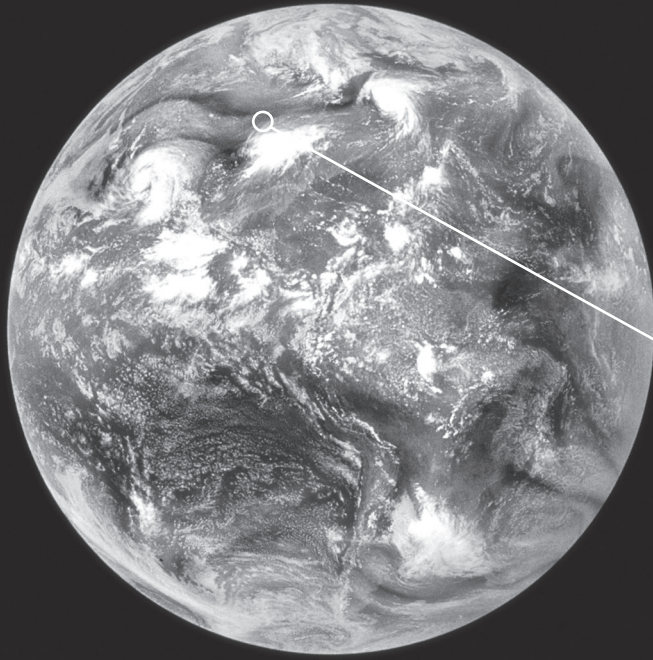


Anne Arundel County Public Schools  
Office of Advanced Co-Curricular Programs



# Advanced Study Program

at the United States Naval Academy

F A L L 2 0 0 9

The Advanced Study Program is sponsored and funded by Anne Arundel County Public Schools through the Advanced Co-Curricular Programs Office. Public school students may attend courses during the fall, spring, and summer semesters of the school year. During the summer session, the program is also open to non-public school students for a fee of \$25 (payable by check to AACPS).

The program consists of advanced studies in mathematics, computer applications, humanities, and the sciences for grades 6–12. Each semester's program consists of a variety of short courses dealing with subject-specific topics of current interest that extend learning opportunities and stimulate thinking and creativity. Students are nominated by their school's content teachers and guidance counselors.

## Purpose

The purposes of this program are to:

- extend the mathematics, humanities, computer science and science education of gifted and talented students;
- expose students to interesting and challenging topics which, while outside the standard school curricula, are accessible to those with high ability and motivation;
- encourage the development of reasoning processes necessary in mathematics, science, and humanities;
- provide the opportunity for students to study in the environment of an institution of higher education or research; and to
- introduce students to college educators and to related opportunities; and challenge students' creativity and task commitment while working with mentors on research projects.

## Student Eligibility

Your child has been nominated for participation in the Advanced Study Program on the basis of demonstrated ability in the following areas:

- demonstrates a high level of mathematics competency
- develops creative and new solutions to standard problems
- takes risks to solve problems without prior knowledge or demonstration
- applies required information and strategies to new and unfamiliar problems
- observes, analyzes, and generalizes mathematical relationships
- reasons well inductively
- reasons well deductively

- expresses mathematical ideas clearly and accurately in both written and oral form
- possesses a high degree of self-motivation and self-direction
- applies mathematics skills in science problem solving
- demonstrates above average ability to understand abstract concepts and relationships
- uses scientific approach when seeking possible solutions
- persists when outcomes do not meet student predictions
- demonstrates divergent thinking and makes unique associations
- demonstrates a positive attitude and interest in science
- expresses curiosity about why things happen
- retains and uses previously learned information and skills
- questions scientific observations and explanations

The program consists of rigorous courses of study. Students enrolled in advanced level programs at the school may be nominated by the staff. Prerequisite course requirements, where indicated, must be met. Students may request consideration for a total of three courses. The staff emphasizes that students who indicate interest in a course must be committed to attend all sessions. The result of students not attending sessions deprives other students of the opportunity.

Courses requested by fewer than ten students will be canceled. **Please note:** Due to the high level of interest in the program, nominated students cannot be guaranteed placement. Every attempt will be made to provide selected students with their first choice; however, it is not unusual for students to be assigned a course identified as their second or third choice.

## Attendance

Attendance is taken at each class meeting. The names of students successfully completing a course are submitted to the school. Students absent from two or more meetings are not considered as completing the course and their names are not forwarded. However, students may and are encouraged to attend the remainder of the classes

## Transportation

Transportation to and from classes must be arranged by the student's parents. Courses are taught on the campus of the United States Naval Academy.

*Due to heightened security, under current procedures vehicles are allowed to enter USNA if either:*

(a) *the vehicle displays a valid Department of Defense (DoD) decal and the driver or a passenger shows a current DoD ID*

*or*

(b) *the driver shows a special temporary pass that has been issued for that driver and that vehicle.*

Please indicate whether you need a temporary parking pass on the application form.

Complete the application and return it to the Advanced Co-Curricular Programs Office **no later than October 15, 2009**. If you have any questions, call us at 410-222-5430.

# Courses

## Math

### M-3

#### Codes, Ciphers and Secret Communications

This is an introduction to cryptography. Cryptography is the practice and study of hiding information, first used in attempts to ensure secrecy in communications, such as those of spies and military leaders. Nowadays it is widely used on the internet for secure transactions, in ATMs, DVDs and videogames.

We will explore some elementary ciphers, starting with Caesar's cipher (named after the Roman emperor Julius Caesar who used it to communicate with his generals).

We will use a few basic number theory facts and frequency analysis as tools for breaking these substitution codes.

