

# MBIO 4600 Food Microbiology Spring 2017

Lecture MWF 9:00A – 9:50A, N331

Lab M 2:00P – 4:50P, N331

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<b>Office hours</b>	W 10:00A-11:00A, F 11:00A-12:00P, or by appointment
<b>E-mail</b>	<a href="mailto:mthao@csustan.edu">mthao@csustan.edu</a> <ul style="list-style-type: none"><li>• This is the best method to contact me regarding emergencies, appointment set up, or questions with very short answers. Please ask complex questions during lecture or office hours. Questions regarding grades or answered on the syllabus will not be acknowledged.</li><li>• Include your name and the course number in the subject line.</li></ul>
<b>Webpage</b>	<a href="http://moodle.csustan.edu">http://moodle.csustan.edu</a>

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**Course Description:** Study of the relationship of microorganisms to food-borne disease, food spoilage, and food production as well as food preservation.

## Course objectives:

At the end of this course, students will know:

1. The parameters that influence microbial growth in foods.
2. The causes of food spoilage and food-borne microbial diseases.
3. The measures necessary to control spoilage and food-borne illnesses including food preservation to increase the shelf-life of foods.
4. The use of microorganisms in food production
5. The methods for the detection, enumeration and identification of food-borne pathogens.

## COURSE REQUIREMENTS

**Prerequisites:** Successful completion of MBIO 3010 and MBIO 3032 or equivalent

**Required Text:** There is no required text. Students may use the following books as reference.

- Jay, James M. 2005. Modern Food Microbiology, 7<sup>th</sup> Edition. Springer Science + Business Media, Inc.
- Doyle, Michael P. 2001. Food Microbiology: Fundamentals and Frontiers, 2<sup>nd</sup> Edition, ASM Press.

**ADD/DROP Policies:** add/drop policies for this class are the same as the university add/drop policies, please consult the Class Schedule for more detail.

## Course Etiquette:

1. Arrive prepared and on time for class.
2. Turn off and put away all cell phones. No cell phone will be allowed out at any time.
3. Please do not carry on conversations with your neighbors once class has started. Such behavior is highly disrespectful and very distracting to me and to the other students around you.

## Grading Policies:

1. **Academic Dishonesty and Misconduct:** There is zero tolerance for cheating. Cheating in any capacity in this class will result in penalties ranging from a minimum of a zero on the assignment or exam to a maximum of expulsion from California State University, Stanislaus as indicated by the official University Policy regarding dishonesty and misconduct. Exams, reports, and/or other assignments are indicators of individual performance. Copying off of another student's exam, plagiarized reports, or other assignments constitutes cheating. If your phone rings during the exam, ten (10) points will be deducted from your exam score. Taking out a cell phone during an exam is considered cheating, your exam will be confiscated, and you will receive zero points for that exam.

