Recent Advances in Organic Chemistry
Chemistry 504
Spring 2018

Tuesday 6:00-8:50 PM, Smith 240

Instructor: Prof. Stacey Brenner-Moyer (www.brennermoyer.com)

Contact Information: seb244@rutgers.edu

Office Hours: Tuesdays 5:00-6:00 PM in Room 201E Life Sciences Building 1.

Course Description: This course will introduce students to synthetic organic methods that are beyond the scope of most undergraduate courses, and which are readily employed in modern organic synthesis or are areas of active research. We will focus on five such topics, and the historical context, key scientists, and reaction mechanisms relevant to each will be presented. This course will entail exercises in original thought and in oral and written presentations for all students, and will provide the foundation for more advanced coursework and research for those students planning to continue in organic chemistry.

Learning Goals:
Upon completion of the course, students should be able to:

- Effectively communicate their scientific perspective both orally and in writing.
- Identify the key scientists in selected fields of organic chemistry, and explain their contributions in detail.
- Illustrate the mechanism of selected reactions.

Required Texts and Materials:
Most of the reading will be from the primary literature referenced in lectures, with the exception of two chapters from Carey and Sundberg part B.

1. Carey, Francis A.; Sundberg, Richard J. *Advanced Organic Chemistry, Part A: Reactions and Synthesis.* 5th ed. Springer, 2007.

   NOTE: This entire book can be downloaded for FREE from campus or login via Rutgers account: https://link.springer.com/book/10.1007%2F978-0-387-71481-3

Course Evaluation:
Your grade for the course will be determined by three graded exercises, each equally weighted:

1) A 25-minute individual student presentation describing recent advances in organic chemistry to be chosen from the following list of topics:

- Flow chemistry
- Molecular machines/motors
- MOFs in catalysis
- Synthetic organic electrochemistry
- Ionic liquids
- Transition metal-free coupling reactions
- Biocatalysis for chemical synthesis
- Choose your own adventure (must be OK'd by Prof.)

2) An in-class, closed-book exam. Exam questions will be derived from lecture material, from the primary literature referenced in lectures, and from the assigned readings and suggested problems in Carey and Sundberg.

3) The final project is a written research proposal. Option A: Pick a natural product discovered within the last two years and, using your knowledge of organic chemistry as well as the material from chemistry 511 and 504, propose a synthesis of it. Option B: Propose a new synthetic organic method (a new reaction using known catalysts and reagents, or a new catalyst or reagent). You must discuss your plans, in detail, with Prof. Brenner-Moyer by **April 3rd**. The length and format of the research proposal will be discussed at a later date.

Policy for Absence from Exams or Illness During Exams: In the event of an excused absence on the scheduled date of the presentation, the presentation will be given the following week. In the event of an excused absence from the in-class exam, contact Professor Brenner-Moyer as soon as possible. In the event of an absence that is not deemed by Professor Brenner-Moyer to be excused, a grade of "0" will be recorded for the presentation and/or exam.

Academic Integrity: This course adheres to Rutgers University policies on academic integrity. For more information, visit: http://academicintegrity.rutgers.edu/

Issues of Courtesy: Lecture will start as scheduled, at 6:00 PM. Please try to arrive *on time*, with your *electronic devices turned off*. If you must arrive late to lecture, please enter quietly, so as not to disrupt those who were on time and are listening intently.

Please note: There will be a 10-15 minute break during every lecture.

Tentative Schedule of Course Topics:

Week	Date	Topic
1	Jan. 16	Organocatalysis • enamine, iminium, dienamine catalysis • organocascade reactions
2	Jan. 23	Organocatalysis: other catalyst classes • N-heterocyclic carbenes • Brønsted acid and hydrogen bond donors • Basic and nucleophilic catalysts
3	Jan. 30	Organocatalysis • cooperative catalysis • use in synthesis
4	Feb. 6	Chapter 4 of Carey and Sundberg part B
5	Feb. 13	Recent progress in stereoselective halogenation
6	Feb. 20	C—H activation
7	Feb. 27	C—H activation
8	Mar. 6	Chapter 10 of Carey and Sundberg part B (i.e., radical chemistry)
9	**Mar. 20**	**Student presentations**
10	Mar. 27	Photoredox catalysis
11	Apr. 3	Photoredox catalysis
12	Apr. 10	*No class*
13	**Apr. 17**	**In-class exam**
14	Apr. 24	Recent advances in total synthesis
15	**May 8**	**Final project due by 9pm**

Important Dates:
* *Mar. 10-18, spring break*

Suggested Problems:
Ch. 4: 2; 4; 12a, b, d, g, h; 13a, c, d; 16; 20; 23; 24
Ch. 10: 6 a, c; 10; 12; 13; 14; 16; 17; 18