COURSE OUTLINE - CHEM 498D/620D

1. General Information

- Advanced Topic in Chemistry/polymer chemistry & Nanotechnology (CHEM 498D/620D), 3 credits, Fall 2016
- Thursday, 18:00-20:30, Loyola campus, CC 450.
- Dr. John Oh, Faculty of Arts & Science, Department of Chemistry & Biochemistry. Office: SP 275.09
- Course email: john.oh@concordia.ca
- Office hours: by appointment (e-mail in advance)
- Course web page available on Moodle (www.myconcordia.ca)

2. Course Description

This course will deal with advanced knowledge in polymer chemistry, materials science, and biomedical engineering. *CHEM222 is a prerequisite.*

The course will offer the introductory polymer chemistry with an emphasis on polymer synthesis. Various methods to synthesize polymers will be discussed; they include classical step growth, free radical, ring opening polymerization, and other polymerizations; and modern living anionic, cationic, and living controlled/radical polymerization. Further, this course will discuss the design and development of functional polymers as building blocks to develop nanomaterials for bio-related applications, particularly drug delivery applications. Topics include amphiphilic block copolymers, self-assembly, micellar nanocarriers, cellular imaging, multifunctional drug delivery, and crosslinked nanogels/hydrogels. Lectures only

Polymer basic and synthesis:
Polymer basic- nomenclature, properties, molecular weight
Classical step-growth & chain-growth polymerization
Anionic and cationic polymerization
Living/controlled radical polymerization- ATRP, RAFT, NMP
Other polymerization methods: ROP, ROMP, etc
Post-modification methods - click chemistry (thiol-ene reactions)

Polymers for bio-related applications:
Block copolymer general and self-assembly
Amphiphilic block copolymers nanostructures, polymer-based drug delivery general
Stimuli-responsive degradation platforms/controlled release
Cellular imaging- inorganic-polymer hybrids
Crosslinked nanomaterials (nanogels/microgels/hydrogels) -drug delivery & tissue engineering

3. Textbooks and Materials

1) Recommended:
   - *Introduction to Polymers*, 3rd Edition, R.J. Young and P.A. Lovell; CRC Press
   - *Introduction to polymer chemistry*, 2nd Edition, C.E, Carraher, Jr.
   - *Block copolymers: synthetic strategies, physical properties, and applications*, N. Hadjichristidis, S. Pispas, and G.A. Floudas
2) **Course website (Moodle on your Myconcordia Portal): Lecture slides and handouts**

4. Grading

The final grade will be weighted as follows:

Undergraduate students

Mid-term Exam:	40%	(during class time on October 13, 2016)
Final Exam:	40%	(in December for 2 hrs, scheduled by Exams Office)
Presentation:	20%	

Presentation would be 10 min long including questions/answers. Topics will be chosen by students, but the presentation should describe the synthesis and applications. Ideally, students will read to understand several research papers for presentation. Evaluation criteria: logical organization, clear presentation, contents, presentation skills, and answers.

5. Detailed lecture schedule (subjected to change)

Lecture 1-5	Polymer basic and synthesis
Lecture 6	Midterm exam (2 hrs)
Lecture 7-11 (1/2)	Bio-related applications
Lecture 11 (1/2)-13	Presentations

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 Fall 2011 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, Sept. 26	16:45-17:45	CC-308
Tuesday, Sept. 27	16:45-17:45	HB-130
Wednesday, Sept. 28	16:45-17:45	CC-308
Wednesday, Sept. 28	20:45-21:45	HC-157
Thursday, Sept. 29	16:45-17:45	CC-204
Thursday, Sept. 29	20:45-21:45	HC-157
Friday, Sept. 30	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 CHEM 101 Moodle site (for guest login, go to: http://moodle.concordia.ca/moodle, Arts and Science, Chemistry and Biochemistry, Specialized Chemistry Sites, CHEM 101, look under FAQ).

PLAGIARISM AND OTHER FORMS OF ACADEMIC DISHONESTY:

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.