Chemistry 9723s (2019)
Advanced Synthetic Methods II

**Target Audience:** This is a general topics course intended for a broad synthetic audience and one need not be an expert in organic or inorganic chemistry.

**Prerequisites:** None. Chemistry 9623 and 9723, Advanced Synthetic Methods I & II, are independent courses and can be taken separately or in any order.

**Class Times:** 10:00 – noon; Tuesdays and Thursdays, MSA 3204

**Instructor:** Professor Brian L. Pagenkopf, Ph.D.
BGS 2020
Office hours by appointment or stop by anytime
(excluding 11:30 am – 2 pm MWF)
bpagenko@uwo.ca (start the subject line with 9723)

**Materials:** Links, PDF’s and/or notes will be provided.

**Topics**

- Brief Review of Relevant Organometallic Mechanisms
- Gold Catalysis
  - Enyne isomerization/cyclopropanation
  - 1,2 and 1,3-shifts
  - O and N-based nucleophiles
  - Examples in Total Synthesis
- Tsuji/Trost Allylic Alkylation
  - Origin of enantioselectivity
  - Substrate/Nucleophile scope
  - Iridium
  - Examples in Total Synthesis
- Cross Coupling Reactions
  - C-C
  - C-N
  - C-O
  - sp³-sp³
  - Examples in Total Synthesis
- Metathesis
  - Overview
  - RCM
  - Examples in Total Synthesis

Note, the topics in 9623 included (asymmetric): aldols, alkylation, carbonyl addition and chelation control, allylation/crotylation, Diels-Alder, dihydroxylation, epoxidation, hydroboration, reduction/hydrogenation and olefination.
Goals. The goals of this course include fostering a habit of routinely reading the literature, practicing formal public speaking, and gaining insights into some modern synthetic methods and appreciation for target-oriented synthesis.

Evaluation: The final grade for the course will be determined by the following

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Abstracts and Presentations</td>
<td>25%</td>
</tr>
<tr>
<td>Class Participation</td>
<td>10%</td>
</tr>
<tr>
<td>Written Assignments</td>
<td>15%</td>
</tr>
<tr>
<td>Formal Presentation</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam (take home)</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Evaluation Details

Abstracts. You will read 5 articles per week and record abstracts of each article in a notebook (hard cover preferred), and I will sign off on the abstracts weekly. You get to pick the papers you abstract, but they should entail new synthetic methods, at least one with organometallics and one with a natural product focus, all from 2016 or newer. I will also pick one abstract that interests me and you will give a brief chalk board presentation on that publication without resorting to the original paper (but that is permissible but discouraged). The goal of the abstracts is to promote reading of the current literature and to record notes on what you read. I hope this becomes a permanent habit for you throughout your professional career. If you already maintain such practices you can use the same notebook. Electronic versions will only be given approval for stylus supported tablets under special conditions (see me). Depending on your notebook, with standard 8 x 11 paper 2 or 3 abstracts can fit on a page. Include a title (not necessarily the title of the paper), the literature citation (or DOI if not yet assigned), corresponding author, university/location, graphics, and key points.

Class participation includes attendance, attentiveness, and asking/answering questions in class.

There will be at least two short written assignments, two pages or less.

At the end of the course you will give a short (~30 min) Formal Presentation on the recent literature. The articles should support a theme or concept, sort of like a “Highlight” in Angewandte Chemie. All students are expected to ask at least one question at the end of each presentation.

At the end of the course will be an open book take home exam based partially on the lecture material. The restriction is that you need to work on it individually, and you’ll have at least 5 days to finish it (not that it should take that long). The idea of this assignment is to review select course content, without requiring you study everything in advance like you’d have to for a regular final exam.
Other Statements

**Medical / Compassionate Excuses:** Policies on missed lectures or assignments are described here: [https://studentservices.uwo.ca/secure/index.cfm](https://studentservices.uwo.ca/secure/index.cfm)

**Student Accessibility Services (SAS):** Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program. Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are encouraged to register with Student Accessibility Services, a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both SAS and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction. For more information, see [http://www.sdc.uwo.ca/ssp/](http://www.sdc.uwo.ca/ssp/)

**Academic Offences:** Scholastic offences are taken seriously, and students are directed to read the relevant policies: [https://grad.uwo.ca/administration/regulations/13.html](https://grad.uwo.ca/administration/regulations/13.html)

**Plagiarism:** All written assignments may be submitted for similarity review and plagiarism detection with [http://www.turnitin.com](http://www.turnitin.com).

**Support Services:** Support is available from the Registrar: [http://www.registrar.uwo.ca](http://www.registrar.uwo.ca), via the University Students Council ([http://westernusc.ca/services/](http://westernusc.ca/services/)) and at Student Development Services ([http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/)).

**Mental or Emotional Health:** Students who are in emotional/mental distress should refer to Mental Health@Western [http://www.uwo.ca/uwocom/mentalhealth/](http://www.uwo.ca/uwocom/mentalhealth/) for a complete list of options about how to obtain help.