

NFS 1072 Kitchen Science

Spring 2024

Mon/Wed/Fri 9:40 – 10:30am

Marsh Life Sciences 233/231 and 225A (Foods Lab and associated classroom)

Instructor Information

Laura Almstead, PhD
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Help Times (aka Office Hours)

Wednesdays 5:00pm – 6:00pm
Thursdays 12:30pm – 1:30pm
or email me to schedule time to meet

What's This Course About?

Ever wonder why you add baking soda to chocolate chip cookies? Or what exactly gluten is and why its properties are so difficult to mimic? 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? Or why some cheeses get beautifully gooey when melted and others turn into a chunky, greasy mess? 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 class and lab – one of the best things about exploring science in the kitchen is getting to see, feel, and in some cases, taste scientific principles at work! Our laboratory activities will give you hands-on opportunities to put scientific principles to the test in the kitchen. Although this is not a cooking class, you can use what you learn in your own kitchen to better understand recipes and come up with your own culinary creations.

What Will You Learn in This Course?

By the end of this course, you should be able to...

- 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 conduct controlled experiments, analyze and clearly present data, and draw appropriate conclusions

What Do You Need for This Course?

There are no required books for this course. Readings – assortments of book excerpts, web pages, and/or videos – will be provided on Brightspace. All lab materials will also be posted on Brightspace. You are responsible for printing each lab handout and bringing it with you to class. To complete your lab write-ups, you'll need access to Microsoft Word and Excel (installed on your computer; not the web-based version). If you don't have Microsoft Office for your personal computer, you can obtain it for free as a UVM student (see details [here](#)). Microsoft Word and Excel are also available on the computers at the library.

How Is This Course Structured?

This is an integrated class and lab course, which means that some days will be class-based and others will be devoted to hands-on lab activities. The primary goal of class days will be to introduce specific scientific concepts important for understanding the properties of foods and various food preparation techniques. In the lab activities, you'll have the opportunity to visualize and test some of the concepts covered in our classes by conducting controlled experiments. There will also be some days devoted to interactive demonstrations and other hands-on activities.

What Resources Are Provided to Support Your Learning?

- *Me (Professor Almstead)*: Got questions? Let me know! I am always available by email and make it a priority to respond as promptly as I can. My help times and the few minutes before or after class are the easiest times to catch me in person. You can also send me an email to arrange another time to chat.
- *Undergraduate TA*: Lily Felten is our undergraduate TA for the class. Her primary role is to provide help during our labs and in-class demos.
- *Readings*: The readings are designed to introduce concepts we'll discuss in class and help you be better prepared to understand what we cover.
- *Class Slides*: A PDF with all slides from class plus any in-class videos will be posted after each class, typically within a couple hours. The class slides are helpful for filling in any gaps in your notes.
- *Class "Extras:"* Inevitably, there are a million more cool things related to our class topics that we simply don't have time to cover, and a million other tangents we follow. With each class, an assortment of web articles, videos, etc., will be posted so you can explore whatever piques your interest. If you find or know of something that would make a good "extra," please pass it along!
- *Lab Handouts*: Each lab handout introduces the main question we'll explore, provides detailed set-up lists and step-by-step instructions, and includes data tables to facilitate data collection. A few lab-specific details related to your lab write-up are provided at the end. And the experiments we conduct may give you ideas for some of your own kitchen explorations!

What's Expected of You in This Course?