2. **Regular class attendance is vital to your success in this course.** Attendance requires not only your physical presence, but your attention and participation as well. Students who are physically present, but inattentive (including, but not limited to, sleeping, excessive conversation, texting, e-mailing, web-surfing, being disruptive, arriving late, leaving early, etc.) may be asked to leave. If you are absent on the days when students are presenting, you will **lose 10 points of your participation points per lecture period**. You are responsible for any information or assignments you missed in your absence. **Lab attendance is mandatory!** If you have missed an entire exercise you will forfeit the entire number of points allotted for that lab exercise. Excessive tardiness or leaving early may constitute absences. **More than 2 lab absences will result in a penalty of 30 points deducted per absence from your total score, thereby significantly reduce your grade.** You are responsible for any information or assignments you missed in your absence.
3. You are expected to study regularly, and to consult your notes when you have a question. Your instructor will be happy to answer questions once you have made an honest effort to do so on your own. A question may sometimes be answered with a question, or your fellow classmates may be called upon to help answer it. This is to lead you to the answer, not to embarrass you.
4. **Exams:**
  - a. Exams are written with the course objectives in mind. Because the information in this course cannot be divided into separate, discreet units, exams will be comprehensive and to some extent, be cumulative. There will be three midterms (75 points each) and a final (150 points).
  - b. Note: Exam date/time changes will be made only in case of an emergency or if they conflict with official university activities. **Do not** schedule any appointments, nor make any travel plans that conflict with a scheduled exam.
  - c. Questions that may appear on exams include multiple choice, matching, short answer, discussion, problem-solving and case study interpretation. You will need Scantron form # 882-E for the exams. Note that:
    - i. Only answers on the Scantron will be graded, so transfer answers carefully
    - ii. Take care to erase well those answers you do not want marked
    - iii. Illegible answers in written portion will not be graded.
    - iv. Correct spelling and grammar are necessary for effective communication. Therefore, spelling and/or grammatical errors will result in loss of points on exams.
  - d. Unless otherwise stated, exams will begin at the beginning of the scheduled class time. **If you are late then you will have less time to complete the exam. Traffic and/or car problems are not acceptable excuses for being late.**
  - e. You will not be allowed to leave the room until you have finished and turned in your exam.
  - f. You must turn off cell phones and remove baseball caps during exams. If your cell phone rings during an exam five (5) points will be deducted from your score. Cell phones must be put away during exams. Taking out a cell phone during an exam is considered cheating, your exam will be confiscated, and you will receive a grade of F in the course.
  - g. After graded exams have been returned, you have one week to review exams or dispute errors; no grades will be changed after that time.
5. **Make-up exams only given under extenuating circumstances and only with proper documentation.** Make-up exams may be different than the exam given in class. Failure to appear at exam time without 24 hours prior notice to instructor with an appropriate excuse, or an appropriately documented emergency, will result in zero points for that exam. If you miss an exam for a legitimate emergency it is still your responsibility to notify the instructor as soon as practical. Under no circumstances will you be allowed to take an exam once it has been handed back. It is **your** responsibility to notify the instructor **prior** to missing an exam and to supply him with a valid, **written** excuse.

6. Total points for course = 650

Assignment	Points	
3 exams (75 pts each)	225	<b>Note:</b> Presentations are required of all students. Students who do not present will have additional points equal to that of the assignment deducted from their final score.
Outbreak presentation	50	
Paper Presentation	50	
Lab book	150	
Class participation	25	
Comprehensive final exam	150	

7. **Grading** will be based on a percent scale:

93-100 = A, 90-92 = A-, 87-89 = B+, 83-86 = B, 80-82 = B-, 77-79 = C+, 73-76 = C, 70-72 = C-, 67-69 = D+, 60-66 = D, < 60 = F

**Note:**

- Take care of your grade. Remember you earn your grade; it is not given to you.
- Grades/scores will not be sent to students via email or be given over the telephone.
- Instructor will not calculate student's scores/grade.
- The instructor reserves the right to reduce your grade due to excessive absences and/or tardiness.

8. **Absolutely no late assignments will be accepted.** Presentation must be turned in presented on the assigned date or else it will be considered late and you will lose points as stated above.

9. **Course Page**

Information for the course (**Lecture notes**, objectives, and/or ppt lectures exam scores, syllabus, related materials, etc.) can be found on the course's Moodle page (moodle.csustan.edu). Lecture materials are **copyrighted** and are only for the personal use of students enrolled in the course. **Do not** give the username/password to anyone else. If you do, **no more** material will be provided.

How to enroll yourself in our Moodle site:

- Go to <http://moodle.csustan.edu> and click Course Categories to find our class: Microbiology, then MBIO 4600: Food Microbiology.
- At the login screen, use your Warrior ID and Password to log in.
- Next, in the box labelled "Student self-enrollment" use the enrollment key: **foodmicrosp17** and you will be able to access the class site.
- If you have any problems logging in or enrolling, please email Glenn Pillsbury ([moodleadmin@csustan.edu](mailto:moodleadmin@csustan.edu)).

**\*Note:**

- No laptops, cameras, cell phones, or any other recording devices allowed in class.**
- Audio\Video Recording** of lectures is not permitted without consent from instructor.

**10. Laboratory Notebook:**

The most important piece of equipment you will use when working in lab is your lab notebook. Since science is built upon the premise that results are reproducible, we must leave detailed information so others could reproduce our work if they read our notes. **For this class, you should use a 3-ring binder (½ inch).** Your notebook is the only source of information of all that you have done in lab. It should be an accurate account of what you did, why you did it, when you did it, what the results were, and what these results mean. Each student is expected to keep their own notebook. Here are a few simple rules to keep in mind while developing your notebook.

