Clackamas Community College

Online Course/Outline Submission System

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Section #1 General Course Information

Department: Engineering Science

Submitter

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Course Prefix and Number: BI - 204

 # Credits: 4

Contact hours

Lecture (# of hours): 33
Lec/lab (# of hours):
Lab (# of hours): 33
Total course hours: 66

For each credit, the student will be expected to spend, on average, 3 hours per week in combination of in-class and out-of-class activity.

Course Title: Elementary Microbiology

Course Description:

A lab class with environmental focus. This class explores microscopic life and its importance in the environment and in industry. We also learn about the causes and implications of waterborne pathogens. Labs will provide practice with aseptic techniques and introduces tools and introduces current methodologies used in the study of microorganisms.

Type of Course: Lower Division Collegiate

Is this class challengeable?

Yes

Can this course be repeated for credit in a degree?

No

Is general education certification being sought at this time?

No

Does this course map to any general education outcome(s)?

No

Is this course part of an AAS or related certificate of completion?

Yes

Name of degree(s) and/or certificate(s): 1-yr certificate in Water & Environmental Technology and/or AAS in Water & Environmental Technology

Are there prerequisites to this course?

No

Are there corequisites to this course?

No

Are there any requirements or recommendations for students taken this course?

Yes

Recommendations: None

Requirements: One term college-level chemistry, or instructor consent.

Are there similar courses existing in other programs or disciplines at CCC?

No

Will this class use library resources?

No

Is there any other potential impact on another department?

No

Does this course belong on the Related Instruction list?

No

GRADING METHOD:

A-F or Pass/No Pass

Audit: Yes

When do you plan to offer this course?

✓ Winter

Is this course equivalent to another?

If yes, they must have the same description and outcomes.

No

Will this course appear in the college catalog?

Yes

Will this course appear in the schedule?

Yes

Student Learning Outcomes:

Upon successful completion of this course, students should be able to:

1. apply the scientific methods by identifying unknown bacteria via experimental analysis, analyzing mathematical data, and writing and presenting an oral scientific report;
2. explain the major developments in microbiology as a branch of biology, and significant discoveries in early and modern microbiology;
3. describe the various cellular processes, including an understanding of the function of enzymes, methods of transport, aerobic respiration and fermentation;
4. explain the role of microbial nutrition and growth, including nutritional requirements, common culture medias used in the laboratory, and methods of cultivating important groups of bacteria;
5. demonstrate an ability to work individually and collaboratively to critically evaluate the science of epidemiology, including emerging infectious disease, and modes of transmission;
6. demonstrate the ability to comprehend and communicate basic scientific principles and concepts important to an understanding of major topics relating to emerging infectious diseases, bioremediation, water quality and wastewater treatment.

This course does not include assessable General Education outcomes.

Major Topic Outline:

1. Microorganisms and the Biological World (Microbes and You).
a. A historical perspective.
b. Groups of microorganisms.
c. Biogenesis.
d. Epidemiology and its use.
e. Emerging infectious diseases.
2. Chemical Principles.
a. Inorganic compound structures and bonding.
b. Acids, bases, and salts.
c. Organic compounds and structures.
d. Nucleic acids.
3. Observing Organisms Through a Microscope.
a. Microscope use and function.
b. Staining techniques:
b1. Simple stains.
b2. Differential stains.
c. Bacterial shapes.
4. Functional Anatomy of Prokaryotic Cells.

a. Morphology of bacterial cells.
b. Structures and functions associated with bacterial cells.
c. Cell wall structures of Gram negative and Gram positive cells.
d. Selective toxicity of prokaryotes related to Cell Differences.
e. Plasma membranes and antimicrobial activity.
f. Cellular transport mechanisms.
5. Functional Anatomy of Eukaryotic Cells.
a. Morphology of eukaryotic cells.
b. Structures and functions associated with eukaryotic cells.
c. Eukaryotic organelles.
6. Enzymes.
a. Catabolic and anabolic reactions.
b. Characteristics and functions of enzymes.
c. Effect of coenzymes, inhibitors, temperature, pH and concentration on enzyme activity.
d. Selective toxicity of enzyme inhibitors.
7. Microbial Metabolism.
a. Glycolysis.
b. Cellular respiration.
c. Aerobic respiration and the Krebs cycle.
d. Electron transport chain.
e. ATP generation.
f. Anaerobic respiration and fermentation.
g. Lactic acid fermentation.
h. Metabolic diversity.
8. Biochemical Testing (Analyzing and Classifying Unknown Bacteria).
a. Biochemical testing.
b. Bergey's classification manual.
9. Dynamics of Microbial Growth.
a. Physical factors needed for microbial growth.
b. Chemical/Nutrient requirements.
c. Chemically defined media.
d. Bacterial growth curve.
10. The Control of Microbial Growth.
a. Microbial death rates.
b. Physical methods of microbial control.
c. Chemical methods of microbial control.
d. Methods of antibiotic resistance.
e. Antimicrobial drugs.
11. Principles of Disease and Epidemiology in Society.
a. Pathology, Infection, and Disease.
b. Classifying Infectious disease.
c. Water borne infectious diseases.
12. Environmental Microbiology.
a. Bioremediation.
b. Degradation of synthetic organic chemicals in soil and water.
c. Degradation of inorganic chemicals in soil and water.
d. The role of microorganisms in water quality.
e. Bacterial role in activated sludge and wastewater treatment.

Does the content of this class relate to job skills in any of the following areas:

1. Increased energy efficiency	**No**
2. Produce renewable energy	**No**
3. Prevent environmental degradation	**No**
4. Clean up natural environment	**No**
5. Supports green services	**No**

Percent of course: 0%

Section #2 Course Transferability

Concern over students taking many courses that do not have a high transfer value has led to increasing attention to the transferability of LDC courses. The state currently requires us to certify that at least one OUS school will accept a new LDC course in transfer. Faculty should communicate with colleagues at one or more OUS schools to ascertain how the course will transfer by answering these questions.

1. Is there an equivalent lower division course at the University?
2. Will a department accept the course for its major or minor requirements?
3. Will the course be accepted as part of the University's distribution requirements?

If a course transfers as an elective only, it may still be accepted or approved as an LDC course, depending on the nature of the course, though it will likely not be eligible for Gen Ed status.

Which OUS schools will the course transfer to? (Check all that apply)

Identify comparable course(s) at OUS school(s)

How does it transfer? (Check all that apply)

:

First term to be offered:

Next available term after approval
: