NFS 195, Principles of Cheesemaking
Spring Semester, 2019
Syllabus

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

Class meeting time and place: MWF 12:00 -12:50; 207 Terrill Hall

Office hours: Open door policy; stop in any time my office door is open. Also, appointments are welcome at any time. Email Dr. K to confirm a time.

Attendance Policy: Students are expected to attend all regularly scheduled classes and to arrive on time (i.e., by 12:00, the start of the class). Attendance will be taken at the start of regularly scheduled classes by having all students sign in on a class roster. It is never acceptable for one student to sign in (i.e., forge the signature) for another student. If a student misses a class, it is the student’s responsibility to contact Dr. K to obtain any missed assignments that were handed out in class.

Prerequisites: CHEM 23, NFS 153

Course Goals and Objectives:

The overarching goal of this course is to provide an overview of the science and technology that underpins the transformation of milk to fresh (or unripened) cheese, and the transformation of unripened cheese to fully ripened cheese. Students who complete this course successfully will gain a broad understanding of the role of milk composition and chemistry in cheesemaking, the cultures, ingredients and equipment used to make cheese, the steps and practices involved, the control features needed to assure quality and contribute towards safety, and the underlying scientific principles that govern every step of the cheesemaking process. The course has 7 specific objectives:

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

Required Text, Notes and Readings:

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

- Required Readings: The following readings will be available on-line through the UVM Libraries web site or provided by the instructor.


  o Industry literature on cultures, coagulants and industry applications

- Further Reading (suggested)


**Grading:**

A student’s course grade will be calculated on a 100 point basis as follows:

- There will be 3 exams. The first 2 exams will each be worth a total of 25 points (i.e., 25% of the course grade). The third exam (Final exam) will be worth a total of 30 points (i.e., 30% of the course grade). Exams will cover all material presented in class (including the ppt lecture notes), and all material in the required readings, except for Cheese: chemistry, physics & microbiology, 4th ed. (80 points total; 80% of the course grade)

- There will be 10 time management homework exercises, each worth 1 point (1% of the course grade). (10 points total)

- There will be one writing assignment, divided into 2 parts, worth a total of 10 points (10% of the course grade)

Students’ grades during the semester will not be posted on Blackboard. Students who wish to know their current grade-to-date during the course of the semester are encouraged to keep a record of the points that they receive on their assignments and exams, from which they can calculate their grade-to-date at any time by a very simple
calculation:

(Total number of points received on exams and assignments to date ÷ total number of points possible to date) x 100%

Exams and Exam Schedule:

Exam 1: Wednesday, February 13, 12:00-12:50
Exam 2: Monday, March 25, 12:00-12:50
Exam 3: Thursday, May 9, 10:30am - 1:15pm (Registrar’s schedule)

Exam 1 and 2 will each consist of 2 sections: an in-class section and a take home section. Exam 3 (final exam) will be taken entirely in class during finals week at the time designated by the Registrar. The in-class section of exam 1 and 2 must be taken at the scheduled times except in cases of acute illness, a death in the family, or similar extenuating circumstances that can be verified by the Office for Student Services of your college and is approved by Dr. K.

The final exam will occur on the date and time 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 Dean’s Office for Student Services of your college. In the event that a student has 4 or more proctored in class final assessments scheduled within a 36-hour period and requests that they be allowed to take the NFS 195 exam at a different time, the Registrar’s policy will be followed to determine the specific course of action, described at: http://catalogue.uvm.edu/undergraduate/academicinfo/examsandgrading/

Please check the final exam schedule for spring 2019 at: (https://giraffe.uvm.edu/%7Ergweb/batch/final_exams_spring.html) as soon as possible to determine if the above conflict applies to your schedule.

The final exam will not be cumulative; it will include all material covered in class after the second exam.

Exams will be handed out to students face down at the start of the class period. Exams must not be turned over until all students have received their copy, at which time the Instructor will inform the class that they may begin the exam. Exams will be collected at the end of the class period. Students must stop writing on their exam when the Instructor announces that the exam is over. Failure to do so will result in a deduction of 1 point (i.e., 5%) from the grade that the student receives on the exam. In the interest of fairness, this procedure is designed to insure that all students are given the same amount of time to complete the exam. Students who need to use the restroom facilities should plan ahead and do so before the start of class. Students will
not be allowed to leave the classroom during the exam until they have handed in their exam. **Food and beverage are not allowed during the exams.**

Cell phones, computers and other electronic devices **must be turned off and put away** during exams. After the first and second exams have been graded, they will be handed back to the students during class.

