Syllabus Spring 2021
NFS 195, Principles of Cheesemaking, 3 credits

Modality, Meeting Pattern: This course will be taught remotely. Class lectures will occur on-line via Microsoft Teams on MWF from 9:40am -10:30am

Instructor: Paul Kindstedt (Dr. K)
354 Carrigan Wing (off Marsh Life Sciences, across from Davis Center,)
Tel: 656-2935
Email: paul.kindstedt@uvm.edu.

Remote office hours: By appointment; appointments always welcome! When an appointment is requested, Dr. K will endeavor to confirm a mutually agreeable meeting time remotely by Microsoft Teams, within 24 h of the request.

Technical support for students:

Students, please read this technology check list to make sure you are ready for classes. https://www.uvm.edu/it/kb/student-technology-resources/

Students should contact the Helpline (802-656-2604) for support with technical issues.

Prerequisites: Chem 23 or equivalent, NFS 153 or instructor permission

General education requirements: Not applicable

Course Description

This course provides an overview of the science and technology principles that underpin the transformation of milk to fresh (or unripened) cheese, and the transformation of unripened cheese to fully ripened cheese. The course is oriented towards the needs of students who desire to pursue a career in the cheese industry.

The course outline is as follows:

Course Outline

Unit 1. Fundamentals of Milk Composition and Chemistry

- Water
- Lactose

- Fat
- Protein
- Minerals/Salts
- Variation in milk composition
- Selective concentration of milk components into cheese

Unit 2. Essential principles and practices of cheesemaking and ripening: Rennet, Acid, Acid-Rennet, and Acid-Heat coagulated cheeses

Unit 2A. The principles of cheesemaking (emphasis on rennet coagulation)
- Coagulation
- The 4 major cheese families
- Rennet coagulation
- The 3 essential determinants of cheese ripening: moisture, acidity and salt content
- The 3 essential manufacturing conditions: time, temperature and acidity
- Acidity theory and measurement
- Defining a target acidity schedule

Unit 2B. The practices of cheesemaking
- The 8 steps of rennet coagulated cheesemaking
- Acid coagulation; acid-rennet coagulation; acid-heat coagulation

Unit 3. Definition and Classification of Cheeses
- USFDA Standards of Identity

Unit 4. Starter and Secondary Cultures
- Functions of the starter culture
- Classification of starter culture bacteria
- Starter culture forms and propagation
- Types and functions of secondary cultures

Unit 5. Starter Culture Inconsistency and Failure
- Factors involving the culture
- Factors involving milk chemistry
- Factors involving agents introduced into the milk
- Factors involving the cheesemaking process

Unit 6. Rennet, Coagulants and Coagulation/Curdling
- Sources of rennet enzymes and coagulant enzymes
- Mechanism of rennet coagulation, in-depth
- Factors that affect rennet coagulation

Unit 7. Principles of Cheese Ripening (common to all rennet coagulated cheeses)

- Glycolysis, Lipolysis and Proteolysis
- The role of cheese chemical environment
- The effect of milk composition on cheese chemical environment
- The role of cheese physical environment and handling

Unit 8. Putting it all Together: Cheddar cheese in-depth

Unit 9. Putting it all Together: Selected cheese Variety in-depth

Course Learning Objectives:

After completing this course, the student will be able to:

1. Describe the chemistry and characteristics of milk that are essential to its transformation to cheese.
2. Explain the basic principles, practices and equipment used to transform milk to cheese.
3. Describe the U.S. definitions for cheeses and system of classification.
4. Explain the chemical, biochemical and microbiological changes that transform green (fresh) cheese to a finished ripened state.
5. Describe the range of commercially available ingredients, especially cultures and enzymes, and their applications in cheesemaking.
6. Describe the factors during cheesemaking which influence quality and safety.
7. Explain how systematic variations of the basic cheesemaking principles and practices allow selected cheese varieties to be produced.

Modality description:

This course will be taught remotely. Lectures will occur online on MWF from 9:40am - 10:30am via Microsoft Teams. Announcements and updates concerning the course will be communicated through Blackboard using the Blackboard Announcement tool on the NFS 195 course home page. Text lectures and powerpoint slides for each class will be available through the NFS 195 Blackboard home page under the Course Materials tab. Most of the material covered in class will be presented in the text lectures and powerpoint slides. However, students will need to attend classes to receive the full course material.

