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Teaching Assistant: Stella Opendi Sasanya, Food Safety Ph.D. Candidate (Stella.Opendi@ndsu.edu)

Online Access: Course materials available for enrolled students through Blackboard at https://bb.ndsu.nodak.edu/webapps/portal/frameset.jsp

If you have questions about course information that are not answered in this syllabus, check the Blackboard website or ask the instructor for further details.

Course Description: Study of the nature, physiology, and interactions of microorganisms in foods. Introduction to foodborne diseases, effects of food processing on the microflora of foods, principles of food preservation, food spoilage, and foods produced by microorganisms. Prerequisites: MICR 202L or MICR 350L (must be capable of safe lab work with cultures). This course is 3 credits, two of which are online modules, and the third is a face-to-face lab. This course is not through DCE, so standard tuition caps and waivers apply.


Other resources: There are over 150 books (use ODIN at http://odinlibrary.org/F?func=find-b-0&local_base=nwq ) and over 50 electronic journals (see http://atoz.ebsco.com/titles.asp?id=8829&sid=45668439&menuid=65&lang=en) related to Food Microbiology through the NDSU library - don't waste these resources! If you need tips on how to use these, please let me know. If you Google, use Google Scholar.

Disabilities: Any student with disabilities, or others who need special accommodations in this class, are invited to share their concerns or requests with the instructor as soon as possible. See the Counseling and Disability Services website at http://www.ndsu.nodak.edu/counseling/disability.shtml

Any students who may be in immuno-compromised states of health should take extra care in the laboratory portion of this course. Please visit with the instructor to ensure adequate controls are used to prevent infection.

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Learning Objectives: Upon completion of this course, students are expected to be able to:

1. Recognize and describe the characteristics of important pathogens and spoilage microorganisms in foods.
2. Understand the role and significance of intrinsic and extrinsic factors on growth and response of microorganisms in foods.
3. Identify ways to control microorganisms in foods.
4. Identify the conditions under which the important pathogens and spoilage microorganisms are commonly inactivated, killed or made harmless in foods.
5. Describe the beneficial role of microorganisms in fermented foods and in food processing.
6. Utilize laboratory techniques to detect, quantify, and identify microorganisms in foods.
7. Acquire, discover, and apply the theories and principles of food microbiology in practical, real-world situations and problems.
8. Develop success skills in communication, critical thinking, interaction, information acquisition and interpretation, organization, professionalism, leadership, auto-didactics and life-long-learning.

These objectives are in accordance with the approval of the NDSU Food Science Program by the Institute of Food Technologists (IFT, see http://www.ift.org/)

Instructor Responsibilities:

✓ Make sure the course content meets with IFT approval of the Food Science program and the interests of students taking it as an elective
✓ Understand the context by which the students will be learning the material (what, how, when, where, and why)
✓ Create, collect, plan, organize, and assess the content in a meaningful and timely way
✓ Openly communicate with and engage students
✓ Keep the presentation of material and the assignment expectations as clear and fair as possible
✓ Provide resources and advice to enhance learning and communication
✓ Give the students the opportunity to develop their auto-didactic skills
✓ Understand students’ scheduling issues, and work with them to meet their needs as much as possible without compromising their or others’ learning
✓ Provide student’s the opportunity to comment on instruction and use feedback to improve the learning in the course

Learner Responsibilities:

