COURSE OUTLINE

FOOD MICROBIOLOGY

BIO 426/280-426

Fall, 2009

INSTRUCTOR: Dr. Broderick E. Eribo

LECTURE: Room 224 - E. E. Just Hall

LABORATORY: Room 209 - E. E. Just Hall

SEMESTER: Fall, 2009

TEXTBOOKS:

Lecture: Modern Food Microbiology, 2005

Laboratory: Food Microbiology
A. E. Yousef. Wiley Publishers

CONFERENCE HOURS: MW 12:00-3:00 p.m. or by Appointment
INTRODUCTION

This course is designed for undergraduate majors and graduate students with interest in the ecology of food borne microorganisms. It covers details of the various parameters necessary for the microbial colonization of foods, the associated diseases. The various mechanisms by which the microbes bring about biochemical changes in the foods are also covered.

Graduate students are expected to present review papers on approved topic areas during the semester. Specific arrangements for the topics and presentation schedule will be made on individual basis.
FOOD MICROBIOLOGY

GENERAL RULES, REGULATIONS AND PROCEDURES

1. GRADING:
   Lecture Exams: 700 Points
   Laboratory 300 Points
   TOTAL POINTS 1000

   900-1000 Points = A
   800-899 Points = B
   700-799 Points = C
   600-699 Points = D
   ≤599 Points = F

2. PLAGIARISM: WILL NOT BE TOLERATED: Anyone caught cheating on exams will be dealt with according to the rules of the College of Arts and Sciences and Graduate School.

3. ADA (Americans with Disability Act): Howard University is committed to providing an educational environment that is accessible to all students. In accordance with this policy, students in need of accommodations due to disability should contact the Office of the Dean for Special Students Services for verification and determination of reasonable accommodations as soon as possible after admission to the University, or at the beginning of each semester. The Dean of the Office of Special Student Services, Dr. Barbara Williams, can be reached at (202) 238-2420.

4. CONDUCT IN LECTURES: Attendance is required. NO TALKING, NO SMOKING, NO EATING permitted during lectures. Lectures start at 2:10 p.m.

5. CONDUCT IN LABORATORY: NO EATING, NO SMOKING! You are asked to respect and be guided by your Teaching Assistant (T.A.). Attendance at each class is required. Accidents of any type must be reported to your T.A.

6. SCHEDULED EXAMINATION: There are NO MAKE-UP EXAMS, except in extraordinary cases, and such cases must be backed with the necessary valid documents.

7. Both the Lecture and Laboratory Exams will be short essay type questions.
<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>TEXT ASSIGNMENT (Chapters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/25</td>
<td>Historical Background: Food borne Microorganisms</td>
<td>1, 2</td>
</tr>
<tr>
<td>8/27</td>
<td>Foodborne Microorganisms Cont'd</td>
<td>2, 4</td>
</tr>
<tr>
<td>9/1</td>
<td>Intrinsic Parameters of Growth</td>
<td>3</td>
</tr>
<tr>
<td>9/8</td>
<td>Intrinsic Parameters, Cont'd</td>
<td>3</td>
</tr>
<tr>
<td>9/10</td>
<td>Extrinsic Parameters</td>
<td>3</td>
</tr>
<tr>
<td>9/15</td>
<td>Spoilage of Vegetables and Fruits</td>
<td>8</td>
</tr>
<tr>
<td>9/17</td>
<td>Spoilage of Meats</td>
<td>9</td>
</tr>
<tr>
<td>9/17</td>
<td>Spoilage of Meats, Cont'd: Poultry and Seafoods, Others</td>
<td>9, 10</td>
</tr>
<tr>
<td>9/22</td>
<td>EXAMINATION (200 POINTS)</td>
<td>ALL THE ABOVE</td>
</tr>
<tr>
<td>9/24</td>
<td>Food Preservation with Chemicals</td>
<td>11</td>
</tr>
<tr>
<td>9/29</td>
<td>Chemicals, Cont'd: Irradiation</td>
<td>11, 12</td>
</tr>
<tr>
<td>10/1</td>
<td>Preservation by Moisture Control: Fermentations</td>
<td>15, 16</td>
</tr>
<tr>
<td>10/6</td>
<td>Preservation by Use of Low Temperature</td>
<td>13, 23</td>
</tr>
<tr>
<td>10/8</td>
<td>Preservation by Use of High Temperature</td>
<td>14</td>
</tr>
<tr>
<td>10/14</td>
<td>Indicator Organisms: Microbiological Criteria</td>
<td>17</td>
</tr>
<tr>
<td>10/13</td>
<td>Culture, Microscopic and Sampling Method</td>
<td>5, Ref.</td>
</tr>
<tr>
<td>10/15</td>
<td>Physical and Chemical Methods</td>
<td>6, Ref.</td>
</tr>
<tr>
<td>10/20</td>
<td>Rapid Methods - Immunologic</td>
<td>6</td>
</tr>
</tbody>
</table>
10/22  Bioassay Methods

