacher;
- Successfully complete the necessary dual enrollment placement test;
- Complete dual enrollment credit courses and earn a "C" or better in the course;
- Passing scores on the highest level attained on the English and mathematics Standards of Learning tests;
- Complete courses within a specific pathway in the STEM Engineering and Technology, Architecture & Construction, Therapeutic Services, Law Enforcement Services and Production Career Clusters;
- Achieve one or more of the following: an industry certification, at least nine transferrable college credits, or an Associate Degree;
- Complete a capstone project and present to an advisory group.
- Adhere to the student code of conduct and attendance policies.

## **HEALTH & MEDICAL SCIENCES-THERAPUTIC SERVICES**

### **INTRODUCTION TO HEALTH & MEDICAL SCIENCES**

**8302 (1 credit)**

#### **STEM ACADEMY**

Grade level: 10, 11, and 12

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application; possess a minimum G.P.A. of 2.5, passing scores on the highest level attained on the English and Mathematics S.O.L. tests.

This course introduces the student to the many and varied opportunities in the health care field. The Healthcare field is one of the fastest growing career areas with great job potential for students. Students study the history of medicine, medical ethics, and how healthcare is delivered and financed in the United States as well as in other parts of the world. The student will be able to research job opportunities available in the health care field. The students will learn basic health care skills that can be used in any medical field: aseptic techniques, medical terminology, emergency and safety procedures, vital signs and the opportunity to become certified in First Aid and Basic CPR by the American Red Cross.

### **HEALTH ASSISTING CAREERS**

**8331 (2 credits, 2 blocks)**

#### **STEM ACADEMY**

Grade level: 11, 12

Prerequisite: Successful completion (minimal "C" average) of Introduction to Health and Medical Sciences 8302, NRCC Placement Examination and NRCC Application. Acceptance for this class is by application process.

**This course is dual enrolled with NRCC NUR 27 Nurse Aide I – 5 credits**

Students explore opportunities in the health care field by developing basic skills common to several assisting careers. HAC is a two-block course that qualifies students to take the Virginia State Certification Exam for Nursing Assistants (CNA). They study body structure and function, principles of health, microbes, and disease, and an overview of the health and patient care system. Supervised work-based learning for a minimum of 40 hours as part of the course in health care settings and is managed by the health and medical sciences education teacher. Students will provide hands-on patient care with instructor supervision.

### **MEDICAL TERMINOLOGY**

**8383 (1 credit, 1 block)**

#### **STEM ACADEMY**

Grade level: 11, 12

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application, possess a minimum G.P.A. of 2.5, passing scores on the highest level attained on the English and Mathematics S.O.L. test. N.R.C.C. Placement Examination and N.R.C.C. Application.

**This course is dual enrolled with NRCC HIM 111 and HIM 113, Medical Terminology I & Medical Terminology and Disease Processes I**

Medical Terminology is designed to help students learn health care language. Topics are presented in logical order, beginning with each body system's anatomy and physiology and progressing through pathology, diagnostic procedures, therapeutic interventions, and finally pharmacology. Students learn concepts, terms, and abbreviations for each topic.

## TECHNOLOGY EDUCATION

### **MATERIALS & PROCESSES TECHNOLOGY (Investigating)**

**8433 (1 credit)**

#### **STEM ACADEMY**

Grade level: 9, 10, 11, 12 (Priority given to 10<sup>th</sup> and 11<sup>th</sup>)

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application; possess a minimum G.P.A. of 2.5, passing scores on the highest level attained on the English and Mathematics S.O.L. tests.

Delving into material properties, manufacturing technology, and mechanical engineering, students in this project-based class will gain experience and understanding in each of the following materials and processes; wood, plastic, ceramics, metal, additive and subtractive manufacturing and natural resources stewardship. Each student will study in a well-equipped production shop to create group and individual projects based on Virginia Department of Education competencies with emphasis placed on self-sufficiency, craftsmanship and career awareness.

