

**EXPERIENCE
UNIVERSITY**

FOR GRADE 7-12 STUDENTS

2018 - 2019

**Enrichment Mini Course
(EMC) Program**

Course Descriptions

(Alphabetical by course title)

**All courses and instructors are subject to change*

Chemistry: Life in the Laboratory

(Chemistry)

Course Description

Do you wonder what exactly chemists do? Or what happens in a chemistry lab? In this course, you will gain experience in a state-of-the-art chemistry lab using practical lab techniques. You will learn how to extract natural products from different plant sources and use anthocyanins as pH indicators to determine the pH of various solutions. Other lab activities will include demonstrations with a rotary evaporator, acid and base experiments, and identifying chemical structures with NMR, IR, and MS spectra. There will be opportunities for you to ask questions and learn about the diverse fields of chemistry with guest lecturers from a variety of positions within the Queen's chemistry department. If you are thinking about a possible future in chemistry, then this may be the course for you!

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: Designing a Prosthetic Limb

(Engineering)

Course Description

Are you interested in learning more about engineering? Do you like using engineering skills and principles to solve challenges? In this course, you will work as a team to create a solution for a given problem. You will learn skills such as, coding, circuitry, Arduino, and 3D Design, and apply these new skills to create a prosthetic limb prototype. You will also have the chance to showcase your accomplishments to other teams.

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 Hyperloop Vehicle

(Engineering)

Course Description

Are you an aspiring engineer? Want to learn skills such as, coding, circuitry, Arduino, and 3D Design? In this course, you will be introduced to engineering through a multi-discipline design challenge. You will work as a team to create a solution for a given problem, and by the end, be able to apply your new skills and engineering principles you have learned to create a Hyperloop Vehicle prototype. You will also have the opportunity to showcase your new prototype to other teams.

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.

Human Anatomy

(Biology, Anatomy)

Course Description

Do you want to get up close and personal with human anatomy? If yes, then this is the course for you! You will start by reviewing the five major systems of the body, including the musculoskeletal, cardiovascular, respiratory, nervous, and gastrointestinal. You will also get hands on experience working with cadaveric specimens and plastinated models, and have an exclusive opportunity to visit the state-of-the-art Anatomy Museum and Laboratory to explore the human body, inside and out! Most importantly, you will be exposed to a challenging and engaging learning environment, led by highly-regarded experts in the field of anatomy at Queen's.

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.

Kinesiology & Health: The Human Body, Mind, and Performance

(Kinesiology, Health Studies)

Course Description

Have you ever wondered how runners like Usain Bolt and Andre De Grasse became so fast? Or how Olympians like Clara Hughes and Christine Sinclair developed such strength and endurance? Or perhaps you are interested in helping people with disabilities maximize their abilities and quality of life. You will learn about the human body in motion by studying the effects of physical activity on health and performance, the physiological factors effecting body during movement, and important concepts in sport psychology. You will also be introduced to concepts involving how certain social factors can influence our physical and mental health, as well as performance. Opportunities to visit various labs and learn more about exercise physiology, sport psychology, biomechanics and ergonomics, cardiovascular physiology, and health promotion, will turn your passion into a possible future career.

Instructor Biography

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

Medicine: A Comprehensive Look at Cancer Today

(Biomedical and Molecular Science)

Course Description

Have you ever wondered what causes a normal cell to become cancerous? Or what current treatments are available? Join this course to learn about the disease that is affecting millions of people in North America. Through lectures and hands-on activities (including DNA modeling, reviewing real cancer cases, and cancer risk assessment), you will study what cancer is and how it is being treated today. If you are looking for in-depth discussions about genetic counseling, interviews with cancer survivors, and advice for career paths from clinical, basic science, and medical faculty, then this is the course for you!

Instructor Biography

Dr. Bruce Elliott has coordinated this popular course for ESU since 2004. He is Professor Emeritus in the Department of Pathology and Molecular Medicine at Queen's University and is also a member of the Queen's University Cancer Research Institute. Graduate student instructors and guest lecturers for this course are specially selected for their experience and passion for the cancer field.

Pathology and Molecular Medicine

(Biomedical and Molecular Science)

Course Description

Have you ever wanted to solve your own diagnostic case or learn how to find your blood type? If yes, then this is the course for you! This course will provide you with a thorough introduction to the field of Pathology – the study of diseases and the structural and functional changes they cause. You will interact with graduate students, professors, and doctors as you learn about genetics, cancer, neuropathology, and even have the opportunity to discuss education and career options. You will also extend your learning in the state-of-the-art Queen's University Anatomy Museum and Clinical Simulation Centre.

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: Discovering the Secrets of the Universe

(Physics)

Course Description

Do you wonder what it must have been like to be the first one ever to discover phenomena like fluorescence or the electromagnetic motor effect? Are you interested in learning more about the life of a physicist? In this course you will explore different experiments and learn about what it means to discover – as physics is a process of discovery, not just a set of facts that can only be learned from a textbook! You will form hypotheses about why something happens, and think about a follow-up experiment to test your hypothesis. By the end of this course, you will choose a question to investigate experimentally, gather data, and present a conclusion. This course will also discuss gender trends in Ontario and ask why there are fewer women than men studying physics. You will also get the opportunity to visit a facility to see physics in action, and engage with current physicists and 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!

Writing Compelling Fiction

(Literature, Creative Writing)

Course Description

You have imagination, passion, a love of stories, and you're great with words – so how do you take your writing to the next level? In this course, you'll discover the secrets to writing stories that stir readers' emotions and take them on a page-turning and meaningful adventure. You'll learn the essential elements of great plots as well as how to develop original story ideas, design memorable characters, hook your readers, and flesh out your hero or heroine's inner journey. Plus, short cuts for improving your writing style. Taught through a combination of collaborative games, creative exercises, lecture, and self-directed writing opportunities.

Instructor Biography

Glen has been a freelance writer since 1999 and has been instructing with 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.