FOOD SCIENCE AND TECHNOLOGY 5410
FRUIT AND VEGETABLE PROCESSING
Or Fun with pigments and enzymes

Autumn semester. The lectures are in 114 Parker Hall, 12:40-1:35 Monday and Thursday. Labs are in the pilot plant in the basement of Howlett Hall room 59, 12:40-3:30 Friday. 3 Units

Course Goals:
1. Students understand the basic steps involved in commercially processing typical fruits and vegetables.
2. Students understand how different processing steps affect quality and safety.
3. Students understand the chemistry of fruits and vegetables, especially pigments and enzymes.
4. Students know how to operate common processing and analytical equipment.

Lab topics: Date Report Due
1. Canning salsa and tomato juice August 30 September 6
2. Enzymes and Pigments **In 124 Parker** September 6 September 13
3. Peeling beets, apples, potatoes and carrots September 13 September 20
4. Canning green beans: effect on color and texture September 27 October 4
5. Jelly/Start Freezing October 4 October 14/Nov 1
6. Finish Freezing/Start Drying October 25 November 1/15
7. Potato chips November 1 November 8
8. Finish Dehydration November 8 November 15
9. Cider November 22 November 29

The required lab format is explained in the course packet.

Required reading:
- There is a packet of lab handouts that needs to be printed out and brought to every lab
- Readings are listed by page number on the last page of the syllabus. Some of the readings include more detail than is needed for this class. The readings are posted on Carmen or you can buy the book.

Carmen:
Information is posted under Grades and Modules. You are not required to use Carmen for this class. Some class notes and useful files are posted under Modules.

Instructors: Assistant: Pilot Plant Supervisor:
Dr. Sheryl Barringer Dr. Hardy Castada Matt Papic 688-3642 247-1945 292-4045
110 Parker Hall 264C Howlett Pilot Plant, Howlett barringer.11@osu.edu castada.1@osu.edu papic.1@osu.edu

Office hours: drop by anytime, or make an appointment through Julie Townsend.57
Laboratory Exercises:

Laboratories will be done in the pilot plant of Howlett Hall. We will be using real processing equipment, so remember that accidents can happen. Report ALL accidents to the instructor, pilot plant supervisor or Assistant immediately. No high heels, open toed shoes or shoes with slippery soles are allowed in the pilot plant. You must wear long pants that go to your ankles. No loose, dangly jewelry or sleeves. Do not wear nice clothes to the lab. Laboratory aprons will be provided but you may still get wet or dirty. Hair and beard (if appropriate) nets are required. Exercise caution when working around equipment that is in motion. For the Pigments and Enzyme lab you will need to bring a lab coat and we will be in 124.

Be certain you read the lab (all labs we are doing that week) before coming to class and turn in the answers to the prelab questions before lab (for all labs we are doing that week). For each laboratory exercise, a written lab report is required. This report is due a week later, at the beginning of the class. It cannot be emailed. If you are late to lab, your report will be counted late. Reports must be neat and readable or they will not be graded. Late lab reports will lose 10 pts if up to one day late, 20 pts if up to two days late and will not be accepted after a week. There are no make-up labs. If you miss the lab, you cannot get points for turning in the lab report. If you have a medical emergency, you need to contact me so we can talk about it. The information needed to answer the questions should have been given in lecture, but ask if you need more information.

Remember to clean up after each lab exercise. This includes hosing down all equipment, taking apart and cleaning equipment where necessary, discarding any garbage and wiping down all surfaces. Any students who leave before the entire area is clean, or do not help with the cleaning, will have points taken off of their lab reports.

At the beginning of each lab, students will first wash their hands and put on their hair nets, then divide into groups and choose a leader. The leader will be in charge of making sure all of the work is done, results are reported to the rest of the class, and everything is clean before leaving. Everyone must lead a group at least once. Make sure you understand what the other groups did. Ask questions at the end of the lab if you are unsure.

Exams: There will be 2 exams and a cumulative final. You are not allowed to use any notes on the exams. Once you leave the exam, you cannot return unless you have made special arrangements with me before the exam starts. That includes going to the bathroom.

Exam hints: If you are asked for 4 reasons, give at least 5. You can get full credit for using excellent logic but coming to the wrong final answer. However, if you don’t explain your reasons you can’t get partial credit.

