MSIT'14 Academy
Department of Mathematics
201 Donaghey Avenue
Conway, AR 72035

Dr. Ramesh Garimella, Chair
Department of Mathematics
University of Central Arkansas
201 Donaghey Avenue
Conway, AR 72035

Activities

The MSIT'14 Program will offer enriched activities for 9th, 10th, & 11th grade students in central Arkansas in mathematics and related fields of science. The MSIT'14 Program provides a setting that is conducive to active learning and the exchange of ideas related to theory and practice in the areas of Science, Technology, Engineering, and Mathematics. Our dynamic instructional environment integrates topics related to sciences and mathematics with hands-on activities. See the other side of this brochure for the activities and descriptions. All sessions will be conducted by UCA professors.

General Information

While some refreshments will be provided, participants should bring their own lunch. Students will have computers available for computations. All activities will be conducted in the Mathematics and Computer Science building and Lewis Science Center of UCA. A map of the university will be included in the registration packet to show the drop-off and pick-up points for students. Applications will be processed in the order received. We encourage students to apply as soon as possible as space is limited. Preference will be given to students in central Arkansas.

Contact Information

Complete information about the MSIT'14 Program (such as more detailed description, activities, and application materials) is available on our Website:
www.uca.edu/math/news/

For questions, contact:

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Program Information

Fee*: $100 per participant

Dates: July 14–18, 2014

Time: 9:00 AM - 4:30 PM

Lunch time: 12:00-2:00 PM
                     Bring your own lunch

Lunch time activities include:

- Visit to UCA Planetarium
- Campus Tour
- Group Photo
- Information on Math & Science programs at UCA

Location:
Math and Computer Science Building

Eligibility:

Participant must be a 9th, 10th, or 11th grade student during 2013-14 school year.

Deadline for application:

June 13, 2014

*A limited number of fee waivers are available. For more information please call the number listed in the contact information.

University of Central Arkansas

MSIT'14

Mathematics, Science, & Information Technology Summer Academy
July 14-18, 2014

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Presented by
Department of Mathematics
&
UCA STEM Institute

MSIT'14: Mathematics, Science, & Information Technology Summer Academy

MSIT'14

The **MATHEMATICS, SCIENCE, & INFORMATION TECHNOLOGY ACADEMY (MSIT)** is a summer program offered during the week of July 14-18, 2014 by the Department of Mathematics and the STEM Institute at the University of Central Arkansas. This one-week program is designed for promising 9th, 10th, and 11th grade students in central Arkansas. The main objective of the program is to stimulate and enhance interest in mathematics and its applications to computer science. UCA's mathematics and computer science faculty members will lead investigations that link their areas of specialty with realistic and scientific applications. Participants will conduct experiments, collect and analyze data, develop mathematical models utilizing computers, and use the results to make predictions and solve problems involving coding and decoding secret messages, meaningful choices in playing a video game, game programming using C++, and graphic programming in Java Script.

Coding and Decoding Secret Messages
Dr. R. Garimella & Dr. R.B. Lenin (Math Faculty)

Coding and decoding, also known as Cryptography, is the art of secret communication. It involves transforming a plain message into a jumbled text so that no one other than the intended receiver will be able to decipher and comprehend the message.

Due to rapid usage of modern communication technologies, security has become a serious concern in terms of tampering with vital messages that are being transmitted over the Internet or hand-held devices. A great deal of modern cryptography depends upon basic number theory, clever manipulations of large integers, and use of software such as *Excel*. In this program, students will be introduced to the essentials of number theory and Excel for encryption. Students will gain hands-on experience in encrypting and decrypting messages.

Video game balance:
Giving players meaningful choices.
Dr. Jeffrey Beyerl (Math Faculty)

Many games give players choices, but many of these leave most players naturally drawn to always doing the same thing. When choices are balanced, players will have genuine decisions to make and will not always follow the same path. Students will learn techniques for modeling with a specific emphasis on quantifying the various choices players must make in a game.

Graphic Programming in Java Script
Dr. Clarence Burg (Math Faculty)

Computer graphics depend heavily on many mathematical concepts from geometry and algebra. Using the Java Script programming language, students investigate how to build lines, polygons and circles, which are the basic building blocks of computer graphs. Starting with an introduction to the basics of programming focusing on Java Script students learn how to develop and implement step-by-step algorithms for drawing these basic shapes. Once students have implemented these basic building blocks, they can create their own artistic designs by combining them in special ways. By the end of the week, students should be able to animate these objects so that they move around the screen, and run and modify these codes for future uses.

Game Programming
Using C++ and Graphics
Dr. Mark Smith (Computer Science Faculty)

In this activity, participants learn how to build interactive computer games. An Open-GL based graphics package is used for creating 2-D and 3-D games implemented in C++ and installed on the Windows 7 platform. Students complete a fully functional graphical game utilizing input controls from the mouse as well as the control/arrow keys. The creation of multifaceted animations with shapes/objects drawn by the Open GL graphics is utilized when implementing the game. Participants will also learn basic software engineering principles involving the development and testing of their games within the Microsoft Visual Studio Integrated Development Environment.

Bubble Shooter with physics!

Registration Form

Instructions: Please complete this form and return to the UCA Math Department along with check for $100 (payable to MSIT '14 @ UCA). See reverse side for address.

Student Name _____

Parent/Guardian Name _____

Address _____

City _____

State_____Zip _____

Home Phone# _____

E-mail_____

Grade in 2013-14 school year _____

School attended _____

_____

Name of activity you would like to attend: (check only one box):

☐ **Cryptology: Coding and Decoding**

☐ **Video game balance**

☐ **Graphic Programming in Java Script**

☐ **Game Programming Using C++ and Graphics**