

## Technology Education

Pathways and Courses	Grades	Prerequisites
<b>Architecture and Construction Careers</b>		
Intro to Mechanical Drafting	9, 10, 11, 12	
Woods: Introduction (Woods 1)	9, 10, 11, 12	
Woods: Project Design (Woods 2)	9, 10, 11, 12	Woods: Intro (Woods 1)
Woods: Construction 1	10, 11, 12	Woods: Intro (Woods 1) or Intro to Mechanical Drafting
Woods: Building Trades (Construction 2)	11, 12	Woods: Intro (Woods 1) or Intro to Mechanical Drafting
<b>Communication Technologies Careers</b>		
Intro to Photography	9, 10, 11, 12	
Advanced Photography	10, 11, 12	Intro to Photography
Intro to Videography	9, 10, 11, 12	
Advanced Videography	10, 11, 12	Intro to Videography or any LA Communication Courses
<b>Manufacturing Careers</b>		
Intro to Robotics	9, 10, 11, 12	
Advanced Robotics	10, 11, 12	Intro to Robotics
Metals: Intro	9, 10, 11, 12	
Metals: Advanced	10, 11, 12	Metals: Intro
<b>Transportation Careers</b>		
Transportation: Flight and Space	9, 10, 11, 12	
Transportation: Auto	10, 11, 12	
AYES Discovery Academy: Autos		Intro to Autos
Brakes	11, 12	
Electrical & Electronic Systems	11, 12	
Steering & Suspension	11, 12	
Engine Performance	11, 12	
<b>Foundational Knowledge and Skills</b>		
Project Lead the Way: Engineering Design (IED)	9, 10, 11, 12	
Project Lead the Way: Principles of Engineering (POE)	10, 11, 12	PLTW: Engineering Design (IED)
Project Lead the Way: Engineering Design and Development (EDD)	12	PLTW: Engineering Design (IED)
Project Lead the Way: Civil Engineering and Architecture (CEA)	10, 11, 12	
Work Experience & Employment	11, 12	See Work Experience Department
Tech Ed Teacher's Aide	10, 11, 12	

Technology Education is the use of engineering and manufacturing technology to make production faster, simpler and more efficient. The industrial technology field employs creative and technically proficient individuals who can help a company achieve efficient and profitable productivity. Technology Education includes instruction in hands-on creating and production, industrial processes, computer applications, and skills that lead to in-demand careers in the 'trades.'

## ARCHITECTURE AND CONSTRUCTION CAREERS

### INTRO TO MECHANICAL DRAFTING

Grade 9,10,11,12

Length of Course: One Trimester

Introduction to Mechanical Drafting is an introductory course for those who are interested in Computer Drafting. Emphasis is placed on geometric construction, fundamentals of computer-aided drafting, and multi view drawings. Creating real working 3D Models in the Inventor Software and Revit Software. Mechanical and Architectural Drafting will be touched on, to give students two possible pathways. Students will also gain real world application with the 3D Printers.

### WOODS: INTRODUCTION (Woods 1)

Grade 9, 10, 11, 12

Length of Course: One trimester

Required for all other Woods Classes

This introductory course will focus on the safe and correct use of woodworking tools and machines. The students will design and build projects to gain the confidence and skill needed to safely use power and hand tools. Examples of projects built are: toys, shelves, CD boxes, chairs, night stands and folding tables.

### WOODS: PROJECT DESIGN (Woods 2)

Grade 10, 11, 12

Length of Course: Two trimesters

Prerequisite: Woods Introduction

Can be repeated

This course will expand from Intro to Woods with a strong emphasis in cabinetry. The students will use advanced construction methods as used in industry. The students will design and build custom projects of their choice with the instructor permission. Projects might include hutches, dressers, tables, gun cabinets, night stands and any other wooden furniture.

### WOODS: CONSTRUCTION 1

Grade 10, 11, 12

Length of Course: One trimester (2 Hour Block)

Prerequisite: Woods Introduction

In this course students have built storage sheds, playhouses, deer stands, or fish houses from the ground up. The students will learn about the aspects of construction from estimating, drawing, to the actual framing and finishing. Students will use laser levels and transits to learn how to layout and square up a building. The students will be working outside on projects and also learn about concrete principles. Basic wiring, plumbing, and heating systems are explored in this course. Several field trips are taken to actual construction sites.

