Last Updated February 2014

2014-2015 GRADE 9-12 COURSE SELECTIONS LISTING

Dear AMSA Student:

You are about to begin the important process of selecting your classes for the upcoming school year. You are encouraged to think carefully about the choices you make in selecting your courses, as the classes you select may affect your future opportunities, as well as your overall satisfaction with school.

This course listing contains most of the information you need to know about AMSA's course offerings and educational opportunities. Some courses may not be offered due to limited student registration, resources available and/or teacher availability. Prerequisites are listed to ensure students have the appropriate level of skills when they enter the class. Classes with prerequisites are generally part of a sequence of courses. It is important to review the prerequisites because students who do not have the necessary qualifications will not be permitted to enroll in the class.

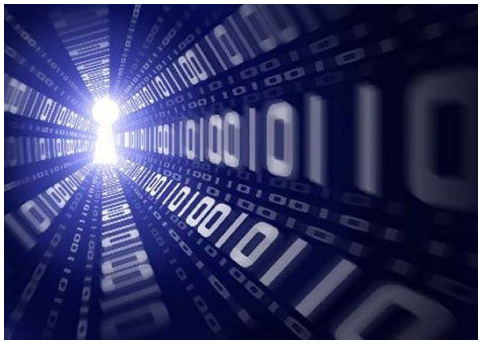
As you prepare for registration and your selection of classes, please keep the following in mind:

1. **Graduation Requirements**
   The high school graduation requirements ensure that each student will attain a certain level of competency, meet the state requirements and complete a well-rounded high school program. **Twenty-eight (28) credits are required for graduation** and 12th graders must have met all the graduation requirements in order to participate in the graduation ceremony. A minimum of 7 credits and a maximum of 8 credits must be earned each school year.

   - Courses that meet every day are worth 1 credit.
   - Courses that meet every other day are worth .5 credits
   - A full year course that meets 7.5 times per week is worth 1.5 credits