Required Course Materials:

- Powerpoint lecture slides of each class (available on-line to registered students at the Blackboard (http://bb.uvm.edu) site for NFS 195 Principles of Cheesemaking)

- Text lectures of each class that coincide with the powerpoint lecture slides (available on-line to registered students at the Blackboard (http://bb.uvm.edu) site for NFS 195 Principles of Cheesemaking)

- Readings: The following readings will be available on-line at the links indicated:

Kindstedt, P.S. 2013. The Basics of Cheesemaking. Chapter 2 in Cheese and Microbes, C.W. Donnelly, ed., American Society for Microbiology, Washington, DC. www.innocua.net/web/download-2293/cm-0002-12.pdf

Johnson, M.E. 2013. Mesophilic and thermophilic cultures used in traditional cheesemaking. Chapter 4 in Cheese and Microbes, C.W. Donnelly, ed., American Society for Microbiology, Washington, DC. www.innocua.net/web/download-2290/cm-0004-12.pdf

Required platforms and software:

This course will use Blackboard extensively. Announcements and updates concerning the course will be communicated through Blackboard using the Blackboard Announcement tool on the NFS 195 course home page. Text lectures and powerpoint slides for each class will be available through the NFS 195 Blackboard home page under the Course Materials tab.

This course will also use Microsoft Teams extensively. Class lectures will occur online on MWF from 9:40am -10:30am via Microsoft Teams.

Attendance Policy: Students are expected to attend all regularly scheduled remote lectures and enter the meeting on time (i.e., by 9:40am, the start of the class). Text lectures and Powerpoint slides for each class will be available through the NFS 195 Blackboard site. The slides and text lectures will cover almost all of the material presented in class. However, students will need to attend classes to receive the full course material. If you need to miss multiple classes because of illness, or if you need to isolate or quarantine, please contact Dr. K by email as soon as you are able. Dr. K will then consult with the Student Services Office of your College. Your safety is our highest priority, and we will work together to develop an appropriate plan to move forward. Further details about the UVM attendance policy can be found at:

http://catalogue.uvm.edu/undergraduate/academicinfo/rightsandresponsibilities/

Grading Criteria/Policies:

A student's course grade will be calculated as follows:

There will be 10 open-book take home essay-type quizzes during the semester, one for each of the Unit sections that the course will cover. Each quiz will be worth 10 points towards the final course total of 100 points that will determine the course grade. Therefore, each quiz will contribute equally to the course grade. However, please note that the length of the 10 Units vary. Some Units may require only 2 or 3 classes to complete, others may require up to 4 or 5 classes to complete. Regardless of the length of the Unit, each Unit quiz will consist of 1 question that will require an essay-type response. Each Unit quiz will cover material included in the Powerpoint lecture notes, the class text lectures, and the remote class presentations via TEAMS for that particular Unit. The quizzes will not be explicitly cumulative; they will only cover the material for that particular Unit. However, material presented in later Units may build upon information presented in earlier Units, therefore, there may be some overlap of information from a previous Unit that is relevant to the quiz response for a later Unit. There will be no final exam. The sole basis for the course grade will be the 10 quizzes.

Students who wish to know their current grade-to-date during the semester are encouraged to keep a record of the points that they receive on their quizzes, from which they can calculate their grade-to-date at any time by a very simple calculation:

(Total number of points received on quizzes to date ÷ total number of points possible to date) x 100% = current grade to date

Course grade will be determined by the total earned out of 100 points possible. Point totals will be calculated to 1 decimal place.

Examples:
A- = 90.0 to 93.2; A = 93.3 to 96.6; A+ = 96.7 to 100
B- = 80.0 to 83.2; B = 83.3 to 86.6; B+ = 86.7 to 89.9
C- = 70.0 to 73.2; C = 73.3 to 76.6; C+ = 76.7 to 79.9
D- = 60.0 to 63.2; D = 63.3 to 66.6; D+ = 66.7 to 69.9
F = less than 60.0

Students who speak English as a second language and who have concerns about the course requirements and grading are encouraged to meet with Dr. K to discuss their concerns.

Assessments (Graded Work):

The course is divided into 9 Units, with Unit 2 divided into 2 sections (A and B). An open book take home quiz will be scheduled upon completion of each Unit section (10 quizzes total). Students will have 1 week to complete each quiz. Students must hand in their completed quiz by the stated due date, except in cases of illness, a family tragedy, or similar extenuating circumstances beyond the reasonable control of the student. ***If this applies to you,*** **please inform the Office for Student Services of your College concerning your circumstances and have the Office for Student Services contact Dr. K to discuss the matter and consider an appropriate accommodation.**

The final (10th) quiz will be due on the date and time of the final exam assigned by the Registrar. No exceptions will be made except for circumstances beyond the reasonable control of the student (e.g., illness, family tragedy) that are verified by the Office for Student Services of your College.

