CHEM 127 – Structure and Function of Organic Molecules (3 cr.)
South Dakota State University
Department of Chemistry & Biochemistry
Spring 2015

Course Meeting Time: M&W 3:00PM – 4:15PM
Course Meeting Location: SAV 280

Instructor David Cartrette, Ph.D.
SAV 336
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David.Cartrette@sdstate.edu
Office Hours: T&W mornings, 0900 – 1030; other times by appointment

Course Description
A continuation of CHEM 115 which introduces the chemistry of carbon containing compounds. It is the second course in a four-course sequence. Topics covered include: nomenclature, functional group analysis, stereochemistry, acid/base chemistry, organic chemistry reactions, mechanistic explanation of electron movement, and thermochemistry of organic reactions. Chemistry, Biochemistry, and Honors College students only. CHEM 326 may not be substituted for CHEM 127 unless explicitly allowed by the department head. This course meets System Goal #6 (SGR 6): Natural Sciences. As a result of taking this course, students will:

- Demonstrate the scientific method in a laboratory experience;
- Gather and critically evaluate data using the scientific method;
- Identify and explain the basic concepts, terminology, and theories of chemistry;
- Apply selected chemistry concepts and theories to contemporary issues

Course Prerequisites CHEM 115 (Atomic and Molecular Structure)

Textbooks Principles of Modern Chemistry, 7th Ed., by Oxtoby, Gillis, and Campion
Solutions manual and study guide to accompany Oxtoby and Loudon texts
Molecular modeling kit is STRONGLY suggested

Examination Schedule See outline, last page of syllabus

Examinations and Other Earned Points

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
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<tbody>
<tr>
<td>Two in-class examinations</td>
<td>300</td>
</tr>
<tr>
<td>Final Exam</td>
<td>200</td>
</tr>
<tr>
<td>Six homework assignments</td>
<td>300</td>
</tr>
<tr>
<td>Total Points</td>
<td>800</td>
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</tbody>
</table>

There will be two 75 minute examinations valued at 150 points each. The final exam for the course is semi-cumulative; emphasis will be placed on material covered after the
second in-class exam. Additionally, six graded homework assignments will be given. The guaranteed grade cutoffs, based on the possible 800 points that can be earned, follow the standard grading scale shown below:

<table>
<thead>
<tr>
<th>Point Total</th>
<th>Grade</th>
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<tbody>
<tr>
<td>720 – 800</td>
<td>A</td>
</tr>
<tr>
<td>640 – 719</td>
<td>B</td>
</tr>
<tr>
<td>560 – 639</td>
<td>C</td>
</tr>
<tr>
<td>480 – 559</td>
<td>D</td>
</tr>
<tr>
<td>0 – 479</td>
<td>F</td>
</tr>
</tbody>
</table>

This course will NOT be graded on a curve.

Course Policies

Instructional Methods:
This course will be taught using traditional lecture methods interspersed with classroom discussion.

Attendance Policy:
Teaching and learning is a reciprocal process involving faculty and students. Faculty members have an obligation of holding classes on a regular basis and students have an expectation to attend and participate in classes on a regular basis. Faculty members determine the specific attendance policy for courses under their direct supervision and instruction. Attendance is not mandatory in lectures, but you will find it very helpful to attend lectures in learning the material. However, should circumstances such as those described below arise, accommodations will be made to assist the student in making up work missed:

Absence due to personal reasons when work is due: Any exceptions to the faculty member’s written attendance policy due to verified medical reasons, death of a family member or significant other, or verified extenuating circumstances judged acceptable by the instructor or the Office of Academic Affairs, will be honored. If a student has an accident, falls ill, or suffers some other emergency over which s/he has no control, the student will gather whatever documentation is available (e.g., copies of repair or towing bills, accident reports or statements from health care provider) to show the instructor. Such exceptions must be communicated and negotiated between the student and faculty member prior to the absence whenever possible. Absences for vacations, breaks, or personal interviews do not constitute a valid reason for absence.

Absence due to approved university-sponsored/recognized trips when work is due: Faculty and administration will honor officially approved absences where individuals are absent in the interest of officially representing the University. Appropriate sanctioned activities include:

- Collegiate club sports and competitions;
· Conferences and workshops recognized by the University not related to academics;
· Commitments on behalf of the University (Students’ Association, Band, Choir, etc.);
· Intercollegiate athletics (refer to page 5 of this document for Student-Athlete Class Attendance Policy); and
· Professional activities recognized by the University related to academics (professional conference attendance, etc.)

