

SAINT FRANCIS UNIVERSITY



STEM Summer Academies

For students entering grades 11 and 12 in Fall 2019

Saint Francis University's STEM Summer Academies are one week programs in engineering, mathematics, computer science, aviation, health sciences, biology, and chemistry designed to provide unique experiences for talented high school students entering their junior or senior years.

2019 Academies Proposed

June 23 - 28, 2019

- Pre-Med Academy
- Environmental Engineering Design Academy
- Air Francis Academy (**NEW!**)

June 28 - July 3, 2019

- Biology: From Dragons to DNA Academy
- Exciting Chemistry Academy

July 7 - 12, 2019

- Solving CyberCrime with Digital Forensics Academy (**NEW!**)
- Science of Exercise Physiology Academy
- Sports Analytics Academy

July 14 - 19, 2019

- Petroleum and Natural Gas Engineering Academy
- Psychology and Neuroscience Academy

Why Attend Academies?

- **Earn 2 College Credits**
(accepted by a majority of universities).
- Get a head start on your college experience!
Participate in **industry-style labs** and immerse yourself into **college level classrooms**.
- Students selected for academies will be provided with room and board and all course materials.
- Academy participants are eligible for a \$4,000 scholarship if enrolling in a qualified major within the School of STEAM/School of Health Sciences and Education (depending on academy attended) at SFU. One scholarship per student.

There is a \$25 non-refundable application fee for EACH academy, payable with your registration submission.

If you are accepted to an academy, there will be additional fees to cover the cost of attendance: A \$400 fee for your first academy, a \$300 fee for your second academy, and a \$200 fee for each additional academy. Note that this fee schedule is per student and not per family. Students enrolled in a Catholic High School will receive \$100 discount.

Questions? Contact us at:
814.472.3878 or 814.471.1215
ScienceOutreach@francis.edu

Register Online by April 22, 2019
www.francis.edu/STEM

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Academies offered June 23 - 28, 2019

Pre-Med Academy

If you are interested in medicine, then consider participating in this one week academy to gain a better understanding of the human body. During this academy, you will measure your own stress hormones, determine your blood type, and gain a greater degree of knowledge of your five senses.

In addition, students will learn about and get hands on experience with genetic testing, metabolic diseases, wound healing assays, and blood pressure regulation. The academy will also discuss best practices for gaining admission into medical school.

Students will receive 2 college credits in Biology 412 (Special Topics) for completing this program.

Environmental Engineering Design Academy

Environmental engineering is the discipline most responsible for preserving and improving human health. Environmental engineers work on projects such as designing drinking water treatment systems and protecting soil, air, and water from pollution.

In the Environmental Engineering Design Summer Academy, students will gain first-hand, project-based experience using knowledge from science, technology, and math to design and construct a solution to an authentic issue in environmental engineering. Along the way, students will learn problem solving skills and engineering design principles that have many real world applications.

Students will receive 2 college credits in Engineering 101 and 102 (one credit each) for completing this program.

Air Francis Academy (NEW!)

From flying to engineering to air traffic control to airport operations: aviation has it all! At Air Francis, students will have a chance to explore the aviation industry from the front seat: be it the pilot's seat in an airplane, the chair of an air traffic controller, or the drafting desk of an engineer. Participants will have the opportunity to participate in behind-the-scenes tours of an FAA air traffic control facility, learn the aerodynamics of fixed-wing and rotary-wing flight, experience the challenge of controlling unmanned vehicles, and fly in an aircraft used for flight training at Saint Francis University.

Students will receive 2 college credits in Science 102 for completing this program, a step towards completing their pilot's license at Saint Francis University.

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Academies offered June 28 - July 3, 2019

Biology: From Dragons to DNA Academy

Biology is the study of life in all of its variety and complexity.

From ecosystems to molecules, biologists investigate the natural world from a variety of exciting perspectives. In this course, students will experience life as both a field and laboratory biologist as they learn hands-on about the ecology, behavior, and genetics of living organisms.