Midterm warnings will be sent out to any student whose cumulative grade near the middle of the term is C- or lower. If a student wishes to contest their course grade, they may do so by following the University policy, described at: http://www.uvm.edu/policies/student/gradeappeals.pdf

Extra Credit Assignments:

Extra credit assignments to improve course grades are **not** offered, either during the semester or after the final course grade has been determined.

Course Evaluation:

All students are expected to complete an evaluation of the course at its conclusion. The evaluations will be anonymous and confidential, and that the information gained, including constructive criticisms, will be used to improve the course.

COVID 19 Policy:

The University of Vermont reserves the right to make changes in the course offerings, mode of delivery, degree requirements, charges, regulations, and procedures contained herein as educational, financial, and health, safety, and welfare

considerations require, or as necessary to be compliant with governmental, accreditation, or public health directives. Additional information on UVM policy is available in the University Catalogue:

http://catalogue.uvm.edu/

Intellectual Property Statement/Prohibition on Sharing Academic Materials:

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.

Tips for Success:

Resources for students on remote/online learning:

- Checklist for success in https://learn.uvm.edu/about/support-for-students/checklist-online-credit-courses/
- Academic support for online courses: https://www.uvm.edu/academicsuccess/online-learning-student-resources-remote-instruction
- 30-minute webinar on online learning success (Mar 2020): https://www.youtube.com/watch?v=Xp_MYsqQyvE

Other Helpful resources:
Undergraduate/Graduate Writing Center,
Supplemental Instruction, Learning Co-op tutors

Student Learning Accommodations:

In keeping with University policy, any student with a documented disability interested in utilizing ADA accommodations should contact Student Accessibility Services (SAS), the office of Disability Services on campus for students. 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 recommended to discuss with their faculty the accommodations they plan to use in each course. Faculty who receive Letters of Accommodation with Disability Related Flexible accommodations will need to fill out the Disability Related Flexibility Agreement. Any questions from faculty or students on the agreement

should be directed to the SAS specialist who is indicated on the letter.

Contact SAS:
A170 Living/Learning Center;
802-656-7753
access@uvm.edu
www.uvm.edu/access

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.
https://www.uvm.edu/registrar/religious-holidays

Academic Integrity:

The policy addresses plagiarism, fabrication, collusion, and cheating.
https://www.uvm.edu/policies/student/acadintegrity.pdf

Grade Appeals:

If you would like to contest a grade, please follow the procedures outlined in this policy:
https://www.uvm.edu/policies/student/gradeappeals.pdf

Grading:

For information on grading and GPA calculation, go to
https://www.uvm.edu/registrar/grades

Code of Student Conduct:

http://www.uvm.edu/policies/student/studentcode.pdf

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.

http://catalogue.uvm.edu/undergraduate/academicinfo/ferparightsdisclosure/

Promoting Health & Safety:

The University of Vermont's number one priority is to support a healthy and safe community:

Center for Health and Wellbeing:

https://www.uvm.edu/health

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 https://www.uvm.edu/studentaffairs

Final Exam Policy:

The University final exam policy outlines expectations during final exams and explains timing and process of examination period. https://www.uvm.edu/registrar/final-exams

Alcohol and Cannabis Statement:

As a faculty member, I want you to get the most you can out of this course. You play a crucial role in your education and in your readiness to learn and fully engage with the course material. It is important to note that alcohol and cannabis have no place in an academic environment. They can seriously impair your ability to learn and retain information not only in the moment you may be using, but up to 48 hours or more afterwards. In addition, alcohol and cannabis can:

- Cause issues with attention, memory and concentration
- Negatively impact the quality of how information is processed and ultimately stored
- Affect sleep patterns, which interferes with long-term memory formation

It is my expectation that you will do everything you can to optimize your learning and to fully participate in this course

Email Guidelines:

Students are welcome to contact Dr. K by email. Email correspondence should be courteous and professional, in keeping with an academic environment of serious learning and mutual respect. Dr. K will normally respond to email messages within 24 hours. If Dr. K does not respond within 24 h, the student should assume that Dr. K did not receive the message and resend the message or contact Dr. K by phone to confirm that the message was received.