✓ Have a serious attitude and understand that learning takes time and effort (you can’t blow off an online course; especially this course)
✓ Have a desire to acquire information and a willingness to work and complete tasks in good faith
✓ Have a willingness to seek assistance when information is not clear
✓ Have a willingness to provide constructive and meaningful feedback to help improve instruction
✓ Complete assignments by scheduled deadlines
  o Assignments may be finished early; this is encouraged (however, grades will not be posted until after the deadline date has passed)
  o A late assignment without a valid reason will receive zero points
  o In the case of traumatic events, like severe illness or death in the family, make-up assignments will be given; however this need must be communicated to the instructor, with proper authentication, as soon as possible.
✓ Actively Participate in the group discussions, both in lab and online
  o This is where a significant amount of learning in this course will occur
  o Lack of serious participation in discussions will lower your chances of getting an A in this course
✓ Attend and actively participate in all labs; attendance is required and taken each lab period
  o If a lab must be missed for justifiable reasons (i.e. field trips or professional meetings – documented properly), the team members and instructor must be notified ahead of time and arrangements made to make up for lost input
  o At no time, can more than one member of a team be absent during the lab period
  o Unexcused absences will result in a grade reduction for any lab reports applicable to the missed period as well as other demerits approved by team members affected
✓ Check Blackboard and/or email regularly for any updates related to the course
Academic Dishonesty/Plagiarism: All work in this course must be completed in a manner consistent with NDSU University Senate Policy, section 335: Code of Academic Responsibility and Conduct (http://www.ndsu.nodak.edu/policy/335.htm), and with the College of Agriculture, Food Systems, and Natural Resources Honor System (http://www.ag.ndsu.edu/academics/honor.htm). The Honor System operates to prevent and stop cheating, as well as penalizing those who cheat. Cases can be reported to any Honor Commission member, your instructors, or the Dean.

Familiarize yourself with what plagiarism is at http://www.plagiarism.org. Dr. Wolf-Hall is very experienced at detecting and dealing with plagiarism and is known for being tough about these things, so please ask if you are unsure. Here are some examples of plagiarism:

- copying word for word from anything and not using quotation marks and citing the source
- turning in someone else’s work as your own
- copying words or ideas from someone else without giving credit
- failing to put a quotation in quotation marks
- giving incorrect information about the source of a quotation
- changing words but copying the sentence structure of a source without giving credit
- copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not

(quoted/copied from www.plagiarism.org as viewed on August 3, 2006)

Grading:

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<th>% Final Grade</th>
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<td>30</td>
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<td>Lab Reports (5, see schedule)</td>
<td>150*</td>
<td>30*</td>
</tr>
<tr>
<td>Project Paper</td>
<td>70*</td>
<td>14*</td>
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<tr>
<td>Team Presentation</td>
<td>30*</td>
<td>6*</td>
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<tr>
<td>Final Exam</td>
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Total Points 500** 100**

Grading Scale: 89.5-100% = A, 79.5-89.4% = B, 69.5-79.4% = C, 59.5-69.4% = D, <59.5% = F

There is no grading curve. Optional extra credit assignments will be given throughout the semester, but will become increasingly challenging as the semester progresses.

*These are graded as a “team grade”. Unexcused absences from the lab will result in grade reductions on lab reports for the offending individuals, not for the entire team. Team assignment grades will only count for students whose average grade on the quizzes is at or above the passing (D) level.

**Those registered in MICR 653 will have an additional 50 points (adjust percentages accordingly) for the project proposal which must be turned in by October 29.**
You can go as far as you like in this course; from barely passing to becoming the next Louis Pasteur. It all comes down to how you use your time and energy to pursue the activities and resources available through this course.

Success Tips for this Course:

- I will provide information, resources, and opportunities to learn. The actual learning will be up to you and the effort you put forward. Grades correlate with effort put forward. It is quite possible to get an A in this course, but it does take time and effort. **If you were looking for an easy A elective, that does not take time from your busy schedule, this is not the course for you.**

- This is an upper-division course, and I do not spoon-feed you for the assignments. Many of the assignments require you to look up information beyond what is provided in the modules and lab protocols. If you are having trouble finding information please ask me, and I will point you to it.

- Read and follow directions carefully. Most points are lost in reports for simply failing to follow directions.

- Manage your time wisely. Procrastination of report writing will hurt your grade; start writing as soon as the experiment is done and fresh in your memory. You also have the entire semester to work on the final - do not put this off until the last week of class (that’s asking for trouble).

- Access course information online regularly; do not put this off until the set class deadlines.

- Make sure all team members get to review reports before they are submitted. This prevents much frustration and likely loss of points on the paper.

- Learn how to do simple searches for published research papers. These will get you so many more brownie points on your reports than website references will.

- Look for reference articles in the folders with the lab exercises. It always amazes me when students don’t use these; I can’t make it much easier.

