Autumn semester. The lectures are in 118 Parker Hall, 12:40-1:35 Monday and Wednesday. Labs are in the pilot plant in the basement of Howlett Hall room 59, 12:40-3:30 Friday, with exceptions as shown on the last page. 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:**

1. Canning salsa and tomato juice
2. Enzymes and Pigments- shifts in 124/136 Parker**
3. Peeling beets, apples, potatoes and carrots
4. Canning green beans: effect on color and texture
5. Jelly/Start Freezing
6. Potato chips
7. Finish Freezing/Start Drying
8. Finish Dehydration
9. Cider

<table>
<thead>
<tr>
<th>Lab topics</th>
<th>Date</th>
<th>Report Due</th>
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<tbody>
<tr>
<td>Canning salsa and tomato juice</td>
<td>September 4</td>
<td>September 11</td>
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<tr>
<td>Enzymes and Pigments- shifts in 124/136 Parker**</td>
<td>September 11</td>
<td>September 18</td>
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<tr>
<td>Peeling beets, apples, potatoes and carrots</td>
<td>September 18</td>
<td>September 25</td>
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<tr>
<td>Canning green beans: effect on color and texture</td>
<td>October 2</td>
<td>October 9</td>
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<tr>
<td>Jelly/Start Freezing</td>
<td>October 9</td>
<td>October 16/Nov 6</td>
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<tr>
<td>Potato chips</td>
<td>October 23</td>
<td>October 30</td>
</tr>
<tr>
<td>Finish Freezing/Start Drying</td>
<td>October 30</td>
<td>Nov 6/Nov 13</td>
</tr>
<tr>
<td>Finish Dehydration</td>
<td>November 6</td>
<td>November 13</td>
</tr>
<tr>
<td>Cider</td>
<td>November 6</td>
<td>November 30</td>
</tr>
</tbody>
</table>

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. Some class notes and useful files are posted under Modules.

**Instructors:**
Dr. Sheryl Barringer 688-3642 110G Parker Hall barringer.11@osu.edu
Dr. Hardy Castada 335G Howlett castada.1@osu.edu
Megan Booth booth.310
Fenfen Tang tang.1263

**Assistants:**
Matt Papic 292-4045
Pilot Plant, Howlett

**Pilot Plant Supervisor:**
Julie Townsend.57

Office hours: after class we can talk or set up a meeting time, or you can 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 or 136, and you will be in shifts.

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. 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 two in person exams and a cumulative take home final. You are not allowed to use any notes on the in person 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:
Lab reports, homework, applications and quizzes  30%
Exams  20%, 20% and 30%
Attendance- photos will be taken each period for contact tracing  (-1%)

With each exam you will be given a list of the questions. You have 24 hours (due at 2pm 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. Submit these answers by email. 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.
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%2C12
Woodruf and Luh. Commercial Fruit Processing. AVI Publishing
Government regulations:
Composition, pH, production websites:
Food composition: https://fdc.nal.usda.gov/
Agricultural production: Agricultural Statistics (HD1751 in the reference section of the Agricultural library) or 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:

You are required to read the University Policies which are posted on the Carmen site and are considered to be part of this syllabus. I have highlighted two of the items below:

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.

Health and safety requirements: All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (https://safeandhealthy.osu.edu), which includes wearing a face mask and maintaining a safe physical distance at all times. Non-compliance will result in a warning first, and disciplinary actions will be taken for repeated offenses.
<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture (Mon, Wednesday)</th>
<th>Due in lecture</th>
<th>Lab (Friday)</th>
<th>Due in Lab</th>
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<tbody>
<tr>
<td>Aug 26-28 w1</td>
<td>Syllabus. F vs. V. Water and CHO.</td>
<td>11-32 composition</td>
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</tr>
<tr>
<td>Sep 31-4 w2</td>
<td>Minor components. Tomato intro for the lab. Enzymes.</td>
<td>99-100, 103-122 raw materials</td>
<td>Tomato salsa</td>
<td></td>
</tr>
<tr>
<td>Sep 9-11 w3</td>
<td>(Labor day) Tomato review. Pigments.</td>
<td></td>
<td><strong>Enzymes Pigments In 124 and 136</strong></td>
<td>Tomato lab</td>
</tr>
<tr>
<td>Sep 14-18 w4</td>
<td>Steps in processing. Low acid foods.</td>
<td>369-378 blanching. 359-360 microbial death.</td>
<td>Peeling</td>
<td>Enzyme lab</td>
</tr>
<tr>
<td>Sep 21-25 w5</td>
<td>Cans and retorts.</td>
<td>396-401 retort theory; 408-415 retorts.</td>
<td><strong>Cumulative Quiz in Carmen</strong></td>
<td>Peeling lab</td>
</tr>
<tr>
<td>Oct 28-2 w6</td>
<td>Retorts. Freezing. EXAM WEDNESDAY.</td>
<td></td>
<td>Canning green beans</td>
<td>Homework 1</td>
</tr>
<tr>
<td>Oct 5-9 w7</td>
<td>Jam. Aseptics.</td>
<td>650-652, 659-667, 676-682 Freezing.</td>
<td>Jelly/Freezing</td>
<td>Green bean lab</td>
</tr>
<tr>
<td>Oct 12-16 w8</td>
<td>Freezing.</td>
<td></td>
<td><strong>Cumulative Problem Solving in Zoom</strong></td>
<td>Jelly lab.</td>
</tr>
<tr>
<td>Oct 19-23 w9</td>
<td>Potato chip processing.</td>
<td>40-44 water activity.</td>
<td>Potato Chips</td>
<td>Homework 2</td>
</tr>
<tr>
<td>Nov 1-6 w11</td>
<td>Drying. Juice.</td>
<td>485-489 drying theory 516-521 drying equip.</td>
<td>Drying/ Cider</td>
<td>Freezing lab</td>
</tr>
<tr>
<td>Nov 9-13 w12</td>
<td>Postharvest physiology. (Veteran’s Day)</td>
<td>623-624, 635-636 CA.</td>
<td><strong>Cumulative Quiz in Carmen</strong></td>
<td>Drying lab</td>
</tr>
<tr>
<td>Nov 16-20 w13</td>
<td>CA/MA. EXAM WEDNESDAY</td>
<td></td>
<td><strong>Cumulative Problem Solving in Zoom</strong></td>
<td>Homework 3</td>
</tr>
<tr>
<td>Dec 30-4 <strong>in Zoom</strong> w15</td>
<td><strong>Zoom classes: Waste and water. Tomato tour. Irradiation. Review</strong></td>
<td>Review questions and answers by email.</td>
<td><strong>Zoom review</strong></td>
<td>Homework 4</td>
</tr>
<tr>
<td>Dec 11</td>
<td>Take Home Final Exam: Due Friday Dec 11 2:00pm</td>
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</tbody>
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**For the Enzyme and Pigments lab, there will be two pre-assigned shifts in lab rooms 124 and 136. 1st shift is 12:40 to 2:00 and the 2nd shift is 2:10 to 3:30 pm. See the lab packet to find your shift.**