The Pennsylvania State University  
BE 309 General Food Microbiology and Hygiene (3 credits)*  
Fall 2011

Monday-Wednesday-Friday; 1-2.15 PM  
106 Agricultural Engineering Building  
Or  
112 Agricultural Engineering Building

Instructor’s Name: Gulten Izmirlioglu  
Office Hours: By appointment  
Email: gxi111@psu.edu

I. COURSE DESCRIPTION

Understanding of morphologic and physiologic properties of microorganisms, specifically bacteria, yeast, and mold, food poisoning and spoilage, enumeration of microorganisms, design of food processing plants and equipments, cleaning and disinfection methods, importance of personnel training in food industry, and water and waste treatment.

II. OBJECTIVES:

Each enrollee will be able to:
   a. Distinguish bacteria, yeast, and mold  
   b. Effect of microorganisms in food industry  
   c. Determine pathogenic microorganisms  
   d. Determine spoilage of food (meat, dairy products, poultry, fish and sea foods, eggs, vegetables and fruits, canned products, frozen products, irritated products)  
   e. Enumerate the microbial load in a food sample  
   f. Understand the basics of designing a food processing plant and equipment  
   g. Train food industry employees.  
   h. Choose an appropriate cleaning/disinfecting method for a particular food processing plant  
   i. Know how to treat industrial waste and water before sending to environment

III. EVALUATION AND REQUIREMENTS:

Course Policy:  
Attendance is not required, but expected, however, will not influence course grading.
Late submissions are accepted with a 10% lost of a grade.

This course is graded on an absolute grading policy.

Grading Scale:
- 94-100 = A
- 90-93 = A-
- 86-89 = B+
- 82-88 = B
- 78-81 = B-
- 74-77 = C+
- 70-73 = C
- 69-60 = D
- <59 = F

Gradable Content:
- Homework&Reports = 20%
- Midterm exam = 30% (2 midterms, 15% each)
- Final exam = 20%
- Project = 30%

Academic Honesty:

Academic integrity, as defined by university Faculty Senate Policy 49-20, is the pursuit of scholarly activity free from fraud and deception and is an educational objective of this institution. Academic dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating of information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students.

IV. INSTRUCTIONAL MATERIALS:


V. CLASS SCHEDULE AND SEQUENCE OF INSTRUCTION:

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Topic</th>
<th>Assignments</th>
<th>Type of class</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to Food Microbiology Course syllabus Expectations</td>
<td>Read Chapter 1: due meeting 2</td>
<td>Lecture</td>
</tr>
<tr>
<td>2</td>
<td>Characteristics of Bacteria Growth of a bacteria Characteristics of Fungi</td>
<td>Homework #1: due meeting 3</td>
<td>Lecture</td>
</tr>
<tr>
<td>3</td>
<td>Gram Staining of a bacteria and yeast (Room 112)</td>
<td>Read Chapter 2 and Lab report #1: due meeting 5</td>
<td>Hands on experiment</td>
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| 4       | Food Poisoning  
-Bacterial  
-Mycotoxicoses | Homework # 2; due meeting 5 | Lecture |
| 5       | Examples of outbreaks and regularities | Read Chapter 3.1, 3.2, 3.3, and 3.4; due meeting 6 | Student presentations |
| 6       | What is spoilage?  
Spoilage of;  
- fresh meats, cured meats, vacuum-packed meats | Read Chapter 3.5 and 3.6; due meeting 7 | Lecture |
| 7       | Spoilage of;  
Poultry and Fish and Sea Foods  
Eggs and egg products | Read Chapter 3.7 and 3.8; due Meeting 8 | Lecture |
| 8       | Spoilage of;  
Vegetables and Fruits | Read Chapter 3.14, 3.15, and 3.17; Homework # 3; due meeting 10 | Video conference (Dr. Nevzat Artik, Ankara Uni.) |
| 9       | Spoilage of;  
Frozen Foods,  
Canned Foods  
Irradiated Foods | | Lecture |
| 10      | Review | | Lecture |
| 11      | Midterm #1 | | Evaluation |
| 12      | Microbial Enumeration  
Sampling  
Plate counting  
Spectrophotometric methods | Read Chapter 4 | Lecture |
| 13      | Plate count for E. coli K12  
(Room 112) | Lab Report #2 due Meeting 15 | Hands on experiment |
| 14      | Design of a food processing plant  
General design principles  
Ceilings, Walls, and Floors  
Ventilation | Project title and brief description due meeting 17 | Lecture |
| 15      | A visit to canned vegetables processing pilot plant on campus | | Field Trip |
| 16      | Design of a food processing equipment  
Construction Materials  
Corrosion of materials  
External Surfaces | | Lecture |
<p>| 17      | Introduction of Project to the class and feedback from peers (is that project applicable and contrubitions to the course) | Read Chapter 7.8 | Student presentations and discussion |</p>
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<tr>
<td>18</td>
<td>Design of Individual Items of equipment Tanks, pumps, valves, pipes, motors, mixers, lines, etc.</td>
<td>Read Chapter 9.1 due meeting 19</td>
<td>Guest Lecturer from ATCI Makina Inc.</td>
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<tr>
<td>19</td>
<td>Cleaning and Disinfection Methods</td>
<td>Homework #4 due meeting 20</td>
<td>Lecture</td>
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<tr>
<td>20</td>
<td>Review</td>
<td>Read Chapter 9.5 and 9.6 due meeting 22</td>
<td>Class Games (Jeopardy)</td>
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<tr>
<td>21</td>
<td>Midterm #2</td>
<td></td>
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<tr>
<td>22</td>
<td>Cleaning and Disinfection Methods; Detergents, Chemical disinfectants</td>
<td>Read Chapter 9.7, 9.8, and 9.9 due meeting 23</td>
<td>Lecture</td>
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<tr>
<td>23</td>
<td>Cleaning and Disinfection Methods; Use of heat, Dry cleaning, CIP</td>
<td>Project due meeting 29</td>
<td>Lecture</td>
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<tr>
<td>24</td>
<td>CIP demonstration (A CIP system will be showed in the workshop and a demonstration will be carried out by a Grad student) (Room 114)</td>
<td>Homework # 5 due meeting 26</td>
<td>Basak Koc/Demonstration</td>
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<tr>
<td>25</td>
<td>Hygiene and Training of Personnel</td>
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<td>Lecture</td>
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<tr>
<td>26</td>
<td>Personnel Training (A professional personnel trainer will give a one hour training to students)</td>
<td>Homework # 6 due meeting 28</td>
<td>Guest Lecturer</td>
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<tr>
<td>27</td>
<td>What is HACCP?</td>
<td>Homework #7 due meeting 29</td>
<td>Lecture</td>
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<tr>
<td>28</td>
<td>HACCP application to a chocolate ice cream processing plant **</td>
<td></td>
<td>Case study</td>
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<tr>
<td>29</td>
<td>Waste and Water Management</td>
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<td>Lecture</td>
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<tr>
<td>30</td>
<td>A visit to Waste Water Management Facility of University</td>
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<td>Field Trip</td>
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*This course outline based on Food Microbiology and Hygiene – 2nd Edition text book written by Hayes, PR 1995.  
** A conference paper of Instructor will be used to illustrate the application of HACCP to a ice cream plant 