- The grading process for lab reports gets harsher as the semester goes by, as I expect you to improve. Learn from mistakes on your first few reports to improve the quality of your later reports. If you are not sure why points are taken off, meet with the instructor to clarify.

- Ask for clarification if anything is not clear to you. There are no dumb questions. This will prevent mistakes by you and/or me. This will benefit not only you but also other students in the course, and will help improve the course.

- A good way to study for the quizzes is to try to write 10 questions of your own. Can you answer them correctly?

- Use your time in the lab period very wisely and efficiently. This will save you time outside of class.
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<td>Orientation &amp; Assessment</td>
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<td>Pre-Test; Student Info Surveyy</td>
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<tr>
<td></td>
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<td>Orientation &amp; Assessment</td>
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<td>Writing Survey; Scavenger Hunt</td>
<td>Thu Aug 26</td>
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<td>Lab (Aug 27)</td>
<td>Introductions</td>
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<td>Get seat &amp; team assignments &amp; sign safety formz</td>
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<td>Aug 30-Sep 3</td>
<td>MODULE 1</td>
<td>History of Food Microbiology</td>
<td>2</td>
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<td></td>
<td></td>
<td>Factors Affecting Survival &amp; Growth in Foods</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab (Sep 3)</td>
<td>Start: Intrinsic &amp; Extrinsic Factors</td>
<td></td>
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<tr>
<td>Sep 6-10</td>
<td>MODULE 2</td>
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<td>3, 20</td>
<td>Quiz 1</td>
<td>Tues Sep 7</td>
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<tr>
<td>Lab (Sep 10)</td>
<td>Continue: Intrinsic &amp; Extrinsic Factors</td>
<td>Start: Principles of Quantification &amp; Contact Surface Testing</td>
<td>Team Expectations Agreement form due to instructor</td>
<td>Fri Sep 10</td>
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<tr>
<td>Sep 13-17</td>
<td>MODULE 3</td>
<td>Microbiological Examination of Foods, Surface &amp; Air: Biofilms</td>
<td>4, 5</td>
<td>Quiz 2</td>
<td>Mon Sep 13</td>
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<tr>
<td>Lab (Sep 17)</td>
<td>Continue: Principles of Quantification &amp; Contact Surface Testing</td>
<td>Project Idea – discuss with instructor before you leave</td>
<td>Fri Sep 17</td>
<td></td>
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<tr>
<td>Sep 20-24</td>
<td>MODULE 4</td>
<td>Principles of Food Preservation</td>
<td>23, 24, 25</td>
<td>Lab Report for Intrinsic &amp; Extrinsic Factors (25 Points)*</td>
<td>Mon Sep 20</td>
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<td>Quiz 3</td>
<td>Wed Sep 22</td>
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<tr>
<td>Lab (Sep 24)</td>
<td>The Sauerkraut Fermentation Day 9</td>
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<td>Sep 27-Oct 1</td>
<td>Lab (Oct 1)</td>
<td>Continue: Sauerkraut Fermentation Day 7</td>
<td>18, 19</td>
<td>Preliminary project proposal &amp; supply list – use form on page 12</td>
<td>Fri Oct 1</td>
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<td></td>
<td>Continue: Sauerkraut Fermentation Day 28</td>
<td></td>
<td></td>
<td>Quiz 4</td>
<td>Mon Oct 4</td>
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<td></td>
<td>Continue: Detection of Pathogens</td>
<td></td>
<td></td>
<td>Lab Report for Principles of Quantification &amp; Contact Surface Testing (30 Points)*</td>
<td>Fri Oct 8</td>
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<td>Oct 4-8</td>
<td>MODULE 5</td>
<td>Food Fermentations &amp; Bioprocessing; Microorganisms as Food</td>
<td>6, 26</td>
<td>Quiz 5</td>
<td>Mon Oct 18</td>
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<td>Oct 25-29</td>
<td>Lab (Oct 29)</td>
<td>Continue: Sauerkraut Fermentation</td>
<td></td>
<td>MicR 653 Graduate Student Proposal</td>
<td>Fri Nov 9</td>
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<td></td>
<td>Continue: Dairy Foods</td>
<td>Start: Team Projects</td>
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<tr>
<td>Nov 1-5</td>
<td>MODULE 7</td>
<td>Introduction to Foodborne Pathogens; Foodborne Parasites</td>
<td>7, 8, 9, 10, 11, 12</td>
<td>Quiz 6</td>
<td>Mon Nov 1</td>
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<td>Lab (Nov 5)</td>
<td>Continue: Dairy Foods</td>
<td>Start: Team Projects</td>
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<td>Nov 8-12</td>
<td>Lab (Nov 12)</td>
<td>Continue: Team Projects</td>
<td></td>
<td>Lab Report for the Sauerkraut Fermentation (30 Points)*</td>
<td>Mon Nov 8</td>
</tr>
<tr>
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<td></td>
<td>Quiz 7</td>
<td>Fri Nov 12</td>
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<tr>
<td>Nov 15-19</td>
<td>MODULE 8</td>
<td>Gram Negative Foodborne Bacterial Pathogens</td>
<td>13, 14, 15, 16, 17</td>
<td>Quiz 8</td>
<td>Mon Nov 22</td>
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<td>Lab (Nov 19)</td>
<td>Continue: Team Projects - Finish Up</td>
<td></td>
<td></td>
<td>Lab Report for Detection of Pathogens (40 Points)*</td>
<td>Fri Dec 3</td>
</tr>
<tr>
<td>Nov 22-26</td>
<td>MODULE 9</td>
<td>Gram Positive Foodborne Bacterial Pathogens</td>
<td>21, 22</td>
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<td>Report Out for Team Projects</td>
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<td>Project Paper (70 Points); Project Presentation (30 Points)</td>
<td>Fri Dec 10</td>
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<td>MODULE 10</td>
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<td></td>
<td>Quiz 10; Extra Credit Crossword (15 points)</td>
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<td>Dec 6-10</td>
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<td>MODULE B</td>
<td>Final Exam (100 Points)</td>
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<td>Post-Test; Student Ratings of Instructionz</td>
<td>Thur Dec 16</td>
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</table>