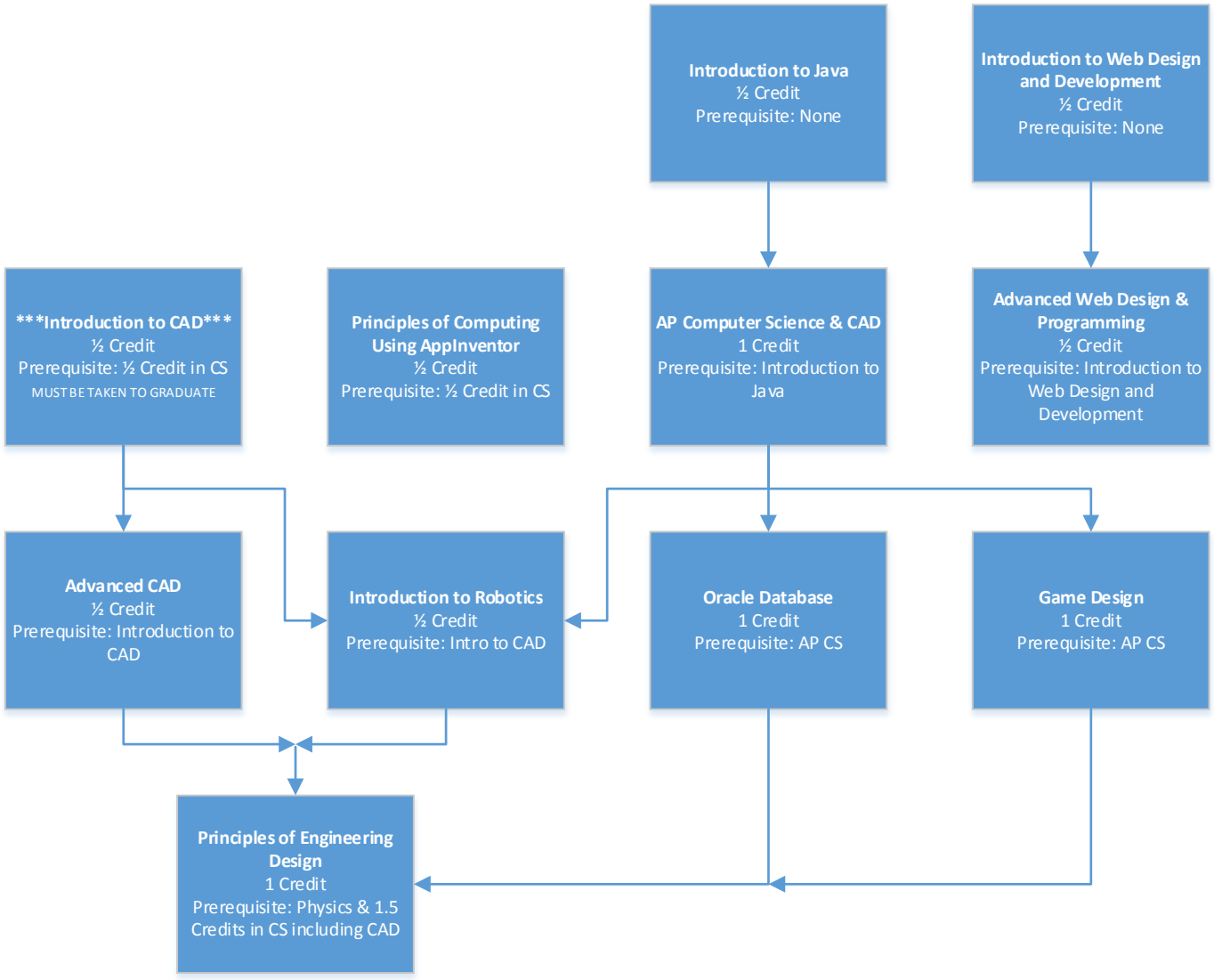
Subject requirements in years

SUBJECT	#YEARS REQUIRED	SUBJECT	# YEARS REQUIRED
Math	**4.5***	Computer Science	**3** **(.5 credit each yr)**
English	**4**	World Language	**2**
Science	**3**	Physical Education Health &Wellness	**4** **(.5 credit each yr)**
History	**3**	Fine Arts	**2** **(.5 credit each yr)**



COMPUTER SCIENCE DEPARTMENT COURSE OFFERINGS

Three years of Computer Science is required for graduation at AMSA. Introduction to CAD must be taken by all AMSA students. Courses offered for computer science are as follows:



NOTE: In order to enroll in an AP computer science course, students must fill out an AP application form.

Introduction to Java **Grades 9-12**

Credit: .5

Prerequisite: None

Students learn how to develop algorithms and code in Java. This is an introductory class that focuses on the basics of writing methods, learning the Java syntax, writing for loops and using if/else statements. Once we have built a solid foundation of procedural techniques, an introduction to Object Oriented Design will be introduced. The class is problem-centered. Rather than just describing programming constructs, we talk in detail about how to apply each construct and where a novice is likely to go wrong when learning how to use each new construct.

Web Design & Development **Grades 9-12**

Credit: .5

Prerequisite: None

Students will be introduced to all aspects of Web Design. Students will use industry standard software and techniques for the design and creation of web sites with a focus on layout design, styling, typography and content. By the end of this course, students will be able to structure and style content to be published on the web.

Principles of Computing Using AppInventor **Grades 10-12**

Credit: .5

Prerequisite: .5 credits in CS

CS Principles is a new course under development that seeks to broaden participation in computing and computer science. Development is being led by a team of computer science educators organized by the College Board and the National Science Foundation. Students are taught exposed to seven big ideas in computing: Creativity, Abstraction, Algorithms, Impact, Data and Internet. Students explore these ideas using MIT's AppInventor, a visual based programming tool to create mobile apps. In addition, students learn how to explore and use computational tools to explore, visualize and analyze large sets of data. This course is schedule to become a new AP course in 2016-2017.

Introduction to CAD **Grades 10-12**

Credit: .5

Prerequisite: .5 credits in CS

Students are introduced to "Drawing Building Blocks" using line types and learning Orthographic Projection. Advanced topics include "Dimensioning", CAD Assemblies and Motion Simulation, and studying the Engineering Design process.