The take-home section of the exam will be handed out in class at the end of the in-class section of the exam, and will be due at the start of the next class period. Late take-home exam sections that are handed in after the next class period will not be accepted and receive a score of zero. Take-home exam sections are to be handed in, in-person, in printed or hand written form **at the start of the class on the day on which the take home section is due.** They are not to be sent by email unless the student has extenuating circumstances and obtains permission from Dr. K to submit by email. Please note that accidental loss of electronic files, last minute computer crashes, printer failures, etc. will not be accepted as legitimate excuses for late take home exams. Please back up your file and do not wait until the last minute to complete and print out your exam. Give yourself enough time to deal with possible IT glitches should they occur.

Course grade will be determined by the total earned out of 100 points possible. Point totals will be calculated to 1 decimal place. Example: B- = 80.0 to 83.2; B = 83.3 to 86.6; B+ = 86.7 to 89.9. 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

**Homework Assignments:**

Instructions for the time management exercises are presented in Appendix 2 of this Syllabus. Time management log forms will be handed out each Monday in class for 10 consecutive weeks. **Completed time logs are to be handed in at the start of class the following Monday.** If a student is absent from class when the log sheet is handed out it, is the responsibility of the student to obtain the form from Dr. K. and hand in the assignment on time. Students must hand in all assignments on time unless the student has extenuating circumstances that can be verified by the Office for Student Services of your college (e.g., medical need, death in the family, etc.), and an extension is approved by Dr. K. Assignments that are handed in late without an approved extension will be accepted if they are received by Dr. K by the next class period after the assignment is due; however, the grading for the late assignment will include a 50% late penalty (i.e., deduction of half of the total points possible). Late
assignments that are handed in after the next class period will not be accepted and receive a score of zero.

**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.

**Cheese Tastings:**

From time to time, cheese samples for tasting will be made available in class to illustrate style of cheese that is being discussed. Tasting is encouraged but optional. Students who have concerns about possible allergic reactions as a result of exposure to cheese in classroom should contact Dr. K.

**Classroom Use of Cell Phones, Computers, Electronic Devices:**

Cell phones must be turned off or placed on vibrate mode during class time and responded to only in the event of emergency, so as not to disturb the class. Computers and related electronic devices may only be used during class for note taking purposes directly related to the class; all other uses are prohibited. Students who find that they are being distracted by other student’s computers should contact Dr. K.

**Religious Observance:**

In accordance with the official policy for excused absences for religious holidays, students have the right to practice the religion of their choice. Each semester students should submit in writing to Dr. K by the end of the second full week of classes their documented religious holiday schedule for the semester. Students who miss work for the purpose of religious observance will be permitted to make up this work.

**Academic Honesty & Professionalism:**

Student interactions with the Instructor and fellow students in the classroom should be courteous and professional at all times, in keeping with an academic environment of serious learning and mutual respect. Likewise, all communications outside of the classroom related to the class (for example, by email, phone or in person) are to be conducted in a courteous and professional manner.

All students are required to be familiar with and adhere to the “Code of Academic
Integrity” delineated in the following website:
http://www.uvm.edu/policies/student/acadintegrity.pdf

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; access@uvm.edu; or www.uvm.edu/access

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 or in person to confirm that the message was received. Homework assignments are to be handed in, in-person, at the start of the assigned classes. They are not to be sent by email unless the student obtains permission from Dr. K to do so.

