**Chem 3514: Organic Chemistry I**

Lecture Syllabus

**Fall 2017**

**Professors:** Dr. Jerry Fong (PHS 305), 607-587-3692, fongjd@alfredstate.edu

Dr. Stephanie Rugg (PHS 302), 607-587-3676, ruggsc@alfredstate.edu

**Course Website:** Blackboard & http://web.alfredstate.edu/faculty/fongjd/OrgChem1.htm

**Required Materials:** Organic Chemistry by Klein, 3rd edition

**Suggested Model Kit:** “**Darling Molecular Model Kit”** (will be required in Organic II)

**Suggested Software:** [**http://www.acdlabs.com/downloads** *download Chemsketch 11.0*](http://www.acdlabs.com/downloads%20download%20Chemsketch%2011.0) *freeware*

**Grading:**

|  |  |  |  |
| --- | --- | --- | --- |
| *Item* | *Points each* | *Total Points* | *% of total* |
| Homework (10) | 30 | 300 | 30 |
| 3 Exams | 100 | 300 | 30 |
| Lab\* | -- | -- | 25 |
| Final Exam | 150 | 150 | 15 |
| *Total* |  | *1000* | *100* |

*\*If you miss two labs or flunk the laboratory portion of the course, you flunk the entire course !!*

*A: 90=100% B: 80-89% C: 70-79% D: 60-69% F: <60%*

**Course Mechanics:**

Homework will be assigned and available each Monday and due the following Wednesday. We will not accept late homework. **If** sufficient student interest arises we’ll will try to hold a regular (once-weekly) recitation but it must be student-generated interest that triggers the recitation. Many in-class `drill & practice’ Powerpoint exercises as well as in-class paper exercises form the backbone of the course. We’re not big on just lecturing. You guys have to get involved and practice the craft of Organic Chemistry, which means lots of active classroom gymnastics. There will also be numerous handouts summarizing and capturing key pieces of the lecture. These will complement the text and provide the instructors’ own `spins’ to the material. You are advised to keep a binder of these and to date each item. You are **utterly responsible** for reading the text sections listed in the course syllabus on the reverse. **Do not rely just on the lecture**. Note too, that just about everything presented during the semester is made available at the homemade course website (see URL above.)

**Course Goals:**

Current Evolutionary Theory says-and we are not making this up- that Life arose from a chain of chemical transformations starting from foolishly simple compounds like ammonia and methane to astoundingly complex organic critters like proteins and DNA, and, thence {upon aggregation, coalescence and just plain shucking and jiving), to entities as different as fleas and redwoods. This is like saying that glass marbles, if banged, rattled and rolled hard enough and long enough, can become a coffee cup or the Statue of Liberty.

To begin to apprehend this fantastic, improbable story, it is helpful to view organic compounds like they’re little animals. It then becomes natural to ask (at least) the following four questions:

1) What do these organic animals `look like’ and how do they act by themselves?

(structure & properties)

2) How do they react to the presence of other, different organic critters? (reaction class)

3) What can we easily cross breed them into? (synthesis)

4) What controls the rate and outcome of breeding? (mechanism)

Answering these four questions are the goals of Organic Chemistry at Alfred State. A more technically rendered version of these goals, the student learning outcomes (SLOs) are below: **At the end of the Fall semester, students should be able to:**

1) properly identify, name and draw the geometric and electronic structure of most simple aliphatic compounds and relate how these structural features govern boiling point, melting point and thermodynamic stability

2) recall the major reactions typical of the several classes of elementary functional groups covered, e.g. alkanes, alkenes, alkynes , alcohols, ethers and alkyl halides

3) use their knowledge of reaction directions, mechanism and molecular structure to create rational and reasonable synthetic pathways to moderately complex compounds starting from a simple starting compound or two.

4) rationalize both the direction and mechanism of these reactions in terms of geometric and electronic structure.

**Course Ethics :**

You can expect good manners, honesty, tolerance, humor and fairness from us. We expect the same from you. You will be ejected from class permanently with an Instructor Initiated Drop and an F if you act with chronic disregard with the Alfred State code of behavior. This policy will be in particular force if you are caught cheating. We utterly detest cheaters.

**Course Philosophy**:

Organic Chemistry is universally viewed as hard and (in)famously unreasonable in its demands on students. At big, premiere schools like Cornell, Harvard and Berkeley, organic chemistry is taught at machine gun rates (sometimes a chapter or two/50 minute lecture). This is done, frankly, -not in the name of learning- but because first year organic chemistry is the pre-med ‘weed-out’ course. The rationale seems to be that if you can cram it all in your head long enough to pass the exams, you must be smart enough to be an MD. We completely reject this asinine approach. It sucks the life right out of the classroom and (fyi) it nearly made one of us quit chemistry altogether- a fact illustrating the distressing fact that even the most committed and dedicated students can be derailed by indifferent teachers.

