University of Wisconsin-Whitewater

Curriculum Proposal Form #3

## New Course

**Effective Term:**

**Subject Area - Course Number:** **CHEMISTRY 454 Cross-listing:**

(See Note #1 below)

**Course Title:** (Limited to 65 characters) Biochemistry of Macromolecules

**25-Character Abbreviation:** Biochem of Macromolecules

**Sponsor(s):** Catherine Chan and Christopher Veldkamp

**Department(s):** Chemistry

**College(s):**

# **Consultation took place**: NA Yes (list departments and attach consultation sheet)

Departments:

**Programs Affected:** **N/A**

**Is paperwork complete for those programs?** (Use "Form 2" for Catalog & Academic Report updates)

NA  Yes  will be at future meeting

**Prerequisites:** Biol 120 or Biol 141 (or equivalent) with a ‘C’ or better and Chem 251, or consent of instructor

**Grade Basis:**  Conventional Letter  S/NC or Pass/Fail

**Course will be offered:**  Part of Load  Above Load

On Campus  Off Campus - Location

**College:**  **Dept/Area(s):**  Chemistry

**Instructor:** Catherine Chan or Christopher Veldkamp

*Note: If the course is dual-listed, instructor must be a member of Grad Faculty.*

**Check if the Course is to Meet Any of the Following:**

Technological Literacy Requirement  Writing Requirement

Diversity  General Education Option:

Note: For the Gen Ed option, the proposal should address how this course relates to specific core courses, meets the goals of General Education in providing breadth, and incorporates scholarship in the appropriate field relating to women and gender.

**Credit/Contact Hours:** (per semester)

Total lab hours: 0 Total lecture hours: 48

Number of credits: 3 Total contact hours: 48

**Can course be taken more than once for credit? (Repeatability)**

No  Yes If "Yes", answer the following questions:

No of times in major:       No of credits in major:

No of times in degree:       No of credits in degree:

Proposal Information: ([***Procedures for form #3***](http://acadaff.uww.edu/UCC/Curriculum_Handbook_09/Procedures_form3.docx))

**Course justification:**

The Chemistry department is changing its curriculum to meet new guidelines issued by the American Chemical Society (ACS). Specifically, we propose to expand the current one semester Biochemistry course to two separate courses, Biochemistry of Macromolecules and Biochemistry of Metabolism and Signaling. Biochemistry of Macromolecules, Chem 454, explores the chemistry of the major compounds of living organisms, e.g., proteins, carbohydrates, lipids and nucleic acids, and is a required course for all Chemistry majors (pending approval by the College and University Curricular Committees). We propose to re-design Biol/Chem 456 to focus on the biochemistry of metabolism and signaling, and is intended for Chemistry majors with a Biochemistry emphasis, students interested in postgraduate education in Biochemistry (and related fields), and Biology majors with a pre-professional or allied health field focus.

**Relationship to program assessment objectives:**

The American Chemical Society (ACS) lists ‘Biochemistry’ as one of the five foundation areas that ACS-approved Chemistry Departments must offer students who are graduating with a Chemistry degree. ACS also requires the department to offer in-depth courses beyond those considered foundation coursework. The Chemistry department proposes to offer the new Biochemistry of Macromolecules course (Chem 454) to explore fundamental biochemical concepts, in compliance with ACS curriculum requirements, and Biol/Chem 456 as a specialized biochemistry course that focuses on metabolism and signaling.

**Budgetary impact:**

Minimal. Dr. Catherine Chan has a joint appointment between the Departments of Chemistry and Biological Sciences and has been teaching the current one semester Biochemistry course (lecture and laboratory combined). The additional staff necessary for teaching this course was fulfilled by the hiring of Dr. Christopher Veldkamp, who joined the Chemistry Department in Fall 2009. No additional staff or equipment needs are anticipated to offer this course.

**Course description:** (50 word limit)

The chemistry of the major compounds of living organisms, e.g., proteins, carbohydrates, lipids and nucleic acids, are studied. Meets for 3 lectures/week, and is required for all Chemistry majors.

