

Clarion University is offering a number of science classes with laboratory and field components in a face-to-face, immersive environment this summer. Courses like General Chemistry and Organic Chemistry are requirements for many health and science majors, and taking these classes in the summer may allow students to accelerate their program, get started early on their college requirements, or make up courses they missed during the normal academic year.

For course/general questions contact 814-393-2225 or email [mkube@clarion.edu](mailto:mkube@clarion.edu)

For housing questions contact 814-393-2352 or email [reslife@clarion.edu](mailto:reslife@clarion.edu)

For enrollment questions contact 1-800-672-7171 option 1 or email [admissions@clarion.edu](mailto:admissions@clarion.edu)

#### **COURSE OFFERINGS**

##### **Summer Session I (5/6-5/23)**

##### **Deadline to Register and Secure Housing April 17**

BIOL 406 - Cell Culture and Tissue Engineering; 3 credits

Focuses on the theory and practice of growing primary cells and cancer cell lines, and the engineering of tissues in culture. Students also learn the theory and practice of quality control procedures and long-term storage of mammalian cultured cells and tissues. Newer advances in stem cell isolation, differentiation, and tissue banking will also be covered. Class is from 12-5 p.m. M, T, W, Th, F.

ES 455 - Field Methods in Geoscience; 5 credits

Field-based course provides upper-level undergraduates hands-on experience in hydrogeology, meteorology, bedrock, and surficial geology projects. Group projects include GIS-based analysis of a small watershed, geologic mapping, and measurement of a stratigraphic section, soils and terrace mapping, and surveying a strip mine remediation site. Emphasizes proper use of traditional and state-of-the-art instruments and equipment. Class is from 8 a.m. – 4 p.m. M, T, W, Th, F. Prerequisites: A geology and hydrogeology course, or permission of the instructor.

##### **Summer Session 2 (6/3-7/5)**

##### **Deadline to Register and Secure Housing May 15**

CHEM 153 - General Chemistry I; 3 credits

Initial course in the fundamental concepts of chemistry for students not majoring in chemistry; it can serve as a preparation Organic Chemistry. Includes atomic theory and structure, stoichiometry, chemical bonding, and the physical states of matter. Completion of a college level algebra course recommended. Class is from 10-11:35 a.m. M, T, W, Th, F.

CHEM 163 - General Chem I Lab; 1 credit

Laboratory exercises to exemplify and augment the material in CHEM 153.

Lab is from 1-3:50 p.m. M, T, Th from 1-3:50.

CHEM 251 - Organic Chem I; 3 credits

Examines bonding, structure, stereochemistry, nomenclature, and the mechanisms of free radical substitution, nucleophilic substitution, electrophilic addition and electrophilic aromatic substitution. Emphasizes organic syntheses, reactions, and methods. Prerequisite: CHEM 153/154 or a year of General Chemistry. Class is from 10-11:35 a.m. M, T, W, Th, F.

CHEM 261 - Organic Chem I Lab; 1 credit

Consists of experiments using important techniques, natural product isolation, and synthesis using modern instrumental methods. Lab is from 1-3:50 p.m. M,T,Th.

### **Summer Session 3 (7/8-8/8)**

#### **Deadline to Register and Secure Housing June 19**

CHEM 154 - General Chemistry II; 3 credits

Continuation of CHEM 153. Includes a discussion of solutions, thermodynamics, equilibria, kinetics, acids and bases, and oxidation-reduction. Prerequisite: CHEM 153. Class is from 10-11:35 a.m. M, T, W, Th, F.

CHEM 164 - General Chem II Lab; 1 credit

Laboratory exercises to exemplify and augment the material in CHEM 154. Lab is from 1-3:50 p.m. M, T, Th.

CHEM 252 - Organic Chem II; 3 credits

Continuation of CHEM 251. A discussion of functional groups, their preparation and reactions. Emphasizes synthesis and mechanisms. Students are encouraged to take the lecture and lab concurrently, but can register for them separately. Prerequisite: CHEM 251. Class is from 10-11:35 am. M, T, W, Th, F.

CHEM 262 - Organic Chem II Lab; 1 credit

Complex synthesis and organic qualitative analysis using modern instrumentation. Emphasizes the important spectroscopic methods of infrared and nuclear magnetic resonance spectroscopy and mass spectrometry. Lab is from 1-3:50 a.m. M, T, Th.