

Submit original with signatures + 1 copy + electronic copy to UAF Governance.

See <http://www.uaf.edu/uafgov/faculty/cd> 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	John Keller	Phone	474-6042
Email Contact	<a href="mailto:jwkeller@alaska.edu">jwkeller@alaska.edu</a>	Faculty Contact	John Keller

1. ACTION DESIRED (CHECK ONE):

Trial Course       New Course

2. COURSE IDENTIFICATION:

Dept  Course #  No. of Credits

Justify upper/lower division status & number of credits:

This 3-er course is similar to an existing undergraduate course, CHEM 324W (4 cr), but it will not be writing intensive, and will have one lecture rather than two. CHEM 324W name will be changed to Advanced Organic Chemistry Laboratory. Both courses have Chem 322, Organic Chemistry Lecture II as a co-requisite.

3. PROPOSED COURSE TITLE:

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 such signatures.)

5. To be STACKED? YES/NO  If yes, Dept.  Course #

6. FREQUENCY OF OFFERING:

Fall, Spring, Summer (Every, or Even-numbered Years, or Odd-numbered Years) — or As Demand Warrants

7. SEMESTER & YEAR OF FIRST OFFERING (if approved)

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)

9. CONTACT HOURS PER WEEK:  LECTURE hours/weeks     LAB hours /week     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/cd/credits.htm> for more information on number of credits.

OTHER HOURS (specify type)

10. COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):

CHEM 323      Organic Chemistry Laboratory  
 3 credits      Offered Spring  
 A laboratory designed to illustrate modern techniques of isolation, purification, analysis and structure determination of covalent, principally organic, compounds. Intended for health science majors; chemistry majors must take CHEM 324W instead. Co-requisite: CHEM 322 (1+6)

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JAN 21 2011

Dean's Office  
 College of Natural Science & Mathematics

Governance 2/11/11 KQ

11. **COURSE CLASSIFICATIONS:** (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

H = Humanities

S = Social Sciences

Will this course be used to fulfill a requirement for the baccalaureate core?

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, Format 8

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 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.

LETTER:  A-F

PASS/FAIL:

**RESTRICTIONS ON ENROLLMENT (if any)**

14. **PREREQUISITES**

Chem 322 (co-requisite)

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

15. **SPECIAL RESTRICTIONS, CONDITIONS**

16. **PROPOSED COURSE FEES**

\$120

Has a memo been submitted through your dean to the Provost & VCAS for fee approval?  
Yes/No

YES

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.

Adding this course will have almost no budgetary impact, except to allow more students to take an organic chemistry lab. We plan to offer C323 Spring each year with two laboratory sections and 15 students per section. Traditionally, we have offered 3 sections of C324W per year, and we plan to replace 2 of those with C323 and offer Chem 324W each spring to coincide with Chem 322 (Organic Chemistry Lecture II). Chem322 is now given only in the spring semester. This will allow a maximum of 40 students per year to take organic chem lab, compared to the current 30-student maximum.

The decrease in "W" offerings will lessen the burden on professors and teaching assistants relating to writing intensive functions. Most of the students who currently take 324W are biology majors who have available several W-courses within their major, and do not require an additional W. Chemistry and Biochemistry majors on the other hand, do require C324 as a W.

C323 will meet in the large Reichardt 245 lab. Other low enrollment advanced labs currently meeting

at this time and place would move to Reichardt 137, the (smaller) organic chemistry teaching lab. The equipment, fume hoods, and other facilities in 245 Reichardt are adequate for a non-advanced organic chemistry lab, and the advanced labs, being more spectroscopy oriented, actually have fewer space and equipment requirements than the organic chemistry lab class.

