

**EXPERIENCE
UNIVERSITY**

FOR GRADE 7-12 STUDENTS

2018 - 2019

**Seven Eight Enrichment
Days (SEEDS) Program
Course Descriptions**



Queen's
UNIVERSITY

esu.queensu.ca

ESU
enrichment studies unit
EST. 1987

(Alphabetical by course title)

**All courses and instructors are subject to change*

Chemistry: Fun with Acids, Bases, and Gases

(Chemistry)

OFFERED SEEDS 3 ONLY

Course Description

Interested in conducting real experiments in a chemistry lab? In this course, you will be given the opportunity to explore a state-of-the-art chemistry lab by completing amusing experiments and observing interesting demonstrations, such as extracting natural products (NP) from fruit and plant sources and using the NP as pH indicators. You will also have the opportunity to ask guest lecturers about the diverse fields of chemistry and the exciting research that is happening at Queen's. By the end of this course, you will use your new skills to make chemistry rockets... finishing with a bang!

Instructor Biography

Hailey acquired her Bachelors of Science degree from Vancouver Island University and is now a Chemistry Master student in the Ross Lab at Queen's University. This is her first year with ESU and she is excited to be challenging you in the world of chemistry.

Engineering: Creating Sustainable Solutions

(Engineering)

OFFERED SEEDS 1 and 2 ONLY

Course Description

Have you ever wanted to design your own prototype? Thinking about engineering as a possible future career? In this course, you will learn about engineering and apply the engineering design process to create sustainable solutions to various problems we face in modern society. You will also learn about how different disciplines of Engineering work together to solve the global complex challenge of harnessing renewable energy sources. Working in teams as engineers, you will apply your new knowledge and skills to design and build a prototype to solve various challenges. This course includes a tour of various engineering buildings on campus where you will be able to interact with Queen's engineering students in action.

Instructor Biography

Scott has been coordinating courses for ESU since 2014 and is currently the Outreach Coordinator for Connections: Queen's Faculty of Engineering and Applied Science Educational Outreach Program. He holds a Master's degree specializing in Engineering Education with a thesis on high school students' perception of engineering. Instructors for this course are specially selected and supervised by Scott.

Engineering: Designing a Mars Rover

(Engineering)

Course Description

Have you ever wanted to learn more about the design principles involved in designing a Mars rover prototype? Thinking about robotics and/or engineering as a possible future career? In this course, you will learn about how engineers apply the computer science, robotics, and coding elements to design and create a prototype to explore the planet Mars. By working in teams as engineers, you will use the EV3 LEGO Mindstorms and expansion pack to apply your new knowledge/skills to design and build a creative prototype to solve the weekly challenge. This course includes a tour of various engineering buildings on campus where you will interact with engineering students in action.

Instructor Biography

Scott has been coordinating courses for ESU since 2014 and is currently the Outreach Coordinator for Connections: Queen's Faculty of Engineering and Applied Science Educational Outreach Program. He holds a Master's degree specializing in Engineering Education with a thesis on high school students' perception of engineering. Instructors for this course are specially selected and supervised by Scott.

Engineering: Makerspace Technology

(Engineering)

Course Description

Are you interested in working with digital technologies such as 3D printers, laser cutters and 3D scanners? In this course, you will learn the process of *making* by designing, innovating, and building with tools and materials to produce shareable artifacts. You will also learn about digital technologies and how they are being used in cutting-edge engineering disciplines such as computer, electrical, and medical. Are you ready to take a hands-on approach to design while exploring how engineering and technology is linked to innovations of the future?

Instructor Biography

Scott has been coordinating courses for ESU since 2014 and is currently the Outreach Coordinator for Connections: Queen's Faculty of Engineering and Applied Science Educational Outreach Program. He holds a Master's degree specializing in Engineering Education with a thesis on high school students' perception of engineering. Instructors for this course are specially selected and supervised by Scott.

How to Write the Stories You Wish You Had Read

(Literature, Creative Writing)

Course Description

Do you aspire to write original stories that take readers to exciting new worlds or help them discover valuable life lessons? Do you dream of writing the next Hunger Games, Percy Jackson, or Harry Potter? This course shows you the secrets to creating great stories, including how to find and develop story ideas, create memorable characters, build an emotional roller coaster of a plot, design a story world, and write your adventure with flair.

Instructor Biography

Glen has been a freelance writer since 1999 and has been instructing for ESU since 2013. He is the author of the award-winning middle-grade novel, *Dancing on the Inside* and currently teaches creative writing at St. Lawrence College in Kingston, Ontario.

