

**MBMB/MICR 425**  
**BACTERIAL PHYSIOLOGY & BIOCHEMISTRY**  
**M, W, F 12:00 pm LSII, Room 430**  
**Fall 2016 - Dr. Derek Fisher**

**COURSE DESCRIPTION:**

The course will provide a detailed look into the chemical composition, cellular structure, and metabolism of microorganisms and will introduce many of the experimental methods used to derive the presented information. Classes will consist of traditional lecture, use of multimedia resources, and classroom discussion. Student participation is expected. Out-of-class readings pertinent to lecture topics (beyond the textbook) will be provided.

**OBJECTIVES:**

Students should develop a global view of how bacteria obtain energy, acquire nutrients, and subsequently convert nutrients into metabolites and ultra-structures required for bacterial growth and division. Students also should gain an understanding of how bacteria sense and respond to their environment (both physical factors and to other living organisms). An appreciation for the experimental methods behind the “facts” also will be obtained.

**PREREQUISITE:**

Organic Chemistry; or consent of instructor.

**RECOMMENDED TEXT:**

**The Physiology & Biochemistry of Prokaryotes - David White, James Drummond, and Clay Fuqua. Oxford Univ. Press, 4th Ed. 2012** I will place a 3<sup>rd</sup> edition on reserve in the library. Not all of the chapters in the 3<sup>rd</sup> edition line up with the 4<sup>th</sup> edition and the 4<sup>th</sup> edition has material not found in the 3<sup>rd</sup> edition.

Lecture slides/notes, recommended reading materials, and old exams/practice questions will be made available on D2L.

**FISHER RESEARCH BACKGROUND:**

<http://www.ncbi.nlm.nih.gov/myncbi/browse/collection/48341232/?sort=date&direction=ascending>

<http://micro.siu.edu/faculty-staff/faculty/fisher.php>

**CONTACT INFORMATION:**

LSIII 1007 (office), LSIII 1026 (lab)  
618-453-5201 (office phone)  
[dfisher@siu.edu](mailto:dfisher@siu.edu) or [fisher@micro.siu.edu](mailto:fisher@micro.siu.edu)

**OFFICE HOURS:**

11 am - 12 pm on Monday and Wednesday or by appointment.

## GRADING OVERVIEW:

SCALE:     A ≥90%  
              B 89-80%  
              C 79-70%  
              D 69-60%  
              F <60%

1) Three one hour exams, 100 points each:	
a) Lectures 1-13	100
b) Lectures 14-26	100
c) Lectures 27-38	100
	Exam points: <b>300</b>
2) Twelve, ten point pop quizzes/homework assignments:	<b>80</b>
<b>Your lowest four scores will be counted as bonus points.</b>	
3) Paper Review (see below):	<b>75</b>
4) FINAL EXAM, Lectures 1-40 = Cumulative (2 hours):	<b>125</b>
	<b><u>Total   580</u></b>

## PAPER REVIEW:

You will be provided with a choice of four primary source papers related to bacterial physiology. You will choose one paper for your review. The review process will be broken down into three stages, with each stage receiving a grade. **Each assignment must be submitted as a Word document via the D2L drop box or as an email attachment.**

**1) 25 points:** Read the paper and answer the six questions included with the “How to read a scientific paper” handout (available on D2L). Your answers are limited to 200 words per question. Points will be deducted for answers longer than 200 words.

**DUE: October 14<sup>th</sup>**

**2) 25 points:** You will then write a review of the paper that must include:

- a) a brief introduction of the topic covered
- b) the “problem” or question that the authors were trying to address
- c) a summary of the results
- d) whether the results supported the authors’ conclusion(s)

**Formatting: two pages (maximum), 0.5 inch margins, 11 pt Arial font, 1.5 spacing. Points will be deducted for not following the formatting rules. The grading rubric for the review is at the end of the syllabus.**

**You must make an appointment with the writing center to go over your review before it is turned in to me. The writing center website is: <http://write.siu.edu/>. You will need to have the**

**writing center send me a conference summary to confirm your appointment. I will not review your paper until I receive confirmation of your conference with a writing center staff member. The writing center has a limited number of appointments per week – do not wait until the last minute to try and make an appointment.**

**The writing process includes editing!!! Some tips - Use the spelling and grammar check installed with your word processing program. Read the sentences out loud to yourself or a peer - do they make sense? Write the draft in advance, put it away for a few days, and then return to edit the draft.**

**DUE: November 14<sup>th</sup>**

**3) 25 points:** I will return your review with edits and comments. You will need to address my edits and comments and submit the updated version. The grading rubric for the “updated submission” is at the end of the syllabus.

**DUE: December 2<sup>nd</sup>**

**GENERAL COURSE TIMELINE:**

**Fall Semester 2016 Holidays (<http://registrar.siu.edu/calendars/academic1617.php>)**

Semester Begins	Monday, August 22
Labor Day Holiday	Monday, September 5
Fall Break	October 8 – 11
Veterans Day	Friday, November 11
Thanksgiving Vacation	November 23 – 27

**Drop Information (<http://registrar.siu.edu/calendars/registration16fa.php>)**

Last day to file drop paperwork, eligible for a refund	Friday, September 2
Last day to file drop paperwork, NOT eligible for a refund	Friday, October 28

**LECTURE/EXAM SCHEDULE\***

Day / Date	Topic	Recommended Reading	Lecture Number
M <b>Aug</b> 22	Introduction To Cell Structure & Metabolism	Chps 1 and 2	1
W 24	Introduction To Cell Structure & Metabolism	Chps 1 and 2	2
<b>F</b> 26	Introduction To Cell Structure & Metabolism <b>Survey Monkey Assignment Due (9 pm)</b>	Chps 1 and 2	3
M 29	DNA Replication and Growth	Chps 2 and 3	4
W 31	Plasmids	D2L	5
F <b>Sep</b> 2	RNA synthesis	Chp 11	6
<b>M</b> 5	<b>No Class: Labor Day</b>		

