

CHEM750/7500: Special Topics in Physical Chemistry Bioelectronics

Instructor: Shirley Tang
QNC-4618, ext. 38037
tangxw@uwaterloo.ca

Lectures:
TBA

Course Summary:

This course covers many advanced topics in the principle, fabrication, and applications of bioelectronics involving nanotechnology. The students will be introduced to the fundamental building blocks of bioelectronics, strategies for fabrication/organization of micro/nanostructures, and design/characterization of the bio-interfaces. Frontier research in the field of bioelectronics and applications (e.g. biosensors, implantables, cell culture analog, biological computers), especially advancements enabled by nanotechnology, will be reviewed at the conclusion.

Grading:

Midterm Exam – 30%, Presentation – 30%, Report – 40%

At the end of the term, each student will investigate a topic in Bioelectronics, give a 45 min oral presentation, and submit a review style report (> 50 references).

Course Text:

No required books for the class, as it will range over a great deal of territory. References and suggested readings will be given as time comes.

Course Website: LEARN

- All handouts, lecture notes, presentation slides will be available on the course website. (Note: No hard copy will be distributed in class).
- Please check announcements and new contents on the course website frequently.
- You are welcome to use course mail to send your questions and other inquiries.

Course Syllabus:

Date	
Week 1	- Course Overview - Introduction - Biomolecules (Basic Structure and Function)
Week 2	- Weak Forces (Intra/Inter Molecular Interactions, Theory)
Week 3	- Protein Adsorption, Part I (Importance, Design Protein-resistant Surfaces)

Week 4	- Protein Adsorption, Part II (Kinetics)
Week 5	- Surface Chemistry & Characterization
Week 6	- Devices/Electrodes and Fabrication Processes (Microfabrication, Nanolithography, Soft Lithography)
Week 7	- List of Suggested Topics for Presentation & Report - Midterm Exam
Week 8	- Special Topics in Bioelectronics – Biosensors (Operation Principles & Implementation)
Week 9, 10	- Special topics in Bioelectronics – Cell / Tissue Interface (Operation Principles & Implementation)
Week 11, 12	- Student Presentations (45 min oral + 15 min Q&A)

For University of Waterloo Students

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check [the Office of Academic Integrity](#) for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read [Policy 70, Student Petitions and Grievances, Section 4](#). When in doubt, please be certain to contact the department’s administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check [the Office of Academic Integrity](#) for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about “rules” for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to [Policy 71, Student Discipline](#). For typical penalties, check [Guidelines for the Assessment of Penalties](#).

Appeals: A decision made or penalty imposed under [Policy 70, Student Petitions and Grievances](#) (other than a petition) or [Policy 71, Student Discipline](#) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to [Policy 72, Student Appeals](#).

Note for students with disabilities: [AccessAbility Services](#), located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Illness: Only VIFs issued from our campus Health Services will be acceptable documentation when the service is available, unless the student is sick on a weekend, during off-hours, while out of town or receiving ongoing care from a family physician or specialist in which case they will have to provide a valid and suitable informative VIF from other health service providers. Information should include (1) date of the physician assessment, (2) dates of illness, (3) level of incapacitation and (4) whether the diagnosis was made by the physician or based on description by the student.

Turnitin.com and alternatives: Text matching software (Turnitin) will be used to screen assignments in this course. This is being done to verify that use of all material and sources in assignments is documented. In the first week of the term, details will be provided about the arrangements for the use of Turnitin and alternatives in this course.

Note: students must be given a reasonable option if they do not want to have their assignment screened by Turnitin. See [Academic Integrity - Guidelines for Instructors](#) for more information.

For University of Guelph Graduate Students

E-mail Communication: As per university regulations, all students are required to check their <mail.uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement: When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the graduate calendar for information on regulations and procedures for Academic Consideration.

Drop Date: The last date to drop one-semester courses, without academic penalty, is Thursday, 3 November 2017. Two-semester courses must be dropped by the last day of the add period in the second semester. Refer to the Graduate Calendar for the Schedule of Dates.

Copies of out-of-class assignments: Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility: The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Centre for Students with Disabilities as soon as possible.

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: <http://www.uoguelph.ca/csd/>

Academic Misconduct: The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Graduate Calendar.

Recording of Materials: Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources: The Graduate Calendar is the source of information about the University of Guelph's procedures, policies and regulations that apply to graduate programs:
<http://www.uoguelph.ca/registrar/calendars/graduate/current/>