### **WOODS: BUILDING TRADES**

Grade 11, 12

Length of Course: Three trimesters (1.5 hour block)

Prerequisite: Woods Introduction

Can be repeated; (6 Credits)

This course covers all aspects of light frame construction while building a house. Topics include: Site preparation, framing, roofing, sheathing, window and door installation, interior and exterior finishing, etc.

## **COMMUNICATION TECHNOLOGIES PATHWAY**

### **INTRODUCTION TO PHOTOGRAPHY**

Elective: 9, 10, 11, 12

Length of Course: One Trimester

Prerequisite: None

Meets Art Standard/Credit

Students are encouraged to provide their own SD memory card for this course. In this course, students learn about the art and craft of great photography. Students will hone their professional eye to capture the greatest moments in nearly every situation and setting imaginable using smart phones, DSLR cameras, and Adobe Photoshop software. Taking students both inside the photographer's studio and out into the field, this course is a chance to learn, in a way anyone can grasp the basic insights and hidden secrets of photography.

### **ADVANCED PHOTOGRAPHY**

Elective: 10, 11, 12

Length of Course: One Trimester

Prerequisite: Introduction to Photography

Meets Art Standard/Credit

Students are encouraged to provide their own SD memory card for this course. In this advanced course, students continue honing their art and craft of great photography. Students will use smart phones, digital compact cameras, DSLR cameras, and Adobe Photoshop software to create professional photographs.

### **INTRODUCTION TO VIDEOGRAPHY**

Elective: 9, 10, 11, 12

Length of Course: One Trimester

Prerequisite: None

Meets Art Standard/Credit

Students are encouraged to provide their own SD memory card for this course. In this course, students will produce digital videos. Students will learn the concepts of storyboarding, journalistic writing, cinematography, camera work, graphics, and editing while using smart phones, HD video cameras, GoPro Cameras and Adobe Premiere Elements software. This course is a chance to learn, in a way anyone can grasp, the basic insights and hidden secrets of videography.

### **ADVANCED VIDEOGRAPHY**

Elective: 10, 11, 12

Length of Course: One Trimester

Prerequisite: Introduction to Video

Meets Art Standard/Credit

Students are encouraged to provide their own SD memory card for this course. In this advanced course, students will produce high quality digital videos. Students will apply concepts of storyboarding, journalistic writing, cinematography, camera work, graphics, and editing while using smart phones, HD video cameras, GoPro Cameras and Adobe Premiere Elements software.

## **MANUFACTURING CAREERS**

### **INTRODUCTION TO ROBOTICS**

Elective: 9, 10, 11, 12

Length of Course: One Trimester

Prerequisite: None

This course will introduce students to the world of robotics. Students will explore technologies related to robotic structure, power, mobility, communication, computer, sensory, and tooling systems. Students will explore the key aspects of robot technology through hands-on projects.

## **ADVANCED ROBOTICS**

Elective: 10, 11, 12

Length of Course: One Trimester

Prerequisite: Introduction to Robotics

Students will problem solve by designing and constructing VEX robots for many hands-on challenges including obstacle courses, battle bots, and the Mars Simulation Missions. Students will explore the key aspects of robotic technology.

## **INTRODUCTION TO METALS**

Elective: 9, 10, 11, 12

Length of Course: One Trimester

Prerequisite: None

This course is an introduction to all things metal fabrication. Students will be introduced to welding, forming, heat treatment, and machining practices. Material identification and selection will also be covered as students build a variety of metal projects to be brought home. This is a great class if students are interested in engineering, design/fabrication, metallurgical engineering, metal art sculpture, or just want to sample the incredible world and career opportunities found in metals!

## **ADVANCED METALS**

Elective: 9, 10, 11, 12

Length of Course: One Trimester

Prerequisite: Introduction to Metals

This course is a continuation of Metals I. Students will have expanded instruction in the area of metal fabrication and design, machining process, and an introduction to CNC technology within manufacturing.