Computer lab use for C323 will differ from current practice in C324W. Organic lab requires a certain amount of computer processing and display of nuclear magnetic resonance (NMR) spectra, and mass spectra, that are often a part of the experiments. There are 10 workstations in Room 172 Reichardt, the main computer lab, where C324W students can go as a group to carry out these important functions. However, with a maximum of 15 students in a C323 section we will need to develop a different approach to spectroscopy computing. We will likely use netbook computers right in the lab as we do for various 100-level classes. The department now has about 30 netbooks for use in 2<sup>nd</sup>-floor labs.

#### 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

Yes

#### 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)

The Department of Biology and Wildlife was informed of this plan in December 2010. Professors Mulder and D. O'Brien were generally supportive since it will allow more students, especially pre-meds and pre-vets, to take this course. They indicated that there was general support from other biology faculty. The main impact will be on biology students that need another "W" course. Pre-meds have relied on C324W for one "W". More "W" courses may be in the offing in Biology to meet this need.

#### 21. POSITIVE AND NEGATIVE IMPACTS

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

One effect will be on the existing organic chemistry lab, 324W, which will have many fewer students, mainly chemistry and biochemistry majors. We are also submitting paperwork for Faculty Senate approval to change the name of that course to Advanced Organic Chemistry Laboratory, to include an additional prerequisite of Chemistry 212 Chemical Equilibrium and Analysis.

Chem 323 will not meet the major requirements of chemistry or biochemistry majors, not can this course be presented as a 300-level elective for these majors.

The main effect outside the Department of Chemistry and Biochemistry will be on pre-medical students and other non-chemistry majors, who will now find it much easier to find a space in this lab. A permission waiting list will not be kept for Chem 323; enrollment will be on a first-come first-served via the usual online method.


#### JUSTIFICATION FOR ACTION REQUESTED

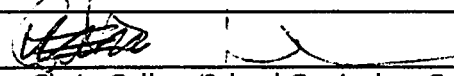
The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory.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

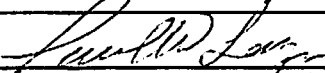
CHEM 324W has always been designed to meet the requirements of chemistry and biochemistry majors, and to fulfill requirements related to accreditation of the UAF's Chemistry B.S. program by the American Chemical Society. Due to the "writing intensive" designation, the advanced spectroscopy and molecular

necessarily have less student-teacher interaction. However, this class size is typical for organic chemistry labs nationwide, whereas the 10-student CHEM 324W class is atypically small.

**APPROVALS:**

 Date 21 Jun 2011  
Signature, Chair, Program/Department of: Chemistry + Biochemistry

 Date 1 Feb 2011  
Signature, Chair, College/School Curriculum Council for: CNSM

 Date 2/11/11  
Signature, Dean, College/School of: CNSM

\_\_\_\_\_  
Date \_\_\_\_\_

Signature of Provost (if applicable)

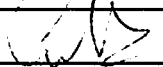
Offerings above the level of approved programs must be approved in advance by the Provost.

**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

\_\_\_\_\_  
Date \_\_\_\_\_

Signature, Chair, UAF Faculty Senate Curriculum Review Committee

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

 Date 26 Jan 2011  
Signature, Chair, Program/Department of: Biology & Wildlife

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

\_\_\_\_\_  
Date \_\_\_\_\_  
Signature, Dean, College/School of: \_\_\_\_\_

**ATTACH COMPLETE SYLLABUS (as part of this application).**

Note: The guidelines are online: <http://www.uaf.edu/uafgov/faculty/cd/syllabus.html>

The department and campus wide curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course change will be denied.

**SYLLABUS CHECKLIST FOR ALL UAF COURSES**

During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

**1. Course information:**

Title,  number,  credits,  prerequisites,  location,  meeting time  
(make sure that contact hours are in line with credits).

**2. Instructor (and if applicable, Teaching Assistant) information:**

Name,  office location,  office hours,  telephone,  email address.

**3. Course readings/materials:**

Course textbook title,  author,  edition/publisher.  
 Supplementary readings (indicate whether  required or  recommended) and  
 any supplies required.

