

**College of San Mateo  
Course Outline**

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- New Course  
 Update/No change  
 Course Revision (Minor)  
 Course Revision (Major)

Date: 11/10/11

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**Department: CHEMISTRY                      Number: 420**

**Course Title: Health Science Chemistry II                      Units: 4**

**Total Semester Hours    Lecture: 48    Lab: 48    Homework: 80                      By Arrangement: 16**

**Length of Course**

- Semester-long  
 Short course (Number of weeks \_\_\_\_\_)  
 Open entry/Open exit

**Grading**

- Letter  
 Pass/No Pass  
 Grade Option (letter or Pass/No Pass)

**Faculty Load Credit** (To be completed by Division Office; show calculations.):

**48 lecture hours X 1 FLC / 16 hours Lecture = 3.0 FLC**

**48 lab hours X 0.8 FLC / 16 hours Lab = 2.4 FLC**

**5.4 FLC Per Semester**

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**1. Prerequisite** (Attach Enrollment Limitation Validation Form.)

CHEM 410: Health Science Chemistry I with a grade of C or higher.

**2. Corequisite** (Attach Enrollment Limitation Validation Form.)

NONE

**3. Recommended Preparation** (Attach Enrollment Validation Form.)

NONE

**4. Catalog Description** (Include prerequisites/corequisites/recommended preparation. For format, please see model course outline.)

CHEM 420 Health Science Chemistry II (4) Minimum of 48 lecture hours and 48 lab hours plus 16 hours by arrangement per term. Prerequisite: CHEM 410. Completes the sequence, focusing on organic and biochemistry with special emphasis on the chemistry of carbohydrates, lipids, proteins, nucleic acids, and vitamins and their respective metabolism. Extra supplies may be required. (Spring only.) Students who complete CHEM 210-220 and CHEM 410-420 will receive credit for CHEM 210-220 only. (AA: Area E5a, CSU)

**5. Class Schedule Description** (Include prerequisites/corequisites/recommended preparation. For format, please see model course outline.)

Same as above.

**6. Student Learning Outcomes** (Identify 1-6 expected learner outcomes using active verbs.)

Upon successful completion of the course, the student will be able to:

1. At the introductory level, students will become familiar with organic functional groups and their reactive behaviors as well as more complex biologically relevant chemical systems.
2. Represent the chemical reactions and biochemical mechanisms.
3. Solve elementary quantitative problems involving behavior and reactions of various chemical substances. Special emphasis will often be given to examples that directly relate to biology, health, and medical sciences.

**7. Course Objectives** (Identify specific teaching objectives detailing course content and activities.

*For some courses, the course objectives will be the same as the student learning outcomes. In this case, "Same as Student Learning Outcomes" is appropriate here.)*

SAME AS STUDENT LEARNING OUTCOMES

**8. Course Content** (Brief but complete topical outline of the course that includes major subject areas [1-2 pages]. Should reflect all course objectives listed above. In addition, a sample course syllabus with timeline may be attached.)

*(Please see attached syllabus for course timeline)*

- CHEM 420 is comprised effectively of two parts, the first half of the class will focus upon Organic Chemistry and the second half on Biochemistry. Both portions of the course will have materials that are focused on the health sciences field.
- Organic chemistry is needed in order to get students familiar with functional groups and their properties. The functional groups that will be studied in detail are: saturated and unsaturated hydrocarbons, alcohols, ethers, aldehydes, ketones, carboxylic acids, amines, amides, and stereochemistry. Students exposed to these functional groups will learn: proper naming, structure elucidation, how to properly draw/represent, chemical reactivity, and how to perform multistep synthesis between each of these functional groups. A student will be able to take the materials learned in this portion of the course, and at the introductory level understand how this information relates to more complex biologically relevant chemical systems found in the human body.
- An understanding of these organic chemistry building blocks will be expanded upon in the biochemistry portion of the course. This introduction to organic chemistry will be applied to large, complex chemical reactions. A student will learn how to properly represent chemical reactions, balance equations, and understand how to approach these types of problems. After an understanding of chemical reactions, the student will use this information in the exploration of biochemical mechanisms that are found in the health sciences field.
- The course also covers in detail how to solve quantitative problems of chemical systems and understanding their behavior. This will involve understanding how functional groups interconvert between themselves, as well as how these can be used to create large scale molecules that are biologically important. This includes an understanding of polymers and their chemistries.

**9. Representative Instructional Methods** (Describe instructor-initiated teaching strategies that will assist students in meeting course objectives. Describe out-of-class assignments, required reading and writing assignments, and methods for teaching critical thinking skills. **If hours by arrangement are required, please indicate the additional instructional activity which will be provided during these hours, where the activity will take place, and how the activity will be supervised.)**

Some but not necessarily all of the following methods are employed when teaching this course to assist students in achieving the course objectives.

- Students will be required to have an appropriate textbook and approved laboratory manual for this course.
- Lecture style presentation of materials
- Computer and video programs.
- In class exams and a comprehensive final
- Group work on problems in lecture and experimental procedures in lab.
- The use of assigned homework.
- In class presentation of a topic that fits in the domain of modern science.
- Instructional materials that will be integrated in this class will include a textbook, outside electronic media (such as videos of chemistry related movies), three dimensional computer simulations of chemical compounds, and physical model kits.
- To be arranged hours will be required. Students are expected to work on the practice and use of modern chemistry as it relates to everyday life. These activities are above and beyond normal classroom/laboratory instruction and are in excess of prescribed homework activities. A list of approved TBA will be provided to students at the start of the semester.

**10. Representative Methods of Evaluation** (Describe measurement of student progress toward course objectives. Courses with required writing component and/or problem-solving emphasis must reflect critical thinking component. If skills class, then applied skills.)

Some but not necessarily all of the following methods are employed when teaching this course to assist the students in achieving the course objectives.

Exams, quizzes, laboratory work, written and oral reports, and assigned exercises will be used to learn and evaluate in an on-going manner students' knowledge acquisition. Furthermore, students may be required to give a class presentation of a modern topic in the sciences.

**11. Representative Text Materials** (With few exceptions, texts need to be current. Include publication dates.)

(2009) Karen Timberlake, *General, Organic, and Biological Chemistry 3<sup>rd</sup>. ed*  
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