This course provides an opportunity for students to work with a faculty member and carry out original research. Students will provide assistance with one of the faculty member's research projects, while also earning credit. Students will gain first-hand exposure to current research methods and share in the excitement of discovery of knowledge acquisition. Progress will be monitored by regular meetings with the faculty member and through a reflective journal. Final results will be presented in a written report and/or a presentation at the end of the term. Approximately **120 hours** of work is expected for the course.

**Prerequisite:** Permission of the Course Coordinator (Dr. Shadi Dalili, **sh.dalili@utoronto.ca**) and/or Project Supervisor

**Recommended Preparation:** Completion of at least 4.0 credits in a relevant discipline.

**Breadth Requirements:** Natural Sciences

**Link to UTSC Timetable:** [https://utsc.calendar.utoronto.ca/section/physical-sciences](https://utsc.calendar.utoronto.ca/section/physical-sciences)

**Note:** Students must send an application to the course coordinator Dr Shadi Dalili, **sh.dalili@utoronto.ca** for admission into this course. Applications must be received by the end of August for Fall enrolment, December 15th for Winter enrolment, and **April 30th for Summer enrolment**.

Typically, students enrolled in a program offered by the Department of Physical and Environmental Sciences and students who have a CGPA of at least 2.5 or higher are granted admission. Approved students will receive a signed course enrolment form to be submitted to the Office of the Registrar.

**Applications must include:**

1) A letter of intent indicating the student's wish to enroll in the course

2) A list of preferred projects, ranked in order of preference (see project descriptions below)

3) A list of relevant courses successfully completed by the student, as well as any relevant courses to be taken during the upcoming semester
Project 1: Developing Bio-nanotechnology Integrated Agricultural Practices: An Interdisciplinary and International Experiential Learning Project

Supervisor: Prof. N. Thavarajah (nirusha.thavarajah@utoronto.ca)

The purpose of this project is for the University of Toronto Scarborough (UTSC) chemistry students enrolled in the “Physical Sciences Research Experience (PSCB90H3)” course and students enrolled in a management course (MGHC23 or MGHC53) to engage in an international work-integrated learning (WIL) group project with faculty, students, and community partners from Sri Lanka and India to solve their current crisis in farming. This is a real-time crisis-management work-integrated experiential-learning team project for students. Interdisciplinary teams will collaborate to develop sustainable solutions to problems in farming using knowledge and skills gained from chemistry and human resource management curricula respectively.

UTSC students will also work with a domestic community partner, “Simpler Thyme” Farm at Hamilton and International partners (i.e., Eastern Universities of Sri Lanka, faculty collaborators from Ghana and a USA).

Positions Available: 2

Learning Skills: Literature search, critical thinking, problem-solving & scientific writing skills.
Qualification: Completion of CHMA11 or A12 with a minimum of A. Please send updated CV & transcript to nirusha.thavarajah@utoronto.ca.

Project 2: Developing New Lab Materials for Introductory Chemistry I & II (CHMA10H3 & CHMA11H3)

Supervisor: Dr. N. Thavarajah (nirusha.thavarajah@utoronto.ca)

Students will develop new lab materials based on the existing CHMA11H3 content, text books and other reliable scientific resources. Students will work with the instructor to develop the lab manual, lab work sheets, quizzes, lab demonstration notes and lab quizzes.
Learning Skills: Literature search, critical thinking, problem solving & scientific writing skills.
Qualification: Completion of CHMB42H3 with a minimum grade of B+. Please send updated CV & transcript to nirusha.thavarajah@utoronto.ca.
Positions Available: 1

Project 3: Developing New Experiments for CHMB41H

Supervisor: Prof. Shadi Dalili (sh.dalili@utoronto.ca)

Project Description
Students involved in this project will be able to develop and modify new laboratory experiments for Introductory Organic Chemistry I (CHMB41H). Students in this placement will work with the course instructor to select new experiments from the chemistry education literature, test the experiments, and prepare accompanying lab manual pages and demonstrator notes. Students will learn skills such as literature searching and analysis, and utilize essential lab techniques such as extraction, distillation, recrystallization, reflux, etc. to develop new labs for the course. Students will also develop written scientific and communication skills through developing lab manual writeups, quizzes, and TA documents for each experiment developed.

Students Required: 1

Qualifications: Completion of CHMB42 with a minimum course grade of B+ and lab grade of A-; must be available for lab work 2 full days during the week between 9am-5pm, ideally Tues, Wed and/or Thurs. Please send updated resume and transcript to sh.dalili@utoronto.ca
Project 4: Developing and Compiling Online Course Assessments in Quercus for CHMB41H

Supervisor: Prof. Shadi Dalili (sh.dalili@utoronto.ca)

Project Description
Students involved in this project will be expected to organize and compile existing lab and tutorial quizzes as well as tutorial worksheets with different versions onto the Quercus platform and randomize quiz sets, such that they can be used for multiple sections of the course without duplication of question sets among different groups. Students should be comfortable with technology and using the Quercus platform and organizing material on this platform. If time permits, students can also design new assessments and questions to be added to the existing repositories to be used in future semesters.

Students Required: 1

Qualifications: Completion of CHMB41 with a minimum course grade of B+. Please send updated resume and transcript to sh.dalili@utoronto.ca