BIO 156: FOOD MICROBIOLOGY

In Workflow

1. BIO Committee Chair (altman@csus.edu)
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Approval Path

1. Wed, 28 Feb 2024 20:38:29 GMT
   Robin Altman (altman): Rollback to Initiator
2. Mon, 25 Mar 2024 23:26:14 GMT
   Robin Altman (altman): Approved for BIO Committee Chair
3. Tue, 26 Mar 2024 21:40:14 GMT
   Susanne Lindgren (lindgren): Approved for BIO Chair
4. Wed, 03 Apr 2024 23:58:34 GMT
   Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
5. Wed, 17 Apr 2024 20:51:59 GMT
   Shannon Datwyler (datwyler): Approved for NSM Dean

Date Submitted: Mon, 25 Mar 2024 15:26:18 GMT

Viewing: BIO 156 : Food Microbiology

Last edit: Wed, 03 Apr 2024 23:58:20 GMT

Changes proposed by: Chris Lopez (223005406)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
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Catalog Title:
Food Microbiology

Class Schedule Title:
Food Microbiology

Academic Group: (College)
NSM - Natural Sciences & Mathematics

Academic Organization: (Department)
Biological Sciences

Will this course be offered through the College of Continuing Education (CCE)?
No

Catalog Year Effective:
Fall 2024 (2024/2025 Catalog)

Subject Area: (prefix)
BIO - Biological Sciences

Catalog Number: (course number)
156

Course ID: (For administrative use only.)
106116

Units:
3

Is the only purpose of this change to update the term typically offered or the enforcement of existing requisites at registration?
No

In what term(s) will this course typically be offered?
Fall term only

Does this course require a room for its final exam?
Yes, final exam requires a room

This course complies with the credit hour policy:
Yes

Justification for course proposal:
Main proposed changes:

A. Change prerequisite for Food Microbiology (BIO156) from General Microbiology (BIO139) to Genetics (BIO184) and Introductory Chemistry (CHEM1B).

B. Change course description in catalog

Proposal A

BIO156 was not taught for over a decade, but remained on the catalog. I revived the class in Fall 2021, building the course from scratch, including the learning objectives, lecture topics, and laboratory exercises. I originally designed Food Microbiology to be an advanced microbiology class, using BIO144 (Path. Bact.) and BIO145 (Div. of Microorganisms) as inspiration. The course is centered around the laboratory section, with each activity created as a Course-based Undergraduate Research Experience (CURE).

The course evaluations were overwhelmingly positive in Fall 2021 and Fall 2022. Thus, the class is well received and students consistently ask about how to enroll in the course. However, the course remains inaccessible to most students in the Biology major. Many students do not complete the current prerequisite (BIO139-General Microbiology) until their final year or semester. This is particularly true of students in the Biomedical and General concentrations. With the course offered Fall, only a small proportion of students can enroll. Additionally, students in concentrations that do not require BIO139 (EEC and Cell/Molecular biology) are unable to take BIO156 unless they also add BIO139 as an elective prior. Thus, the proposed prerequisite changes will increase course accessibility to a wider range of students, particularly those in the “mid-level” of their undergraduate Biology program progression.

Career development is a key outcome of our Biology degree program, with many students changing their career goals from the time they enter due to new experiences in and out of the classroom. In microbiology, there are diverse career opportunities for our students in fields that range from medicine and research to public policy and industry. BIO139 is the first time students engage with microbiology in detail and learn about these potential careers; yet, since BIO139 is often taken towards the end of the degree, there are limited possibilities to further develop any interests in microbiology careers while at Sac State. Changing the prerequisites will allow students to take microbiology earlier in their undergraduate career, potentially benefiting student career development in microbiology.

My proposal is to change the prerequisites to BIO184 and CHEM1B. This ensures that students have a good foundation of biology/genetics and introductory chemistry to begin studying microbiology. The expected outcomes with these proposed changes will be to increase accessibility to students, allow students to take microbiology earlier in their undergraduate career, and increase interest in microbiology careers.

Changing the prerequisite necessarily means that there will be adjustments to the course content. The learning objectives I established when I revived the course will remain the same. In the lecture section, there will be more introductory discussion on microbiology fundamentals before diving into details specific to food microbiology. For the laboratory, the beginning weeks will cover key microbiology techniques including microbial culturing, microscopy, pipetting basics, and aseptic technique. The CURE components will follow this “microbiology boot camp.”