- *Come to class and labs.* This is a very hands-on course. Making up labs is virtually impossible due to the Foods Lab schedule, and most demos can't be experienced outside of class time. Additionally, class is a great time to ask questions as we go through the material. Obviously, we'll figure something out if you're ill or have a last-minute emergency. That said, please make attendance a top priority so you can fully experience the course.
- *Help create a positive learning environment.* Do your part to help create a classroom environment that facilitates learning. This includes:
 - refraining from distracting behaviors (e.g. texting; checking social media; arriving late; doing other work)
 - contributing to class (e.g. asking questions; volunteering answers to questions)
 - respecting and encouraging your classmates
 - helping others during our labs
- *Communicate and check your email.* As indicated in multiple other parts of this syllabus, questions are always welcome – before/during/after class, via email, and during my help times. One of my favorite things about teaching is getting to know students, so I love when people stop by just to chat or reach out to tell me about themselves! Reminders, announcements, and updates will be sent to your UVM email address; check it daily or have it forwarded to an email account you check frequently.

What Can You Expect from Me?

My three main goals are 1) for you finish the course with an appreciation for the importance of understanding the scientific principles behind what happens to foods in the kitchen, 2) for you to leave with skills and knowledge you can apply in your own kitchen, and 3) to have fun! To achieve these goals, I will strive to be as clear as possible in conveying the material and describing expectations, provide resources to support your learning, welcome and answer any questions you have, and give frequent reminders about upcoming due dates, etc. I will also bring my own excitement for kitchen science to classes and labs, and encourage and support your explorations in any way I can.

How Will You Know If You're Learning?

You have a variety of ways to demonstrate your understanding in this course. A brief overview of the components and their contribution towards your final grade are indicated on the next page followed by more detailed descriptions. To maintain fairness, individual extra credit is not an option and scores will not be curved. To allow some flexibility in considering your overall progression in the course, the scale for final letter grades will be determined at the end of the semester; it will not be more stringent than standard cutoffs. For ALL assessments, you are expected to demonstrate your own understanding. Academically dishonest behaviors are not fair to your classmates and will be reported to the Center for Student Conduct.

All work for the course should be submitted on Brightspace before class/lab on the date indicated in 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's

an extenuating circumstance that warrants an extension, contact me *before* the assignment is due. Life happens, and emergencies will be handled on a case-by-case basis.

Reading and Pre-Lab Questions	20%
Lab Write-Ups	55%
Quizzes	15%
<u>Engagement and Preparation</u>	<u>10%</u>
TOTAL	100%

Reading and Pre-Lab Questions

Reading Questions will be provided with each set of readings to help you focus on the most important points in the readings and be better prepared for class. There will be roughly 8 to 10 questions, mainly short answer, and they'll be provided on Brightspace several days in advance. **Pre-Lab Questions** serve a similar purpose; they're designed to highlight essential details in the lab handouts, and help you be better able to complete the labs effectively and efficiently. Expect about 8 to 10 questions that are a mix of short answer, multiple-choice, and select all. There will be one set of pre-lab questions for each lab; if a lab extends over two days, they're due before the first day of the lab.

Lab Write-Ups

Lab write-ups are your opportunity to build and practice data analysis, interpretation, and presentation skills as well as deepen your understanding of concepts we discuss in class. For each lab write-up, you'll present and summarize your analyzed data, and write a few paragraphs in which you describe and apply concepts we've discussed to interpret your data. See the Lab Write-Up Guidelines document for a complete description of the components and criteria for assessment. Due dates for lab write-ups are indicated in the Course Schedule.

Quizzes

There are no exams in this course. Instead, there will be short (~10 minute) in-class quizzes distributed throughout the semester to give you an opportunity to demonstrate your knowledge of and ability to apply the concepts we've discussed in class. Quizzes will consist primarily of short answer or select all questions; specific topics will be announced in advance. Quizzes will be held at the beginning of class on the dates indicated in the Course Schedule. If you are ill or need to miss class for a UVM sanctioned event, let me know in advance so we can make other arrangements. Make a point to get to class on time; if you're late, you'll have less time to complete the quiz.

Engagement and Preparation

To get the most out of this course, you need to be actively engaged and participate. It also makes things a lot more fun! Come to class/lab prepared for the day's activities, ask questions, and contribute to class discussions. The rubric on the following page provides some guidelines for assessment. Because behaviors such as arriving late, being distracted (e.g. checking Facebook; texting; doing other work), and failing to clean up properly after labs limit your ability to learn and can hinder the learning of others, any such behaviors will be considered when assessing your engagement and preparation.