- 1) Notebooks do not have to be "neat" but they should be legible (i.e. write neat enough for me to be able to read it). Record the date at the top of each page. Do not recopy your notes. NEVER!! By recopying your notes, you may filter out some information that seems insignificant at the time, but may be very valuable later.

Also, a notebook is not designed to be a duplication of the lab exercise instructions. Just cite the lab exercise, and then record any deviations from/changes to the protocol.

- 2) Divide your notebook into 2 sections: a) copies of protocols you use; b) your notes and hard copies of your data.
- 3) You may use either pen (blue or black) or pencil, but if you use pencil, make sure it is dark enough to be seen easily. If you make a mistake, neatly cross it out and continue.
- 4) For each experiment, you will record all measurements and calculations you perform. It is very important to include hard copies of your data followed by interpretations of the results, i.e., What do the numbers mean??! Refer to the hard copy of your data and write detailed explanations of what your data mean to you and what you need to do next.

In your lab book, the above information will be included under the following headlines:

- a. **Title of the experiment**
- b. **Purpose of the experiment:** Statement(s) of the **purpose(s)** of the experiment (**in your own words!!!**).
- c. **Procedure:** If you deviated from the normal protocol, you should record all changes to procedure. Note any problems you may have encountered in carrying out the protocol. You do not need to rewrite the instructions given in the lab protocol provided for you, but record what you did beyond the given instructions/protocol: Explain in enough detail/information so someone else who is not in the class can understand and repeat what you did.
- d. **Results:**
  1. **What data did you get?** – Tables of raw data, **write your own data down, DO NOT copy/Xerox your lab members' tables.**
  2. **How did you analyzed the data?** – include calculations, tables, graphs, etc.
  3. **Summarize results** - narrative of results as supported by data.
- e. **Conclusion:** What conclusions can you draw from the results? If you were to repeat the experiment, what would you change?
- f. Record any observations that you think might be significant.

Come to the lab FULLY PREPARED to do the work for that period and plan to stay the ENTIRE TIME. READ YOUR LAB PROTOCOL IN ADVANCE so you will understand what you are going to do and why. Come prepared to ask questions if you do not understand something. Your attendance and participation will have a direct and large effect on your final grade. The idea is to enjoy the lab but also to THINK and to WORK.

Please note: appropriate laboratory conduct and safety are extremely importance for your safety and the safety of others. Failure to follow safety rules as discussed in class will result in the lowering of your grade or dismissal from the course.

### **Guidelines for oral presentations (content and delivery are both important)**

1. Preparation and knowledge of materials
  - o Do your homework to fill in gaps of knowledge - resources outside of paper
  - o Anticipate questions that may be raised, find answers
  - o When reading paper, be critical of techniques/methods used, results obtained and conclusions drawn based on results

2. Organized the presentation to flow from one section to another.
  - Break down procedures, results etc. According to questions/objectives
    - Sufficient introduction to topic and problem
    - Clear statement of objectives/goals
    - Clear explanation of experiments (methods and procedures used)
    - Clear explanation of results
      - Detail explanation using figures and tables as visual aids
      - Use pictures to illustrate what you are speaking about
    - Discuss result and draw conclusion
3. Rehearse the presentation to run in the allotted time
  - Speak clearly, loud enough to be heard and do not talk too fast (happens when one is nervous)
  - Have variety in your voice (tone)
    - Don't speak in a monotone or mumble.
4. Avoid distracting body movements.
  - Avoid cracking knuckles, jingling keys in pocket, using laser pointer inappropriately, etc.
  - Do use hand gestures
5. Do move around, instead of remaining in a "frozen" state
  - Avoid fidgeting, swaying or rocking in place.
  - Avoid having your back to the audience.
  - Avoid pacing or moving around so much to make the audience dizzy.
6. Make and maintain eye contact with the audience.
  - Make eye contact with every person in the room
  - Plug into the audience's brain
7. Make short notes but avoid reading your presentations - slides or notes
8. Display enthusiasm and genuine concern for your subject.
9. Avoid grammar errors, misspellings, typos in presentation
  - Unacceptable because of grammar and spell check
  - Shows audience your indifference
10. Avoid too many distracting "Uh"s & "Like"s, etc.