Prereq: 'C' or better in Biol 120 or Biol 141 (or pass a higher level Biology course) and Chem 251.

**If dual listed, list graduate level requirements for the following:**

1. **Content** (e.g., What are additional presentation/project requirements?)   
N/A

2. **Intensity** (e.g., How are the processes and standards of evaluation different for graduates and undergraduates? )   
N/A

3. **Self-Directed** (e.g., How are research expectations differ for graduates and undergraduates?)   
N/A

**Course Objectives and tentative course syllabus** with [mandatory information](http://www.uww.edu/acadaff/UCC/Mandatory_Info_Course_Syllabi.docx)(paste syllabus below):

**Biochemistry of Macromolecules (CHEM 454)**

**Instructor**: Dr. Catherine Chan/ Dr. Christopher Veldkamp

**Office**: Upham Hall 209//Upham Hall 257

**Phone**: 262-472-5133/262-472-5267

**E-mail**: chanc@uww.edu/ veldkamc@uww.edu

**Class Time:** M & W 11:00 AM – 12:15 PM

**Where:** UH144

**Credits:** 3

**Prerequisite:**

Biol 120 or Biol 141 (or equivalent) with a ‘C’ or better and Chem 251.

**Course Materials:**

Text – Fundamentals of Biochemistry: Life at the Molecular Level

Voet, Voet & Pratt 4th edition.

Lecture outlines (Powerpoint slides) are posted on D2L course web site.

Students should provide their own scientific calculators.

**Course objectives:**

Biochemistry is the study of chemical reactions as pertained to biological systems. This is a field of intense research with numerous medical and agricultural applications. One of the main goals of this course is to introduce students to fundamental biochemical concepts, and to help them bridge the gap between chemistry and biology while developing a working vocabulary of biochemistry. Students are expected to keep up with reading and homework assignments, and actively participate in class discussions. The ability to apply concepts introduced in class to solve real life and hypothetical problems is emphasized. This course focuses on the study of important biomolecules and enzymes.

**Tentative schedule:**

|  |  |  |
| --- | --- | --- |
| Week | Chapter | Topic |
| 1 | 1 & 2 | Introduction to the Chemistry of Life and Water |
| 2 | 3 | Nucleotides, Nucleic Acids and Genetic Information |
| 3 | 24 | Nucleic Acid Structure |
|  | Exam 1 |  |
| 4 | 4 | Amino Acids |
| 5 | 5 | Proteins: Primary Structure |
| 6 | 6 | Protein: Three-Dimensional Structure |
| 7 | 7 | Protein Function: Myoglobin and Hemoglobin, Muscle Contraction, Antibodies |
|  | Exam 2 |  |
| 8 | 8 | Carbohydrates |
| 9 | 9 | Lipids and Biological Membranes |
| 10 | 10 | Membrane Transport |
|  | Exam 3 |  |
| 11 | 11 | Enzymatic Catalysis |
| 12 | 12 | Enzyme Kinetics, Inhibition, and Control |
| 13 | 12 | Enzyme Kinetics, Inhibition, and Control |
|  | Exam 4 |  |
| 14  15 |  | Primary literature  Primary literature/Review |
|  | Final Exam |  |

**Course policies**:

**A. Attendance**

* Attendance is highly recommended. **There will be important materials presented in lecture that is NOT available from the lecture outline or the text**. If a lecture is missed, it is the student’s responsibility to find out and obtain materials pertaining to what was covered in lecture, including announcement, lecture notes, assignments, etc. Students will NOT be allowed to make-up any quizzes or assignments due to missing classes.
* Please respect your fellow students and the instructor by turning off all communication devices, and refrain from noisy chatter and other disruptive behavior during class time. Disruptive students will be asked to leave the classroom.
* In the event of inclement weather, students are responsible as described in the UWW undergraduate catalog.

**B. Discussions**

* Participation in class discussions promotes active learning and is an integral part of this course. Students are expected to come prepared to be an active participant in class.

