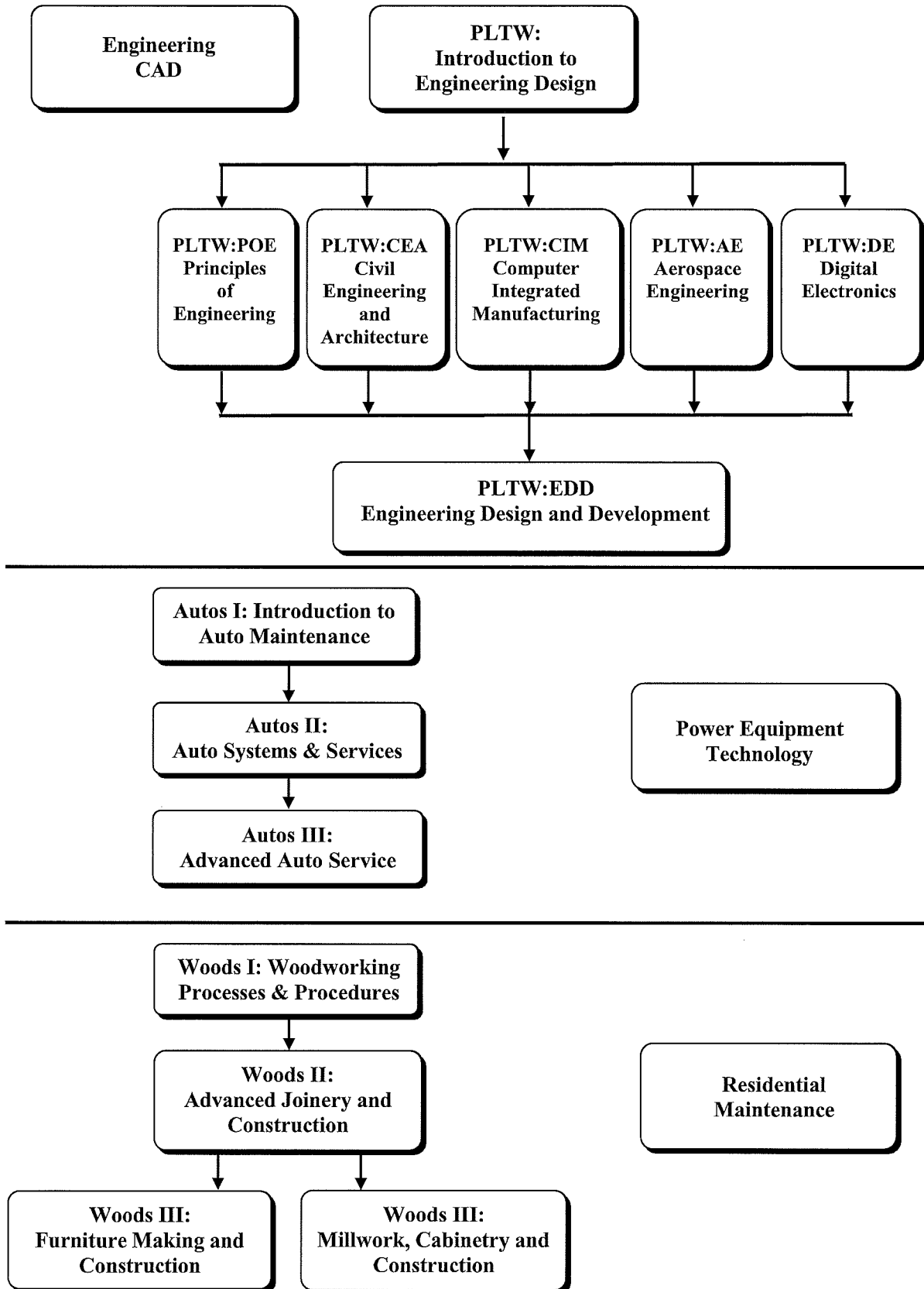


Technology and Engineering



Technology and Engineering

TECHNOLOGY AND ENGINEERING COURSE LIST

All Elective Courses

<u>Subject</u>	<u>Grades</u>	<u>Prerequisites</u>
Autos I : Introduction to Auto Maintenance	9, 10, 11, 12	None
Autos II : Auto Systems and Services	10, 11, 12	Autos I
Autos III: Advanced Auto Service	11, 12	Autos I & II
Engineering CAD	9, 10, 11, 12	None
Power Equipment Technology	9, 10, 11, 12	None
Project Lead the Way: IED Introduction to Engineering Design	9, 10, 11, 12	Completion of Algebra I is strongly recommended
Project Lead the Way: POE Principles of Engineering	10, 11, 12	Completion of Algebra I is strongly recommended
Project Lead the Way: CEA Civil Engineering and Architecture	10, 11, 12	PLTW: Introduction to Engineering Design
Project Lead the Way: CIM Computer Integrated Manufacturing	10, 11, 12	PLTW: Introduction to Engineering Design or PLTW: Principles of Engineering
Project Lead the Way: AE Aerospace Engineering	10, 11, 12	PLTW: Introduction to Engineering Design or PLTW: Principles of Engineering
Project Lead the Way: DE Digital Electronics	10, 11, 12	PLTW: Introduction to Engineering Design or PLTW: Principles of Engineering
Project Lead the Way: Engineering Design and Development	11, 12	PLTW: Introduction to Engineering Design and an additional PLTW course
Residential Maintenance	9, 10, 11, 12	None
Woods I: Woodworking Processes & Procedures	9, 10, 11, 12	None
Woods II: Advanced Joinery and Construction	10, 11, 12	Woods I
Woods III: Furniture Building and Construction	11, 12	Woods II
Woods III: Millwork, Cabinetry, and Construction	11, 12	Woods II

Note: Students may enroll in PLTW courses in either school. Bus service is provided for students who select a course outside of their home school.

For information regarding Project Synergy, AP + PLTW, and College Credit for PLTW Classes, see Appendix C.

TECHNOLOGY AND ENGINEERING COURSE DESCRIPTIONS

AUTOS I: INTRODUCTION TO AUTO MAINTENANCE

ST2323

Length/Credit: 1 semester / 0.5
Grade(s): 9, 10, 11, 12
Prerequisite: None
