

CHE 150**Chemistry of Natural Products
International/Study Abroad Section****Fall 2024**

Time and Place: TIGP Rms 204 & 207, dates and times as indicated below
CRN: TBD
Instructor: Dr. Neil Schore
Phone: 530-304-6794 E-mail: neschore@ucdavis.edu
Office Hours: After lectures and upon request; also note optional discussion sessions
TAs: Will DeSnoo
TA Office Hours: TBD
Course website: Please check Canvas for course updates and handouts

Course Description and Objectives:

This course is an accelerated and international version of CHE 150 that introduces the chemistry, biosynthesis, and pharmacological activity of natural products. It will cover topics in the first five chapters of the Dewick textbook. Emphasis will be placed on the key biosynthetic pathways responsible producing biologically active secondary metabolites. Upon completion of this course, students should be familiar with the chemistry principles underlying the biological processes that produce polyketides, phenylpropanoids, terpenoids, and steroids in nature. Students should be able to examine the structure of a natural product and recognize its key biosynthetic pathways and building blocks. Students should also become familiar with literature searching and proper use of references.

Prerequisite: CHE118C, CHE128C, one year of undergraduate organic chemistry lecture, or Dr. Schore approval

Text Book: Paul M. Dewick “Medicinal Natural Products: A biosynthetic approach”
3rd Edition, John Wiley & Sons Ltd, 2009

Additional reading will be distributed in class or posted on Canvas.

Grading:

Midterm (Wednesday, Nov 13, 2024, 2-3 PM)	100 pts
Final (Saturday, Nov 23, 2024, 9-11 AM)	150 pts
Attendance and Participation	50 pts
Take Home Assignments (2 × 50 pts)	100 pts
TOTAL	400 pts

Attendance & Participation: Full credits are given for those who attend all lectures punctually and participate actively when called on during lecture.

Take Home Assignments: You may work with your classmates on the assignments, but you must turn in your own work. These are designed to prepare you for the exams, so it is in your best interest to make sure that you can do the problems correctly on your own.

Midterm: The midterm will be a 50 minute exam on the materials covered in the first half of the course and will consist of problems of a similar format to the first Take Home Assignment. There will be *no make-up midterm*, no exceptions. Students absent for the midterm for a *legitimate reason* (supported by documentation) will have the final exam counted for 50% of their total grade.

Final exam: You must take the final exam to pass the class. Students who miss the final exam for a legitimate reason may be given a grade of “incomplete,” provided that the student has a passing grade before the final. Criteria for incompletes are detailed here:

<http://catalog.ucdavis.edu/academicinfo/grades.html>

Exam regrades: Exam regrading will be performed only if a detailed written request is provided to Dr. Schore on the day the exam is returned. If a regrade is granted, the *entire exam will be regraded* and

points may be deducted from problems other than the subject of the regrade request. Do not alter your exam in any way if you request a regrade.

Academic dishonesty: Please refer to the UC Davis Student Judicial Affairs statement regarding academic conduct: <http://sja.ucdavis.edu/cac.html> or <http://sja.ucdavis.edu/files/cac.pdf>. Do not cheat or plagiarize! Penalties may now include assignment of the grade of 'F' for a course.

CHE150 Lecture Topics:

Introduction

Building blocks and construction mechanisms – From a chemist's point of view

The acetate pathway – Fatty acids and polyketides

The shikimate pathway – Aromatic amino acids and phenylpropanoids

The mevalonate and methylerythritol phosphate pathways – Terpenoids and steroids

Additional Reading:

- 1) *Strategic Applications of Named Reactions in Organic Synthesis*, L. Kürti & B. Czako (2005).
- 2) *Chemical Aspects of Biosynthesis*, Mann, J. (1995).
- 3) *The Billion Dollar Molecule*, B. Werth (1995).
- 4) *Quinine: Malaria and the Quest for a Cure That Changed the World*, F. Rocco (2003)
- 5) *Natural Product Chemistry: A Mechanistic, Biosynthetic and Ecological Approach*, Kurt B. G. Torssell (1997)
- 6) *Natural Product Chemistry at a Glance*. Stephen P. Stanforth (2006)

Other Sources:

Connecting from off campus for electronic journals at UC Davis:

<https://www.library.ucdavis.edu/ul/services/connect/>

SciFinder Search at ACS site: <https://origin-scifinder.cas.org/scifinder/login>

PubMed Search at NCBI site: <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=PubMed>

Chemical & Engineering News: <http://pubs.acs.org/cen/index.html>

A special issue: Top Pharmaceuticals <http://pubs.acs.org/cen/coverstory/83/8325/index.html>

Tentative Class Schedule (Subject to change)

[Optional discussions 9 am T Nov 5, 12, and 19]

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| 1. Oct 30, 2pm | (W) | Syllabus
Chapter 1. Introduction
Chapter 2. Building blocks and construction mechanisms: from a chemist's point of view |
| 2. Nov 2, 9am | (Sa) | Homework #1-- Problems available at Canvas
Chapter 3. The acetate pathway: fatty acid and polyketides |
| 3. Nov 5, 9am | (T) | Optional discussion session |
| 4. Nov 6, 2pm | (W) | Chapter 3 continued |
| 5. Nov 9, 9am | (Sa) | Homework #1--Due at the beginning of the lecture
Homework #2-- Problems available at Canvas
Chapter 3 continued |
| 6. Nov 12, 9am | (T) | Optional discussion session |
| 7. Nov 13, 2pm | (W) | Midterm Exam
Chapter 4. The shikimate pathway: aromatic amino acids and phenylpropanoids |
| 8. Nov 16, 9am | (Sa) | Chapter 5. The mevalonate (MVA) and methylerythritol phosphate (MEP) pathways |
| 9. Nov 19, 9am | (T) | Optional discussion session |
| 10. Nov 23, 9am | (Sa) | Homework #2--Due at the beginning of the class |
| 10. Final Exam: Saturday, Nov 23, 2024, 9 am – 11 am, TIGP Rm 207 | | |