Fall 2017
The Chemistry of Alcohol
Chem 283-01   SSM 127
Sept 4, 11, 18, 25   Oct 2, 9, 23, 30   Nov 6, 13, 20, 27   Dec 4
6:30-8:15pm
Instructor: Michael Cohen
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e-mail: orthowine@gmail.com, cohenmm@cofc.edu
Office hours: By appointment.

Course prerequisites: one-year college level biology or chemistry

Course description:
This course will explore the workings of chemistry and it’s application in the creation of alcoholic beverages. Beer, wine, and spirit will be broken down to the molecular level to gain an understanding of how fermentation works to create such radically different alcoholic beverages available in the market place. Laboratory analysis will be conducted in conjunction with the course. Students will make their own beer during the semester and will analyze their samples in a laboratory environment. Field trips to breweries will supplement the course curriculum

Learning objectives:
Topics:
- Learn the basic components of beer and how they are manipulated to create differing flavor profiles
- Relate similarities and differences in fermentation science as it relates to wine, beer, and spirit
- Evaluate and detail alcohol chemistry and reducing sugars in wine in a laboratory setting
- Evaluate the contribution of wood and its components in the creation of alcohol
- Understand the biochemistry behind sensory analysis and how organoleptics influence the wine industry

Learning methods:
- The course is designed to expose the student to wine, beer, and spirit chemistry.
- The first section of the course is devoted to the development of beer from an academic basis in text through a theoretical expression with home construction
- The student will be tasked with creating their own beer at home and analyze it in a laboratory setting with respect to anthocyanogenses, total carbohydrates, and alpha iso acids.
- Laboratory knowledge will be gained from a new analyzer specifically designed for beer chemistry. Students will need to critically think through their beer experiments to quantify their results
- Incorporation of real world chemistry will be provided through off campus visits to local breweries where students will be able to see firsthand the application of chemical science in the beer industry.
- The second part of the course revolves around the students’ acquisition of wine chemistry knowledge through sensory analysis and laboratory analysis of alcohol content and reducing sugars.
• Case study will be incorporated into the curriculum as a way to develop authentic learning and synthesize hypothesis about alcohol chemistry

**Learning Outcomes**

• Upon completion, the student will obtain an in-depth knowledge of the chemistry involved in the creation of alcoholic beverages
• By utilizing database query, the student will be proficient in stipulating criteria relevant to data mining as it pertains to the subject matter, further developing computer skills for the science industry
• With the interaction of the students presenting data, in a symposium style setting, students will become familiar with scientific interaction and learn to assimilate as well as question knowledge
• Students will begin to understand the nuances of alcohol and how it can be altered within the human body

**The course will support the School of Science and Math learning goals:**

• **Effective Communications:** The students are encouraged to participate in interactive lecture discussion of the material. Case study analysis will effect this goal. Field trips to breweries will provide the student an opportunity to interact with experts in their particular field.

• **Ethical Awareness:** Students will recognize and be able to appraise ethical dilemmas involved in Science and Math industries. Medical science will be incorporated into the curriculum to expose the student to medical issues as they pertain to alcohol production and consumption.

• **Global Awareness:** Students will be exposed to the international contributions of scientists who have expanded the base knowledge of chemistry as it pertains to alcohol. The role of chemistry in creating unique alcoholic beverages around the world will be stressed. The need for future scientific discovery as it pertains to alcohol creation will be stressed.

• **Problem Solving Ability:** Students will be tasked with creating beer, analyzing this in a laboratory setting and submitting their scientific discovery for grading. Additionally, students will select a wine of their choosing for a laboratory analysis of alcohol content and reducing sugars, and submit their findings for grading. Lecture material will provide directional assistance in this creation.

**Recommended text:**

*The Chemistry of Alcohol*
By Michael Cohen, DO FAAOS
Spiral bound book offered by the book store

**Academic Integrity:** The College of Charleston’s Honor Code is in effect in this course. Any student caught cheating will receive a failing grade in the course and additional action may be taken. Cheating includes copying someone else’s work in exams, quizzes, and assignments. It includes using notes and other aides during exams when not authorized to do so, collaborating with others for take-home exams, using someone else’s idea’s without referencing them, or turning in an assignment for this class that was submitted, in whole or in part, for another class. Cheating also includes the
allowing of one’s work to be copied by another and doing work for another student. If you are unclear about what constitutes cheating, please see the Instructor.

Students Needing Access Parity (SNAP) – We provide services and accommodations for students with disabilities (physical, psychological, learning or attentional) that have been documented by a qualified MD or psychologist. Documentation must meet criteria published in the SNAP brochure and on our website http://disabilityservices.cofc.edu. Accommodations are decided on a case-by-case basis and are determined by the type and severity of the disability and the essential elements of the course the student is taking. Accommodations are designed to provide access to education and to circumvent or reduce the effect of the disability as much as possible, not to give an advantage or guarantee success.

Grades:

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<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>92-100</td>
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<tr>
<td>A-</td>
<td>89-91.9</td>
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<td>B+</td>
<td>86-88.9</td>
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<tr>
<td>B</td>
<td>81-86</td>
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<tr>
<td>B-</td>
<td>79-80.9</td>
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<td>C</td>
<td>77-76.9</td>
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<tr>
<td>C+</td>
<td>72-76.9</td>
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<td>C-</td>
<td>70-71.9</td>
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<td>D+</td>
<td>67-69.9</td>
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<td>D</td>
<td>60-66.9</td>
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<td>F</td>
<td>59 or less</td>
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Factors in Grading: The course is broken up into several sections with laboratory experiments for beer and wine. There are 5 labs during the semester and each will be worth 10% towards the final grade. Factors involved in laboratory work will be the completeness of the experiment, hypothesis, demonstration of work during the lab, and conclusion.
A comprehensive final exam will be given at the end of the course worth 40% of the final grade.
Class participation, attitude, and demeanor will count for 10% of the final grade.

Class attendance and participation: Attendance is important. Due to the in depth coverage of the subject matter, missing one class can be difficult to make up on your own. Research indicates that class discussion/participation fosters enhanced learning for all members of the class.
- Anyone missing more than 2 classes may be deemed ineligible for a grade of ‘A’
- Anyone missing more than 3 classes may be deemed ineligible for a grade of ‘B’
- Anyone missing more than 4 classes may be deemed ineligible for a grade of ‘C’
- Anyone missing more than 5 classes may be deemed ineligible for a grade of ‘D’

Attendance is only excused for medical or other serious and legitimate reasons. Students MUST submit documentation for any absence considered for an excuse.