

Submit original with signatures + 1 copy + electronic copy to Faculty Senate (Box 7500).
 See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/> for a complete description of the rules governing curriculum & course changes.

TRIAL COURSE OR NEW COURSE PROPOSAL

SUBMITTED BY:

Department	Chemistry & Biochemistry	College/School	CNSM
Prepared by	Fenton Heirtzler	Phone	474-5507
Email Contact	frheirtzler@alaska.edu	Faculty Contact	Fenton Heirtzler

1. ACTION DESIRED
 (CHECK ONE): Trial Course X New Course

2. COURSE IDENTIFICATION: Dept Chemistry Course # 494 No. of Credits 3

Justify upper/lower division status & number of credits: There will be three lectures, one hour each, per week.

3. PROPOSED COURSE TITLE: Asymmetric Organic Synthesis

4. To be CROSS LISTED? YES/NO If yes, Dept: Course #
 (Requires approval of both departments and deans involved. Add lines at end of form for additional required signatures.)

5. To be STACKED? YES/NO No If yes, Dept. Chemistry & Biochemistry Course #

Stacked course applications are reviewed by the (Undergraduate) Curricular Review Committee and by the Graduate Academic and Advising Committee. Creating two different syllabi—undergraduate and graduate versions—will help emphasize the different qualities of what are supposed to be two different courses. The committees will determine: 1) whether the two versions are sufficiently different (i.e. is there undergraduate and graduate level content being offered); 2) are undergraduates being overtaxed?; 3) are graduate students being undertaxed? In this context, the committees are looking out for the interests of the students taking the course. Typically, if either committee has qualms, they both do. More info online – see URL at top of this page.

6. FREQUENCY OF OFFERING: Spring (even-numbered years) Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (AY2013-14 if approved by 3/1/2013; otherwise AY2014-15) AY2013-14 AUG 20 2013

Dean's Office
College of Natural Science & Mathematics

8. COURSE FORMAT:

NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school's curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.

COURSE FORMAT: (check all that apply) 1 2 3 4 5 6 weeks to full semester

OTHER FORMAT (specify) _____
 Mode of delivery (specify lecture, field trips, labs, etc) Lecture

9. CONTACT HOURS PER WEEK: 3 LECTURE hours/weeks 0 LAB hours /week 0 PRACTICUM hours /week

Note: # of credits are based on contact hours. 800 minutes of lecture=1 credit. 2400 minutes of lab in a science course=1 credit. 1600 minutes in non-science lab=1 credit. 2400-4800 minutes of practicum=1 credit. 2400-8000 minutes of internship=1 credit. This must match with the syllabus. See <http://www.uaf.edu/uafgov/faculty-senate/curriculum/course-degree-procedures/-guidelines-for-computing-/> for more information on number of credits.

OTHER HOURS (specify type)

10. COMPLETE CATALOG DESCRIPTION including dept., number, title, credits, credit distribution, cross-listings and/or stacking (50 words or less if possible):

Example of a complete description:

TOM GREEN
8/21/13 TLP

FISH F487 W, O Fisheries Management

3 Credits Offered Spring

Theory and practice of fisheries management, with an emphasis on strategies utilized for the management of freshwater and marine fisheries. *Prerequisites: COMM F131X or COMM F141X; ENGL F111X; ENGL F211X or ENGL F213X; ENGL F414; FISH F425; or permission of instructor. Cross-listed with NRM F487. (3+0)*

Chem 494 Asymmetric synthesis

Theory and practice in the synthesis of highly enantiomerically enriched organic compounds according to compound classes. *Prerequisites: Chem 322 and Chem 202 or permission of instructor; 3 credits.*

11. COURSE CLASSIFICATIONS: Undergraduate courses only. Consult with CLA Curriculum Council to apply S or H classification appropriately; otherwise leave fields blank.

H = Humanities S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core? If YES, attach form.

YES: NO:

IF YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6

W = Writing Intensive, Format 7

Natural Science, ("X" for Core)
Format 8

11.A Is course content related to northern, arctic or circumpolar studies? If yes, a "snowflake" symbol will be added in the printed Catalog, and flagged in Banner.

