NFS 095  Kitchen Science
Spring 2020
Mon/Wed/Fri  9:40 – 10:30am
Marsh Life Sciences 233

Instructor Information
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Laura.Almstead@uvm.edu
Office Hours:  Wednesdays  4:30pm – 6:00pm
               Thursdays  11:30am – 1:00pm
               or by appointment (e-mail me to schedule a time)

Course Description
Ever wonder why you add baking soda to chocolate chip cookies? Or whether searing a piece of meat really “locks in” the juices? Or why chocolate melts in your mouth, but not in your hand? Or why cutting an onion brings tears to your eyes, and whether the way you cut it makes any difference? Or what makes sticky rice sticky? In this course, we use science to unlock the mysteries of food and cooking. We’ll explore the scientific principles that underlie culinary phenomena and apply them to explain the properties of foods and how certain food preparation techniques work. The class is structured as an integrated lecture-lab, and our laboratory activities will give you hands-on opportunities to put these scientific principles to the test in the kitchen. At the end of the course, you’ll apply what you’ve learned to investigate the science behind a culinary phenomenon of your choice. Although this is not a cooking course, you can use what you learn in the class in your own kitchen to better understand recipes and come up with your own culinary creations.

Learning Outcomes
• Describe the structures of the primary molecules in foods and explain how their structures relate to their chemical and physical properties
• Explain how the types of chemical bonds within and between molecules in foods change in response to various food preparation techniques and how these changes relate to what we see in the kitchen
• Explain how energy transfer differs between cooking methods and why different cooking materials (e.g. water vs. oil; stainless steel vs. glass) differ in their ability to transfer heat to foods
• Apply an understanding of enzymatic and temperature-dependent chemical reactions important in the kitchen to explain how we can manipulate them when preparing foods
• Describe the molecular and physiological mechanisms that underlie our perception of flavor
• Demonstrate an ability to design and conduct controlled experiments, analyze and clearly present data, and draw appropriate conclusions
Required Materials
There are no required books for this course. Required readings (posted on BlackBoard) will consist of book excerpts, web pages, videos and/or scientific papers. Lab handouts will also be posted on BlackBoard. You are responsible for printing each lab handout and bringing it with you to class. You will also need access to Adobe Reader to read course documents and Microsoft Word and Excel to complete your assignments. If you do not have Microsoft Office for your personal computer, you can obtain it for free as a UVM student (details here http://www.uvm.edu/it/software/about.html). Microsoft Word and Excel are also available on the computers at the library. Adobe Reader is free and can be downloaded from https://get.adobe.com/reader/ if you don’t already have it on your computer.

Course Structure
This is an integrated lecture-lab course, which means that some of the classes will be lecture/discussion and others will be devoted to hands-on lab activities. The primary goal of lectures will be to introduce specific scientific concepts important for understanding the properties of foods and various cooking/food preparation techniques. In the lab activities, you’ll have the opportunity to visualize and assess some of the scientific concepts covered in lecture by conducting controlled experiments. Although you’ll be able to taste a few of the things you make in lab, our goal is not preparation of foods for consumption.

Class Policies
• Attendance is essential. Participation and engagement in class and lab are essential components of this course. Readings and associated materials are important pre-class preparation, but are not substitutes for what we’ll discuss in class. In most cases, lab activities cannot be completed outside of class time, and data obtained from your experiments is required to complete the lab write-ups. Contact me as soon as possible if you cannot be in class due to illness or a UVM sanctioned event.

• ALL electronics (e.g. cell phones) must be turned off and kept OFF your desk. Use of electronic devices limits your ability to engage in class and is distracting to people around you. Be courteous and help create a positive learning environment. Laptops are allowed during our lectures for note taking purposes and are NOT allowed on days when we’re performing lab activities.

• Questions are welcomed and encouraged at all times. Please let me know if something is not clear! If you find yourself struggling, talk to me as soon as possible so that you do not fall behind.

• Announcements and reminders will be sent to your UVM e-mail address. You are responsible for checking your UVM e-mail on a daily basis (or having your UVM e-mail forwarded to an account you check daily).
Grading
No individual extra credit will be offered. The scale for final letter grades will not be determined until the end of the semester, but will not be more stringent than standard cutoffs.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Participation</td>
<td>12%</td>
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<tr>
<td>Reading Questions</td>
<td>12%</td>
</tr>
<tr>
<td>Lab Write-Ups</td>
<td>30%</td>
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<tr>
<td>Quizzes</td>
<td>16%</td>
</tr>
<tr>
<td>Final Project</td>
<td>30%</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
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Assignments
There are two types of assignments in this course, Reading Questions and Lab Write-Ups, which are described below. Unless otherwise noted, all assignments must be submitted on BlackBoard BEFORE class on the day they are due (see the Course Schedule). Late assignments submitted within 24 hours of the due date will receive a 15% penalty. An additional 10% will be deducted per day for each day beyond that up to a maximum of five days late. If there is an extenuating circumstance that warrants an extension, you must contact me BEFORE the assignment is due. Emergencies will be handled on a case-by-case basis.