**C. Announcements**

- Occasionally, the instructor may provide additional instructions for an upcoming lecture or

assignment shortly prior to class time. These announcements will be posted on the course web site

news page and whenever possible, the instructor will also attempt to contact all students in the

course via e-mail. It is advised that students regularly check their university issued e-mail accounts

(e-mail will only be sent to uww accounts) and/ or the course web site for updates.

**D. Exams**

* The exam schedule is included in this syllabus. Students must take their exams on the scheduled day. Students MUST take the COMPREHENSIVE FINAL EXAM in order to pass the course. THERE WILL BE NO MAKE-UP EXAMS – A missed exam will be recorded as ZERO except for the following reasons:

**(1) Religious Beliefs Accommodation**

Board of Regents policy states that students’ sincerely held religious beliefs shall be reasonably accommodated with respect to scheduling all examinations and other academic requirements. Students must notify the instructor, within the first three weeks of the beginning of classes of the specific days or dates on which they will request accommodation from an examination or academic requirement. For additional information, please refer to the University Bulletin and the Timetable; “Accommodation of Religious Beliefs”.

**(2) Absence for University Sponsored Events**

University policy adopted by Faculty Senate and the Whitewater Student Government states that students will not be academically penalized for missing classes in order to participate in university-sanctioned events. They will be provided an opportunity to make up any work that is missed; and if class attendance is a requirement, missing a class in order to participate in a university-sponsored event will not be counted as an absence. A university-sanctioned event is defined to be any intercollegiate athletic contest or other such event as determined by the Provost. Activity sponsors are responsible for obtaining the Provost’s prior approval of an event as being university sanctioned and for providing an official list of participants. Students are responsible for notifying their instructors as soon as possible (at least one week in advance) of their participation in such events.

**(3) You are very sick on the day of exam**

Students must contact the instructor PRIOR to class time on/ before the day of the exam AND must present a doctor’s note to the instructor explaining your absence at the beginning of the next class period (or the first session that the student starts attending class again). The doctor's note does not need to include medical details but must specify: (1) The date the student received care in the medical facility (2) The duration in which the student is deemed unfit to attend class. If you are unable to attend class for an extended period of time, please notify the instructor to discuss possible options for making-up missed assignments/ exams.

* If the student meets one of the three criteria given above, at the discretion of the instructor, he/ she may be asked to take the mid-term exam on a different date. Otherwise, the remaining mid-term exams will be averaged to provide a score for the missed exam. A student who misses the final exam with a legitimate reason will be asked to take the final exam on a different day (A different version of the exam may be given at the discretion of the instructor). Otherwise, the student will receive a ZERO for the missed exam.

- You must PROPERLY NOTIFY the instructor of your intent and reason to miss an exam following

the procedures outlined above; otherwise your request may not be honored even if your reason is

legitimate.

**Grading:**

* Final grade for the entire semester will be based on students’ performance in the following categories:

**(1) Exams**

4 mid-term exams, 80 points each, and 1 comprehensive final exam, 120 points.

**(2) Quizzes & in-class worksheets**

These will be unannounced quizzes and worksheets given during class time throughout the semester, 60 points total. NO make-up will be allowed. Absence policy for quizzes and in-class worksheets is the same as missed exams as stated in a previous section.

**(3) Discussions**

You will be graded according to your level of active participation in individual and group class discussions throughout the semester, 30 points total. Note that attendance is NOT the same as active participation. Students who miss lectures frequently or rarely participate in class activities will receive a failing grade in this category.

**(4) Discussion of primary literature**

Students will be assigned to read recent articles on topics we covered in lecture. Students are expected to read them AHEAD of class time so that full participation in in-class discussion is possible. Take-home assignments will be given to test your comprehension of these articles, 30 points total.

- If a student does not agree with the points received for a particular exam or assignment, a written appeal that clearly indicates the reason(s) for disagreement must be submitted by 5 PM the day following the graded exam/ assignment has been returned. The entire exam/ assignment will be re-graded and returned to the student within a week. No appeals will be considered during class time and no verbal explanations will be provided. Excessive/ frivolous requests for re-grading will be penalized 25% of the value of the exam/ assignment.