YES

NO

12. COURSE REPEATABILITY:

Is this course repeatable for credit?

YES

NO

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit?

TIMES

If the course can be repeated for credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?

CREDITS

13. GRADING SYSTEM: Specify only one. Note: Later changing the grading system for a course constitutes a Major Course Change.

LETTER:

PASS/FAIL:

RESTRICTIONS ON ENROLLMENT (if any)

14. PREREQUISITES

Chemistry 322, and Chemistry 202 or equivalent. Minimum grade: C

These will be required before the student is allowed to enroll in the course.

15. SPECIAL RESTRICTIONS, CONDITIONS

16. PROPOSED COURSE FEES

\$ 00.00

Has a memo been submitted through your dean to the Provost for fee approval?

Yes/No

17. PREVIOUS HISTORY

Has the course been offered as special topics or trial course previously?

Yes/No

No

If yes, give semester, year, course #, etc.:

18. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

Lecturing space (Reichardt 165 or equivalent) will be required

19. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (kljensen@alaska.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.

No

X

Yes

Specialist subject books, including the proposed textbook, are confirmed to be available at Rasmuson Library

20. IMPACTS ON PROGRAMS/DEPTS

What programs/departments will be affected by this proposed action?

Include information on the Programs/Departments contacted (e.g., email, memo)

Undergraduates have expressed interest in an advanced level Organic Chemistry course, and this new course meets that need.

21. POSITIVE AND NEGATIVE IMPACTS

Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.

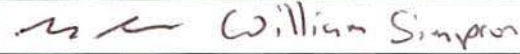
The new course will increase interest in undergraduate research projects and graduate studies with UAF research groups specializing in organic chemistry.

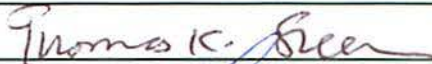
JUSTIFICATION FOR ACTION REQUESTED


The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

This advanced-level Organic Chemistry class builds upon the principles laid down in the Introductory Organic Chemistry I and II classes (chem 321 and chem 322, respectively). It provides a basis for specialization in the field for upper-level undergraduates.

APPROVALS: Add additional signature lines as needed.

 William Simpson	Date	19 Aug 2013
Signature, Chair, Program/Department of: Chemistry and Biochemistry		

 Thomas K. Green	Date	9-24-13
Signature, Chair, College/School Curriculum Council for: CNSM -		

	Date	9/27/13
Signature, Dean, College/School of: CNSM		

Offerings above the level of approved programs must be approved in advance by the Provost.

	Date	
Signature of Provost (if above level of approved programs)		

ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE		
	Date	
Signature, Chair		
Faculty Senate Review Committee: ___Curriculum Review ___GAAC		
___Core Review ___SADAC		

ADDITIONAL SIGNATURES: (As needed for cross-listing and/or stacking)

	Date	
Signature, Chair, Program/Department of:		

	Date	
Signature, Chair, College/School Curriculum Council for:		

	Date	
Signature, Dean, College/School of:		

1. COURSE INFORMATION:

Title: Asymmetric Synthesis

Course number: chem 494

3 credits

Prerequisites: Chem 322 and Chem 202 or equivalent, minimum grades of "C".

Location: Reichardt 165

Meeting time:

2. INSTRUCTOR INFORMATION:

Professor Fenton Heirtzler

Office: 161

Office hours: 1:00 – 2:00 TR

Tel.: 474-5507

e-mail: frheirtzler@alaska.edu

3. SUPPORT SERVICES:

Office hours: 1:00 – 2:00 TR

4. COURSE READINGS/MATERIALS:

G. Proctor '*Asymmetric Synthesis*' 1996, Oxford Science Publications [QD262; 0536466] (highly recommended)

Reading assignments from the scientific literature.

Molecular models (recommended)

5. COURSE DESCRIPTION:

Catalogue Description: Theory and practice in the synthesis of highly enantiomerically enriched organic compounds according to compound classes.

Prerequisites: Chem 322 and Chem 202 or permission of instructor. 4 credits.