- **Reading Questions**: These assignments will consist of a few short answer-style questions based on the required readings. The goals of these questions will be to help you focus on the most important points in the readings and be better prepared for class. There will be one set of questions for each assigned reading. The questions will be available on BlackBoard several days in advance and are due BEFORE class on the day the readings are indicated in the schedule. Your lowest score will be dropped, however you’re still responsible for completing ALL assigned readings and coming to class prepared.

- **Lab Write-Ups**: Lab Write-Ups will require you to analyze your data, present it in a clear and organized format, and write a short paragraph in which you apply concepts we’ve discussed to interpret your data. Specific guidelines for each write-up will be provided. Additionally, there will be a set of short pre-lab questions due before the lab that are designed to help you prepare for the lab activities. Your score for the pre-lab questions will be included in the Lab Write-Up grade. Due dates for pre-lab questions and write-ups are indicated in the Course Schedule.

**IMPORTANT**: Although you are welcome to discuss assignments with your classmates, you must turn in your OWN work written in your OWN words. Copying text, verbatim or with slight modification, from your readings or a classmate is plagiarism. This includes Excel files generated for the Lab Write-Ups. All cases of plagiarism will be reported to the Center for Student Conduct according to University policy.

Quizzes
There are no exams in this class. Instead, there will be short (~5 to 10 minute) quizzes distributed throughout the semester. Quizzes will consist primarily of short answer or multi-select questions that cover concepts discussed in prior classes and/or labs. Specific topics will be announced in advance and dates are indicated in the Course Schedule. Missed quizzes can only be made up in the case of an excused absence due to a UVM sanctioned event or extended illness verified by your Dean’s office. Exceptions will be considered on a case-by-case basis.
Final Project
The final project is your chance to apply what we’ve talked about to explore a culinary phenomenon of your choice. A set of topics will be provided to choose from; others are possible if they’re feasible given our time/equipment constraints and are based on concepts we cover in the course. You’ll do background research to learn more about your culinary phenomenon and related scientific concepts, and design and carry out an experiment like those we’ve done in our labs to assess it. The components of the final project are described briefly below. Detailed expectations are provided in the Final Project Guidelines document, and due dates are indicated in the Course Schedule.

• **Topic Proposal**: A description that includes the culinary phenomenon you will explore, an explanation of why you chose the topic, the scientific concept(s) it illustrates, and a short summary of the experiment you propose to perform.

• **Experiment Plan**: The specific question you’ll address, a detailed experimental protocol including a set-up list and data tables, and a list all of the equipment and materials you need for your experiment.

• **Article**: A paper written in the style of a Kenji Lopez-Alt Serious Eats or America’s Test Kitchen article that presents the results of your experiment and explains how the results can be applied to a specific recipe or food preparation technique.

• **Presentation**: A short presentation in which you share your findings with your classmates.

Participation & Class Blog
Active participation and engagement are expected in class and our lab activities. This includes coming to class and lab prepared for the day’s activities. We’ll also have a class blog to encourage additional exploration/engagement. While there is no set number of required posts, you’re expected to contribute to the blog over the course of the semester. Posts are meant to be informal (and fun!) and a mechanism for sharing personal stories, cool articles/videos you find, etc. that are related in some way to what we discuss or the general concept of the course – taking a scientific approach to exploring why foods do what they do in the kitchen. There are a few general examples below and a couple of posts from me to get you started (I’ll also post/comment over the course of the semester). You’re also encouraged to comment on other people’s posts. Comments, just like in-class discussions, should be respectful.

Example class blog post topics:
- a favorite recipe or family recipe that illustrates (or goes against) a scientific concept we’ve discussed
- something about your own experiences in the kitchen (e.g. a failed recipe you tried; something you’ve seen/experienced and now understand because of what we’ve discussed)
- a description of your own kitchen experiments
- link to an experiment done by a food blogger with a brief description of why it caught your eye
- link to a blog/article/video that expands on something we’ve discussed with a few words to explain why you picked it
- question based own experiences and/or extends what talked about in class

Participation will be scored using the rubric on the following page. Each bin describes examples of excellent, good, satisfactory, below satisfactory, or unsatisfactory participation. The examples are not meant to be comprehensive, but represent guidelines for assessment.
### In-Class Discussions and Class Blog

<table>
<thead>
<tr>
<th>Description</th>
<th>Score</th>
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<tbody>
<tr>
<td>Engaged, attentive, and prepared. Able to contribute to class discussions and ask intelligent questions. Posts to class blog and/or replies to others’ posts periodically during the semester.</td>
<td>6</td>
</tr>
<tr>
<td>Engaged and attentive. Some difficulty contributing to class discussions due to insufficient preparation --OR-- occasionally late. Contributes to class blog every once in a while.</td>
<td>5</td>
</tr>
<tr>
<td>Generally engaged and attentive; may arrive late on occasion. Some difficulty contributing to class discussions due to insufficient preparation and/or lack of attention. Contributes very little to class blog.</td>
<td>4</td>
</tr>
<tr>
<td>Frequently distracted during class and/or consistently late. Lack of engagement/attention hinders ability to contribute to discussions. May not be prepared for class or contribute to class blog.</td>
<td>2</td>
</tr>
<tr>
<td>Often late and/or behavior is disruptive to others.</td>
<td>0</td>
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### Lab Activities