Advanced Web Design & Development **Grades 10-12**

Credit: .5

Prerequisite: Web Design & Development

Students will build upon concepts learned in Web Design & Development with a focus on user centric design. By the end of this course, students will create websites fluid and responsive

websites that will properly display in a variety of platforms and screen sizes. This course is project based and students will work on both developing new sites and improving existing website design.

Introduction to Robotics **Grades 11 & 12**

Credit: .5

Prerequisite: Introduction to CAD or AP CS

The Robotics course is an integrated STEM experience focusing on both programming, using the Robot C programming language and mechanical engineering. Students will be exposed to the VEX Robotics Curriculum and Model Rocketry. Students will explore the evolution of flight, navigation and control, flight fundamentals, aerospace materials, propulsion, space travel, and orbital mechanics. Students analyze robotics and use in space. Students analyze, design, and build robotic Mars rovers. Students will also analyze stresses and mechanical properties of materials using Solidworks CAD simulations.

Advanced CAD **Grades 11 & 12**

Credit: .5

Prerequisite: Introduction to CAD

Through the Ten80 Student Racing Challenge initiative, students prepare for a career as engineers, scientists, business professionals utilizing CAD as an engineering tool. The classroom is a "professional" motorsport team with project tasks ranging from motion simulation assembly design, material specifications, aerodynamic design, and alternative energy. Students will compete using 1:10 scale electric radio controlled cars that they maintain and improve through mechanical changes. Students work toward completing certifications that lead to regional and national awards.

Advanced Placement Computer Science **Grades 10 - 12**

Credit: 1

Prerequisite: B+ in Intro to Java Programming and permission from Instructor.

AP CS is a first-semester college level course in Computer Science and is guided by the AP College Board's AP Computer Science course description. Advanced concepts using the Java programming language will be covered. Students will study object-oriented programming methodology, problem solving, algorithm development, data structures, iteration, arrays, and classes. Summer reading and practice problem sets are required. This course satisfies AMSA's CAD requirement.

Oracle Database **Grades 11 & 12**

Credit: 1

Prerequisite: AP Computer Science

Students are introduced to the database design process and learn how to identify database entities and relationships, create entity relationship diagrams using ERD conventions, convert the design into a physical model, create relational tables, and insert data. During the second part of the course students focus on programming with Structured Query Language (SQL) and learn all aspects of querying and database administration. At the end of the course, students have the option to take the Oracle SQL Developer certification exam.

Game Design **Grades 11 & 12**

Credit: 1

Prerequisite: AP Computer Science

Game programming is one of the most challenging aspects of Computer Science. It attempts to combine concepts in: computer graphics, human computer interaction, networking, artificial intelligence, computer aided instruction, and databases. This course is an introduction to the theory and practice of video game design and programming. Topics include the history of game design and animation, game theory, game genres, game assets, and the Unity 3D game engine. Students are required to work in a team to develop a game in Unity, demonstrating design principles discussed in the course.

Principles of Engineering Design **Grade 12**

Credit: 1

Prerequisite: 1.5 credits in CS, Physics

The focus of the engineering course is to introduce students to a variety of engineering disciplines through project-based learning. Students will implement the engineering design process, modeling software, and prototype building. This is an interdisciplinary course utilizing physics, chemistry, and math concepts. Students will complete projects in architecture and civil engineering. The study of electrical and mechanical engineering will focus on building an AM/FM radio and audio amplifiers. The unit on aerospace engineering and robotics will focus on model rocketry and on remote control airplanes.

ENGLISH LANGUAGE AND WORLD LITERATURE COURSES

The AMSA English Language and World Literature program encompasses six-years of continuous and historically aligned courses beginning in grade 6. The English Language Arts component focuses on written assignments that correlate with the literature under study. This assists students with the rigorous levels of literary analysis required at AMSA's college prep, honors and AP levels while promoting better assimilation of the themes, genres and cultures of our literary content.

An emphasis is placed on grammar and vocabulary skills, the basic tools needed for writers to succeed at their craft. Each grade level's curriculum will include a structured vocabulary program that will reinforce composition, reading comprehension and test-taking skills. Our grammar program includes scaffolded skills, with each grade building upon the next.