Requests for excused absences must be submitted one week prior to the trip or event. Students must present the completed approved trip absence card to the faculty member prior to the trip or event to have an official excused absence. Faculty members are not required to honor incomplete or late cards.

_Students with official excused absences:_ Students with excused absences will be given appropriate make up work or instructor-determined equivalent opportunities for obtaining grades as students who were in attendance. Students with official excused absences are not to be penalized in course progress or evaluation. However, should excused absences be excessive, the faculty member may recommend withdrawal from the course(s) or a grade of incomplete to the student.

_Office Hours:_
A certain number of hours a week are set aside as your time to ask questions about the course material. In the event that you cannot attend office hours, I ask that you make an appointment such that I’m actually in the office when you arrive.

_Returned Graded Assignments:_
When a graded assignment is returned to you, a period of 24 hours must pass before asking any questions about it. Also, before asking any question you must consult the answer key, which will be posted on D2L. Be aware that if you speak with me about your returned graded assignments, I will know whether you consulted the answer key posted on D2L. If you feel that your work has been evaluated unfairly, you may submit a re-grade request (see below).

_Re-grade Requests:_
You may submit a re-grade request for any graded assignment if the following conditions apply:

a) Material must be completed in blue or black ink. Use of pencil will result in no re-grade opportunity.
b) The addition of points on an exam or homework was incorrect.
c) The answer you gave was congruent with the answer key but you still did not receive the points.
d) The minimum number of points you may ask for is 5 points. In other words, if you feel that your answer was worth less than 5 points you may not request a re-grade unless conditions a and b are met.
e) Re-grade requests can be made up to 8 days after the assignment has been returned to you.

**Note:** You should be aware that the instructor retains the right to re-grade the entire assignment, which may result in an overall lower grade.

**Late Assignments:**
Assignments are due before lecture starts on the due date. Assignments turned in within 24 hours after this time will be graded and a 50% deduction of points will occur. Assignments more than 24 hours late will receive a grade of zero.

**Helpful Hints**

**Reading Assignments:**
Reading assignments for each chapter from both texts (when applicable) will be posted on D2L, before we begin covering the chapter. It is your responsibility to read these assignments before coming to class.

**Problem Assignments:**
End of the chapter problem assignments will be posted on D2L along with chapter reading assignments for each topic covered. It is your responsibility to work and understand these problems since they might show up in quizzes or exams. While these assignments will not be turned in for grading, it is a good idea to be able to work and understand these problems.

**Homework:**
There will be five problem sets assigned during the course which **will** be graded. The exercises used in the problem sets will be different from the ones provided in the textbooks. I suggest, as mentioned above, that you work the problems provided in the textbook, as you might see them (or variants of them) again.

**Helpful Hints:**
First and most importantly, **KEEP UP WITH ASSIGNED READINGS AND PROBLEMS!** Problem solving success is **vital** to your successful understanding and completion of CHEM 127. Maintain a small (4 people or less) study group that meets regularly. Based on experience, in this study group the most effective methods are to meet at least twice per week, divide the practice problems equally, and come prepared to discuss the problems you were given in the group. While listening to lecture and reading the textbook is always a good thing to do, you will learn much more when you are able to explain concepts to others in your own words. If you have questions in lecture, don’t be afraid to ask. Feel free to come to office hours, or make an appointment if you cannot make scheduled office hours.

**Classroom Etiquette:**
Lecture will begin promptly at 3:00PM, so please be in your seat and ready by this time. The instructor will be in the classroom previous to this time and at the end of the lecture period if you have any questions you’d like to ask. You should expect lecture to end at
4:15PM, and not before. I ask that you do not read newspapers, prepare to leave before the entire class period is over, talk loudly, or inappropriately use technological devices in the classroom. Anyone who disturbs the class repeatedly will be asked to leave.

**Academic Dishonesty:**
The University has a clear expectation for academic integrity and does not tolerate academic dishonesty. University Policy 2.4 sets forth the definitions of academic dishonesty, which includes but is not limited to, cheating, plagiarism, fabrication, facilitating academic dishonesty, misrepresentation, and other forms of dishonesty relating to academics. The Policy and its Procedures also set forth how charges of academic dishonesty are handled at the University. Academic Dishonesty is strictly proscribed and if found may result in student discipline up to and including dismissal from the University.