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<tr>
<th>Description</th>
<th>Score</th>
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<tr>
<td>Arrives on time fully prepared with lab handout. Works efficiently and carefully to complete lab activities. Area is clean, and equipment and materials are properly put away at the end of lab. Tries to help others if necessary.</td>
<td>6</td>
</tr>
<tr>
<td>Makes a sincere effort to complete lab activities efficiently and carefully. Occasionally hindered by a lack of preparation or forgetting to bring the lab handout. Area is clean, and equipment and materials are properly put away at the end of lab.</td>
<td>5</td>
</tr>
<tr>
<td>Attempts to complete lab activities efficiently and carefully, but is often hindered by a lack of preparation and/or attention. Area is generally clean, and most equipment and materials are properly put away at the end of lab.</td>
<td>4</td>
</tr>
<tr>
<td>Has difficulty completing lab activities efficiently and effectively due to a lack of preparation and/or effort. Frequently leaves station messy and/or does not put equipment and materials away properly.</td>
<td>2</td>
</tr>
<tr>
<td>A lack of preparation, effort, and/or engagement diminishes partner's and/or others’ ability to carry out lab activities.</td>
<td>0</td>
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UVM Policies: Below are links to various UVM polices you may find useful.

**Course Materials Property Rights:** Consistent with the University’s policy on intellectual property rights, it is the College of Agriculture and Life Science’s policy that teaching and curricular materials (including but not limited to classroom lectures, class notes, exams, handouts, and presentations) are the property of the instructor. Therefore, electronic recording and/or transmission of classes or class notes (i.e. selling or posting) is prohibited without the express written permission of the instructor. Such permission is to be considered unique to the needs of an individual student (e.g. ADA compliance), and not a license for permanent retention or electronic dissemination to others. For more information, please see the UVM policy on Intellectual Property, sections 2.1.3 and 2.4.1

**Student Learning Accommodations:** In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Disability Services on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. A student's accommodation letter lists those accommodations that will not be implemented until the student meets with their faculty to create a plan. Contact SAS: A170 Living/Learning Center (802-656-7753) [https://www.uvm.edu/academicsuccess/student_accessibility_services](https://www.uvm.edu/academicsuccess/student_accessibility_services)

**UVM’s policy on disability certification and student support:** [https://www.uvm.edu/policies/student/disability.pdf](https://www.uvm.edu/policies/student/disability.pdf)

**Religious Holidays:** Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time.

**Academic Integrity:** This policy addresses plagiarism, fabrication, collusion, and cheating. [https://www.uvm.edu/policies/student/acadintegrity.pdf](https://www.uvm.edu/policies/student/acadintegrity.pdf)

**Grade Appeals:** Procedures for contesting a grade are outlined here: [http://www.uvm.edu/policies/student/gradeappeals.pdf](http://www.uvm.edu/policies/student/gradeappeals.pdf)

**Grading:** Information on grading and GPA calculation can be found here: [http://catalogue.uvm.edu/undergraduate/academicinfo/examsandgrading/](http://catalogue.uvm.edu/undergraduate/academicinfo/examsandgrading/)

**Code of Student Rights and Responsibilities:** [http://catalogue.uvm.edu/undergraduate/academicinfo/rightsandresponsibilities/](http://catalogue.uvm.edu/undergraduate/academicinfo/rightsandresponsibilities/)

**FERPA Rights Disclosure:** The purpose of this policy is to communicate the rights of students regarding access to, and privacy of their student educational records as provided for in the Family Educational Rights and Privacy Act (FERPA) of 1974. [https://www.uvm.edu/deanofstudents/confidentiality_and_ferpa](https://www.uvm.edu/deanofstudents/confidentiality_and_ferpa)

**Promoting Health & Safety:** The University of Vermont’s number one priority is to support a healthy and safe community. Center for Health and Wellbeing [http://www.uvm.edu/~chwb/](http://www.uvm.edu/~chwb/) Counseling & Psychiatry Services (CAPS) Phone: (802) 656-3340.C.A.R.E. If you are concerned about a UVM community member or are concerned about a specific event, we encourage you to contact the Dean of Students Office (802-656-3380). If you would like to remain anonymous, you can report your concerns online by visiting the Dean of Students website at [http://www.uvm.edu/~saffairs/](http://www.uvm.edu/~saffairs/)

**Final exam policy:** The University final exam policy outlines expectations during final exams and explains timing and process of examination period. [http://catalogue.uvm.edu/undergraduate/academicinfo/examsandgrading/?_ga=2.109740103.354575143.1522726744-2032053719.1522726744](http://catalogue.uvm.edu/undergraduate/academicinfo/examsandgrading/?_ga=2.109740103.354575143.1522726744-2032053719.1522726744)