Food Microbiology
Laboratory Course
11:400:424

1 credit, 120 min session, each topic consists of two sessions

Course Goals:
This is an introductory laboratory course in food microbiology. In this class, the student will become familiar with the laboratory methods used in the microbiological analysis of foods, and with the identifying characteristics of the major groups of microorganisms associated with food spoilage, foodborne disease, and food fermentations.

**FOOD MICROBIOLOGY COURSE** (lectures) should be taken concurrently. A previous laboratory course in General Microbiology is required.

Expectations:
The experiments, assignments, projects, and other activities in this course are designed to help students to learn the basic principles of food microbiology, execute correctly and efficiently basic food microbiology methods, work effectively with others to solve problems, report their results clearly and concisely, both in oral and written form, and think critically about the planning of experiments and the interpretation of results. Students are expected to show up for class on time and be prepared for the class activities, work diligently, ask questions and participate in class discussions.

Major Learning Outcomes:
Upon successful completion of this course, the student is expected to be able to:
1. Use aseptic technique to properly handle microorganisms;
2. Properly use microscope;
3. Stain microorganisms using the Gram stain;
4. Inoculate and isolate bacteria;
5. Analyze food for the presence of microorganisms;
6. Prepare fermented food using microorganisms

Communication:
Students are encouraged to ask questions, express concerns, etc. at any time. This is a rather informal laboratory class and the TA will be in the lab at the regularly scheduled lab times. Therefore, it is expected that most questions can be answered during the lab time. However, if you would like to talk with the course co-coordinator or the TA at another time, we would be happy to set up an appointment with you. Talk to us in class (best option), send us an email message (next best option), call us on the phone, or stop by the office.

Special requirement:
Students are required to wear lab coats.
Safety Regulations for the Food Microbiology Laboratory Course:

1. Always wear a lab coat.
2. No eating, drinking or chewing gum.
3. Wear protective gloves when required.
4. Hands must be disinfected at the beginning and the end of the work.
5. The entire work area must be disinfected before and after the work.
6. No mouth pipetting. Last drop should never be blown out of the pipette.
7. Place used pipettes in designated containers of disinfectant.
8. All tubes and plates should be labeled with the name of the microorganism, name of a group member, and the date.
9. To prevent water vapor from condensing on the lids of the plates, all plates (except for plates with fungi) are to be incubated in an inverted position.
10. Discard culture plates and tubes in appropriate receptacles.

Procedures for Spills:

1. Individual involved is not to attempt to clean up the spill.
2. Always call a TA or instructor.
3. The person doing the clean up is to cover all contaminated surfaces with disinfectant solution, which should be allowed to remain on the surface for 5 min.
4. After the surface is disinfected, all materials will be collected by the TA and discarded in the appropriate receptacles.
5. Failure of a student to report a spill will be grounds for deduction of points from the lab grade.

Lab Notebooks:

Every student must have a separate notebook, which will count for 10 points (out of a total of 100 points) for your final grade. The notebooks will be collected and graded at the times of Exams I and II. They will also be checked early in the semester to be sure that they are maintained correctly.

Following is expected:

1. The notebook should be a bound book with the pages numbered.
2. Each experiment should start on a new page and should be clearly labeled with its name and number.
3. The "working section" for each experiment should clearly describe the samples tested (include all relevant information such as brand, company name, lot number, pull date, etc.), where the procedures can be found in the lab manual, what changes were made in the procedures, how the samples were handled and what dilutions were made, and an account of problems encountered, errors made, special observations, etc. You do not have to copy procedures from the lab manual. You only need to note where the printed procedures were not followed.
4. The results section should include all raw data, neatly tabulated, all calculations made (include just a sample calculation if several repetitive calculations were made), and the final reported results.

5. At the end of each experiment you must include a one-page summary (written in good English in complete sentences) that states the purpose of the experiment, summarizes what was done, presents the reported results, and discusses the significance of the results. If results don't seem to be good or reasonable, the discussion should include an analysis of what went wrong. If results seem good, the discussion should include talk about what they mean. These summaries will be the principal parts of your notebook that will be examined for grading.

It is wise to keep the notebook up to date and complete each write-up and summary as you finish each experiment. The completed notebook must be handed in at the times of Exams I and II. Late notebooks will have 5 points deducted per day late.

Working in Groups

Most experiments should be conducted in groups of no more than 3 students. All members of the group have to share equally in the work that must be done. Rotate jobs among group members; for example, don't have the same person always make dilutions.

For each experiment, the group must hand in a brief report that summarizes what the experiment was; what sample(s) were used; raw data obtained (in tables, please!); reported counts; brief notation on any problems encountered. This report is due on the day that the experiment is completed. Each group member must take turns to compile data and hand in the report.
SCHEDULE
Food Microbiology Laboratory Course

Topic

1. Introduction to Food Microbiology and Laboratory Safety
2. Standard Plate Count of Milk and Foods
3. Heat, Cold and Other Stress Factors Affecting Microbial Growth
4. Isolation and Identification of Listeria
5. Isolation and Identification of Salmonella
6. Isolation and Identification of Escherichia coli
8. Food Safety in Your Home
9. Special Project: Microbial Isolation and Analysis
11. Fermentation of Foods and Bioprocessing and Continuation of the Special Project
12. Group Reports and Final Papers
13. Quiz and Papers Analysis

Grading for the Laboratory

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<tr>
<td>Laboratory Quiz</td>
<td>20 pts</td>
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<tr>
<td>Laboratory Notebooks</td>
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<td>Laboratory assignments</td>
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<td>Working with the group</td>
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<td>Special project</td>
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Total: 100 points