**4. Course description:**

Content of the course and how it fits into the broader curriculum;  
 Expected proficiencies required to undertake the course, if applicable.  
 Inclusion of catalog description is *strongly* recommended, and  
 Description in syllabus must be consistent with catalog course description.

**5.  Course Goals (general), and (see #6)**

**6.  Student Learning Outcomes (more specific)**

**7. Instructional methods:**

Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

**8. Course calendar:**

A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say "lab". Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

**9. Course policies:**

Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

**10. Evaluation:**

Specify how students will be evaluated,  what factors will be included,  their relative value, and  
 how they will be tabulated into grades (on a curve, absolute scores, etc.)

**11. Support Services:**

Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

**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.

State that you will work with the Office of Disabilities Services (208 WHIT, 474-5655) to provide reasonable accommodation to students with disabilities."

**CHEMISTRY 323**  
**ORGANIC CHEMISTRY LABORATORY**  
**Corequisite: Chem 322 Organic Chemistry**

**Spring 2012**  
**3 Credits**

**Lecture:** ..... Monday 2:15-3:15; REIC 165  
**Lab:** ..... Tues and Thurs., 8:00-11:00; REIC 245  
OR ..... Wed and Fri., 8:00-11:00; REIC 245

**Instructor:** ..... Office REIC, 474- @alaska.edu  
..... Office hours by appointment, or drop-in.

**Teaching Assistants**.....

..... Office REIC, 474- @alaska.edu  
..... Office hours

..... Office REIC, 474- @alaska.edu  
..... Office hours

**Required Materials:** (1) *A Small Scale Approach to Organic Laboratory Techniques 3rd Edition*.  
Brooks/Cole. (2010) Donald L. Pavia, Gary M. Lampman, George S. Kriz, Randall  
G. Engel  
(2) Student Lab Notebook, Hayden-McNeil STP100

**Recommended:** USB memory stick for backing up data and text files

**Fees:** (1) Material fee for chemicals, glassware breakage, and other supplies \$120  
(2) chemistry computer lab fee \$45 (charged only once for multiple chem classes)  
(3) key deposit \$5 cash (Bring it to first lab.)

**Course Description (from catalog):**

A laboratory designed to illustrate modern techniques of isolation, purification, analysis and structure determination of covalent, principally organic, compounds. Intended for health science majors; chemistry majors must take CHEM 324W instead. Co-requisite: CHEM 322 (1+6)

**Course Goals:** This course emphasizes several aspects of organic laboratory practices. These include:

- 1) Synthetic procedures
- 2) Chromatographic analysis (GC, TLC, and HPLC)
- 3) Standard work-up procedures
- 4) Purification techniques (crystallization, distillation, extraction, chromatography...)
- 5) Spectroscopic analyses (NMR, MS, and IR)
- 6) Literature searches
- 7) Use of relevant computer software
- 8) Chemical calculations including stoichiometry

**Information Sources**

- [WWW.HAZARD.COM](http://WWW.HAZARD.COM) is a good on-line source of Material Safety Data Sheets (MSDS). The department also keeps a set of MSDS in NSF 139.

- Scifinder Scholar – literature searching
- ACD labs NMR software
- HyperChem software for molecular calculations
- Japan spectral database <http://riodb01.ibase.aist.go.jp/sdbs/>

**Laboratory Safety:** Laboratory safety is a major concern of all chemical laboratories but is especially important in organic labs due to the presence of flammable solvents, potentially hazardous fumes, highly reactive reagents, etc. The first lab will deal explicitly with these hazards and the appropriate safety measures to follow. Subsequent lectures, besides covering the theory and practicalities of the week's experiment will also cover specific hazards that you may encounter. Please attend these lectures and be prepared for the lab by doing any assigned readings and having your notebook prepared before coming to lab. If you are not prepared for lab you may be asked to leave.

