



Course Approval Form

For instructions:
<http://registrar.gmu.edu/facultystaff/catalog-revisions/course/>

Action Requested: (definitions available at website above)

☒ Create NEW ☐ Inactivate
☐ Modify (check all that apply below)

Course Level:

☒ Undergraduate ☐ Graduate

☐ Title
☐ Credits

☐ Repeat Status
☐ Schedule Type

☒ Prereq/coreq
☐ Restrictions

☐ Grade Mode
☐ Other: _____

College/School: College of Science

Submitted by: Esther Peters

Department: Environmental Science and Policy

Ext: 3-3462

Email: epeters@gmu.edu

Subject Code: EVPP Number: 402

(Do not list multiple codes or numbers. Each course proposal must have a separate form.)

Effective Term: ☒ Fall
☐ Spring
☐ Summer

Year 2017

Title: Current

Banner (30 characters max w/ spaces)

New Applied and Industrial Microbiology

Fulfills Mason Core Req? (undergrad only)

☐ Currently fulfills requirement
☐ Submission in progress

Credits: ☒ Fixed →
(check one) ☐ Variable →
☐ Lec + Lab/Rct →

3
to
0 or

Repeat Status:
(check one)

☒ Not Repeatable (NR)
☐ Repeatable within degree (RD) →
☐ Repeatable within term (RT) →

Max credits allowed:
(required for RT/RD status only)

Grade ☒ Regular (A, B, C, etc.)
Mode: ☐ Satisfactory/No Credit
(check one) ☐ Special (A, B, C, etc. +IP)

Schedule Type:
(check one)
LEC can include LAB or RCT if linked
sections will be offered

☒ Lecture (LEC)
☐ Lab (LAB)
☐ Recitation (RCT)
☐ Internship (INT)

☐ Independent Study (IND)
☐ Seminar (SEM)
☐ Studio (STU)
☐ Activity (ACT)

☐ Research (RSC)
☐ Student Teaching (STC)
☐ Thesis (THS-798/799)
☐ Dissertation (DIS-
998/999)

Prerequisite(s) (NOTE: hard-coding requires separate Prereq. Checking form; see above website):

BIOL 213, 305, 306 or EVPP 210, 305, 306; Chem 211, 212; or permission of instructor.

Corequisite(s):

Restrictions Enforced by System: Major, College, Degree, Program, etc. Include Code(s).

Equivalencies (check only as applicable):

☒ YES, course is 100% equivalent to BIOL 402
☐ YES, course renumbered to or replaces _____

Catalog Copy (Consult University Catalog for models)

Description (No more than 60 words; use verb phrases and present tense)	Notes (List additional information for the course)
Biology of microorganisms of ecological and industrial significance. Includes food production, spoilage and preservation, fermentation technology, waste disposal, water purification, biodeterioration, and decomposition.	
Indicate number of contact hours: When Offered: (check all that apply) <input type="checkbox"/> Fall <input type="checkbox"/> Summer <input type="checkbox"/> Spring	Hours of Lecture or Seminar per week: <input type="checkbox"/> Hours of Lab or Studio: <input type="checkbox"/>

Approval

Department

College/School Approval

Date

If this course
those units are

units, the originating department must circulate this proposal for review by
to do so will delay action on this proposal.

Unit Name

Unit Approver's Signature

Date

Undergraduate or Graduate Council Approval

UGC or GC Council Member

Provost's Office

UGC or GC Approval Date

Form revised 11/10/2016

Course Proposal Submitted to the College of Science Curriculum Committee (COSCC)

The form above is processed by the Office of the University Registrar. This second page is for the COSCC's reference.
Please complete the applicable portions of this page to clearly communicate what the form above is requesting.

FOR ALL COURSES (required)

Course Number and Title: Applied and Industrial Microbiology

Date of Departmental Approval:

FOR INACTIVATED/REINSTATED COURSES (required if inactivating/reinstating a course)

- Reason for Inactivating/Reinstating:

FOR MODIFIED COURSES (required if modifying a course)

- Summary of the Modification:
- Text before Modification (title, repeat status, catalog description, etc.):
- Text after Modification (title, repeat status, catalog description, etc.):
- Reason for the Modification:

FOR NEW COURSES (required if creating a new course)

- Reason for the New Course: This course is proposed to permit ESP students to more easily take this course.
 - Relationship to Existing Programs: Will add to the BS in Environmental Science electives for undergraduates
 - Relationship to Existing Courses: Cross-listing for BIOL 402
 - Semester of Initial Offering: Fall 2017
 - Proposed Instructors: Dr. Theodorus Visseren
 - Insert Tentative Syllabus Below
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Applied and Industrial Microbiology

Spring 2017

BIOL 402-001 / EVPP 490-007

Introduction

Welcome to the course Applied and Industrial Microbiology!

This course is about the use of microorganisms, including in various industrial food producing processes, in degrading organic pollutants; for example in oil spills, and in wastewater treatment.

- Organic pollutants can be degraded completely by microorganisms.
- Controlled growth of microorganisms results in the production of ethanol, lactic acid and acetic acid. These processes are used in the food industry.
- Different types of microorganisms are used in, among others, the processes of brewing beer, making wine, baking bread and producing yoghurt, as they produce the necessary enzymes.
- Appropriate treatment of wastewater is essential for maintaining environmental quality and for reducing the spread of disease.