10/27  **EXAMINATION (200 POINTS)**

10/29  Staphylococcal Gastroenteritis, *Bacillus cereus*  

11/3   Salmonellosis

11/5   *Escherichia coli* Syndromes, Listeriosis

11/10  *Clostridium perfringens*, Botulism

11/13  *Campylobacter jejuni*, *Vibrio parahaemolyticus*

11/17  Other Vibrios, *Yersinia enterocolitica*  

11/19  Mycotoxicoses, Viruses in Foods  

11/19  Other Foodborne Hazards, Scombroid Poisoning  

11/24  Recap

12/1   **EXAMINATION (300 POINTS)**

ALL THE ABOVE

- 18, 19
- 20
- 20, 22
- 19
- 21, Ref.
- 21, 22, Ref.
- 28, Ref.
FOOD MICROBIOLOGY
LABORATORY GENERAL RULES

1. Read the rules!

2. Read the entire exercises, introduction and procedures, BEFORE attending lab!

3. Do all parts of the appropriate exercise(s) unless otherwise indicated.

4. DO NOT "BORROW" equipment from other trays, tables or student groups.

5. Use materials organized in a designated area only at that specific area. DO NOT take them back to your assigned work area for any length of time. Your colleagues may also need to use such materials.

6. Use open flames with EXTREME CAUTION! Hair, clothing, books, and fingers all burn!

7. DO NOT waste solutions/reagents.

8. DO NOT put solids (paper, slides, coverslips, etc.) in the sink. These items belong only in the appropriate waste containers -- plumbing repair is limited on campus and rather expensive.

9. DO NOT pour any unauthorized liquids down the drains. According to environmental regulations, certain chemicals must be collected for safe disposal (Check with your TA).
10. Clean up any spills IMMEDIATELY following specific instructions detailed under "Safety Rules".

11. At the end of the exercise, you must clean up after yourself.

12. Make sure that your equipment is clean when you are finished and that all items in your equipment tray is properly replaced in the same position before you leave.

13. DO NOT remove ANY materials from the lab room unless authorized. This includes slides, coverslips, lens paper, forceps, etc.

15. Read any and all notices regarding safety, organization and procedures.

16. Under NO CIRCUMSTANCES should you attempt to disassemble your MICROSCOPE. Only a qualified technician should attempt this feat.
SAFETY RULES

1. In order to prevent contamination of clothing by microorganisms and soiling with stains, students are required to wear protective garments such as white coats, which may be purchased in the College of Dentistry Bookstore.

2. There is to be ABSOLUTELY NO EATING, DRINKING, or SMOKING in the laboratory or adjacent areas.

3. Report ANY INJURY, regardless of its triviality, to your GTA IMMEDIATELY! You are dealing with potential pathogens.

4. To reduce the possibility of contamination, wipe the lab table thoroughly with disinfectant BEFORE you begin and AFTER you have completed your lab exercises. Use it to clean minor spills as well. Notify your GTA of major spills.

5. Purses, books, and other materials not specifically used during the course of the lab should be stored in the cabinets beneath the lab desks. Generally, only your lab manual, handouts and writing utensils should be left out. DO NOT PLACE ANYTHING on the floor as the room is quite congested.