Other info: Students may acquire 3 semester hours of college credit for AUT152 at Elgin Community College upon completion of Autos I and Autos II.

This entry level automotive technology course introduces students to the automobile and its systems. Students learn and practice common preventative maintenance skills and repair techniques. Students will gain a foundational level of understanding which can be applied to their future as a car owner or to a potential career in the automotive industry. Safety and professionalism are continually reinforced.

AUTOS II: SYSTEMS AND SERVICES

ST2421, ST2422

Length/Credit: 1 year / 1.0
Grade(s): 10, 11, 12
Prerequisite: Autos I
Other info: Students may acquire 3 semester hours of college credit for AUT152 at Elgin Community College upon completion of Autos I and Autos II.

This second level automotive technology course builds upon the skills learned in Autos I and engages students in the operation of automotive systems, common failures of the systems, and diagnosis and repair procedures.

AUTOS III: ADVANCED AUTO SERVICE

ST2721, ST2722

Length/Credit: 1 year—2 period class / 2.0
Grade(s): 11, 12
Prerequisite: Autos I & II

This course provides students with the opportunity to apply what they have learned in Autos I and II to real world situations. This course operates like a commercial automotive repair facility which allows students to gain a greater appreciation for automotive projects such as suspension and steering service, refrigeration systems, and starting and charging systems. Further system study is emphasized in the area of drive train and computer controls. Students are prepared for entry level automotive employment and/or post-secondary education upon conclusion.

POWER EQUIPMENT TECHNOLOGY

ST2623

Length/Credit: 1 semester / 0.5
Grade(s): 9, 10, 11, 12
Prerequisite: None
Other info: Students may acquire 4 semester hours of college credit for AUT100 at Elgin Community College

This introductory course engages students with the internal combustion engine, including theory, construction, operation, service and customer service. Students learn the necessary concepts of safety, tool usage, and shop procedures.