6. COURSE GOALS:

To provide understanding of how enantiomerically enriched compounds can be synthesized using examples relating to metal chelation, steric effects, chiral reagents and chiral catalysts. To demonstrate to how the chirality of naturally occurring single-enantiomer compounds can be transmitted to non-chiral starting materials through reactivity. To show how the relative amounts of enantiomers in chirally enriched materials can be quantified using chemical and physical methods.

7. STUDENT LEARNING OUTCOMES:

By the completion of this module, the students should be able to (a) show how the synthesis of absolutely chiral molecules belonging to specific compound classes can be achieved from achiral starting materials and chiral auxiliaries (b) have a grasp on the mechanisms leading to the preferred formation of a single enantiomer of a product molecule (c) have a good idea of the methods available for the quantification of enantiomerically enriched mixtures according to their compound class.

8. INSTRUCTIONAL METHODS:

Instruction will be by lecture on either whiteboard or chalkboard. Students will be expected to competently record their own notes. This method insures that complicated topics will be correctly paced for the instructional environment.

Homework and test grades will be posted on Blackboard.

9. COURSE CALENDAR:

Week #	Content
1	<ul style="list-style-type: none">• Introduction, Significance of Asymmetric Organic Synthesis• Terminology - What is the chiral pool?• Quantification of Chiral Purity (optical rotation, NMR methods, GC/HPLC)
2	<ul style="list-style-type: none">• Using Cram's Rule & Cram's Metal Chelation Rule to Understand diastereotopicity.• Chiral Auxiliaries for Nucleophilic Addition to Carbonyl Group
3	<ul style="list-style-type: none">• Use of Chiral Auxiliaries to Control Hydride Addition to Carbonyl Group• Catalytic Reduction of Ketones• Homework assignment #1 due at end of week
4	<ul style="list-style-type: none">• Catalytic Reduction of Ketones• Enantioselective hydroboration of alkenes
5	<ul style="list-style-type: none">• Catalytic reduction of alkenes and imines
6	<ul style="list-style-type: none">• Stereospecific Addition of Electrophiles to Enolates with Chiral Auxiliaries• Homework assignment #2 due at end of week
7	<ul style="list-style-type: none">• Review/catch up
8	<ul style="list-style-type: none">• Mid-term exam (in class)• Diastereoselective Aldol Reactions
9	<ul style="list-style-type: none">• Enantioselective Hydrogenation of Carbon-Carbon Double Bonds
10	<ul style="list-style-type: none">• Diastereoselective Aldol Reactions
11	<ul style="list-style-type: none">• Enantioselective Hydrogenation of Carbon-Carbon Double Bonds• Cyclopropanation of Alkenes
12	<ul style="list-style-type: none">• Sharpless Epoxidation of Allylic Alcohols• Homework assignment #3 due at end of week
13	<ul style="list-style-type: none">• Jacobsen-Katsuki Epoxidation of <i>cis</i>-Alkenes• Sharpless Asymmetric Dihydroxylation of <i>trans</i>-Alkenes
14	<ul style="list-style-type: none">• Asymmetric Diels-Alder Reactions

10. COURSE POLICIES:

Since students will be required to take their own lecture notes. Complete attendance at the lectures is essential to success in this course.

Articles from the recent scientific literature will be discussed in the class, and from this, a mark for class participation will be assigned over the entire term.

Make-up exams will be allowed for documented emergency medical circumstances. This does not include doctor appointments, sleeping late, and so forth.

Plagiarism in tests and exams will result in a mark of 'F' for the same test or exam.

11. EVALUATION:

- 3 Homework assignments of equal value: 300 points total
- Mid-term exam, held in class: 200 points
- Final exam: 400 points
- Classroom participation in discussion of reading assignments: 100 points

Grades will be tabulated according to the following rubric: 900-1000 points – A; 800-899 points – B; 700-799 points – C; 600-699 points – D; 0 – 599 points – F

12. DISABILITIES SERVICES:

The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. Students with documented disabilities who may need reasonable academic accommodations should discuss these with the instructor during the first two weeks of class. The instructor will work with the Office of Disabilities Services (*208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities. You will need to provide documentation of your disability to Disability Services.