Objective: 1) To explore the microbiology of the major groups of prokaryotes that catalyze key biogeochemical transformations in nature

(2) To contrast the major physiological processes of these organisms and relate them to the ecology of their ecosystems

(3) To investigate the microbial ecology of specialized microbial habitats

(4) To employ bioenergetic principles to predict the ecology of microbial ecosystems

Text: BROCK BIOLOGY OF MICROORGANISMS, 14th edition, 2014, Michael T. Madigan, John M. Martinko, Kelly S. Bender, Daniel H. Buckey, and David A. Stahl (Benjamin Cummings/Pearson). Alternatively, a copy of the textbook has been put on reserve at the library if you do not wish to purchase it. You may also purchase the electronic version online [www.coursesmart.com; type "9780321897398" into the search field]. Assigned readings from the text (see lecture schedule below) are listed by section number. Additional journal articles may be assigned for some of the lecture topics and these will be announced in class at least a week prior of the associated lecture.

Grading: Your grade in MICR 470 is based on: three quizzes (30 points each), two exams (100 points each), a final exam (100 points), and attendance and participation points (40 points). Your lowest quiz score will be dropped to make the total points for the course 400. Coverage for each quiz will be announced in class at least two periods prior to the quiz. Quizzes will be short-answer format and may also contain some definitions of key terms. Exams will be a mixture of objective (multiple choice/true-false) and essay questions. Quiz and exam essay questions will be at the same level. The final exam will consist of 40 points covering material since the third quiz and 60 points comprehensive and will be entirely objective. NO MAKE-UP QUIZZES OR EXAMS WILL BE GIVEN. For optional extra credit (maximum 30 points), students may give a presentation on the microbial diversity/ecology of a natural or engineered habitat of their choice (directions for grading criteria for these presentations are outlined on pages 3-4 of this syllabus).

100-90% (400-360 pts) = A; 89-80% (359-320 pts) = B; 79-70% (319-280 pts) = C; 69-60% (279-240 pts) = D; ≤59% (≤239 pts) = F.

Class behavior: No cell phone use (calls or texting) is permitted during class unless you are looking up material pertaining to the lecture. Phones should also be in silent mode during class. This may seem like common courtesy to most students, but unfortunately it has to be pointed out to some. Although I should not need to remind Jr., Sr., and grads of this: Students who earn a good grade in MICR 470 typically have a nearly perfect attendance record.
MBMB/MICR 470 Schedule

Please note that the dates scheduled for the quizzes and two hourly exams are tentative and will be announced in class at least one week in advance.

**Partial lecture slides can be downloaded from Desire2Learn [https://online.siu.edu](https://online.siu.edu)**

The following lecture schedule is subject to change without notice.

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Date</th>
<th>Topic (Chapter sections)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1/20</td>
<td>The Prokaryotic Cell Review (2.7-2.12; 3.3-3.13; 5.11-5.16; Appendix 1)</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1/22</td>
<td>The Prokaryotic Cell Review (2.7-2.12; 3.3-3.13; 5.11-5.16; Appendix 1)</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>1/27</td>
<td>Review continued and Early Earth and Origin of Life (12.1-12.3; supplemental material- Microbe, April 2012-see D2L)</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1/29</td>
<td>Phylogeny, Evolution, and Systematics (12.4-12.10)</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>2/03</td>
<td>Phylogeny, Evolution, and Systematics (12.4-12.10)</td>
</tr>
<tr>
<td>6</td>
<td>2/05</td>
<td>Quiz 1</td>
<td>Anoxygenic Photosynthesis (13.1-13.3; 14.4-14.7)</td>
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<tr>
<td>4</td>
<td>7</td>
<td>2/10</td>
<td>Photosynthesis and Autotrophy (13.4-13.5; 14.2-14.3)</td>
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<tr>
<td>8</td>
<td>2/12</td>
<td></td>
<td>Fermentation (3.8-3.9; 13.11-13.14)</td>
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<tr>
<td>5</td>
<td>9</td>
<td>2/17</td>
<td>Fermentation and Syntrophy (15.6, 15.8; 13.15)</td>
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<tr>
<td>9</td>
<td>2/19</td>
<td></td>
<td>Anaerobic Respiration, Nitrate Reduction, and Denitrification (13.16-13.17; p 456)</td>
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<tr>
<td>6</td>
<td>10</td>
<td>2/24</td>
<td>FIRST HOURLY EXAM</td>
</tr>
<tr>
<td>11</td>
<td>2/26</td>
<td></td>
<td>Sulfate/Sulfur Reduction, Iron Reduction, and Other Acceptors (13.8; 14.9-14.10; 13.21; 14.14)</td>
</tr>
<tr>
<td>7</td>
<td>12</td>
<td>3/03</td>
<td>Acetogenesis and Methanogenesis (13.19-13.20; 14.18, 16.2;)</td>
</tr>
<tr>
<td>13</td>
<td>3/05</td>
<td></td>
<td>Sulfur/Iron Oxidation and Nitrifying Bacteria (13.8-13.9; 14.11, 14.15; 13.10; 14.13)</td>
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<tr>
<td>-</td>
<td>3/10</td>
<td></td>
<td>Spring Break</td>
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<tr>
<td>-</td>
<td>3/12</td>
<td></td>
<td>Spring Break</td>
</tr>
<tr>
<td>8</td>
<td>14</td>
<td>3/17</td>
<td>Anammox, Hydrogen Bacteria, and Methylotrophs (13.10; 13.7; 14.16; 13.23; 14.17)</td>
</tr>
<tr>
<td>15</td>
<td>3/19</td>
<td></td>
<td>N2 Fixation and Hydrocarbon metabolism 3.17; 14.12; 13.22, 13.24</td>
</tr>
</tbody>
</table>
**Student presentations**

Consider an ecosystem of your choice (see Chapter 19-21 for ideas), discuss it with your instructor, and have your presentation placed on the lecture schedule. The ecosystems currently listed are guiding examples only; your own ideas are highly welcome. Sign-ups are due by March 31th, 2015.

