

# Computer Science and Engineering

<b>Course Title</b>	<b>9th Grade</b>	<b>10th Grade</b>	<b>11th Grade</b>	<b>12th Grade</b>
Introduction to Computer Science	•	•	•	•
Intermediate Computer Science	•	•	•	•
Introduction to Mobile Apps		•	•	•
3D Animation - Multimedia II	•	•	•	•
Gaming I - Multimedia II	•	•	•	•
Web Design - Mulitmedia II		•	•	•
Advanced Gaming - Multimedia III		•	•	•
AP Computer Science Principles - YR		•	•	•
Introduction to Engineering & Engineering I	•	•	•	•
Engineering II & Solidworks ACC CAD 255		•	•	•
Engineering III - YR			•	•
Engineering IV - YR				•

## BUSINESS, MARKETING, COMPUTER SCIENCE & ENGINEERING FLOWCHART 20-21

TSA—Technology Student Association is a national organization for STEM, Computer Science and Engineering students

### Computer Science & Engineering

<u>9<sup>th</sup> grade</u>	<u>10<sup>th</sup> grade</u>	<u>11<sup>th</sup> grade</u>	<u>12<sup>th</sup> grade</u>
Introduction to Computer Science Intermediate Computer Science 3D Animation -- Multimedia II Gaming I -- Multimedia II  Introduction to Engineering and Engineering I	Introduction to Computer Science Intermediate Computer Science Introduction to Mobile Apps 3D Animation -- Multimedia II Gaming I -- Multimedia II Advanced Gaming AP--Computer Science Principles—YR Web Design – Multimedia II  Introduction to Engineering <u>and</u> Engineering I  Engineering II <u>and</u> Solidworks ACC CAD 255	Introduction to Computer Science Intermediate Computer Science Introduction to Mobile Apps 3D Animation -- Multimedia II Gaming I -- Multimedia II Advanced Gaming AP--Computer Science Principles—YR Web Design – Multimedia II  Introduction to Engineering <u>and</u> Engineering I  Engineering II <u>and</u> Solidworks ACC Solidworks ACC CAD 255  Engineering III -- YR	Introduction to Computer Science Intermediate Computer Science Introduction to Mobile Apps 3D Animation -- Multimedia II Gaming I -- Multimedia II Advanced Gaming AP--Computer Science Principles—YR Web Design – Multimedia II  Introduction to Engineering <u>and</u> Engineering I  Engineering II <u>and</u> Solidworks ACC CAD 255  Engineering III -- YR Engineering IV -- YR

<b>Introduction to Computer Science</b> <b>30455</b>	<b>Credit:</b> <b>0.5</b>	<b>\$15/Semester</b>	<b>Grade:</b> <b>9-12</b>
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**Prerequisites:** None  
**Graduation Req:** Practical Arts

In this course, the basics of computer programming are learned and practiced as students write their own computer programs, including computer games. Students will develop problem solving, critical thinking, math, and programming skills.

<b>Intermediate Computer Science</b> <b>30450</b>	<b>Credit:</b> <b>0.5</b>	<b>\$15/Semester</b>	<b>Grade:</b> <b>9-12</b>
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**Prerequisites:** Introduction to Computer Science  
**Graduation Req:** Practical Arts

Introduces students to the discipline of computer science. Covers algorithm development, data representation, logical expressions, subprograms and input/output operations using a structured programming language.

<b>Introduction to Mobile Apps (Programming &amp; Mobile Apps)</b> <b>30460</b>	<b>Credit:</b> <b>0.5</b>		<b>Grade:</b> <b>10-12</b>
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**Prerequisites:** Introduction to Computer Science  
**Graduation Req:** Practical Arts

This is a project-oriented course that examines the principles of mobile application design and development for mobile platforms Apple iOS and Android devices. This course teaches skills in one of the fastest growing areas of computer programming. This course is for anyone who wants to learn how to get started with mobile application development.

<b>3D Animation - Multimedia II</b> <b>31010</b>	<b>Credit:</b> <b>0.5</b>	<b>\$35/Semester</b>	<b>Grade:</b> <b>9-12</b>
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**Prerequisites:** None  
**Graduation Req:** Practical Arts

3D Animation students will move beyond the introductory level of electronic media and learn skills in 3D modeling and animation. This course focuses on using software applications for developing two and three dimensional animations. Upon completion of this course, students will have the fundamental skills to create animated short movies.

<b>Gaming I - Multimedia II</b> <b>31005</b>	<b>Credit:</b> <b>0.5</b>	<b>\$35/Semester</b>	<b>Grade:</b> <b>9-12</b>
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**Prerequisites:** None  
**Graduation Req:** Practical Arts

Gaming I students will move beyond the introductory level of electronic media for students to learn intermediate skills in video gaming. This will include character animation, landscape manipulation, and structures.

