

General information

Course: CHEM 498E
Section: 51
Term: Winter
Credits: 3.0
Location: CC-425
Time: Tues 18:00-20:30

Instructor: **Prof. Ann English**
Department: Chemistry and Biochemistry
Office: SP 275.23
Phone: (514) 848-2424 ext. 3338
E-mail: ann.english@concordia.ca
Office hours: **Tues 3:30-5:30 pm or by appointment**

Instructor: **Prof. Dajana Vuckovic**
Department: Chemistry and Biochemistry
Office: SP 275.31
Phone: (514) 848-2424 ext. 3981
E-mail: Dajana.vuckovic@concordia.ca
Office hours: **Tues 1-2 pm, or by appointment**

Course Description

Calendar course description: The life sciences are currently undergoing an “omics” revolution where concentrations and interactions of hundreds or thousands biomolecules are systematically interrogated in parallel. One of the major analytical tools contributing to the power and growth of metabolomics and proteomics is mass spectrometry. This course will survey and critically discuss the state-of the-art mass spectrometry-based tools that are driving metabolomics and proteomics revolution for applications such as shotgun proteomics, quantitative proteomics, post-translational modifications, top-down proteomics, untargeted metabolomics, lipidomics, metallomics, structural biology and molecular structure characterization. Lectures only.

Course Goals and Objectives

Overall course goal: Select, design or evaluate the most appropriate omics study to answer a biological, clinical or environmental question of interest

Course objectives/learning outcomes:

- Summarize and critique different analytical approaches to perform a selected analysis and select the most suitable approach for a given case study
- Identify and explain the main principles of key techniques in metabolomics and proteomics
- Critically analyze a journal article or experimental design of an omics study
- Interpret basic mass spectrometry data such as calculating the mass of intact proteins or assigning a peptide’s sequence based on its mass spectrum
- Interpret and discuss the results of a principal component analysis
- Utilize common proteomics and metabolomics databases as needed for the design of experiments and the interpretation of results

Grading scheme

Assignments	Assignment 1 – Feb 7, 2017 Assignment 2 – Mar 7, 2017 Assignment 3 – Mar 28, 2017	30
Individual student presentation	April 11, 2017	20
Class participation	Throughout course Instructor evaluation: 2 Assigned readings discussion: 4 In-class activities and groupwork: 4	10
Final exam	TBD, during exam period April 19-May 2	40 (comprehensive)

Due dates and late policy:

→ Assignment due dates: **Assignments are due by 05:55 pm before the beginning of the class on the stated dates.**

→ Late policy on assignments: **No late assignments will be accepted unless** a medical note is provided. Any assignments that are not handed in by the due date and time will be assigned a mark of **zero**. Assignments will **not** be accepted by email. Only printed or hand-written solutions to the assignment will be accepted. Please hand in complete solution to the assigned problems, not just the final answers.

TEXTBOOK

- No textbook is assigned for this course
- Course notes and references described in weekly schedule for more in depth information
- Discussion papers – see page 4

MOODLE

All assignments and relevant course notes will be posted on the Moodle course website. Please check the course website periodically to access these online materials. If you have any problems using Moodle, please consult the Helpdesk at extension 7613.

GOOD ADVICE

- Answer all questions on the assignments
- Go over all assigned readings
- Prepare for the discussion-style sessions by reading the assigned journal article and critically thinking about it ahead of class time (guidance questions will be posted on Moodle to consider during assigned reading)
- Seek assistance well before the exam

Tentative topics and schedule:

Date	Topic	Instructor
Jan 10	<ul style="list-style-type: none"> Intro to omics Intro to electrospray ionization (ESI) 	DV
Jan 17	<ul style="list-style-type: none"> Modern tandem MS Mass analyzers for tandem MS Ionization methods and dissociation methods 	AE
Jan 24	<ul style="list-style-type: none"> Shotgun proteomics, guest lecture of Dr. Heng Jiang (CBAMS) 	Guest lecture
Jan 31	<ul style="list-style-type: none"> Quantitative proteomics 	DV
Feb 7	<ul style="list-style-type: none"> PTMs 	AE
Feb 14	<ul style="list-style-type: none"> Structural characterization studies Interaction studies 	AE
Feb 28	<ul style="list-style-type: none"> Top-down proteomics 	AE
Mar 7	<ul style="list-style-type: none"> Metallomics 	AE
Mar 14	<ul style="list-style-type: none"> Guest lecture – Professor Pierre Thibault, UdeM (tentative date) 	AE
Mar 21	<ul style="list-style-type: none"> Untargeted metabolomics Experimental design & method validation 	DV
Mar 28	<ul style="list-style-type: none"> Targeted metabolomics and lipidomics 	AE/DV
April 4	<ul style="list-style-type: none"> Biomarker discussion Student presentations 	AE/DV
April 11	<ul style="list-style-type: none"> Student presentations Exam review 	AE/DV