### **ENGINEERING EXPLORATIONS I**

**8450 (1 credit)**

#### **STEM ACADEMY**

Grade level: 10, 11, 12

Prerequisite: Materials & Processes Technology STEM Academy or Technology Foundations Academy and Algebra II

This is the first course of two-course, project-based pathway that will enable students to examine technology and engineering fundamentals related to solving real-world problems. Students will be exposed to a variety of engineering specialty fields including mechanical, civil, electrical, and industrial systems, and related careers. Students will gain a basic understanding of engineering history and design, using mathematical and scientific concepts. Students will participate in hands-on projects in a well-equipped production shop as they communicate their findings through technical reports, writing, and drawings.

### **ENGINEERING ANALYSIS AND APPLICATIONS II**

**8451 (1 credit)**

#### **STEM ACADEMY**

Grade level: 11, 12

Prerequisite: Engineering Explorations I STEM Academy or Technology Foundations Academy and Algebra II

This is the second of a possible two-course pathway that will allow students to examine systems, the interaction of technology and society, ethics in a technological world, and the fundamentals of modeling while applying the engineering design process to areas of the designed world. Students will participate in hands-on projects, including one public capstone project, in a well-equipped production shop. Students will communicate information through team-based presentations, proposals, and technical reports.

### **MANUFACTURING SYSTEMS I**

**8425 (1 credit) (1 block)**

#### **STEM ACADEMY**

Grade level: 9, 10, and 11

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application; possess a minimum GPA of 2.5, passing scores on the highest level attained on the English and Mathematics SOL tests.

This course provides an orientation to careers in various fields of manufacturing. Emphasis will be placed on manufacturing systems, safety, materials, production, business concepts, and the manufacturing process. Students participate in individual and team activities to create products that demonstrate critical elements of manufacturing.

## **MANUFACTURING SYSTEMS II, ADVANCED**

**8425 (2 credit) (2 blocks)**

### **STEM ACADEMY**

Grade level: 10, 11 and 12

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application; possess a minimum GPA of 2.5, passing scores on the highest level attained on the English and Mathematics SOL tests. N.R.C.C. Placement Examination and N.R.C.C. Application.

**This course will be dual enrolled with NRCC.**

Students develop an in-depth understanding of automation and its applications in manufacturing. Activities center on flexible manufacturing processes and computer integrated manufacturing (CIM). Students work in teams to solve complex interdisciplinary problems that stem from the major systems in automated manufacturing.

## **DRAFTING I**

**8530 (1 credit)**

### **STEM Academy**

Grade level: 10, 11

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application, possess a minimum G.P.A. of 2.5, passing scores on the highest level attained on the English and Mathematics S.O.L. test.

This class is recommended for students interested in Architectural Design, Engineering, Industrial/mechanical Design, 3D modeling, or a career in Computer-Aided Drafting and Design. The first nine weeks will consist of manual sketching and drafting. Students will learn the necessary skills to produce complete accurate drawings like those produced by professional drafters, designers, architects, and engineers. Students will be instructed with the latest version of Auto-Cad and Inventor Pro, some of the industry's leading design software packages. Students will do mechanical, technical and architectural drawings with an emphasis on technical skills necessary to produce quality technical drawings. This class allows students to participate in Skills U.S.A.

## **DRAFTING II**

**8531 (1 credit) (NRCC 3 credits)**

### **STEM Academy**

Grade level: 11, 12

Prerequisite: Drafting I STEM Academy, NRCC Placement Examination, and NRCC Application

**This course is dual enrolled with NRCC CAD 114, Computer Aided Drafting & Design- 3 credits**

This class will offer students the opportunity to expand their knowledge of drafting and design with the use of Auto-Cad. They will be introduced to 3D modeling and architectural design. Emphasis will be placed on producing high quality work at industry standards. Students' lab time will be project based. Upon successful completion of this course, students may be required to take the Workplace Readiness Exam given, or another industry exam to earn a credential. This class allows students to participate in Skills U.S.A.

## **DRAFTING III**

**8532 (1 credit, 1 block)**

### **STEM Academy**

Grade level: 11, 12

Prerequisite: Drafting II STEM Academy, NRCC Placement Examination, and NRCC Application

**This course is dual enrolled with NRCC CAD 120, Intro to Graphic Representation - 3 credits**

This class is for advanced students who have completed levels I & II in Drafting. Students will concentrate on completing entire projects from initial conception of design through the finished architectural, civil engineering and 3D modeling design phase. Students will continue to work with 3D design and will complete several projects utilizing this technology. This class allows students to participate in Skills U.S.A.