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WOODS I: WOODWORKING PROCESSES & PROCEDURES ST5121, ST5122

Length/Credit: 1 year / 1.0
Grade(s): 9, 10, 11, 12
Prerequisite: None

This entry-level woodworking and construction course introduces students to hand and power tools used to complete a variety of processes. Students will plan projects, select materials, and utilize safe practice. Students will also participate in team design, manufacturing, and project assembly.

WOODS II: ADVANCED JOINERY AND CONSTRUCTION ST5221, ST5222

Length/Credit: 1 year / 1.0
Grade(s): 10, 11, 12
Prerequisite: Woods I

This second-level woodworking and construction course builds on the skills developed in Woods I: Woodworking Processes and Construction, with an emphasis on advanced joinery applications and further development and refinement of modern construction processes. Students will make use of technical reading and writing to fabricate, manufacture, and assemble individual and group projects.

WOODS III: FURNITURE BUILDING AND CONSTRUCTION ST5321, ST5322

Length/Credit: 1 year / 1.0 (*May be repeated*)
Grade(s): 11, 12
Prerequisite: Woods II

This woodworking and construction course will develop students' knowledge in furniture building and construction skills. Design, collaboration, and communication are fundamentals that will be developed and refined during this year-long course.

WOODS III: MILLWORK, CABINETRY, AND CONSTRUCTION ST5421, ST5422

Length/Credit: 1 year / 1.0 (*May be repeated*)
Grade(s): 11, 12
Prerequisite: Woods II

This woodworking and construction course builds upon previously acquired knowledge and skills for students to create complex millwork, cabinetry, and construction. Innovative exploration of concepts, processes, and materials is the fundamental premise of study in this program. Students are encouraged to explore diverse, interdisciplinary approaches to creatively problem solve and implement possible solutions.

RESIDENTIAL MAINTENANCE ST3023

Length/Credit: 1 semester / 0.5
Grade(s): 9, 10, 11, 12
Prerequisite: None

This course provides an introduction to basic maintenance processes and practices frequently encountered in the home. Topics will include zoning, permits, finance, and liability issues as related to home ownership. Students will develop a working knowledge of carpentry, electrical, HVAC, and plumbing systems. Students will learn how to perform dry-wall repairs and design, fabricate, and install ceramic tile.

PROJECT LEAD THE WAY & ENGINEERING

Project Lead The Way (PLTW) prepares students to be innovative and productive leaders in Science, Technology, Engineering, and Mathematics (STEM) and to make meaningful, pioneering contributions to our world. PLTW partners with middle schools and high schools to provide a rigorous, relevant STEM education. Through an engaging, hands-on curriculum, PLTW encourages the development of problem-solving skills, critical thinking, creative and innovative reasoning, and a love of learning. The PLTW middle and high school STEM education programs give students a brighter future by providing them with a foundation and proven path to college and career success in STEM-related fields. STEM education is at the heart of today's high-tech, high-skill global economy. PLTW sparks the ingenuity, creativity, and innovation within all of our students.

Source: <http://www.pltw.org/about-us/who-we-are>

PLTW Class Location Schedule	
Offered at both schools every year:	Alternating Years:
IED	17-18: AE at East; DE at North
POE	18-19: AE at North; DE at East
CIM	19-20: AE at East; DE at North
CEA	20-21: AE at North; DE at East
EDD	

**PROJECT LEAD THE WAY: IED
INTRODUCTION TO ENGINEERING DESIGN**

ST7021, ST7022

Length/Credit: 1 year / 1.0
Grade(s): 9, 10, 11, 12
Recommendation: Algebra I is strongly recommended.

This course's major focus is the design process and its application. Through hands-on projects, students apply engineering concepts and communicate their work. Students use industry standard 3D modeling software to help them design solutions to solve proposed problems, document their work, and communicate their solutions to peers and members of the professional community.

