

**CHMD16H3: Environmental & Analytical Chemistry  
-Winter Term 2019-**

**Lecture: Mondays 12-4pm in Room BV 359 (Jan 7<sup>th</sup> – Feb 11<sup>th</sup>, 2019)  
Laboratory: Mondays 12-4pm in Room EV 216 (Feb 25<sup>th</sup> – April 1<sup>st</sup>, 2019)**

**Instructor: Professor M.J. Simpson**

**Office: Room SY322**

**Email: msimpson@utsc.utoronto.ca**

**Office Hours: To be announced & by appointment**

**COURSE DESCRIPTION**

Students will learn about analytical techniques used in environmental chemistry, including: gas and liquid chromatography, mass spectrometry, atomic absorption, and ultraviolet-visible spectroscopy. Environmental sampling and ecotoxicology will also be covered. Students will carry out laboratory analyses and receive hands-on training with analytical instrumentation commonly used in environmental chemistry.

**PREREQUISITES**

CHMB55H3 and CHMC11H3. All students must have the appropriate prerequisites for this course.

**EXCLUSIONS**

CHM317H (St. George campus), CHM410H (St. George campus).

**GRADE BREAKDOWN**

<b>Midterm exam</b>	<b>30%</b>
<b>Research Project</b>	<b>30%</b>
<b>Laboratory Reports (two reports)</b>	<b>40%</b>

**ASSIGNMENT PREPARATION & SUBMISSION**

All course work including the Research Project and Laboratory Reports must be prepared using MS Office (or equivalent) software and submitted using Turnitin.com (see section on plagiarism). Students will also be required to submit hardcopies of their work to the course instructor or teaching assistant.

**LATE WORK**

Late assignments will not be accepted and assigned a grade of zero.

**COURSE LECTURE NOTES & LECTURE ATTENDANCE**

There is no required textbook for this course and lecture notes will cover all topics in detail. Lecture notes (as a pdf) will be posted on the UofT Portal (Blackboard). Examination material will include emphasized lecture material only (lecture material will be discussed in detail in class). Students should make every attempt to attend lectures regularly.

## LIBRARY RESOURCES

The following textbooks (available online through the UofT library) are relevant to the course content:

- “Environmental Trace Analysis: Techniques and Applications”, 2014, J.R. Dean. Wiley.
- “GC-MS: A practical guide”, 2011, O. D. Sparkman, Z. Penton, F. G. Kitson. 2<sup>nd</sup> edition, Elsevier.
- “Introduction to Modern Liquid Chromatography”, 2010, L. R. Snyder, J. J. Kirkland, J.W. Dolan. 3<sup>rd</sup> edition, Wiley.
- “Fundamentals of Contemporary Mass Spectrometry”, 2007, C. Dass, Wiley.
- “Introduction to Mass Spectrometry: Instrumentation, Applications, and Strategies for Data Interpretation”, 2007, J.T. Watson, O. D. Sparkman, 4<sup>th</sup> edition, Wiley.

## PLAGIARISM

Normally, students will be required to submit their course essays and laboratory reports to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays and laboratory reports to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University’s use of the Turnitin.com service are described on the Turnitin.com web site.

University of Toronto Scarborough code of Behavior on Academic Matters states that "it shall be an offense for a student knowingly: to represent as one's own any idea or expression of an idea or work of another in any academic examination or term test or in connection with any other form of academic work, i.e., to commit plagiarism."

**Students are expected to submit original work. Any form of plagiarism will not be tolerated. Students suspected of plagiarism will be reported based on University policy and code of behavior (please refer to the University Calendar for more details).**

## E-MAIL ENQUIRIES

E-mail is not an effective means for teaching or discussion of scholarly material. Students are encouraged to discuss topics in person with the instructor. Simple queries can be sent via email but questions about course content are best discussed in person.

## ACCESSIBILITY NEEDS

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact The UTSC Accessibility Services as soon as possible: <http://www.utsc.utoronto.ca/~ability/>

## WRITING SUPPORT

The University of Toronto Scarborough Writing Centre (<http://utsc.utoronto.ca/twc/>) offers writing support to all students in several forms. Students are advised to take advantage of their programs for assistance with scientific writing.

### TENTATIVE LECTURE SCHEDULE & LABORATORY SCHEDULE

Date	Topics	Course work due
Monday, January 7 <sup>th</sup>	- Course introduction and overview - Sampling and isolation of compounds for quantification and identification	
Monday, January 14 <sup>th</sup>	- Basics of analytical measurements and quantification - Gas chromatography & related analytical detectors	
Monday, January 21 <sup>st</sup>	- Gas chromatography & related analytical detectors (continued) - Liquid chromatography & related analytical detectors	
Monday, January 28 <sup>th</sup>	- Liquid chromatography & related analytical detectors (continued)	
Monday, February 4 <sup>th</sup>	<b>IN ROOM EV140 for this lecture only</b> - Metal analysis (atomic absorption and atomic emission) - Guest speakers (2-4pm)	<b>Optional: research paper outline</b>
Monday, February 11 <sup>th</sup>	<b>MIDTERM EXAM (12-2pm)</b> <b>Room location will be announced when available</b>	
Monday, February 18 <sup>th</sup>	<b>Family day &amp; reading week</b> <b>No lecture</b>	
Monday, February 25 <sup>th</sup>	Groups 1&2 – Analysis of PAHs in soil by GC & Pb in soil by AAS Groups 3&4 – Analysis of water by LC & IC	
Monday, March 4 <sup>th</sup>	Groups 1&2 – Analysis of PAHs in soil by GC & Pb in soil by AAS (continued) Groups 3&4 – Analysis of water by LC & IC (continued)	<b>Written research paper due at 12pm</b>
Monday, March 11 <sup>th</sup>	Groups 1&2 – Analysis of PAHs in soil by GC & Pb in soil by AAS (continued) Groups 3&4 – Analysis of water by LC & IC (continued)	
Monday, March 18 <sup>th</sup>	Groups 1&2 – Analysis of water by LC & IC Groups 3&4 – Analysis of PAHs in soil by GC & Pb in soil by AAS	<b>Lab report due at 12pm</b>
Monday, March 25 <sup>th</sup>	Groups 1&2 – Analysis of water by LC & IC (continued) Groups 3&4 – Analysis of PAHs in soil by GC & Pb in soil by AAS (continued)	
Monday, April 1 <sup>st</sup>	Groups 1&2 – Analysis of water by LC & IC (continued) Groups 3&4 – Analysis of PAHs in soil by GC & Pb in soil by AAS (continued)	
Friday, April 5 <sup>th</sup>	<b>Last day for submission of term assignments</b> <b>No laboratory experiments</b>	<b>Lab report due by 4pm</b>