

# UMASS AMHERST **SUMMER College**

## **SCIENCE, TECHNOLOGY, ENGINEERING, & SUSTAINABILITY RESEARCH PROGRAMS**

UMass Amherst is one of the nation's top public research universities as measured by national and international rankings, academic citations, and research funding. The campus spends more than \$180 million on research each year, demonstrating its contribution to the nation's position as a technological and economic leader. We work in conjunction with academic, government, and private partners to translate new knowledge and scientific discoveries into technical innovations and scholarly works that create opportunity for students, faculty and the public.

### **Research Intensives (featured)**

Our competitive 6-week Summer Research Intensives program places high-achieving high school students in professional working labs alongside distinguished faculty, graduate and undergraduate students in state-of-the-art labs. We offer placements in biology, biochemistry, molecular biology, clinical psychology and food sciences.

<http://www.umass.edu/summercollege/research-intensives>

### **Summer Engineering Institute**

The Summer Engineering Institute is a multi-faceted program that allows students to explore how engineers envision creative, practical solutions that benefit the everyday lives of people and the communities in which they live. Students will be exposed to selected topics in chemical, civil, computer systems, electrical, environmental, industrial, and mechanical engineering.

In presentations, computer labs, group projects, and field trips, you will learn from UMass faculty and practicing professionals about the application of science and engineering principles in chemical, civil, computer systems, electrical, environmental, industrial, and mechanical engineering.

You will come away understanding the skills necessary for a career in engineering and the pathways in higher education that will prepare you for engineering-related careers.

<http://www.umass.edu/summercollege/summer-engineering-institute>

### **Forensic Chemistry**

As a Forensic Chemistry student, you'll delve into current scientific techniques in the areas of forensic chemistry and biology. You'll learn how to apply the scientific principles behind crime-solving techniques and gain an understanding of the education, training, and other requirements you'll need in order to get your dream job in a forensics laboratory.

You'll conduct experiments, interpret their results, and communicate the results of your tests. You'll explore topics including drug chemistry, fire debris analysis, toxicology, biology, DNA analysis, and fingerprints. You'll also get an introduction to the legal aspects of forensics, including testimonies, relevant laws, and chain of custody issues. You may have the opportunity to visit a real forensics laboratory and hear from guest lecturers in the field. And you'll be given an opportunity to complete a challenge project of your own choosing, incorporating the knowledge you've gained.

<http://www.umass.edu/summercollege/forensic-chemistry>

### **Astronomy**

Astronomy: Black Holes and Dark Energy will present the modern theories that take the facts of astronomy for use in science fiction, including the physics of black holes and the strange effects of dark energy. We'll explain the implications of observations using telescopes such as the Hubble Space Telescope, surveying the state of current observations while learning to take our own images with the 16 inch telescope at UMASS' Orchard Hill Observatory during night observing sessions. We'll look at the Universe as a zoo, studying different unique objects in the universe, from stars to black holes to galaxies to the Universe itself. Students will spend time in interactive lectures that are problem-solving based and in labs, doing experiments and getting a hands-on understanding of what professional astronomers do.

<http://www.umass.edu/summercollege/astronomy-black-holes-and-dark-energy>

### **Digital Forensics**

This course provides an introduction to the principles and practices of digital forensics.

We will explore the steps in the acquisition, preservation, analysis, and courtroom presentation of digital evidence. We'll see how this information can be recovered from many sources, including file systems, operating systems, networks, database systems, applications, media files, and embedded systems. We'll learn about existing tools for digital forensics, such as The Sleuth Kit and Wireshark, and we'll learn to write our own. We will also explore more advanced topics, such as anti-forensics, timeline generation, and authorship attribution.

<http://www.umass.edu/summercollege/digital-forensics>

### **Summer Institute for Leadership and Sustainability (SILS)**

The Summer Institute for Leadership and Sustainability (SILS) is a 2-week intensive for students who are passionate about protecting our environment for future generations and exploring sustainability issues. SILS utilizes some of the unique resources of the University and uses them as models for how issues of sustainability can be addressed in the real world by experts in the field.

In a seminar setting, participants will learn about core concepts of sustainability and leadership ranging from the economic, ethical, social, and scientific aspects of sustainability to managing and

facilitating groups, strategic problem solving, and media relations. Our SILS program is part of the Commonwealth Honors College, the premier honors college in New England.

<http://www.umass.edu/summercollege/summer-institute-leadership-and-sustainability-sils>

### **Human Health and Movement (Kinesiology)**

In Human Health and Movement, you'll join like-minded peers to take part in an activity-based curriculum that introduces concepts from the field of Kinesiology. You'll explore exercise science, health, movement research and fitness through short lecture sessions, team-based learning experiences, and active labs that include off-site training involving hiking, biking and water activities.

<http://www.umass.edu/summercollege/kinesiology-human-health-and-movement>