## CONSTRUCTION

### CARPENTRY I

**8601 (1 credit)**

#### STEM ACADEMY

Grade level: 9, 10 (priority given to 10)

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application; possess a minimum G.P.A. of 2.5, passing scores on the highest level attained on the English and Mathematics S.O.L. tests.

Carpentry I introduces students to skills essential to success in the profession. Students use hand and power tools to cut stock; learn to read blueprints; build and install foundations, trusses, doors, windows, stairs, and finishes; and frame walls, floors, ceilings, roofs, decks, and porches. All students will obtain a required OSHA 10 Safety Credential in the class. Students will be required to work outside on projects. **Students will have the opportunity to work on a home built for Habitat for Humanity.**

### CARPENTRY II

**8602 (2 credits, 2 blocks)**

#### STEM Academy

Grade level: 11, 12

Prerequisite: Carpentry I STEM Academy, NRCC Application and Placement Examination

Students will have the opportunity to work on a home built for Habitat for Humanity.

**This course is dual enrolled with NRCC BLD 110 and BLD 125- 6 credits**

Carpentry II completes students' secondary training for the carpentry profession. Students study blueprints; build and install foundations, trusses, doors, windows, stairs, and finishes; and frame walls, floors, ceilings, roofs, decks, and porches. In addition, students are introduced to basic rigging, learn to estimate and select building materials, and install cabinets. **Students will have the opportunity to work on a home built for Habitat for Humanity.**

### CARPENTRY III

**8603 (2 credits, 2 blocks)**

#### STEM Academy

Grade level: 12

Prerequisite: Carpentry II STEM Academy, NRCC Placement Examination and NRCC Application.

**This course is dual enrolled with NRCC BLD 126 and BLD 135- 6 credits**

This course prepares students for success in the carpentry profession. Students use hand and power tools to cut stock; build and install foundations, trusses, doors, windows, stairs, and finishes; study blueprints; and frame walls, floors, ceilings, roofs, decks, and porches. In addition, students are introduced to basic rigging, learn to estimate and select building materials, and install cabinets. **Students will have the opportunity to work on a home built for Habitat for Humanity.**

## **ELECTRICITY I**

**8533 (1 credit)**

### **STEM Academy**

Grade Level: 10, 11

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application, possess a minimum G.P.A. of 2.5, passing scores on the highest level attained on the English and Mathematics S.O.L. test.

Students will be introduced to the field of electricity. The course will cover residential, commercial, and industrial wiring methods and materials. Students will be introduced to basic electric theory, electrical safety, electrical tools, electrical equipment, and electrical test equipment. Students will learn to read basic electrical blueprints and basic electrical schematics. Students will be introduced to both residential and commercial wiring systems, including conduit wiring systems. Workmanship and professionalism will be stressed throughout the course. Students will spend a significant amount of class time engaged in hands-on learning. Electricity I students will be involved in Skills-USA. Students will gain leadership skills and have the opportunity to compete against other students at the local, district, state, and national level.

## **ELECTRICITY II**

**8534 (2 credit, 2 blocks)**

### **STEM Academy**

**8534 (2 credit, 2 blocks)**

Grade level: 11, 12

Prerequisite: Electricity I STEM Academy, NRCC Placement Examination, and NRCC Application.

**This course is dual enrolled with NRCC ELE 111 and ELE 112- 6 credits**

Students will practice commercial and industrial wiring methods. Electric motors and motor controls, and relays will be studied. Students will be expected to troubleshoot and repair a wide range of electrical devices and equipment. Students will be introduced to more complex electrical blueprints and electrical schematics. The National Electrical Code will be heavily emphasized throughout the course. Students will bend conduit, install electrical wire and cables, install electrical devices, wire motor control systems, and troubleshoot circuits. Electrical rework and upgrades will also be covered. Students will be very involved in Skills-USA. Students may be required to take the Introductory Craft Skills, National Construction Career Test (NCCT) or another certification exam upon successful completion of this class.

## **ELECTRICITY III**

**8535 (2 credits, 2 blocks)**

### **STEM Academy**

Grade level: 11, 12

Prerequisite: Electricity II STEM Academy, NRCC Placement Examination, and NRCC Application.