*aModules and lab protocols should be posted on Blackboard about one-week prior to scheduled start. Students can start ahead of time. All Lab meetings will start at 3:00 on Fridays in Van Es 107 – Attendance Required.

*bAssignments are due by 11:59 PM on the dates indicated. Quizzes (15 points each) will be online in Blackboard, must be completed at one time, and will be timed for 50 minutes, so be prepared. Review guides will be posted with the modules. Quizzes will be available as soon as possible, usually one week prior to the due date, and may be taken early, but be sure you are prepared before you take them. Any evidence of cheating will be dealt with severely – I have psychic abilities to know when cheating is going on!

*cNot graded, however, failure to complete will result in grade reductions for other assignments Highlighted team project assignments are due during the lab period.

*zTeam accountability assessments must be completed by the same due dates as the labs are submitted.

It does get busy towards the end of the semester, so plan your work time carefully. Do what you can prior to the due dates.
Laboratory Policies for Food Microbiology  
(MICR 453/653)

– Confucius

1. Lab exercises will be done in teams. Poor communication within a team may affect all team member grades. See page 10 for laboratory report instructions.

2. Read each laboratory exercise & supplementary materials completely before coming to the lab. This will prepare you to carry out the work immediately and will also ensure accuracy and safety in your experiments. There will be very little to no lecturing at the beginning of the lab period.

3. Sanitize your work area before beginning your work and before leaving when you are finished. A disinfectant solution and sponge are provided for this purpose.

4. Do your work in an organized and careful manner. Not only will this improve the quality and reliability of your data, it will also help you to utilize your time more efficiently.

5. Divide the responsibility of the various tasks that need to be done, but be sure that each individual makes all observations and independently records all data. Each lab period ends with a team discussion of the day’s activities and results.

6. Keep your work area clean and clutter free. Good housekeeping is essential for safety and to prevent contamination. Hang coats and book bags on the hooks provided.