**Practice, practice, practice! The more prepared you feel, the less nervous you'll be.**

### Tentative Lecture Schedule (open to revision)

DATE		SUBJECT	LAB TOPIC
<b>Jan</b>	27	Introduction to course	
	30	Introduction to food microbiology and the history of microorganisms in food	<ul style="list-style-type: none"> <li>Introduction, drawer check-in, safety review</li> </ul>
<b>Feb</b>	1	Introduction to Food-borne diseases	
	3	Introduction to Food-borne diseases (cont'd)	
	6	Gram negative food-borne pathogens	<ul style="list-style-type: none"> <li>Enumeration of microorganisms</li> </ul>
	8	Gram negative food-borne pathogens (cont'd)	
	10	Gram negative food-borne pathogens (cont'd): <a href="#">Outbreak presentation topics due</a>	
	13	Gram positive food-borne pathogens	<ul style="list-style-type: none"> <li>Enumeration of microorganisms (cont'd)</li> </ul>
	15	Gram positive food-borne pathogens (cont'd)	
	17	Food- and water-borne viral diseases	
	20	<b>Exam I</b>	<ul style="list-style-type: none"> <li>Isolation of pathogens from food: homogenization and enrichment</li> </ul>
	22	Food- and water-borne viral diseases (cont'd)	
	24	Protozoa in food	
	27	Parasitic worms in foods	<ul style="list-style-type: none"> <li>Isolation of pathogens from food: Serial dilution and plating onto selective/differential media</li> </ul>
<b>Mar</b>	1	Parasitic worms in foods (cont'd)	
	3	Prions in foods; <a href="#">Outbreak presentations due!</a>	
	6	<b>Student outbreak presentation (3)</b>	<ul style="list-style-type: none"> <li><b>Student outbreak presentation (6)</b></li> </ul>
	8	<b>Student outbreak presentation (3)</b>	
	10	Fungal toxins in foods	
	13	Methods for detecting pathogens in food	<ul style="list-style-type: none"> <li>Isolation of pathogens from food: Results</li> <li>Detection of pathogens by immunoassay</li> </ul>
	15	Parameters affecting growth and survival of microorganisms in food: Temperature	
	17	Temperature (cont'd)	
	20	<ul style="list-style-type: none"> <li><b>Spring break!</b></li> </ul>	
	22		
	24		
	27	<b>Exam II</b>	<ul style="list-style-type: none"> <li>Detection of pathogens by PCR: DNA isolation and quantitation</li> </ul>
	29	Water activity	
31	<b>Cesar Chavez Holiday</b>		

DATE		SUBJECT	LAB TOPIC
Apr	3	Water activity (cont'd)	• Detection of pathogens by PCR: PCR reactions
	5	Water activity (cont'd)	
	7	Low pH: Acids	
	10	Low pH: Acids (cont'd)	• Detection of pathogens by PCR: gel electrophoresis
	12	Atmosphere (oxygen)	
	14	Atmosphere (oxygen) (cont'd); Paper selection due	
	17	Controversial preservatives	• Detection of pathogens by PCR: DNA purification, quantitation, and preparation for sequencing
	19	Controversial preservatives (cont'd)	
	21	Microbial spoilage patterns	
	24	<b>Exam III</b>	• Food production: sauerkraut
	26	Microbial spoilage patterns (cont'd)	
28	Microbial spoilage patterns (cont'd)		
May	1	Lactic acid fermentation	• Food preservation: the effect of osmotic pressure and garlic
	3	Lactic acid fermentation (cont'd)	
	5	Complex fermentations	
	8	Complex fermentations (cont'd)	• Food preservation: the effect of osmotic pressure and garlic
	10	Food safety control measures and legal issues	
	12	Food safety control measures and legal issues; Paper presentations due!	
	15	<b>Student paper presentation (3)</b>	<b>Student paper presentation (6)</b>
	17	<b>Student paper presentation (3)</b>	
	22	<b>Final exam (150 points) 8:30A -10:30A</b>	