Class	
Engaged, attentive, and prepared. Able to contribute to class discussions and ask intelligent questions.	5
Engaged and attentive. Some difficulty contributing to class discussions due to insufficient preparation.	4
Generally engaged, but has difficulty contributing to class discussions due to insufficient preparation and/or lack of attention.	3
Lack of engagement/attention hinders ability to contribute to discussions.	1
Lab Activities	
Arrives with a solid understanding of what to do in the lab. Works efficiently and carefully to complete lab activities. Effectively communicates with partner to coordinate and divide tasks.	5
Makes a sincere effort to complete lab activities efficiently and carefully. Occasionally hindered by a lack of preparation or failing to communicate well with partner.	4
Attempts to complete lab activities efficiently and carefully, but is often hindered by a lack of preparation, attention, and/or communication with partner.	3
Has difficulty completing lab activities efficiently and effectively due to a lack of preparation and/or effort. Often fails to communicate effectively with partner.	1

N2: Natural Science (with Lab)

In natural sciences courses, students become familiar with scientific thought, observation, experimentation, and formal hypothesis testing. They develop the skills necessary to make informed judgments about scientific information and arguments related to the natural world. Students also gain the ability to assess the impacts of our expanding scientific knowledge and technology on the diversity of life on Earth, and the quality of life for our own species. All courses provide experiences with the methods of scientific inquiry used to develop new knowledge about the natural world. N2 courses include a laboratory component.

After completing an N2 course, students will be able to:

- 1) Demonstrate familiarity with scientific thought, observation, analysis, experimentation, and formal hypothesis testing in relation to the general field or topic of the course.
- 2) As appropriate to the level and field of the course, make informed judgments about scientific information and arguments related to the natural world.
- 3) As appropriate to the level and field of the course, use appropriate theories and models to predict change in natural systems over time.
- 4) Demonstrate understanding of the scientific method through practical and written work.

[UVM Values and Policies](#) Below are links to various UVM policies you may find useful.

Promoting Health & Safety: It is our collective responsibility to support a healthy and safe community. Don't hesitate to reach out to the [Center for Health and Wellbeing](#) or [Counseling & Psychiatry Services \(CAPS\)](#) (802-656-3340). If you are concerned about a UVM community member or specific event, I encourage you to contact the Dean of Students Office (802-656-3380). You can also report your concerns anonymously online by visiting the [Dean of Students website](#).

Code of Student Conduct: This [policy](#) describes the University's expectations for students' responsibility in promoting the community's welfare.

Student Learning Accommodations: 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. https://www.uvm.edu/academicsuccess/student_accessibility_services

UVM's policy on disability certification and student support: See policy [here](#).

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.

Athletic Conflicts: Student athletes need to notify me of any classes they may miss due to documented athletic conflicts by the end of the second week of the semester. Notify me of any changes to the schedule at least a week in advance. We will work together to create a plan that allows you to stay on top of the work for this class.

Academic Integrity: This [policy](#) addresses plagiarism, fabrication, collusion, and cheating. Violations will be reported to the Center for Student Conduct.

Grading and Grade Appeals: Information on grading and GPA calculation is available [here](#). The process for appealing a final course grade is [here](#).

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.

Final exam policy: The University [final exam policy](#) outlines expectations during final exams and explains timing and process of examination.

Course Materials Property Rights: Students are prohibited from publicly sharing or selling academic materials that they did not author (for example: class syllabus, outlines or class presentations authored by the professor, practice questions, text from the textbook or other copyrighted class materials, etc.); and students are prohibited from sharing assessments (for example homework or a take-home examination). Violations will be handled under UVM's Intellectual Property policy and Code of Academic Integrity.