7. Disposable plastic pipettes and petri dishes are always discarded into the biohazard bags positioned around the lab. Glass pipettes, tubes, spreaders, and petri dishes are placed into assigned containers for rewashing.

8. Each team will be assigned two lockers. The locker will contain: a test tube rack, paper carton, wire basket, 600 ml beaker (for holding stomacher bags) and two inoculating loops and an inoculating needle for transferring bacteria.

9. Label all tubes and plates with the date, your team’s name and the organism (if known).

10. Memorize and follow the safety instructions. You will be required to sign a copy of the safety instructions indicating your understanding prior to initiating any experiments.

| Seat # __________________ |
| _________________________ |
| Locker #s ________________ |
| _________________________ |
| Team Name _____________________ |
Laboratory Safety

Any laboratory can be a hazardous place if workers are careless and use poor techniques or improperly use chemicals or equipment. One of the best ways to avoid hazards is to know and understand what you are going to do with each experiment before you begin. You have already been advised to read thoroughly each experiment before coming to lab. In addition to being prepared to do the work, your safety and that of your co-workers will be an additional dividend.

The instructor will show you the location of all safety equipment in the laboratory including fire extinguishers, first-aid kit, emergency shower, eyewash, fire blankets, etc. With the introduction of each lab, the instructor will point out all necessary safety precautions you should take in each experiment. **Instructions for safety in the laboratory include:**

- All lab exercises are to be completed under Biosafety Level 2 criteria as specified by the Centers for Disease Control (http://www.cdc.gov/biosafety/publications/bmbl5/index.htm).
- Use common sense when working in the lab. Know what you are doing and always think safety first. Never use a piece of equipment, instrument, culture or chemical unless you are aware of possible hazards. Listen to the instructor when safety considerations are explained.
- Note the location of the carbon dioxide fire extinguisher (for putting out fires), fire blanket (for putting out fire on people), emergency eyewash and shower.
- If glassware is broken, ask the instructor for the brush and dustpan kept for these occasions.
- Sanitize your work area before beginning your work and before leaving when you are finished. A disinfectant solution and sponge are provided for this purpose.
- Eating, drinking, gum, cough drops, cigarettes, etc. are **not allowed** in the lab (don’t put anything in your mouth).
- Notice the biohazard bags located around the laboratory. They are intended for discarded disposable plastic pipettes and Petri dishes. Do **NOT** put glassware or paper in them.
- The campus safety office has ruled that shorts and open shoes should not be worn in laboratory classes. Long hair must be tied back, caps reversed and long sleeves rolled up when the gas burners are lit.
- If you spill a culture, contact the instructor immediately and sprinkle ChloraSorb on the spill.
- Always wash your hands before leaving the laboratory.

“I, the undersigned, have read the above rules and agree to observe and abide by them. I will not hold the department of Veterinary and Microbiological Sciences responsible for accidents which occur as a result of my carelessness.”

Signature ____________________________  Date _______________

Printed Name ____________________________
Team Rules

The laboratory portion of the MICR 453/653 course requires that teams complete laboratory exercises. The objectives for team activities are:

- To develop teamwork and communication skills. Employers often state that they are looking for students with good technical knowledge, but they also stress the important need for good communication, problem solving, decision-making, and team-work skills.
- To benefit from the shared experiences with other individuals. Sometimes the best way to learn a topic well is to teach it to someone else. This is a course taken by different majors with different backgrounds, so the teams have been set up with as much variety as possible so that the experiences of each individual in the team can contribute to the overall effort.

The following policies will be followed:

- Designate a coordinator, recorder and checker for each assignment. Add a monitor for 4-person teams. Rotate these roles for every lab activity.

- Agree on a common meeting time (most lab periods are good times to take care of business) and what each member should have done before the meeting (readings, taking the first cut at some or all of the assigned work, etc.)

- Do the required individual preparation.

- Coordinator checks with other team members before the meeting to remind them of when and where they will meet and what they are supposed to do.

