

**CHEM 942, Fall 2017
ORGANIC SYNTHESIS II**

GENERAL INFORMATION

Instructor: Dr. Helena C. Malinakova 4029 Malott Hall
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Office Hours: Tuesday and Thursday 10:00-10:50 AM, and by
appointment via E-mail

Attendance:

Lectures will be held on Monday, Wednesday and Friday of each week in 1003 Malott Hall 11:00-11:50 AM. Attendance is required because material not covered in the required text will be presented.

Required Text:

Advanced Organic Chemistry, Part B-5th edition by F. A. Carey and R. J. Sundberg; Springer, 2007
ISBN-13: 978-0-387-68354-6

Suggested Study Materials:

Hudlicky, T.; Reed, J. W. "The Way of Synthesis" Evolution of Design and Methods for Natural Products,
Wiley-VCH, 2007 ISBN 978-3-527-31444-7
Hoffmann, R. W "Elements of Synthesis Planning" Springer, 2009
ISBN 978-3-540-79219-2

Course Content and Goals:

In this course, synthetically important carbon-carbon bond-forming reactions, including the mechanisms and issues concerning region- and stereocontrol will be presented in the context of significant total syntheses of natural products. The goal of this class is: (1) to introduce the most significant synthetic reactions and reagents; (2) to demonstrate different approaches to the design of practical syntheses of complex organic molecules; (3) to provide a historical perspective on the development of synthetic organic chemistry and outline its future challenges. Specific topics that will be discussed are outlined in the enclosed "Class Schedule".

Examination and Quizzes:

There will be two (2) "evening examinations": **EXAM I** on Wednesday, October 4 and **Exam II** on Wednesday, November 15 (time and location will be arranged and announced in class) and the **FINAL EXAM** on Monday, December 11 at 10:30 – 1:00 pm in Malott 1003. See the enclosed "Class schedule".

The examinations will consist of questions involving mechanisms of synthetic reactions discussed in class. You will also be asked to complete a given reaction scheme by providing structures of missing reagents, products or substrates. In every examination, there will be questions asking you to propose a short practical syntheses of given targets using transformations discussed in class.

There will be three (3) 15 minutes-long "in class" **QUIZZES I-III** on September 15; September 29 and November 10 (see the enclosed "Class Schedule").

Marking:

Quizzes I-III
Exams I-II
Final Exam

$3 \times 25 = 75$ pts
 $2 \times 100 = 200$ pts
100 pts

TOTAL**375 pts****Grading:**

Full letter grades only will be assigned on the basis of total accumulated points relative to the maximum of 375 pts. Note: +/- grading system will NOT be used in this class.

August 8, 2017
The University of Kansas
Chemistry 942, F 2017

**CHEM 942, Fall 2017 – ORGANIC SYNTHESIS II
CLASS SCHEDULE**

Date M	Topic	Date W	Topic	Date F	Topic
08/21	NO CLASS for "observation of the solar eclipse" ☺	08/23	Introduction: Hudlicky "The Way of Synthesis" Part 1	08/25	Diels-Alder Reactions Regiochemistry Carey-Sandberg Chapter 6.1
08/28	Diels-Alder Reactions Stereochemistry Carey-Sandberg Chapter 6.1	08/30	Diels-Alder Intramolecular	09/01	Diels-Alder Inverse electron demand Diels-Alder; Isochrysohermidin- Boger
09/04	LABOR DAY	09/06	Dipolar Cycloadditions I Carey-Sandberg Chapter 6.2	09/08	Dipolar Cycloadditions II Resiniferatoxin-Wender
09/11	[3,3]Sigmatropic Rearrangements Carey-Sandberg Chapter 6.4	09/13	Cope and Claisen Rearrangement Prostaglandine-Stork	09/15	Cope and Claisen Rearrangement Prostaglandine-Stork QUIZ I (in class)
09/18	Main Group Organometallics Carey-Sandberg Chapter 7	09/20	Directed Ortho Metalation V. Snieckus-Chem. Rev. 1990	09/22	Directed Ortho Metalation: V. Snieckus-Chem. Rev. 1990
09/25	Reagents with B, Si and Sn Carey-Sandberg Chapter 9	09/27	Reagents with B, Si and Sn Carey-Sandberg Chapter 9	09/29	Organic Reagents with B, Si, Sn J. Harwig; Leighton QUIZ II (in class)
10/02	Reactions with cationic intermediates Carey-Sandberg Chapter 10.1	10/04	Cationic Cascade and Tandem Reactions Progesterone-Johnson EXAM I (evening)	10/06	Cationic Cascade and Tandem Reactions Overman
10/09	Reactions with free radical intermediates Carey-Sandberg Chapter 10.3	10/11	Radical Reactions – in cascades Hirsutene-Curran Radical Cascades in Synthesis Morphine-Parker	10/13	Radical Reactions- Modern Applications D. Curran in Nature - "Electron as catalyst"
10/16	FALL BREAK	10/18	Radical Reactions- Modern Applications	10/20	No Class (attend the ACS meeting)
10/23	Reactions with carbene intermediates Carey-Sandberg Chapter 10.2	10/25	Reactions with carbene intermediates Carey-Sandberg Chapter 10.2	10/27	Catalysis with NHC's F. Glorius; T. Rovis
10/30	Transition Metal- Mediated Reactions Fundamentals Crabtree Organometallic Chemistry	11/01	Transition Metal- Mediated Reactions Fundamentals Crabtree Organometallic Chemistry	11/03	Transition Metal-Mediated Reactions Carey-Sandberg Chapter 8
11/06	Cross-Coupling and Heck Reactions Future directions, G. Fu	11/08	Cross-Coupling and Heck Reactions Future directions,	11/10	Transition Metal Carbenes, Rh carbenoids- H. Davies QUIZ III (inclass)
11/13	Transition Metal- Mediated Cycloadditions Estrone- Vollhardt	11/15	Transition Metal- Mediated Cycloadditions Estrone- Vollhardt EXAM II (evening)	11/17	Strategies and tactics in synthesis Hudlicky "The Way of Synthesis" Part 2
11/20	Disconnection viaFG-oriented bond-sets Hoffman "Elements of Synthesis Planning" Chapter 2	11/22	NO CLASS - THANKSGIVING	11/24	NO CLASS – THANKSGIVING
11/27	Skeleton and Building block oriented bond-sets Hoffman "Elements of Synthesis Planning" Chapters 3 and 4	11/29	Formation of Cyclic structures Hoffman "Elements of Synthesis Planning" Chapters 5 and 6	12/01	Formation of Cyclic structures Hoffman "Elements of Synthesis Planning" Chapters 5 and 6
12/04	Aiming for "Ideal Synthesis" JOC 2010 p 4657 Barran	12/06	Review of strategies for Welwitindolinone syntheses	12/08	STOP DAY

FINAL EXAM: MONDAY DEC 11, 10:30 am – 1:00 pm in Malott 1003