Principles of Cheesemaking
Lecture Outline

1. Fundamentals of Milk Composition and Chemistry
   - Water
   - Lactose
   - Fat
   - Protein
   - Minerals/Salts
   - Variation in milk composition
   - Selective concentration of milk components into cheese

2. Essential principles and practices of cheesemaking
The 8 basic steps of cheesemaking
The 3 essential manufacturing conditions: time, temperature and acidity
The 3 essential determinants of cheese ripening: moisture, acidity and salt content
Ripening and affinage

3. **Definition and Classification of Cheeses**
   - USFDA Standards of Identity/USDA Cheese Classification

4. **Starter and Secondary Cultures**
   - Functions of the starter culture
   - Types of starter culture bacteria, and culture forms and propagation
   - Starter culture problems and failure
   - Types and functions of secondary cultures

5. **Coagulants and Coagulation**
   - Sources of rennet enzymes and coagulant enzymes
   - Mechanism of coagulation in-depth
   - Factors that affect rennet coagulation

6. **Principles of Cheese Ripening**
   - 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

7. **Putting it all Together: Selected Cheese Varieties in-depth:**
   - Cheddar, Colby and Monterey cheeses
   - Dutch-type (Edam and Gouda) cheeses
   - Swiss-type cheeses
   - Parmesan-type cheeses
   - Bloomy rind cheeses
   - Washed rind cheeses
   - Blue mold cheeses
APPENDIX 1

NFS 195 Strategies for Success

Set Two Goals for Yourself:

1. Develop a command of the information (details) presented in class

2. Develop a grasp of the larger concepts that bind the details into the “bigger picture” of how cheese is made and how it ripens.

Learning Strategies:

1. Keep a log of time spent on NFS 195 outside of class. Make sure that you invest at least 6 hours per week. (NOTE: You will need to keep a log of time invested outside class for 10 consecutive weeks in order to complete the time log assignments.)

2. Review the assigned readings and powerpoint study notes ahead of the class discussions, and reread them as often as necessary to assimilate the information contained therein.

3. Take comprehensive notes in class.

4. Review class notes and powerpoint study notes immediately after class (i.e., on the same day that the class is held). Also, review the section of the readings that covers the material presented in class that day.
   - Make a list of specific questions or sources of confusion from today’s class
   - Seek clarification for specific questions/confusion during the next class or meet with Dr. K to seek clarification.

5. Each day, briefly review all powerpoint study notes and class notes that have been covered since the last exam. The exams are not cumulative; therefore you do not need to review material that was covered on the last exam(s). Focus on committing to memory all details and larger concepts that have been presented so far.
   - Allocate less time for review immediately after your last exam, but progressively allocate more time for review as the exam date approaches.
• If you still have specific unresolved questions meet with Dr. K to address them.

**Homework Assignments**

The time management log assignments and the two-part writing assignment are cumulatively worth 20% of the course grade. Thus, they have a significant impact on your course grade. Complete the log assignments and writing assignments and hand them in on time to insure that you receive full credit.

**APPENDIX 2**

**NFS 195 Principles of Cheesemaking Daily Time Log Time Management Exercises**

According to University of Vermont policy, the definition of a credit hour includes one hour of classroom instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks. Therefore, you should expect to invest a minimum of 6 hours per week of out-of-class student work for Cheese and Culture, which will consist of completing the reading assignments, writing assignments and studying. To help you keep track of your time and stay on target, you will maintain a *Daily Time Log for Work Outside the Classroom* (See attached Log sheet) each week for the next 10 weeks. Each week, beginning on Monday and ending the following Sunday, your task is to log in the times spent each day for Cheese and Culture on reading, study and writing assignments outside of class. At the end of the week you will tabulate the total time spent outside of class for Cheese and Culture, and you will hand in your *Daily Time Log* for the week in class on Monday. You will receive 1 point towards your course grade (1% of your course grade) for handing in your completed *Daily Time Log* on time. You will not be penalized if your total time for the week is less than six hours, and you will not receive extra credit if you total time exceeds six hours. The purpose of this exercise is simply to help you budget your time so that you will do well in the course. See the section on NFS 050 Strategies for Success in the APPENDIX of the syllabus for further suggestions to develop strong study habits.
NAME_______________________________

NFS 195 Daily Time Log for Work Outside the Classroom

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<thead>
<tr>
<th>Day</th>
<th>Reading and Study</th>
<th>Writing Assignment</th>
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<tbody>
<tr>
<td>MONDAY</td>
<td>BEGIN _______ END _______ TOTAL _______</td>
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<td>SUNDAY</td>
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WEEKLY TOTAL ________