The microorganisms in these processes are Fungi and Bacteria.

Bacteria are single celled prokaryotes. The cell structure is simpler than that of other organisms, as there are no membrane bound organelles. Yeasts and molds are eukaryotic cells.

Instructor

Theodorus G. Visseren

Email: tvissere@gmu.edu

Office: David King Hall room 3026

Office hours: Tuesday 12.00-14.00 pm. Thursday 12.00-13.00 pm

Profile and objectives of the course

The course Applied and Industrial Microbiology **BIOL 402-001 / EVPP 490-007** aims to attain insight into the intrinsic and extrinsic most relevant properties of the microorganisms that are used in various industrial processes. The class is meant for biology and environmental science students.

In order to attain a coherent understanding of microorganisms, the first week of the course will contain basic information about prokaryotes and eukaryotes.

With this set-up of the course, the learning outcomes are the following. After this course students are able to:

1. Reproduce the characteristics of the microorganisms involved.
2. Describe various industrial processes in which microorganisms are used.
3. Describe factors that influence the processes in which microbiology is used.
4. Recognize why different types of microorganisms are used.
5. Understand the importance of microorganisms in the area of industrial microbiology.

At the conclusion of the course, students will be able to apply the information of this course in their daily lives as well as make a career in the area of applied and industrial microbiology.

Course Relationship to Existing Programs

The course is especially designed to be part of the B.S. program Environmental Science, and the B.S Biology. However, check with your advisor on the relevance in your specific program.

Practical information

3 credits, Tuesdays and Thursdays 10.30-11.45 AM.

Literature

We will use different chapters from the following books. The chapters will be available through Blackboard.

- Food Microbiology:
An Introduction. Third Edition
Thomas Montville, Karl R. Matthews and Kalmia E.Kniel
- Brock Biology of microorganisms; Fourteenth Edition
Michael T. Madigan, John M. Martinko, Kelly S. Bender, Daniel H. Buckley, David A. Stahl.

Additional reading material will be provided throughout the semester.

Educational activities

The course includes the following activities:

- Attending lectures
- Reading literature
- Homework assignments
- Field trips are not required, but it is expected that the student will arrange her/his schedule to make attendance possible. Students should inform the instructor before the field trip if he/she is not able to join.

Examination and grading

In principle all activities of the course are mandatory. Participation in all lectures is a prerequisite for passing the course. One or two meetings can be missed due to illness or unforeseen circumstances, if you inform the instructor by email before the meeting.

The examination has the following elements:

1. Presence during lectures and excursions (no grade, but prerequisite to pass)
2. A short exam (#1) after four lessons: basic knowledge about micro organisms (15%)
3. A short exam (#2) after thirteen lessons (15%)
4. A short exam (#3) after twentytwo lessons (15%)
5. Homework assignments (20%)
6. Final exam (35%)

Scores will be summed to a 0-100 scale, and the final grade for the course will be converted into letter grades (see below). The minimum grade to pass for elements 2-6 is 60 points.

<i>Final weighted average score course</i>	<i>Letter grade</i>
97-100	A+
93-96	A
90-92	A-
87-89	B+
83-86	B
80-82	B-
77-79	C+
73-76	C
70-72	C-
60-69	D
0-59	F

Academic integrity

Plagiarism is not accepted. Students are required to be familiar and comply with the requirements of the GMU Honor Code. The software program SafeAssign will be used to check for originality where appropriate.

Disability accommodations

If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services (ODS) at 993-2474, <http://ods.gmu.edu>. All academic accommodations must be arranged through the ODS.

Biol 402-001 / EVPP 490-007 Lecture Schedule – SPRING 2017 (adjustments possible)		
Week of	Lecture Topic	Text Chapter(s) A= Food microbiology B= Brock Biology
Jan 23	Introduction Prokaryotes, Eukaryotes Growth Curve, Oxygen Temperature, Nutrients.	B: Chapter 5.6
Jan 30	Glycolysis CAC, ETC, ATP Fermentation	B: Chapter 3.8 – 3.9
Feb 6	EXAM #1 Yeast species Pasteurization, Filtration	B: Chapter 5.17 - 5.18
Feb 13	Producing Beer Raw materials Top fermentation Bottom fermentation	A: Chapter 20
Feb 20	Beer Production	A: Chapter 20
Feb 27	Grapes into Wine Red, White and Champagne Field Trip: Brewery* ??	A: Chapter 20
Mar 6	Grapes into Wine Red, White and Champagne EXAM #2	A: Chapter 20
Mar 13	SPRING BREAK!!	SPRING BREAK!!
Mar 20	Wastewater, Bacteria	B: Chapter 21.6 – 21.8
Mar 27	Wastewater Field Trip: Wastewater Plant*??	
April 3	Dairy, Vegetable and Meat Lactic Acid Bacteria Yoghurt, Cheese, Sour Cream, Meat, Sauerkraut, Pickles	A: Chapter 19
Apr 10	Yoghurt, Cheese	A: Chapter 19
Apr 17	EXAM #3 Field Trip: Vineyard*??	
Apr 24	Biofuel and Bioremediation Hydrocarbons	B: Chapter 21.4 - 21.5
May 1	Bioremediation	B: Chapter 21.4 - 21.5
	Wrap-up and Review for Final Exam	
* Field Trips to be confirmed		