In the Biology: From Dragons to DNA Academy, we will first visit a number of local habitats to study and sample dragonflies and various aquatic insects, then we'll investigate their DNA and proteins using molecular biology techniques. In addition, each student will work with HeLa cells, a cervical cancer cell line, to visualize cellular stress.

Students will receive 2 college credits in Biology 412 (Special Topics) for completing this program.



Exciting Chemistry Academy

Exploring the World through Chemistry!

Chemistry is everywhere and chemistry will take you anywhere you want to go. We want to show you the exciting options you will have for your career if you know chemistry. Each day will focus on experiments and hands on activities conducted by chemists in different careers. Become a pharmacist or medical doctor, environmental chemist, a forensic chemist, a chemistry teacher, or move into the new world of nanochemistry.

Students will receive 2 college credits in Science 102 for completing this program.

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Academies offered July 7 - 12, 2019

Solving CyberCrime with Digital Forensics Academy (NEW!)

3 Bullets - 2 Bodies - 1 Computer

Technology meets criminal justice in the field of Digital Forensics. Cyber criminals use mobile devices, laptops, and network servers to commit a variety of crimes from hacking to drug dealing. In other instances, electronic devices serve as convenient storage media for evidence of crimes. In this Academy, you will learn how digital forensics is becoming the next CSI. You will be presented with a real-world digital "Who Done It?" The police have a theory about what happened, but they need more evidence, so they turn to you. You will learn how to use a variety of cutting edge tools and applications to find digital artifacts and evidence hidden within a computer. Did it happen as the police suspect, or is it something completely different? Your task, should you choose to accept it, will be to solve the crime and provide the police with the digital evidence they need.

Students will receive 2 college credits in CPSC 113: Introduction to Computer Technologies for completing this program.

Science of Exercise Physiology Academy

Exercise Physiologists study the acute and chronic physiological responses and adaptations resulting from physical activity. An Exercise Physiologist can apply this knowledge to improve or maintain health, fitness, or performance.

In the Science of Exercise Physiology Academy, students will study the physiology of exercise, experience and appreciate why the body responds to exercise the way it does, collect and analyze data, and communicate the results to others. Students attending this academy will have the option to Scuba Dive (all equipment provided) during an evening activity in our Stokes pool.

Students will receive 2 college credits in Exercise Physiology 102 and 103 (1 credit each), along with a course lab manual for completing this program.

Sports Analytics Academy

In sports today, the effective use of analytics can be the difference between winning and losing. General Managers, coaches, gamblers, agents, and fantasy sports participants are among those who make use of the insights gained by the quantitative analysis of sports.

In the Sports Analytics Academy, students will learn the use of statistics to come to a better understanding of various sports. How does one compare the relative strength of two teams who have not played one another? Is it a good decision to try to steal a base in a given situation? What is the main reason there is a home field advantage? What is the role of chance in a game? In this course we will use analytics to come to a better understanding of sports as well as using sports to help us learn the basics of analytics.

Students will receive 2 college credits in Mathematics 102 for completing this program.

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Academies offered July 14 - 19, 2019

Petroleum and Natural Gas Engineering Academy

Petroleum and Natural Gas Engineering is the discipline concerned with oil and natural gas production from subsurface rocks at around 2-20 thousand feet deep. The PNGE summer academy provides participants a fun adventure in the oil and gas world from its generation to its application.

This academy introduces students to the fields of geology, rock property analysis, drilling method and equipment, production technology, and especially the method to enhance oil recovery through multiple hands-on projects, language arts activities, and teamwork. This will help students to better understand the basic knowledge of how oil and natural gas is generated, explored, and produced.

Students will receive 2 college credits in Engineering 101 and 102 (one credit each) for completing this program.



Psychology and Neuroscience Academy

At the Psychology and Neuroscience Academy you will explore the mysteries of the human mind, discovering the biological, cognitive, developmental and social factors that influence our normal and abnormal behaviors.

Students will investigate the connection between the brain and human behavior while dissecting brain specimens, explore perceptual illusions while dissecting eye specimens, explore the effects of various psychotropic drugs while applying them to the daphnia system, and practice the science of learning and memory while training live rats and dogs.

Students will receive 2 college credits in Psychology 425 (Special Topics) for completing this program.

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