6. Broken glass boxes are for broken glass only.

7. Petri dishes must be discarded in the appropriately labeled waste cans only. DO NOT overfill a waste can (ask your GTA to take care of it) or place dishes on top of a tied plastic bag. Dispose of all media according to instructions from your TA as soon as you are finished with it.
8. Papers should be discarded only in the waste baskets -- NOT in the sinks - broken glass containers or petridish discard!

9. Turn bunsen burners on slowly and only as high as is necessary -- about one inch of flame. TURN OFF the burners when not in use to prevent burns and to keep the room temperature bearable.

10. Use open flames with EXTREME CAUTION! Hair, clothing, books, and fingers all burn!

11. Used cultures and broth tubes must be discarded in the assigned baskets, in an upright or slanted position. The caps keep out stray bacteria, but are not waterproof. DO NOT discard in the petridish waste containers, as these can be washed and reused.

12. Students with long hair should tie it back to prevent the possibility of its catching fire. Similarly, avoid flowing sleeves, scarves, ties, flammable jewelry, etc.

13. Personal hygiene is important. Wash your hands frequently. Put a band-aid over any cuts. Avoid putting your hands to your mouth, eyes, etc. Be aware of any medical conditions you may have that might be affected by this laboratory environment.
<table>
<thead>
<tr>
<th>DATE</th>
<th>EXPERIMENTS</th>
<th>EXERCISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/25</td>
<td>Check-in; Basic Microbiologica Techniques: Dilutions and Sampling Methods</td>
<td>1</td>
</tr>
<tr>
<td>8/27</td>
<td>Plate Count Methods -Pour and Surface(Bacteria and Fungi)</td>
<td>2</td>
</tr>
<tr>
<td>9/1</td>
<td>Direct Microscopic Count Method</td>
<td>3</td>
</tr>
<tr>
<td>9/8</td>
<td>MPN Method for Determining Microbial Numbers</td>
<td>Spec. 1</td>
</tr>
<tr>
<td>9/10</td>
<td>Incidence/ Numbers of Organisms</td>
<td>Spec. 2</td>
</tr>
<tr>
<td>9/15</td>
<td>Determining D Values and Thermal Death Time</td>
<td>Spec. 3</td>
</tr>
<tr>
<td>9/17</td>
<td>Cell Injury</td>
<td>Spec. 4</td>
</tr>
<tr>
<td>9/22</td>
<td>Enterobacteriaceae</td>
<td>4</td>
</tr>
<tr>
<td>9/24</td>
<td>Coliform and Fecal Coliform Organisms</td>
<td>5</td>
</tr>
<tr>
<td>10/29</td>
<td>Staphylococcus aureus:</td>
<td>7, Spec 5</td>
</tr>
<tr>
<td>10/1</td>
<td>Listeria monocytogenes</td>
<td></td>
</tr>
<tr>
<td>10/6</td>
<td>The Lactic Acid Bacteria</td>
<td>29</td>
</tr>
<tr>
<td>10/8</td>
<td>Sauerkraut Production</td>
<td>Spec 6</td>
</tr>
<tr>
<td>10/13</td>
<td>EXAMINATION</td>
<td>100 Points</td>
</tr>
</tbody>
</table>
10/15 Preparation of Yogurt and Acidophilus Milk
10/20 Milk and Ice Cream
10/22 Cheese and Butter
10/27 Enumeration of Yeasts and Molds in Foods
10/29 Detection and Identification of Salmonella
11/3 Examination of Canned Foods
11/5 Special Project
11/10 Special Project contd.,
11/13 Special Project contd.,
11/17 Special Project contd.,
11/19 Special Project contd.,
11/24 Special Project contd.,
12/1 Special Project Paper Due
12/3 Examination
ALL OF THE ABOVE
FOOD MICROBIOLOGY LABORATORY RULES
AGREEMENT
Fall, 2009

I ___________________________ ___________________________ ___________________________ have read and understand
Last Name First ID #

the safety and general rules for the laboratory, and agree to abide by all the rules, including any additional rule that may be introduced by verbal instructions as seen fit throughout the duration of the course. I further understand that the instructor reserves the right to deny my participation in the laboratory for failure to keep to these rules.

__________________________
Student

__________________________
Instructor/ Dr. Broderick Eribo