# **TRANSPORTATION CAREERS**

## **TRANSPORTATION: FLIGHT AND SPACE**

Grade 9, 10, 11, 12

Length of Course: One trimester

This one trimester course will help students understand flight and space technologies. Students will understand the history of aerospace and design, develop, construct, and test aircraft and spacecraft through hands-on projects.

## **TRANSPORTATION: AUTO**

Elective: 10, 11, 12

Length of Course: One Trimester

Prerequisite: None

Articulated College Credit is Given for this Course

This course covers all the major systems of modern vehicles and general maintenance required. We will cover procedures for servicing vehicles, shop safety, and the use of service manuals and bulletins. Tools, equipment, and minor repairs or service will also be taught. A driver's license is NOT required for this class.

### **AYES – DISCOVERY ACADEMY FOR AUTMOTIVE (ADVANCED)**

Elective: 11, 12 - Discovery Academy Application Required

Length of Course: All Year

Prerequisite: Transportation: Auto

The AYES (Automotive Youth Education System) program is designed to give students the opportunity to learn firsthand the art of automotive repair and diagnosis. Lab activities will include diagnosis and repair of customer vehicle and also some donated vehicles from St. Cloud Technical and Community College (SCTCC). There are four main areas of study; Brakes, Chassis Electrical, Engine Performance, and Suspension and Steering/Wheel Alignment. The classes are provided in conjunction with SCTC and are taught by ASE certified SCTCC instructors.

## **FOUNDATIONAL KNOWLEDGE AND SKILLS**

### **PLTW: INTRO TO ENGINEERING AND DESIGN (IED)**

Grade 9, 10, 11, 12

Length of Course: Three trimesters

Meets the art standard

If you are considering a career in engineering, design, architecture, or any other related field, this course is a must. The class utilizes AutoDesk Inventor, 3-D modeling CAD software, to teach problem solving skills. The curriculum emphasizes communication skills with presentations and teamwork. Activities, projects, and problem-based learning are all utilized. This class applies math and science and will give you a great skill set and experience in preparation for a successful career in engineering. College credit may be available upon successful completion of state exam.

### **PRINCIPLES OF ENGINEERING (POE)**

Elective: 11, 12

Length of Course: One Year

Prerequisite: Engineering Design

College/University Credit Available (3 transcript credits)

This course is designed to help students understand the field of engineering and engineering technology. If you have an interest in engineering, but are unsure what kind of engineering, "POE" would be a great fit: this course is for you! A true engineering variety is taught in this course, including material science and testing, statics, robotic programming, projectile motion, mechanical design, hydraulics, and thermodynamics.

**PLTW: CIVIL ENGINEERING AND ARCHITECTURE (CEA)**

Grade 10, 11, 12

Length of Course: Three trimesters

Completion of Introduction to Engineering Design recommended.

Meets the art standard

This overview of the fields of civil engineering and architecture emphasizes the inter-relationship and mutual dependence of both fields. Students use state-of-the-art software to solve real world problems and apply knowledge to hands-on-projects and activities. By developing and implementing plans for a playground/park or vacation home for example, students experience firsthand the job responsibilities of architects and civil engineers. By the end of the course, students are able to give a complete presentation to the client including three-dimensional renderings of buildings and improvements, zoning and ordinance constraints, infrastructure requirements, and other essential project plans. College credit may be available upon successful completion of state exam.

**PLTW: ENGINEERING DESIGN AND DEVELOPMENT (EDD)**

Grade 11, 12

Length of Course: Three trimesters

The knowledge and skills students acquire throughout PLTW Engineering come together in EDD as they identify an issue and then research, design, and test a solution, ultimately presenting their solution to a panel of engineers. Students apply the professional skills they have developed to document a design process to standards. Students who succeed in developing a real solution could lead to opportunities of statewide and national recognition. College credit may be available upon successful completion of state exam.

**TECH ED TEACHER'S AIDE**

Elective: 11, 12

Length of Course: One Trimester

Prerequisite: Must have taken the class before, achieved a "B", and permission from the instructor.

The purpose of this course is to give the student the opportunity to explore an interest area by assisting in the classroom and lab activities to help their peers.