Discussion paper schedule:

Jan 31	Assigned discussion paper 1 (proteomics)
Feb 28	Assigned discussion paper 2 (proteomics)
Mar 21	Assigned discussion paper 3 (metabolomics)
April 4	Assigned discussion paper 4 (lipidomics)

RIGHTS AND RESPONSIBILITIES

Plagiarism:

The most common offense under the Academic Code of Conduct is plagiarism which the Code defines as “the presentation of the work of another person as one’s own or without proper acknowledgement.” This could be material copied word for word from books, journals, internet sites, professor’s course notes, etc. It could be material that is paraphrased but closely resembles the original source. It could be the work of a fellow student, for example, an answer on a quiz, data for a lab report, a paper or assignment completed by another student. It might be a paper purchased through one of the many available sources. Plagiarism does not refer to words alone - it can also refer to copying images, graphs, tables, and ideas. “Presentation” is not limited to written work.

It also includes oral presentations, computer assignments and artistic works. Finally, if you translate the work of another person into French or English and do not cite the source, this is also plagiarism.

In Simple Words: Do not copy, paraphrase or translate anything from anywhere without saying where you obtained it! (Source: The Academic Integrity Website: <http://provost.concordia.ca/academicintegrity/plagiarism/>)

The academic code of conduct can be found in section 17.10 of the academic calendar (<http://www.concordia.ca/academics/undergraduate/calendar/current/17-10.html>). Any form of unauthorized collaboration, cheating, copying or plagiarism found in this course will be reported and the appropriate sanctions applied. The mandatory seminar is a clear and fair opportunity to learn what our faculty regards as academic misconduct. Failure to take part in this learning opportunity and thus ignorance of these regulations is no excuse and will not result in a reduced sanction in any case where academic misconduct is observed.

MANDATORY QUIZ AND SEMINAR

As part of this course, you are **required** to i) attend a Chemistry and Biochemistry Departmental Seminar on the academic conduct code and the appropriate use of information sources and ii) pass the online quiz associated with this seminar (the passing grade for the quiz is 100%). (**Note:** This is **not** the University’s quiz you may have been asked to take when you first registered and logged into the myConcordia portal; the one you must take is similar, but graded by the Department of Chemistry and Biochemistry, and you cannot take it until after you have attended the seminar.) The aim of this seminar is to clarify the academic conduct code in terms of what practices will be considered unacceptable with regards to work submitted for grading in Chemistry and Biochemistry courses. **You are only exempt from repeating the seminar and the quiz if you have done both in Winter 2012 or more recently,*** otherwise you are required to repeat both this term. This short seminar (1 hour) will be held at the following times (note that late-comers will not be admitted):

Date	Time	Place
Monday, Jan. 23	16:45-17:45	HC-155
Monday, Jan. 23	20:45-21:45	HC-155
Tuesday, Jan. 24	16:45-17:45	CC-308
Wednesday, Jan. 25	16:45-17:45	HC-155
Wednesday, Jan. 25	20:45-21:45	SP-S110
Thursday, Jan. 26	16:45-17:45	HC-155
Friday, Jan. 27	16:45-17:45	CC-310

As space for each of the seminars is limited by the room size, please sign up to your preferred time. Sign up sheets are available outside SP 201.01 (Departmental office).

If you do not complete this course requirement, your final grade for the course may be lowered by one full letter grade with an incomplete (INC) notation until such time as this requirement is completed. Please refer to the undergraduate calendar (section 16.3.6) for details on removal of an incomplete notation.

* You are exempt if you can locate your ID in the pdf file located on the Departmental web site (<http://www.concordia.ca/content/dam/artsci/chemistry/docs/compliance-list.pdf>).