**Dates:** Mon and Fri  
Oct 26 and 30, Nov 2 and 6

**Time:** 5:00 p.m. - 7:30 p.m.

**Location:** To be announced

**Instructors:** Julian Withers  
Prof. Irina Popovici

**Sessions:** 5

**Class size:** 15

**Prerequisite:** None

Recommended for students in grades 6-9

## Science

### S-5

#### Science of Music and Sound

This course module is designed for students with a basic understanding of mathematics and music. Students will learn in a lab-like environment the basics of creating sounds with synthesizers and obtain a basic understanding of Fourier Series and how to manipulate them using electronics. Basic music theory will be presented in terms of how instruments play and why they sound like they do.

**Dates:** Mon and Wed  
Nov 2, 4, 9, 12, 16

**Time:** 5:00 p.m. - 7:00 p.m.

**Location:** To be announced

**Instructor:** Prof. Kevin McIlhany

**Sessions:** 4

**Class size:** 12

**Prerequisite:** None

Recommended for students in grades 6-9

### S-16

#### Topics In Modern Astronomy

This is an exciting era for astronomy...the news is full of discoveries which in turn open more new questions. After an initial "Introduction to the Universe," this seminar course will explore some of the latest developments and controversies in the field. Possible topics will include the life and death of a star, neutron stars and black holes, active galaxies and quasars, cosmology, planetary exploration and other areas selected by the students. In addition, weather permitting, we will learn constellations and study the night sky. We will also schedule an evening observing session with the Naval Academy telescope.

**Dates:** Monday and Tuesday  
October 26 and 27,  
Nov 2, 3, and 9

**Time:** 6:30 p.m. - 8:30 p.m.

**Location:** To be announced

**Instructor:** Professor Elise Albert

**Sessions:** 5

**Class size:** 12

**Prerequisite:** Completed or currently taking  
Mathematics Seven

Recommended for students in grades 7-9

## S-17 GIS—Combining Maps and Computers

A Geographical Information System combines map coordinates with a computer database and allows us to rapidly look for geographical patterns in data sets. We will look at how we make maps, the kinds of map data that can be merged and combined in a GIS, and data available for free on the Internet. We will look at satellite data, digital elevation data such as that collected by the Shuttle Radar Topography Mission, and see how they can be combined to let us "fly" over the terrain while seated at the computer. We will use hand held GPS (Global Positioning System) receivers to make our own GIS database. We will look at diverse uses of the technology, from the earth sciences to redistricting after the 2000 Census to recreating history with a GIS. Each student will receive a CD-ROM with a Windows GIS program and a variety of GIS data covering Annapolis.

**Dates:** Tuesday and Thursday  
Oct 29, Nov 3, 5, 10, and 12

**Time:** 4:30 p.m. - 6:30 p.m.

**Location:** To be announced

**Instructor:** Prof. Peter Guth

**Sessions:** 5

**Class size:** 16

**Prerequisite:** Completed or currently taking  
Mathematics 6

Recommended for students in grades 6-9

## Engineering

### E-3 Build Your Own

In this engineering class, students will use the design and build approach to create their own catapults, rockets, underwater gliders and bristlebots. Students will also evaluate and optimize the performance of their engineering systems.

**Dates:** Monday and Wednesday  
Nov 9, 11, 16, 18.

**Time:** 5:00 p.m. - 7:00 p.m.

**Location:** To be announced

**Instructor:** Professor Angela Moran

**Sessions:** 4

**Class size:** 16

**Prerequisite:** Completed or currently taking  
Mathematics 6

Recommended for students in grades 6-9



ANNE ARUNDEL  
COUNTY PUBLIC SCHOOLS

Kevin M. Maxwell, Ph.D.  
*Superintendent of Schools*

**[www.aacps.org](http://www.aacps.org)**  
[www.aacps.org/gifted/adjunct.asp](http://www.aacps.org/gifted/adjunct.asp)

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# Advanced Study Program Application

Please Print

Complete the information below. Select two courses you would like to take and list as your first and second choice. You must have the signature of a teacher in the content area of the course you are applying for. If you are selected, you will be mailed a registration form with the specific date/time/place of the course.

Student Information		
Name	Grade	Is Student currently on an IEP or 504 Plan? <input type="checkbox"/> Yes <input type="checkbox"/> No
School		
Home Street Address		
City		Zip
Home Phone	Parent E-mail Address	

Course Information	
<b>1st Choice:</b>	<b>2nd Choice:</b>
Content Teacher Signature	Content Teacher Signature

Parent/Guardian Permission (signature required)	
The parent/guardian:	<ul style="list-style-type: none"> <li>· Agrees to provide transportation to and from the U.S. Naval Academy</li> <li>· Has reviewed the course selections and concurs with the choices</li> <li>· Understands the attendance policy to qualify for successful completion of the program</li> </ul>
Parent/Guardian Signature	

## USNA Temporary Vehicle Pass

If you do not have a current valid Department of Defense (DoD) decal and driver (or passenger) with a current DoD ID, you will need to show a current temporary pass for that driver and that vehicle.

**Yes, I need a temporary parking pass.**

**Return this form to the Advanced Co-Curricular Programs Office by October 15, 2009.**

Mail: Advanced Co-Curricular Programs Office · Anne Arundel County Public Schools, 2644 Riva Road, Annapolis, MD 21401

Fax: Advanced Co-Curricular Programs Office at 410-222-5608

This form is also available online at [www.aacps.org/gifted/adjunct.asp](http://www.aacps.org/gifted/adjunct.asp)

For more information, call the Advanced Co-Curricular Programs Office at 410-222-5430.