**Web Design - Multimedia II**  
**30601**

**Credit:**  
**0.5**

**Grade:**  
**10-12**

**Prerequisites:** Introduction to Computer Science  
**Graduation Req:** Practical Arts

Students move beyond the introductory level of basic computer skills to learn how to design, create, publish, and maintain web pages and websites. Students will learn the basics of HTML and CSS and how to structure and style a webpage using only a text editor. Students will gain the skills and project-based experience needed for entry into web design and development careers.

**Advanced Gaming -  
Multimedia III**  
**31020**

**Credit:**  
**0.5**

**\$35/Semester**

**Grade:**  
**10-12**

**Prerequisites:** Gaming I  
**Graduation Req:** Practical Arts

Advanced Gaming introduces computer program design using concepts of structured programming and logic. Students will move beyond the intermediate level of electronic media to learn advanced skills in video game creation. Includes pseudocode, flowcharts, and structure charts. This class covers variables, data types, control structures, looping, program breaks, and arrays.

**AP Computer Science  
Principles**  
**30506S1 & 30506S2**

**Credit:**  
**1**

**\$94/AP Exam**

**Grade:**  
**10-12**

**Prerequisites:** Introduction to Computer Science  
**Graduation Req:** Practical Arts

AP Computer Science Principles offers a multidisciplinary approach to teaching the underlying principles of computation. The course will introduce students to the creative aspects of programming, abstractions, algorithms, large data sets, the internet, cyber security concerns, and computing impact. AP Computer Science Principles will give students the opportunity to use technology to address real-world problems and build relevant solutions. This course will help students prepare to be successful on the AP Computer Science Principles assessments which consist of two parts: completion of through-course performance tasks and the end-of-course AP Exam.

**Introduction to Engineering  
& Engineering I**  
**80345 & 80332**

**Credit:**  
**1**

**\$50/Semester**

**Grade:**  
**9-12**

**Prerequisites:** None  
**Graduation Req:** Practical Arts

Introduction to Engineering, (paired with Engineering I), is a year-long class designed to open the door on engineering foundations and their application to the real world using a Project Based Learning structure. Topics of study may include, but are not limited to, engineering analysis, testing, physics, planning and design, digital manufacturing design and fabrication, intelligent systems bio robotics, dynamic logic and sensory imaging, and aerospace rocketry-aerodynamic engineering. Engineering I, (paired with Introduction to Engineering), is a semester-long course that offers students the opportunity to work with Arduino kits to explore design, systems, sensor technology, and programming. Students will work in small teams to compete against classmates in their projects. Options include Sea Perch, robot soccer, drag racing, sensor based line-follow, and a Mar's rover challenge. Students will use the 12 - step engineering process to develop and test their robots and will conclude the class by exploring careers that involve robotics.

<b>Engineering II &amp; Solidworks (ACC CAD 255) (CE) 80334 &amp; 69075</b>	<b>Credit:</b> <b>1</b>	<b>\$50/Semester</b>	<b>Grade:</b> <b>10-12</b>
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**Prerequisites:** Introduction to Engineering & Engineering I. Students must have an ACC “S” number for ACC CAD 255.

**Graduation Req:** Practical Arts

Engineering II, (paired with Solidworks), is a course that offers students the opportunity to practice engineering concepts in a modular lab design. Students will complete short introductory rotations on modules designed to provide hands-on experience with engineering applications. These applications include wind tunnel technology, pneumatics, sensor technology, materials testing, design of structures, GPS technologies, mechanical systems, etc. The focus is on developing skills that the students can apply to projects and to motivate students to continue their learning in math and science. Solidworks introduces basic non-parametric 3D concepts to build confidence in 3D thinking and progresses to three dimensional parameters. The student learns to construct, modify, and manage complex parts in 3D space as well as to produce 2D drawings from the 3D models. Students enrolled in this course must be concurrently enrolled in ACC.

<b>Engineering III 80336S1 &amp; 80336S2</b>	<b>Credit:</b> <b>1</b>	<b>\$50/Semester pending board approval</b>	<b>Grade:</b> <b>11-12</b>
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**Prerequisites:** Engineering II & Solidworks (ACC CAD 255)

**Graduation Req:** Practical Arts

In this year-long course, students will have the opportunity to work in teams to complete engineering projects which may include background on pneumatics, programmable logic controllers, 3D Printing, materials testing, design and testing of structures, electronics, sensors and mechanical systems. Projects may include: automated systems, drones, solar cells, and catapults. The overall goal is to provide students a background to make informed career choices about their interest and ability in pursuing learning in math, science and engineering.

<b>Engineering IV 80337S1 &amp; 80337S2</b>	<b>Credit:</b> <b>1</b>	<b>Grade</b> <b>11-12</b>
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**Prerequisites:** Engineering III

**Graduation Req:** Practical Arts

Students will work in teams to complete projects: Topics include pneumatics, programmable logic controllers, measurement tools, materials testing, design and testing of structures, electronics, wind tunnel testing, sensors and mechanical systems. Projects many include advanced robotics and electric car, solar cells, Maglev trains, automated hydroponic garden, home security systems and water desalination. The overall goal is to provide students a background to make informed career choices about their interest and ability in pursuing math, science and engineering.