- Total possible points for the course: [80 x 4 (mid-term exams)] + [120 (final exam)] + [60 (quizzes & in-class worksheets)] + [30 (primary literature)] + [30 (discussion)] = 560

* Percentage scale used for determining grades in this course:

Grade % Course grade

100 – 89.5 A

89.4 – 79.5 B

79.4 – 69.5 C

69.4 – 59.5 D

59.4 – 0 F

This scale will NOT be changed.

- In case a final grade % needs to be rounded off, the following guidelines will be used:

(1) If the second decimal place is 4 or less, the final grade % will be rounded down.

(2) If the second decimal place is 5 or more, the final grade % will be rounded up.

However, the instructor may also choose to take into consideration class participation and civility when rounding off a student's grade %.

**Dropping the course:**

It is the students’ responsibility to obtain, fill out and get the necessary signatures on official drop forms before the deadline.

**Additional notes:**

* The University of Wisconsin-Whitewater is dedicated to a safe, supportive and    non-discriminatory learning environment.  It is the responsibility of all undergraduate and graduate students to familiarize themselves with University policies regarding [Special Accommodations](http://www.uww.edu/StdRsces/csd/academic_index.php), [Academic Misconduct](http://www.uww.edu/Catalog/02-04/Legal/legal1.html#Misconduct), [Religious Beliefs Accommodation](http://www.uww.edu/Catalog/02-04/Legal/legal5.html), [Discrimination](http://www.uww.edu/Catalog/02-04/Legal/legal6.html) and [Absence for University Sponsored Events](http://www.uww.edu/Catalog/02-04/Legal/legal1.html#Misconduct) (for details please refer to the Schedule of Classes; the [“](http://www.uww.edu/www.uww.edu/Catalog/02-04/Legal/Legal1.html)[Rights and Responsibilities](http://www.uww.edu/Catalog/02-04/Legal/Legal1.html)[”](http://www.uww.edu/www.uww.edu/Catalog/02-04/Legal/Legal1.html) section of the [Undergraduate Catalog](http://www.uww.edu/Catalog); [the Academic Requirements](http://www.uww.edu/gradstudies/catalog0608/Gradpolicies.php#academicinformation) and Policies and the [Facilities and Services](http://www.uww.edu/gradstudies/catalog0608/Gradpolicies.php#facilitiesandservices) sections of the [Graduate Catalog](http://www.uww.edu/gradstudies/catalog0608/gradcat0608.php); and the “[Student Academic Disciplinary Procedures](http://www.uww.edu/stdhdbk/uwsystem.html) (UWS Chapter 14); and the “[Student Nonacademic Disciplinary Procedures](http://www.uww.edu/stdhdbk/uwsystem.html)" (UWS Chapter 17).
* If any student requires special accommodations, the instructor should be notified as soon as possible.
* **No class materials, including lecture outlines and exam questions/answers, can be posted on non-UWW web site(s) without the written permission of the instructor and the publisher.**

**Academic misconduct:**

Academic misconduct (cheating, copying, and plagiarism) will not be tolerated and will be dealt with according to UWS Chapter 14. The university believes that academic honesty and integrity are fundamental to the mission of higher education and of the University of Wisconsin System. The university has a responsibility to promote academic honesty and integrity and to develop procedures to deal effectively with instances of academic dishonesty. Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources, and for respect of others’ academic endeavors. Students who violate these standards are subject to disciplinary action. UWS Chapter 14 identifies procedures to be followed when a student is accused of academic misconduct. For additional information, please refer to the section in the Student Handbook titled, Student Academic Disciplinary Procedures.

IF YOU CHEAT, YOU WILL FAIL! There are no exceptions or mitigating circumstance.

**Bibliography:** (Key or essential references only. Normally the bibliography should be no more than one or two pages in length.)

Fundamentals of Biochemistry: Life at the Molecular Level, Voet, Voet & Pratt 4th edition, and references therein.

Students will also be expected to obtain information from public web sites such as http://www.ncbi.nlm.nih.gov/ and <http://portal.acs.org/portal/acs/corg/content> to help with the literature review section of the course.