Grading:
The grading breakdown is:

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
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<tr>
<td>Lab reports, homework, applications and quizzes</td>
<td>30%</td>
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<tr>
<td>Exams</td>
<td>20%, 20% and 30%</td>
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<tr>
<td>Attendance</td>
<td>(-1%)</td>
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With each exam you will be given a list of the questions. You have 24 hours (due at 3pm the next day) to return the list with the correct answer for any question you feel you answered incorrectly on the exam. Correct answers on the original exam will not be regraded down. You may do this by email, fax, in my mailbox or under my door. You will receive 1/3 credit for each question answered correctly, that was previously wrong.

The class is graded on a straight scale: 100-93 = A, 92-90 = A-, 89-87 = B+ , 86-83 = B, 82-80 = B-, 79-77 = C+, etc. It is acceptable (and desirable) for the entire class to receive As, if you earn them.
Grades will periodically, but not regularly, be posted on Carmen.

**Homework and Lab Reports:**
Every Friday there is a homework assignment or lab report due. If we don’t meet on Friday, then it is due in lecture. See the course packet for more instructions on what is expected in the lab reports.

**Possibly useful texts and websites.**

**Canning, retorting:**
Lopez, A. A Complete course in canning. The Canning Trade. Ch 9 and 12
The Almanac of the canning, freezing and preserving industry. TX599. Contains part of the CFR

**General fruits and vegetables:**
Food chemistry [computer file] / edited by Owen R. Fennema. Available through the library as hard copy and electronically. There are 4 editions, but the third (1996) is the best. http://library.ohio-state.edu/search~S7?afennema%2C+owen/afennema+owen/1%2C1%2C12%2CB/frameset&FF=afennema+owen+r%5%2C%2C"
Woodruf and Luh. Commercial Fruit Processing. AVI Publishing

**Government regulations:**

**Composition, pH, production websites:**
Food composition: http://www.ars.usda.gov/ba/bhnrc/ndl then “search”
Agricultural production: Agricultural Statistics (HD1751 in the reference section of the Agricultural library)
on www.usda.gov or www.census.gov/compendia/statab/
Worldwide agricultural production: http://faostat.fao.org/
Chemical structures and characteristic aroma: http://www.flavornet.org/flavornet.html then enter the name.
http://library.ohio-state.edu/screens/databases.html then to Food Science and Technology Abstracts (FSTA) for flavors and pigments

**Postharvest physiology, respiration, etc:**

**Academic Misconduct:**
It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.
Students are allowed to work on their lab reports together, but each student must write their own report in their own words.

**Disability Services**
Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability
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<th>Week</th>
<th>\textbf{Aug} 20-23 w1</th>
<th>\textbf{Aug} 26-30 w2</th>
<th>\textbf{Sep} 2-6 w3</th>
<th>\textbf{Sep} 9-13 w4</th>
<th>\textbf{Sep} 16-20 w5</th>
<th>\textbf{Sep} 23-27 w6</th>
<th>\textbf{Oct} 30-4 w7</th>
<th>\textbf{Oct} 7-11 w8</th>
<th>\textbf{Oct} 14-18 w9</th>
<th>\textbf{Oct} 21-25 w10</th>
<th>\textbf{Oct} 28-1 w11</th>
<th>\textbf{Nov} 4-8 w12</th>
<th>\textbf{Nov} 11-15 w13</th>
<th>\textbf{Nov} 18-22 w14</th>
<th>\textbf{Nov} 25-29 w15</th>
<th>\textbf{Dec} 2 w16</th>
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<td>Lecture (Mon, Thursday)</td>
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<td>23-27</td>
<td>Retorts. Aseptics. EXAM THURSDAY.</td>
<td>Enzymes Pigments In 124</td>
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<td>30-4</td>
<td>Jam. Freezing.</td>
<td>Jelly/Freezing</td>
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<td>14-18</td>
<td>Freezing. Water activity.</td>
<td>Jelly lab</td>
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<td>28-1</td>
<td>Potato chip processing. Drying</td>
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<td>18-22</td>
<td>(Veteran’s Day) EXAM THURSDAY</td>
<td>Cumulative Quiz in 311</td>
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<td>11-15</td>
<td>Grades &amp; standards. Postharvest physiology. CA/MA. Refrigeration. humidity</td>
<td>Drying lab</td>
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<td>Waste and water. Tomato tour. Irradiation. Review</td>
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Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/.
Final Exam: Thursday Dec 12 2:00pm-3:45pm