This is why we teach Organic Chemistry way, way, way differently than they do at those other places. For our money, what Organic Chemistry ultimately teaches you is a unique ***thinking style.*** Organic chemists apply this style as they seek underlying pattern and sense from often disjointed and conflicting piles of information. Part of this admittedly involves remembering things, but the process and approach you take to permanently organizing, imagining and fixing information into your cranium constitutes the real lesson. If you master the organic chemist’s ***approach*** to dealing with puzzles and problems you’ll have permanently gained a foundation skill critical to science, medicine and to living in general.

Getting you to actively practice and permanently take this skill in your bones is the course’s real focus.

This is not to say that you won’t be responsible for a ton of chemistry. You’ll span ~ the same amount of material as the folks at all the big schools. However, the instructor’s lectures will focus on active, in-class practice with thinking like an Organic Chemist. Just like symbols and numbers in math, the details of organic chemistry (reaction and mechanism) are not the end in themselves, but the fodder for practicing a particular style of reasoning. It may not be Berkeley, but then, Berkeley ain’t Alfred State. We vow to never to make students feel as discouraged and demoralized as Doc was when he took Organic Chemistry the first time. We’re going to hang loose, work together and have some fun. So, buckle up and let’s go for the ride through Organic Land.

**Academic Integrity:**

Absolute academic integrity is expected of all students and faculty members of Alfred State. Students must in no way misrepresent their work, fraudulently or unfairly advance their academic status, or in any way help other students commit acts of academic dishonesty, and faculty members must fairly evaluate academic work. This code defines rights and responsibilities relating to academic integrity and outlines the procedure for dealing with allegations of academic misconduct. It also outlines the procedure for student academic grievances against faculty members. This code shall be communicated to the college community by being included in the faculty handbook, the college website, and student and faculty orientation information. The college website contains the most current version of the policies and procedures governing the college's academic integrity code. (http://www.alfredstate.edu/academic-integrity-code)

**Students with Disabilities:**

Alfred State is firmly committed to providing an equal opportunity for a college education to all qualified students. The philosophy of the Office of Student Disability Services reflects the interpretation of Section 504 of the Rehabilitation Act of 1973 in terms of providing reasonable and individualized accommodations. We welcome students with disabilities into our campus community and our programs. In this spirit, we are committed to providing reasonable opportunities to qualified students to participate in campus programs and activities. We recognize that the needs for each person with a disability are unique; therefore, services and/or accommodations are provided on an individualized basis. Students with disabilities are encouraged to participate in all aspects of campus life. Self-identification is essential and self-advocacy is encouraged.

For further information, please visit the Office for Disability Services Website.

**SYLLABUS**

**CHEMISTRY 3514 Fall 2017 (Fong & Rugg)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Dates** | **General Topic** | **Text pages** |
| **1** | 8/28-9/1 | Review: Valence Bond theory , Line/Bond structures, curved arrows, functional groups | Ch. 1 & 2 (Fong) |
| **2** | 9/4-9/8 | Acids: Intro to mechanisms | Ch 3 (Rugg) |
| **3** | 9/11-9/15 | Alkanes: naming, constitutional isomers | Ch 4 (Fong) |
| **4** | 9/18-9/20 | Cyclohexane conformations | Ch 4 (Fong) |
| **4** | 9/22 | Stereochemistry | Ch 5 (Rugg) |
| **5** | 9/25-9/27 | Stereochemistry cont. | Ch 5 (Rugg) |
| **5** | **9/29** | **Exam 1: Ch 1-5** |  |
| ***6*** | *10/2-10/3* | *Minibreak!* |  |
| **6** | 10/4-10/6 | Mechanisms | Ch 6 (Rugg) |
| **7** | 10/9-10/13 | Substitution reactions | Ch 7 (Fong) |
| **8** | 10/16-10/20 | Elimination reactions | Ch 8 (Rugg) |
| **9** | 10/23-10/25 | Practice with SN1, SN2, E1, E2 |  |
| ***9*** | ***10/27*** | ***Exam 2: Ch 6-8*** |  |
| **10** | 10/30-11/3 | Addition to Alkenes | Ch 9 (Rugg) |
| **11** | 11/6-11/10 | Alkynes | Ch 10 (Fong) |
| **12** | 11/13-11/17 | Radical Reactions | Ch 11 (Fong) |
| **13** | 11/20 | Review |  |
| ***13*** | *11/22-11/24* | *Thanksgiving Break!* |  |
| **14** | 11/27-12/1 | Synthesis | Ch 12 (Rugg) |
| **15** | 12/4-12/8 | Synthesis cont. |  |
| ***5*** | ***12/6*** | ***Exam 3: Ch 9-12*** |  |
| **15** | 12/8 | Parting shots | Fong & Rugg |
| **16** | 12/11-12/15 | Finals Week |  |