Proposal B

The current catalog description is very short and does not provide any specific details on the laboratory section. The revised, proposed description highlights broad concepts covered in the lecture and laboratory components. Importantly, the proposed description is still broad enough so that faculty other than myself could teach the course, but have the flexibility to concentrate on different topics as they see fit.

Course Description: (Not to exceed 90 words and language should conform to catalog copy.)
An exploration of the diversity and physiology of microbes in food fermentation, preservation, and spoilage. Topics include fundamental concepts in microbial growth and metabolism, community fermentation, virulence of food pathogens, probiotics, and fermented foods in society. Laboratory includes original experiments to investigate microbial communities in ferments and to detect spoilage organisms. Lecture two hours; laboratory three hours.

Are one or more field trips required with this course?
No

Fee Course?
Yes

Is this course designated as Service Learning?
No

Is this course designated as Curricular Community Engaged Learning?
No

Does this course require safety training?
Yes

Does this course require personal protective equipment (PPE)?
Yes

Course Note: (Note must be a single sentence; do not include field trip or fee course notations.)
This course requires student laboratory safety training and PPE.

Does this course have prerequisites?
Yes

Prerequisite:
BIO184 and CHEM1B

Prerequisites Enforced at Registration?
No

Does this course have corequisites?
No

Graded:
Letter

Approval required for enrollment?
No Approval Required

Course Component(s) and Classification(s):
Discussion
Laboratory

Discussion Classification
CS#02 - Lecture/Discussion (K-factor=1WTU per unit)
Discussion Units
2

Laboratory Classification
CS#16 - Science Laboratory (K-factor=2 WTU per unit)
Laboratory Units
1

Is this a paired course?

No

Is this course crosslisted?

No

Can this course be repeated for credit?

No

Can the course be taken for credit more than once during the same term?

No

Description of the Expected Learning Outcomes and Assessment Strategies:

List the Expected Learning Outcomes and their accompanying Assessment Strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers). Click the plus sign to add a new row.

	Expected Learning Outcome	Assessment Strategies
1	Describe how environmental factors influence the growth and virulence of microbes in food products.	examinations; laboratory experiments; laboratory reports
2	Compare and contrast spoilage organisms with food-borne pathogens.	examinations; worksheets
3	Compare and contrast controlled versus wild/spontaneous fermentation methods of food production.	laboratory experiments; laboratory reports
4	Explain the role of fermented foods in the cultures from which they originate.	worksheets
5	Describe the mechanisms by which microbes benefit humans through food.	examinations; worksheets
6	Analyze original scientific literature, including describing methods and interpreting data.	manuscript discussions; laboratory reports
7	Quantify microbes from food products using methods common to the food industry.	laboratory experiments; laboratory reports; worksheets
8	Identify spoilage organisms, food-borne pathogens, and beneficial microbes through culturing and microscopy.	laboratory experiments; laboratory reports; worksheets
9	Develop hypotheses, design experiments, and critically analyze results related to food microbiology.	laboratory experiments; laboratory reports
10	Effectively communicate experimental results through oral and written formats.	manuscript presentations; laboratory presentations; laboratory reports

Attach a list of the required/recommended course readings and activities:

BIO156_readings_FormA.docx

Is this course required in a degree program (major, minor, graduate degree, certificate?)

No

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?

No

Will there be any departments affected by this proposed course?

No

I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.

I/we agree

University Learning Goals

Undergraduate Learning Goals:

Competence in the disciplines
Knowledge of human cultures and the physical and natural world

Intellectual and practical skills
Integrative learning

Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

GE Course and GE Goal(s)

Is this a General Education (GE) course or is it being considered for GE?

No

Please attach any additional files not requested above:

FoodMicroCourseUpdate_v2.pdf
BIO156_F23_Lopez_syllabus.pdf

Reviewer Comments:

Robin Altman (altman) (Wed, 28 Feb 2024 20:38:29 GMT): Rollback: Rolled back at request of submitter and to address comments provided by Dept Curriculum & Assessment Committee (comments shared with submitter via email.)

Key: 451