- Meet and work. Coordinator keeps everyone on task and makes sure everyone is involved, recorder pre-pares the final solution to be turned in, monitor checks to make sure everyone understands both the solution and the strategy used to get it, and checker double-checks it before it is handed in. Agree on next meeting time and roles for next assignment. For teams of three, the same person should cover the monitor and checker roles.

- Checker turns in the assignment, with the names on it of every team member who participated actively in completing it. If the checker anticipates a problem getting to class on time on the due date of the assignment, it is his/her responsibility to make sure someone turns it in.

- Review returned assignments. Make sure everyone understands why points were lost and how to correct errors.

- Consult with your instructor if a conflict arises that can’t be worked through by the team.

- Dealing with non-cooperative team members. If a team member refuses to cooperate on an assignment, his/her name should not be included on the completed work. If the problem persists, the team should meet with the instructor so that the problem can be resolved, if possible. If the problem still continues, the cooperating team members may notify the uncooperative member in writing that he/she is in danger of being fired, sending a copy of the memo to the instructor. If there is no subsequent improvement, they should notify the individual in writing (copy to the instructor) that he/she is no longer with the team. The fired student should meet with his/her instructor to discuss options. Similarly, students who are consistently doing all the work for their team may issue a warning memo that they will quit unless they start getting cooperation, and a second memo quitting the team if the cooperation is not forthcoming. Students who get fired or quit must either find another team willing to add them as a member or get zeroes for the remaining assignments.

As you will find out, group work isn’t always easy—team members sometimes cannot prepare for or attend group sessions because of other responsibilities, and conflicts often result from differing skill levels and work ethics. When teams work and communicate well, however, the benefits more than compensate for the difficulties. One way to improve the chances that a team will work well is to agree beforehand on what everyone on the team expects from everyone else. Reaching this understanding is the goal of the assignment on the Team Expectations Agreement.

Discrimination against a team member because of gender, ethnicity, sexual orientation, age, religion, social status or physical/mental disability will not be tolerated.
Team Expectations Agreement

Team Name: __________________________

Team Member Names:      Team Member Signatures:
_________________________________________  ___________ _________________________
_________________________________________  ___________ _________________________
_________________________________________  ___________ _________________________
_________________________________________  ___________ _________________________

These expectations are for your use and benefit—they won’t be graded or commented on unless you specifically ask for comments. Note, however, that if you make the list fairly thorough without being unrealistic you’ll be giving yourselves the best chance.

Rules and Expectations Agreed Upon: Read the article “Coping with Hitchhikers and Couch Potatoes” (posted under labs on the Bb site). Then, as a team, fill in this section, print the form, sign, and turn in a copy to the instructor by the deadline indicated on the schedule

1. Follow the team rules as stated in the course syllabus above—preparation for and attendance at group meetings, making sure everyone understands all the lab protocols (experiments, methods, objectives, results etc.).

2. Communicating frankly but with respect when conflicts arise.

3. Write any other expectations that your team may have]
Instructions for 5 standard laboratory reports

Lab reports will be written as a team. It is up to the team to decide how they will go about development of the final document. It is strongly recommended that teams utilize the lab class period as much as possible to organize their efforts. Lab reports are due as indicated on the schedule in the syllabus. Email the report as an attachment to the instructor who will then confirm transmission. Late reports will not be graded. There is no page limit as reports vary. An abstract and introduction are not required for the standard reports. Use the following format and headings (underlined items) for your standard reports:

**Team:** Your team and your names

**Date and Title:** State the experiment title and date submitted.

**Objective:** Concise (short but clear) statement about the purpose of the experiment. Once sentence is usually enough.

**Materials and Methods:** **Do not re-copy the procedures.** If the procedure was followed exactly as given in the laboratory instructions, simply refer to them “as stated in lab protocol”. If there are modifications or changes to procedures make a note of them.

**Results:** Include all data – class, team and/or individual. If calculations are made, show the calculations. Record all observations. Include drawings of microscopic structures, tables, graphs, flow diagrams, or diagrams of procedures if appropriate.