**This course is dual enrolled with NRCC ELE 113 and ELE 114- 6 credits**

Student's skills and knowledge in the field of electricity will be further developed in this course. Industrial electrical systems will be covered extensively, and will include: three-phase electrical systems, industrial motor controls, distribution systems, industrial electrical motors, and transformers. Students enrolled in this course will spend significant time practicing and learning the National Electrical Code in preparation for future employment in the electrical trades. Students will be very involved in Skills-USA.

## **PRODUCTION**

### **WELDING I**

**8672 (1 credit)**

#### **STEM Academy**

Grade level: 10, 11, and 12

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application, possess a minimum G.P.A. of 2.5, passing scores on the highest level attained on the English and Mathematics S.O.L. test.

Students will receive instruction providing career training in the areas of metal fabrication and emerging welding technologies. This course will provide students with a basic knowledge of electricity and how it applies to welding. In addition, students will be introduced to shielded metal arc welding, gas metal arc welding, gas tungsten arc welding, oxy-fuel welding, plasma arc cutting, and oxy-fuel cutting processes. Students will begin the American Welding Society SENSE program to earn a welding industry certification.

### **WELDING II**

**8673 (2 credits, 2 blocks)**

#### **STEM Academy**

Grade level: 11, 12

Prerequisite: Welding I STEM Academy, NRCC Placement Examination, and NRCC Application

**This course is dual enrolled with NRCC WEL 100- 3 credits**

Students learn to use gases and electric arc processes to fabricate and weld metal parts according to diagrams. Students will also learn to read blueprints and interpret weld symbols, as well as demonstrating many construction safety standards as they relate to the welding industry. Each student will be required to perform horizontal, vertical, and overhead welds using each major welding process. Students will complete the American Welding Society SENSE program to earn a welding industry certification.

### **WELDING III**

**8674 (1 credit, 1 block)**

#### **STEM Academy**

Grade level: 11, 12

Prerequisite: Welding II STEM Academy, NRCC Placement Examination, and NRCC Application

**This course is dual enrolled with NRCC WEL 123- 3 credits**

Students will work toward receiving American Welding Society (AWS) welding qualifications to become an entry level welder. Students will learn the various types of weld tests and perform destructive and non-destructive tests on their own welds. Each student will learn metallurgy and aluminum welding practices. Students will explore careers in welding as well as demonstrate maintenance procedures for each welding machine.

## **LAW ENFORCEMENT SERVICES**

### **CRIMINAL JUSTICE I**

**8702 (1 credit, 1 block)**

#### **STEM ACADEMY**

Grade level: 10, 11 and 12

Prerequisite: Complete a Pulaski County Governor's STEM Academy Application; possess a minimum GPA of 2.5, passing scores on the highest level attained on the English and Mathematics SOL tests.

Students are introduced to the legal foundations, processes, principles, techniques, and practices for exploring careers within the criminal justice system. Criminal Justice I is the first of a three-year sequence of classes designed to prepare students for further study and employment in the field of law enforcement, experience using the various law enforcement implements in simulated laboratory situations, and physical training. Guest speakers from the profession ride-along programs and visits to local police academies will be included. Some training sessions may be conducted at off-campus sites. Students planning to work for local police departments, state police, park service, department of forestry, or any other law enforcement agency are encouraged to enroll.

### **CRIMINAL JUSTICE II**

**8703 (2 credits, 2 blocks)**

#### **STEM ACADEMY**

Grade level: 11, 12

Prerequisite: Minimum "C" average in Criminal Justice I. Complete a Pulaski County Governor's STEM Academy Application, possess a minimum GPA of 2.5, passing scores on the highest level attained on the English and Mathematics SOL tests.

Students learn the legal foundations, processes, principles, techniques, and practices for exploring careers within the criminal justice system, and the history of terrorism in the United States. Students combine classroom instruction and supervised, practical experience throughout the school year. Criminal Justice II provides more in-depth study of concepts introduced in Criminal Justice I. Students will have the opportunity to explore aspects of law enforcement procedures and techniques through simulated experiences. Upon completion of this course, students will have the opportunity to take the Criminal Justice Assessment and/or the Crime Scene Investigation and Criminal Justice Examination.