**PROJECT LEAD THE WAY: POE
PRINCIPLES OF ENGINEERING**

ST7121, ST7122

Length/Credit: 1 year / 1.0
Grade(s): 10, 11, 12
Recommendation: Algebra I and PLTW: Introduction to Engineering Design are recommended.
Prerequisite: IED
Other info: Students may acquire 3 semester hours of college credit for ECS117 at Elgin Community College upon completion of PLTW: POE and PLTW:CEA

This course exposes students to major concepts they will encounter in a post-secondary engineering course of study. Topics include mechanisms, energy, statics, materials, and kinematics. Students will develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students will document and communicate their solutions to a variety of audiences. This course is articulated with Elgin Community College (must also take PLTW: CEA).

**PROJECT LEAD THE WAY: CEA
CIVIL ENGINEERING AND ARCHITECTURAL DESIGN**

ST7221, ST7222

Length/Credit: 1 year-1 period class / 1.0
Grade(s): 10, 11, 12
Prerequisite: PLTW: Introduction to Engineering Design
Other info: Students may acquire 3 semester hours of college credit for ECS117 at Elgin Community College upon completion of PLTW: POE and PLTW:CEA

This course exposes students to various aspects of civil engineering and architecture. Students will apply their knowledge to the design and development of residential and commercial properties and structures. In addition, students use 3D design software to design and document solutions for major course projects. Students collaboratively communicate and present solutions to their peers and members of a professional community of engineers and architects. This course is articulated with Elgin Community College (must also take PLTW: POE).

**PROJECT LEAD THE WAY: CIM
COMPUTER INTEGRATED MANUFACTURING**

ST7421, ST7422

Length/Credit: 1 year/ 1.0
Grade(s): 10, 11, 12
Prerequisite: PLTW: Introduction to Engineering Design or PLTW: Principles of Engineering.

This course provides the necessary skills for success in a 21st century manufacturing setting. Students will demonstrate the initiative to build a manufacturing process using robotics and automations, computer modeling, manufacturing equipment, and flexible manufacturing systems. Students will collaborate and present manufacturing solutions.

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PROJECT LEAD THE WAY: AE AEROSPACE ENGINEERING

ST7521, ST7522

Length/Credit: 1 year/ 1.0
Grade(s): 10, 11, 12
Prerequisite: PLTW: Introduction to Engineering Design or
PLTW: Principles of Engineering.

This course explores the evolution of flight, navigation and control, flight fundamentals, aerospace materials, propulsion, space travel, and orbital mechanics. In addition, this course presents alternative applications for aerospace engineering concepts. Students analyze, design, and build aerospace systems. They apply knowledge gained throughout the course in a final presentation about the future of the industry and their professional goals.

PROJECT LEAD THE WAY: DE DIGITAL ELECTRONICS

ST7721, ST7722

Length/Credit: 1 year/ 1.0
Grade(s): 10, 11, 12
Prerequisite: PLTW: Introduction to Engineering Design or
PLTW: Principles of Engineering.

This course is the foundation of all modern electronic devices such as mobile phones, MP3 players, laptop computers, digital cameras and high-definition televisions. Students are introduced to the process of combinational and sequential logic design, engineering standards and technical documentation.

PROJECT LEAD THE WAY: EDD ENGINEERING DESIGN AND DEVELOPMENT

ST7321, ST7322

Length/Credit: 1 year/ 1.0
Grade(s): 11, 12
Prerequisite: PLTW: Introduction to Engineering Design

The knowledge and skills students acquire throughout PLTW Engineering come together in Engineering Design and Development 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, completing Engineering Design and Development ready to take on any post-secondary program or career.

ENGINEERING CAD

ST1021, ST1022

Length/Credit: 1 year / 1.0
Grade(s): 9, 10, 11, 12
Prerequisite: None
Other info: Students may acquire 3 semester hours of college credit for CAD108 at Elgin Community College.

This course will introduce students to problem solving skills used to generate technical drawing for collaborative design ideas. The scope of this course will introduce the study of engineering, architectural, and product design through the development of communication skills using drafting and Computer-Aided-Design. Students will create models using a 3D prototyping printer and other equipment. This course is articulated with Elgin Community College.

Note: Students may enroll in PLTW courses in either school. Bus service is provided for students who select a course outside of their home school.