

Applications of Nanoscience

Description:

Welcome to Applications of Nanoscience! This course is designed for high school students who are interested in learning the essential skills of technology development through a scientist's lens. During this intensive two-week program, you will explore important and current applications of nanoscience through lectures, demonstrations, and hands-on learning, as well as develop skills in scientific literacy, communication, and technology entrepreneurship. In the second week of this course, you will work in teams to develop and pitch a novel technology startup company. As you develop your ideas, you will also get the chance to explore many different scientific techniques and several types of instrumentation that the university has to offer through exclusive lab tours.

Education Director:

Rita Blaik, PhD

Education Manager:

Cheylene Tanimoto, PhD

Program Coordinator:

Elaine Morita, PhD

Instructor of Record:

Prof. Sarah Tolbert, Department of Chemistry & Biochemistry

Course Hours:

MTWRF 9:30 AM – 5:30 PM PDT. You are expected to follow codes of conduct for Summer Sessions and this course for the duration of the two week program unless prior written permission is obtained at least three days before the beginning of the course.

Technology requirements:

All students are required to have a laptop. Course documents will be posted on a Padlet website, Slack will be used for class communication, and students will be asked to submit assignments by uploading files to a Google Drive. Free MATLAB software that runs in-browser will be used for experiment data analysis.

Overall Course Structure:

Week 1 is focused on giving you the skills you need to be a successful scientist. In the mornings, we will have workshops about skills that scientists need outside the lab (and that you'll need for your Week 2 project) and give you a chance to practice them. The afternoons will consist of laboratory experiments which will be presented by our instructor, and they will each include a hands-on element that students will do in the lab.

Week 2 will be your chance to take what you learned in Week 1 and apply these skills to develop your own ideas. You will be grouped in assigned teams according to shared technology

interests, and on Monday, you will give a preliminary product pitch (you'll receive guidelines for this later). You'll spend the rest of the week developing your proposed technologies into startup pitches, and then give a final presentation on Friday.

Safety Dress Code:

Lab safety is extremely important. Since we will be entering lab spaces with real hazards, students MUST wear long pants and shoes that cover the entire foot. This means NO open-toed shoes, exposed feet, exposed ankles (including while sitting), shorts, skirts, or ripped jeans/pants. Safety glasses, lab coats, and gloves will be provided. **If you are not dressed appropriately, you will not be allowed to participate in the day's activities.**

Safety checks will be conducted at the start of every lab session. We will be checking your work station, dress code, and understanding of safety considerations/risks/dangers and protocols. All labs must be conducted following the directions of your instructors.

Pre-Homework:

You are responsible for a set of vocabulary terms that will be sent out before the course begins. We look forward to everyone bringing their own strengths from their own unique background, but we also want to make sure that everyone is familiar with some basics by the time we begin. These terms come from biology, chemistry, physics, and entrepreneurship and we want you to be familiar with them before they are used throughout the course. We will call on students to define words throughout the course and we will have trivia-based fun activities that might include some of these key terms. You will also be required to complete the Environment, Health, and Safety (EH&S) Laboratory Safety Fundamentals online course through worksafe.ucla.edu to understand the basic safety precautions when working in a laboratory environment. Additionally, students will be provided instructions for setting up a free MATLAB account to have access to MATLAB in-browser.

Homework:

There will be five homework assignments given during the first week; each one will expand on the skills and experiments we go over during that day. These assignments are due at 9:30 AM the day after they are assigned. They will be graded for effort on a scale of unsatisfactory (✓ -), satisfactory (✓), or excels (✓ +).

Final Presentation:

At the end of our two week course, you will present your technology product proposal at the CNSI Auditorium. We invite your families to attend, with questions! This presentation session will be held on Friday of week two from 10:30 AM – 1:00 PM. We'll give you more information about this as it gets closer.

Grading:

Pass/no pass.

The grading structure is as follows:

- Completion of homework assignments with an average grade of satisfactory (30% of total grade)

- Participation in all workshop activities and lab activities (25%)
- Proposal presentation (10%)
- Final presentation (35%)

A passing grade requires a total score of at least 70%. In addition, any student who fails to abide by the proper codes of conduct as defined in the welcome packet and our safety rules may receive a “no pass” grade. If you ever feel like you’re struggling, please feel free to come talk to any of the instructors!

Code of Conduct:

All students are expected to follow the UCLA Summer Sessions code of conduct as well as the safety guidelines outlined in our safety and liability waivers, which you should all have signed prior to the first day of class. Students are expected to follow instructions set out by instructors, especially when in laboratory spaces and performing experiments.

We look forward to meeting every student and making this the best program it can be. We will be flexible and patient with various issues that might come up (health issues, not being able to get supplies, deadlines, emergency situations that may arise, etc.) and we ask that you will be patient with us as well.