**Discussion:** Concisely discuss your results. Lengthy discussions of principles involved are not necessary, but do include information pertinent to the experiment, which reflects your understanding of the concepts involved. INTERPRET AND EXPLAIN YOUR RESULTS! Do not repeat the results section – this may result in a loss of points. If the outcome of the experiment was different than anticipated, discuss the reasons for this and what might have occurred (it is not always analyst error). Comparisons between samples and methods are very important. If study questions were included in the lab, you must incorporate the answers within your discussion. Use references to compare your results to what other studies have found.

**References:** At least 2 references are required (some references may have been supplied to you by the instructor). Follow the referencing style of the Journal of Food Protection Instructions for Authors; these instructions and an example paper are posted on the Blackboard site. All references must be cited within the text of the report. Points will be lost if this format is not used correctly.

Only websites ending in “.gov” may be used as references – site and list these properly per JFP style. Lab protocols and course presentations are not acceptable references. Unapproved references will lower your grade.

**Teamwork Feedback:** An assessment of team accountability will be posted on the Course site after the completion of each lab report. This will help the instructor evaluate the accountability within the team.

**Grading Rubric** (how I will grade these reports):

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Level of Success - An A is outstanding, a B is strong, a C meets minimum requirements, a D needs extensive revision, and an F is not acceptable. See grading scale for grade weights.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper format (25%); all sections are there and done correctly. Grammar, spelling and punctuation will also affect the grade. Following directions is very important.</td>
<td>A</td>
</tr>
<tr>
<td>Completeness and accuracy of results (25%); all results are indicated. Pay attention to significant figures, units and formatting.</td>
<td>A</td>
</tr>
<tr>
<td>Completeness and accuracy of the discussion section (50%); discussion is thorough, yet concise; use of references; shows understanding and independent thought; answers study questions and does not repeat results section.</td>
<td>A</td>
</tr>
</tbody>
</table>

*The teamwork feedback results may affect individual grades within the group. If you need clarification on your team’s report grade, please visit with the instructor. Grading of reports grows increasingly stringent with each subsequent report as I expect you to improve.
Instructions for Team Lab Projects, Presentations and Reports

Each team is expected to design and conduct a food microbiology project. The resources available and the time restriction of completing the experiments during the scheduled laboratory period limit what can be done. You will need to have team discussions outside of the scheduled class periods, plan for this accordingly and utilize the communication resources on the Blackboard website. **The deadlines for the Team Project steps appear in the course schedule on page 5 of this syllabus.** The steps include:

- As a team, discuss your proposed project idea with the instructor. The instructor will provide feedback and advice on the feasibility of the idea and let you know if you can proceed.
- Draft a preliminary **project description and supply list** (see next page). The instructor will discuss this with the team before proceeding.
- Draft a final project description and supply list. This will take at least two weeks to process after submission to ensure that you will have all the materials you need in place to do your project.
- After the final description and list is submitted, the projects may commence as indicated on the schedule.
- A final report and presentation will be given during the final week of classes.

**The Team Oral PRESENTATION** will be a 15-minute, Power Point or video presentation of the project including an introduction to the problem, the objective of your experiment, the materials and methods, and the results and discussion. Sections of the presentation can be divided among the team members. If you need special arrangements for your presentation, visit with the instructor.

The Team presentation is worth **30 points**, of which 1/3 (10 points) will be from the instructor evaluation and 2/3 (20 points) will be from **peer evaluations**. Evaluations will be based on:

- Adequate introduction (20%)
- Objective stated clearly (20%)
- Sound methodology (20%)
- Reasonable conclusions (20%)
- Overall presentation (20%)

**Team project REPORTS** will have the same format as the other lab reports, with the exception that an **INTRODUCTION section will be included**. Cite references in the introduction section. The materials and methods section needs to be descriptive and not a list of supplies (see example JFP paper).