**Notebook.** Maintain an up-to-date notebook. During the lab make notes on (i) your actual procedure including weighing data, (ii) significant visual observations, (iii) drawings of TLC sheets, including solvent info, and (iv) spectra or spectra file names in a separate collection. DATE each page or entry. Hand in a copy to the TA after each lab period.

**Pre-lab.** Before each lab you should enter in your notebook the following, and hand in a copy to the TA at the beginning of the lab:

- a statement of the purpose** of the experiment, in your own words.
- balanced chemical equations** for any reactions you will undertake
- calculation of the **theoretical yield** of the desired organic product if applicable using dimensional analysis with the correct units and significant figures
- a table of **physical constants** (MW, MP, BP, solubility, density of starting materials, and the amounts (g, mL, and moles) to be used, if known.
- hazardous properties** for each chemical (including solvents) you plan to use in the experiment. Obtain this information from the Web – for example, if you look up the compound at the Aldrich Chemical Co web site - <http://www.sigmaaldrich.com/catalog/search/AdvancedSearchPage> then follow the link to MSDS, the Material Safety Data Sheet will provide the appropriate information.
- answers to **any pre-lab questions** provided by the instructor (need not be entered in lab book).

**Reports and products** are due on Mondays by 6:00 PM two weeks after the scheduled lab. Late reports may result in a reduction of points.

**Lectures.** It is essential that you attend all lectures and arrive on time to the laboratory in order to fully understand the experiment and safety issues. Each lecture will begin by pointing out salient features for the upcoming experiment. Questions regarding 1) the choice of solvent, 2) order of addition, 3) which reagent to use in excess, 4) work-up steps, 5) appropriate stopping points, etc., will be addressed. Much of the midterm and final exams will come from these lectures..

**Always check the marker board in lab for important announcements.**

**Grades:** The final letter grade will be based on the total number of points accrued during the semester, apportioned as follows. (+/- grades may be used).

Experiments (12 @ 50 pts each)	600
Midterm Exam	100

Final Exam	100
Notebook	100
<b>Total</b>	<b>900</b>

**Students with documented disabilities** who may need reasonable academic accommodations should discuss these with me during the first two weeks of class. You will need to provide documentation of your disability to Disability Services in the Center for Health and Counseling, 474-7043, TTY 474-7045.

## Other Sources

The following references may be useful and should be found in (and should not be removed from) the laboratory:

- *Aldrich Chemical Catalog* gives physical properties as well as safety issues for most commercially available organic reagents. (You can order your own free.)
- *The Merck Index* is an excellent reference book for over 10,000 important organic substances. It has a handy cross index and molecular formula index that you will find useful.
- *The CRC Handbook* is another reference book that provides some physical and spectral information on a wealth of substances. (The Merck Index is easier to use and more relevant.)
- *Advanced Organic Chemistry: Reactions, Mechanisms, and Structure* by March (McGraw-Hill) is particularly useful because it provides good references to the chemical literature.
- *The Chemist Companion: A handbook of practical data, techniques, and references* by A.J. Gordon and Richard A. Ford (John Wiley & Sons) is a good source of information for all chemists (inorganic, organic, analytical...).
- *Reagents for Organic Synthesis* by Fieser and Fieser, volumes 1-13 (John Wiley & Sons) has detailed discussions about nearly every organic reagent with references to the chemical literature. At times details about how the reagent is typically used in a given reaction is provided.
- *Organic Synthesis*; collective volumes 1-5 (John Wiley & Sons) provides very detailed procedures for specific syntheses. The scale of the reactions, however, is usually large.
- *Spectroscopic Identification of Organic Compounds*; 6<sup>th</sup> Ed., by R.M. Silverstein, G.C. Bassler, and T.C. Morrill (John Wiley & Sons) provides good discussion and extensive tables for the interpretation of standard IR, <sup>1</sup>H NMR, <sup>13</sup>C NMR, and mass spectra.