

**FS 402 INDUSTRIAL FERMENTATIONS (3 cr)
SPRING 2017**

- Lectures:** MWF 12:30 to 1:20 pm
- Location:** Room XXX, Teaching Learning Center, University of Idaho
- Instructor:** Gulhan Unlu, Ph.D.
Associate Professor
School of Food Science
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- Prerequisites:** General microbiology (equivalent to MBioS 101 or 305) and general biochemistry (equivalent to MBioS 303) are required.
- Required Text:** Peter F. Stanbury, Allan Whitaker and Stephen J. Hall. 2015. *Principles of Fermentation Technology*. Elsevier. ISBN-13: 978-0750645010
- Recommended Text:** Richard H. Baltz, Arnold L. Demain, and Julian E. Davies. 2010. *Manual of Industrial Microbiology and Biotechnology*. ASM Press. ISBN-13: 978-1555815127
- Other readings will be made available electronically.
- Office Hours:** Telephone or email (preferred) for an appointment.
- Attendance Policy:** Students are expected to be present in all lectures and to be present for examinations. Make-up examinations will be available to those students with excused absences only. In these cases, the instructor must know of the intended absence for an examination three days prior to the examination date so a substitute examination can be written and the date for the examination established. Those students who miss an examination due to an unexcused absence will receive a score of zero ("0") for that examination.

Student Learning Outcomes and Assessment:

At the end of this course, students should be able to:	Course Topic	Assessment of Outcome:
Demonstrate a fundamental understanding of industrial fermentations focusing on principles behind the science and technology.	<ul style="list-style-type: none"> ▪ An Introduction to Fermentation Processes ▪ Microbial Growth Kinetics ▪ The Isolation, Preservation, and Improvement of Industrially Important Microorganisms ▪ Media for Industrial Fermentations ▪ Sterilization ▪ The Development of Inocula for Industrial Fermentations ▪ Design of a Fermentor ▪ Instrumentation and Control ▪ Aeration and Agitation ▪ The Recovery and Purification of Fermentation Products ▪ Effluent Treatment ▪ Fermentation Economics ▪ Emerging Topics 	Examinations Participation in class discussions
Apply scientific knowledge to assess and solve industrial fermentation science and technology problems	Same as above	Examinations Participation in class discussions
Exhibit communication skills to convey technical information and defending scientific findings in the area of industrial fermentations.	Same as above	Examinations Participation in class discussions
Have the professional skills for positions in fermentation and allied industries, government or academia.	Same as above	Examinations Participation in class discussions

Course Outline:

Class Periods (45) Topics

3	An Introduction to fermentation processes
3	Microbial growth kinetics
4	Isolation, preservation, and improvement of industrially important microorganisms
1	Examination 1
3	Media for industrial fermentations
3	Sterilization
3	Development of inocula for industrial fermentations
4	Design of a fermentor
1	Examination 2
1	Instrumentation and control
3	Aeration and agitation
3	Recovery and purification of fermentation products
3	Effluent treatment
3	Fermentation economics
6	Practical applications/emerging topics
1	Review of final examination and course evaluation

Examination 3 → **(day of week), May XX, 2016** (time)

Class Cancellations:

Lecture/laboratory will NOT be held on the following dates: January 16 (Martin Luther King, Jr. Day), February 20 (Presidents Day), and March 13-17 (Spring Break).

Description of Required Assignments:

Readings: You are expected to read (and thus responsible for) all chapters in your required textbook, select chapters recommended in recommended textbook, and any additional reading assignments. Additional readings will be made available.

Examinations: There will be two mid-term examinations and a final examination, all “closed book” during regularly scheduled class times. Dictionaries, cell phones, computers, iPods, or ANY other electronic equipment cannot be used, played, or consulted during examinations.

Grading:

<u>Assessment</u>	<u>Points</u>
Examination 1	150
Examination 2	150
Examination 3	150
Class participation	<u>50</u>
Total points possible	500

<u>% of Total Points</u>	<u>Grade</u>
≥90%	A
80-89%	B
70-79%	C
60-69%	D
<60%	F

Students with Disabilities:

Reasonable accommodations are available for WSU students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.

Reasonable accommodations are available for UI students who have documented temporary or permanent disabilities. All accommodations must be approved through Disability Support Services located in the Idaho Commons Building, Room 306 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course. Contact DSS at www.access.uidaho.edu (email: dss@uidaho.edu; phone: 208-885-6307).

Academic Integrity:

WSU expects all students to behave in a manner consistent with its high standards of scholarship and conduct. Students are expected to uphold these standards both on and off campus and acknowledge the university's authority to take disciplinary action. The purpose of these standards and processes is to educate students and protect the welfare of the community. The standards of Conduct for Students can be found at <http://conduct.wsu.edu>. University instructors have the authority to intervene in all situations where students are suspected of academic dishonesty. In such instances, responsible instructors retain the authority to assign grades to students considering, from an academic standpoint, the nature of the student action. More information

regarding responding to academic integrity violations can be found at <http://academicintegrity.wsu.edu/>. Feel free to contact the Office of Student Standards and Accountability (509-335-4532) if you would like more specific information about the process. Writing Programs (509-335-7959) can assist with proactive assignment design that minimizes intentional or unintentional academic dishonesty.

Cases of academic dishonesty shall be processed in accordance with academic integrity policies as stated in the *Washington State University Student Handbook, Faculty Manual* (WSU students) or the *University of Idaho Faculty Staff Handbook* (UI students). In general, avoid conversations with fellow students, do not read a newspaper or complete crosswords, and turn off cellular phones during class.

Safety and Emergency Notification:

The Campus Safety Plan, which can be found at <http://safetyplan.wsu.edu>, contains a comprehensive listing of University policies, procedures, statistics, and information relating to campus safety, emergency management, and the health and welfare of the campus community. All faculty, staff, and students are encouraged to visit this web site as well as the University emergency management web site at <http://oem.wsu.edu/Emergencies.html> to become familiar with the campus safety and emergency information provided.