These reports must include **at least five references**, of which **at least three need to be from a peer-reviewed journal** (i.e. Journal of Food Protection, Journal of Food Science, Applied and Environmental Microbiology, Food Microbiology, etc.). You should have no problem finding lots of references doing a database search through the Library’s website ([http://library.ndsu.edu/find/databases/tag-result/?user=kathie.richardson&topic=agriculture](http://library.ndsu.edu/find/databases/tag-result/?user=kathie.richardson&topic=agriculture)). If you are unfamiliar with database searches, meet with the instructor or consult one of the librarians. Only websites with “.gov” are allowed, unless extremely relevant to the point being made. There is no page limit. **This report is worth 70 points**, and graded by the **same rubric** as for the other lab reports.
Food Microbiology       Team: ______________________
Team Project Description & Supply List

Use this form to submit your team’s project idea and supply needs. The initial list will be reviewed by the instructor and discussed with your group to indicate needed revisions. The final list will be final, and if you need additional supplies, you may be out of luck. Please think through every step of your projects very carefully and be aware of supply availability and time limitations.

Due dates are indicated on the schedule on page 5 of the syllabus. All lists need to be electronically submitted to the instructor. It is best to discuss your lists with the instructor prior to proceeding.

Check one:
_____ Preliminary List  ____Final List

Project idea/objective(s):
________________________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________________________

This table can be altered to accommodate your team’s needs - examples are indicated and are to be deleted for your list. Remember that all food items need to be purchased and are not covered by the lab fee, but do need to be indicated on this sheet. Make sure you list “everything” you will need, and that you thoroughly and correctly describe what you are asking for.

<table>
<thead>
<tr>
<th>Date Needed</th>
<th>Supply Item (these are examples only; edit as suitable for your project)</th>
<th>Exact Number/Amount Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Food or other miscellaneous supplies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Media</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(indicate tubes, slants, plates, film, molten, etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dilution Blanks (99 ml, 9 ml, etc.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pipettes, Pipettmen, tips, and volumes, etc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spreaders, etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Balances, plate counters, etc.</td>
<td></td>
</tr>
</tbody>
</table>
The oral presentations of the group projects will be graded, in part (66%), by the students. Please be fair and honest in your evaluations (Do not rate your group). Turn this form in at the conclusion of the lab period.

<table>
<thead>
<tr>
<th></th>
<th>Team Name</th>
<th>Team Name</th>
<th>Team Name</th>
<th>Team Name</th>
<th>Team Name</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rate the criteria below (A-E) for each group with the numbers 1 through 5, with 1 being poor and 5 being excellent.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Objective stated clearly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B Adequate Introduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C Sound Methodology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D Reasonable conclusions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Overall Presentation</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Comments</td>
<td></td>
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</tbody>
</table>

Scores and comments will be compiled for each group and will be provided to the individuals of the groups. The compiled scores and comments will be anonymous, so the teams will not know who made specific comments.
If You are Registered for MICR 653…

The graduate students will be required to submit **project proposals** worth **50 points**. This may or may not relate to your team project, however, it has to be a food microbiology study.

The Journal of Food Protection format must be followed for references and citations.

There is a **5-page limit (includes references)**; double space, use 1-inch margins and a 12-point font; and this proposal must contain the following sections:

- ✓ Your name
- ✓ Title
- ✓ Abstract (150 word limit; a summary of the proposed project)
- ✓ Hypothesis and objectives
- ✓ Introduction and Justification (review of literature and explanation of why project was selected)
- ✓ Experimental Design (what are the treatments, comparisons, etc.)
- ✓ Materials & Methods (references standard methods; do not list - be descriptive - what and how used)
- ✓ Expected Results and Potential Pitfalls (what should happen and what might go wrong)
- ✓ References (a minimum of five peer-reviewed publications; more is fine; non-.gov websites are acceptable if relevant, but will not be counted in the 5 reference minimum)
- ✓ Include page numbers

It will be **due October 30**.

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<td>A</td>
</tr>
<tr>
<td><strong>Depth and relevance of the literature review (25%); covers major references for the topic; does not have references that are unrelated to theme of project.</strong></td>
<td>A</td>
</tr>
<tr>
<td><strong>Soundness of the hypothesis and objectives (50%); are clearly stated, logical and clearly reflected in the project description and design; feasibility and design are within constraints</strong></td>
<td>A</td>
</tr>
</tbody>
</table>

If you need further clarification, please visit with the instructor.