Human Anatomy: Get to Know Your Insides

(Biology, Anatomy)

Course Description

Have you ever wondered how many bones are in your body? Or what muscles help you speak, eat and kick a ball? This course will help you understand all this and more about the human body as well as how your own body systems work. Through hands-on activities and a visit to the Anatomy Lab, you will learn about your brain, the musculoskeletal system, how your heart works to circulate blood throughout your body, and the path of food from your mouth to all the way out! You will also explore injuries and what happens when our systems fail to function properly and diseases develop. This course uses real bones and organ models during activities and culminates with an animal organ dissection lab.

Instructor Biography

Instructors for this course are graduate students studying and working in the Department of Biomedical Science at Queen's University. Many of them are currently completing their Master's degree in Anatomical Science at Queen's.

Let's Go to Court! An introduction to Canadian Tort Law

(Law)

Course Description

When does bumping elbows become battery? When does a joke become infliction of emotional harm? Doctors are humans and make mistakes - when are those mistakes actionable? Where is Tort law headed? These are some of the questions you will be able to answer at the end of the course. Join this class to learn about intentional torts (such as assault & battery), negligence/medical negligence and the possibilities for the future. Equipped with this new set of knowledge, you will learn advocacy skills and put it all together during a mock trial.

Instructor Biography

Kathryn has been an instructor with ESU since 2016. She earned her Law Degree at Queen's University while focusing on students' rights in education, mental health law, and tort reform.

Pathology: From DNA to Forensics

(Biology, Pathology)

Course Description

Do you dream of becoming a Crime Scene Investigator? Want to investigate a mock crime scene? Then this course is for you! You will learn about the human body, diseases, DNA and genetics through hands-on activities including: a genetics testing lab, dragon genetics lab, blood typing (with simulated blood), and examining plastinated specimens. You will also learn forensics skills such as fingerprinting, and handwriting analysis. Are you ready to solve the case?

Instructor Biography

Dr. Mackenzie Bowman is in her ninth year as course coordinator and holds a PhD in Pathology and Molecular Medicine. She is currently a Senior Scientist in the Clinical and Molecular Hemostasis Research Group at Queen's University. Instructors for this course are specially selected and supervised by Dr. Bowman.

Physics: It All Matters

(Physics)

Course Description

Are you interested in what life is like for a physicist? Do you wonder what it would be like to be the first one ever to make a discovery? This course will begin with some experiments, observing effects, wondering why they happen, and questioning how a physicist might test your ideas. By the end of this course, you will choose a question of your own interest to investigate, gather data, and present your conclusion to your fellow physicists. This course will also discuss gender trends in Ontario, exploring why there are fewer women than men studying physics and how the community of physicists may address this. You will also have the opportunity to visit a facility to see physics in action, and engage with current physicists to learn about their work.

Instructor Biography

Jon is a new instructor for ESU. A former teacher, Jon has run engaging physics shows and hands-on activities in schools across London, UK. He has also worked as a research scientist using GPS so that people can get the time accurately from atomic clocks. Jon has also run professional development for hundreds of British teachers of physics, reviewed dozens of papers for an academic journal in physics education, and wrote physics activities for eight student workbooks for grades 7 & 8. He also likes to experience firsthand the physics effects of cycling through his first winter in Canada!

The Science of Movement, Health, and Sport

(Kinesiology, Health Studies)

Course Description

Do you have a passion for sports and exercise? Ever wonder how professional athletes like Sidney Crosby or Serena Williams perform at such a high level? In this course, you will explore the human body and how it moves when you exercise. You will also experience hands-on activities in various labs in the Queen's Kinesiology department, such as human physiology exercise testing, sport psychology video observation, and nutrition programs. From healthy eating, to developing exercise routines, or finding the right coach, this course will teach you concepts and skills to keep you physically active during your lifetime.

Instructor Biography

Rob has been coordinating courses for ESU since 2017. He is currently the Laboratory and Educational Coordinator of the School of Kinesiology and Health Studies at Queen's University. Instructors for this course are specially selected and supervised by Rob.

What's Beneath the Surface? The Study of Lake Life

(Biology/Ecology)

OFFERED SEEDS 1 and 2 ONLY

Course Description

Earth is often called "the water planet" because it has approximately 14,000 cubic kilometers of water. Have you ever wondered what is happening in all that water? Over the three-day course, we will explore what is happening beneath the surface in our lakes. What makes a healthy lake ecosystem and how can we tell? Through hands-on experiences and lessons, we will learn about phytoplankton, zooplankton and fish and how the interactions between them provide us with opportunities for recreation, employment and food! Out of that 14,000 cubic kilometers of water, only 0.009% is fresh and accessible, we will also explore how lake ecosystems are changing with human development and impact.

Instructor Biography

Robin – a first time instructor for ESU – is a graduate student in the Biology Department at Queen's University. Her research interests focus on lake ecology, specifically the impact of additions of road salt on lake ecology in Ontario. Over the summers, she enjoys spending her time canoeing and collecting samples from lakes all over Ontario!