CHEMISTRY 414–SECTION 1 (weeks 1-6): Catalysis

People:

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*Note Dr. Crudden will be teaching the first 6 weeks, after which Dr. Evans will take over and teach the last 6 weeks concurrently with Chem 863.

Web Site: https://onq.queensu.ca/d2l/home/558122

Schedule: **Classes will be given in person and pre-recorded lectures from last year will also be available for students who are unable to attend for any reason**. Dr. Crudden will be available in real time each week for office hours that will be held virtually and in person.

Textbooks: Rather than have one required textbook, I will suggest several textbooks, reviews and scientific papers for reference material in the specific notes.

Marking (out of 50%):

Assignments	Total 25% each (due Sept. 16, Sept. 23, October 1st, and October 7)
Presentations	25% (week of October 24–time slots to be determined)

Participation marks will be added on top of the marks described above, to encourage students to participate in final presentations. The value will be determined at the end of term but will not exceed 5%.

Dates: First two classes are remote only–available for download. First in person class (Dunning 10) will be September 12th. There will be no lectures the week of October 17th–this is time allotted for research into and practice of your presentation. Presentations will be held October 24th and an extra two hrs will be found on that day or October 25th so that all presenters have approximately the same amount of time to prepare.

Assignments

Assignment 1: Case study of heterogenized catalyst (details to be provided), given in presentation form, up to 10 powerpoint or keynote slides. Can be done as an individual or groups of up to 3. Due September 16th (worth 5%).
Assignment 2: Case study of Jacobsen work on epoxide opening with water, provided in presentation form, 5 powerpoint or keynote slides. Details will be provided. Can be done as an individual or groups of up to 3. Due September 22nd (worth 5%).
Assignment 3: Individual assignment based on course material, due September 30th (worth 10%).
Assignment 4: Creation of Wikipedia page for a topic covered in class or something related due October 7th (worth 5%). Individual. Details to be provided.

Presentation

Time: 10 minutes long and 10 minutes for questions. Will be carried out in week 7.
Topic: Should be based on a publication within the last 5 years. Topics given out by Dr. Crudden or can be chosen independently (needs to be approved by Dr. Crudden). Topic submitted to Dr. Crudden by October 7th.
Format: Formal presentation in groups–size to be determined based on enrollment. Presentations will be carried out in sequence first with volunteers and then presentation order will be chosen at random.

Marking (out of 100):

20% for participation – half for a critique of other student's presentations (these critiques will not be used to evaluate your colleagues but rather your ability to assess the presentations) and half for your own participation and asking questions.

40% content
20% knowledge of the subject/questions
20% delivery skills/presentation quality

Course Outline

Section One: Introduction, Catalysis/Catalytic terms, Assessing catalytic activity and heterogeneity, Intro to acid catalysis, Zeolites
Section Two: Lewis acid catalysis (Zimmerman–Traxler, Evans Aldol), Lewis base catalysis, Frustrated Lewis Pair catalysis
Section Three: Principles of Transition metals and basic reactions of TMs, Hydrogenation, biocatalysis
Section Four: Industrial Catalysis: Haber-Bosch process, Carbonylation (Oxo process, Cativa process), Polymerization.
Section Five: Cross–coupling reactions and Metathesis chemistry
Section Six: Group presentations

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Students are responsible for familiarizing themselves with and adhering to the regulations concerning academic integrity. General information on academic integrity is available at Integrity@Queen's University, along with Faculty or School specific information. Departures from academic integrity include, but are not limited to, plagiarism, use of unauthorized materials, facilitation, forgery and falsification. Actions which contravene the regulation on academic integrity carry sanctions that can range from a warning, to loss of grades on an assignment, to failure of a course, to requirement to withdraw from the university.

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Calculator Policy

No calculators are needed or allowed.

Accommodations Statement

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