**Students with Disabilities:**
Any student who feels s/he may need testing or learning accommodation based on the impact of a disability should contact Nancy Hartenhoff-Crooks, Coordinator of Disability Services (605-688-4504 or Fax, 605-688-4987) to privately discuss your specific needs. The Office of Disability Services is located in room 065, the Student Union. *It is the responsibility of the student to report her/his learning affective disorder to the Coordinator of Disability Services.*

**Academic Freedom and Responsibility**
The South Dakota Board of Regents (the governing body of higher education in the state) has required the inclusion of a statement on freedom of learning into all syllabi beginning Fall 2006 semester (BOR Policy 1:11). It reads as follows:

_Students are responsible for learning the content of any course of study in which they are enrolled. Under Board of Regents and University policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any courses of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should first contact the instructor of the course. If the student remains unsatisfied, the student may contact the department head and/or dean of the college which offers the class to initiate a review of the evaluation.*

**Learning Goals for the Course:**
Basic Student Learning Outcomes
This course satisfies System Goal (SGR) #6 in graduation requirements. As a result of taking this course, students will understand the fundamental principles of the natural sciences and apply scientific methods of inquiry to investigate the natural world in the following ways:

- Demonstrate the scientific method in a laboratory experience
- Gather and critically evaluate data using the scientific method
- Identify and explain the basic concepts, terminology, and theories of chemistry
• Apply selected chemistry concepts and theories to contemporary issues

These will be assessed in a variety of ways, including but not limited to homework assignments and examinations.

Advanced Student Learning Outcomes
The overarching goal for the development and implementation of the 115/127/229/237 sequence is to provide first and second year students with the tools necessary to be successful problem solvers, critical thinkers, and (to some degree) risk takers in their knowledge acquisition. Upon completion of this course, I expect that you will:
• Have a stronger understanding of the structure/function relationship and its application toward the problem solving processes
• Begin to make strong cognitive connections for the unifying principles of chemistry as they apply to both organic and inorganic examples
• Develop a sense of independence of thought which continually grows over time
• Acquire the vocabulary of chemistry and use it competently when discussing course material
• Begin to understand the reactions of organic chemistry and how molecules are transformed by reactions
<table>
<thead>
<tr>
<th>Dates</th>
<th>Topic</th>
</tr>
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<tbody>
<tr>
<td>12 – 14 Jan</td>
<td>Course Expectations; Stereochemistry</td>
</tr>
<tr>
<td>19 Jan</td>
<td>MLK, Jr Day</td>
</tr>
<tr>
<td>21 Jan</td>
<td><em>Last day to drop course without “W”</em></td>
</tr>
<tr>
<td>21 Jan</td>
<td>Stereochemistry; Theories of Acid/Base Behavior</td>
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<tr>
<td>26 - 28 Jan</td>
<td>Theories of Acid/Base Behavior</td>
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<tr>
<td>2 - 4 Feb</td>
<td>Reactive Intermediates in Organic Chemistry</td>
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<tr>
<td>9 – 11 Feb</td>
<td>Radical Halogenation of Alkanes</td>
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<tr>
<td>16 Feb</td>
<td>Presidents’ Day Holiday</td>
</tr>
<tr>
<td>18 – 23 Feb</td>
<td>Radical Halogenation of Alkanes</td>
</tr>
<tr>
<td>25 Feb</td>
<td>Exam I</td>
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<tr>
<td>2 – 4 Mar</td>
<td>Analysis of Reactions: Substitution and Elimination</td>
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<tr>
<td>9 – 13 Mar</td>
<td>Spring Break</td>
</tr>
<tr>
<td>16 – 23 Mar</td>
<td>Analysis of Reactions: Substitution and Elimination</td>
</tr>
<tr>
<td>25 Mar</td>
<td>Exam II</td>
</tr>
<tr>
<td>30 Mar - 8 Apr</td>
<td>The Pi Bond; Electrophilic Addition</td>
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<tr>
<td>7 Apr</td>
<td><em>Last Day to Drop Class with “W”</em></td>
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<tr>
<td>13 – 15 Apr</td>
<td>Alkyne Chemistry</td>
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<tr>
<td>22 – 29 Apr</td>
<td>Benzene and the Concept of Aromaticity</td>
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<tr>
<td>TBA</td>
<td>FINAL EXAM</td>
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