Potential topics

- Marine ecosystems: ocean surface, tidal flats, deep-sea, methane seeps, estuaries, anoxic basins, etc.
- Freshwater ecosystems: lakes, rivers, swamps, bogs, etc.
- Terrestrial ecosystems: rocks and soil, prairie, forest, tundra, etc.
- Extreme environments: deserts, hot springs, glaciers, deep subsurface, mine drainage, etc.
- Built environments: landfills, wastewater treatment reactors, bioremediation, etc.
- Food ecosystems, agricultural systems, aquaculture, etc.

Presentations should be ~20 min in length, in PowerPoint or equivalent format, and include the following:

- introduction of the ecosystem (~5 min)
- comprehensive list of roles and functions held by microorganisms in this ecosystem (~5 min)
- more elaborate explanation of 1 or 2 of these microbial functions and interactions (~10 min)
- summary

Prepare a presentation outline for posting on D2L, due at least 2 days before your talk.
Student presentations will be rewarded with up to 30 bonus points, based on the following criteria:

- quality of content
- visual and oral presentation
- classroom discussion, knowledge of related material
- quality and timely submission of the outline

Note that good presentations will be considered course content and, thus, are relevant material to be tested on in the final exam.

**Emergency Procedures Statement.** Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on BERT’s website at www.bert.siu.edu, Department of Safety’s website www.dps.siu.edu (disaster drop down) and in Emergency Response Guideline pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.
IMPORTANT DATES *

Semester Class Begins: 03/03/2015
Last day to add a class (without instructor permission): 01/20/2015
Last day to withdraw completely and receive a 100% refund: 02/01/2015
Last day to drop a course using SalukiNet: 04/05/2015
Last day to file diploma application (for name to appear in Commencement program): 03/13/2015
Final examinations: 05/11–5/15/2015

Note: For outreach, internet, and short course drop/add dates, visit Registrar's Academic webpage http://registrar.siu.edu/

SPRING SEMESTER HOLIDAYS
Martin Luther King, Jr.'s Birthday 01/19/2015
Spring Vacation 03/07–03/15/2015

WITHDRAWAL POLICY ~ Undergraduate only

Students who officially register for a session may not withdraw merely by the stopping of attendance. An official withdrawal form needs to be initiated by the student and processed by the University. For the proper procedures to follow when dropping courses and when withdrawing from the University, please visit http://registrar.siu.edu/pdf/ugradcatalog1314.pdf

INCOMPLETE POLICY—Undergraduate only

An INC is assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments. An INC must be changed to a completed grade within one semester following the term in which the course was taken, or graduation, whichever occurs first. Should the student fail to complete the course within the time period designated, that is, by no later than the end of the semester following the term in which the course was taken, or graduation, whichever occurs first, the incomplete will be converted to a grade of F and the grade will be computed in the student's grade point average. For more information please visit: http://registrar.siu.edu/grades/incomplete.html

REPEAT POLICY

An undergraduate student may, for the purpose of raising a grade, enroll in a course for credit no more than two times (two total enrollments) unless otherwise noted in the course description. For students receiving a letter grade of A,B,C,D, or F, the course repetition must occur at Southern Illinois University Carbondale. Only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned. See full policy at http://registrar.siu.edu/pdf/ugradcatalog1314.pdf

GRADUATE POLICIES

Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please visit http://gradschool.siu.edu/about-us/grad-catalog/index.html

DISABILITY POLICY

Disability Support Services provides the required academic and programmatic support services to students with permanent and temporary disabilities. DSS provides centralized coordination and referral services. To utilize DSS services, students must come to the DSS to open cases. The process involves interviews, reviews of student-supplied documentation, and completion of Disability Accommodation Agreements. http://disabilityservices.siu.edu/

PLAGIARISM CODE


MORRIS LIBRARY HOURS
http://www.lib.siu.edu/about

SAFETY AWARENESS FACTS AND EDUCATION

Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: http://safe.siu.edu

SALUKI CARES

The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For Information on Saluki Cares: (618) 453-5714, or siucares@siu.edu, http://salukicares.siu.edu/index.html

EMERGENCY PROCEDURES

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. We ask that you become familiar with the SIU Emergency Response Plan and Building Emergency Response Team (BERT) programs. Please reference the Building Emergency Response Protocols for Syllabus attachments on the following pages. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.

INCLUSIVE EXCELLENCE

SIU contains people from all walks of life, from many different cultures and sub-cultures, and representing all strata of society, nationalities, ethnicities, lifestyles, and affiliations. Learning from and working with people who differ is an important part of education as well as an essential preparation for any career. For more information please visit: http://www.inclusiveexcellence.siu.edu/

LEARNING AND SUPPORT SERVICES

Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website: Tutoring: http://tutoring.siu.edu/
Math Labs: http://tutoring.siu.edu/math_tutoring/index.html

WRITING CENTER

The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit http://write.siu.edu/

AFFIRMATIVE ACTION & EQUAL OPPORTUNITY

Our office's main focus is to ensure that the university complies with federal and state equity policies and handles reporting and investigating of discrimination cases. For more information visit: http://diversity.siu.edu/

Additional Resources Available:

SALUKINET: https://salukinet.siu.edu/cp/home/displaylogin
ADVISEMENT: http://advisement.siu.edu/
SIU ONLINE: http://online.siu.edu/