W	7	Protein Synthesis	Chp 11	7
F	9	Cell Envelope	Chp 12	8
M	12	Cell Envelope	Chp 12	9
W	14	Cell Envelope	Chp 12	10
F	16	Solute Transport	Chp 17	11
M	19	Solute Transport	Chp 17	12
W	21	TBD		13
<b>F</b>	<b>23</b>	<b>Exam 1 Lectures 1-13</b>		
M	26	Protein Transport and Secretion	Chp 18	14
W	28	Protein Transport and Secretion	Chp 18	15
F	30	Responses to Environmental Stress	Chp 16	16
M	<b>Oct</b> 3	Responding to Environmental Cues	Chps 19 and 20	17
W	5	Responding to Environmental Cues	Chps 19 and 20	18
F	7	Biofilms / Cell to Cell Communication	Chps 21 and 22	19
<b>M</b>	<b>10</b>	<b>No Class: Fall Break</b>		
W	12	Bioenergetics	Chp 8	20
<b>F</b>	<b>14</b>	<b>Membrane Bioenergetics Review Part 1 DUE</b>	Chp 4	21
M	17	Membrane Bioenergetics	Chp 4	22
W	19	Electron Transport	Chp 5	23
F	21	Electron Transport	Chp 5	24
M	24	Photosynthesis	Chp 6	25
W	26	Photosynthesis	Chp 6	26
F	28	<b>Exam 3 Lectures 14-26</b>		
M	31	Regulation of Metabolic Pathways	Chp 7	27
W	<b>Nov</b> 2	Central Metabolism	Chp 9	28
F	4	Central Metabolism	Chp 9	29
M	7	Central Metabolism	Chp 9	30
W	9	Fermentation	Chp 15	31
<b>F</b>	<b>11</b>	<b>No Class: Veterans Day</b>		

<b>M</b>	<b>14</b>	Fermentation <b>Review Part 2 DUE</b>	Chp 15	32
W	16	Metabolisms of Lipids/Nucleotides/Amino Acids	Chp 10	33
F	18	Inorganic Metabolism	Chp 13	34
M	21	Inorganic Metabolism	Chp 13	35
<b>W</b>	<b>23</b>	<b>No Class: Thanksgiving Break</b>		
<b>F</b>	<b>25</b>	<b>No Class: Thanksgiving Break</b>		
M	28	C1 Metabolism	Chp 14	36
W	30	C1 Metabolism	Chp 14	37
<b>F</b>	<b>Dec 2</b>	<b>TBD Review Part 3 Due</b>		38
<b>M</b>	<b>5</b>	<b>Exam 4 Lectures 27-38</b>		
W	7	Bacterial development	Chp 23	39
F	9	Bacterial Virulence and Metabolism	D2L	40
<b>M</b>	<b>14</b>	<b>FINAL EXAM - December 12, 12:30 - 2:30</b> <a href="http://registrar.siu.edu/pdf/examfall16.pdf">http://registrar.siu.edu/pdf/examfall16.pdf</a>	Lectures 1-40	

**\*Lecture dates and material are tentative, exam dates and review paper due dates are not. Students will only be responsible for material covered in class prior to the exam date.**

### ADDITIONAL INFORMATION

#### **HINTS for SUCCESS:**

- 1) Attend class.
- 2) Study often, not just the night before an exam.
- 3) Review lecture material the evening after a lecture. This will help you learn the material and will make studying for exams much easier.
- 4) Read the chapters cited next to each lecture prior to class. It will help you better comprehend the lecture material.
- 5) Ask questions!
- 6) Seek out academic help before it is too late – it is very difficult to recover from two failed exams.
- 7) **LEARNING ASSISTANCE and DISABILITY SERVICES:** <http://tutoring.siu.edu/index.html> and <http://disabilityservices.siu.edu/>

#### **ATTENDANCE:**

Attendance is not mandatory, but absences will negatively affect your grade **as material covered exclusively in the classroom will appear on exams.** In addition, **pop quizzes will be administered and no make ups will be offered for missed quizzes.**

**ACADEMIC COURTESY (modified from B. Stiles, Wilson College):**

Please arrive to class on time and be prepared to discuss the material. Cell phones must be turned to silent or off during class. Ringing and buzzing cell phones bother others in the class (and the instructor) and detract from a fruitful educational environment. Sleeping, reading newspapers, talking to friends, texting, or other activities distracting the students and instructor are strictly forbidden.

### **EXAMS, PAPER REVIEW, and QUIZZES:**

Exams may only be rescheduled for extreme circumstances (death of an immediate family member, illness requiring hospitalization, etc.) or an absence due to a pre-approved academic/athletic conflict. Proof may be required (for example, a doctor's note) and permission to reschedule will be granted on a case by case basis at the discretion of the instructor. Failure to take an exam on the scheduled date without an approved absence will result in a 0 (F) for the exam. Make up "pop" quizzes will not be offered. As your lowest four quizzes are counted as bonus points, a missed quiz due to absence will simply be considered as 0 bonus points. The paper review due dates are non-negotiable and no leniency will be offered regarding failure to obtain an appointment with the writing center.

### **ACADEMIC DISHONESTY POLICY (adapted from the College of Science policy**

**[http://www.science.siu.edu/ common/pdfs/oppaper](http://www.science.siu.edu/common/pdfs/oppaper)):**

Students may be subject to disciplinary proceedings resulting in an academic penalty or disciplinary penalty for academic dishonesty. Academic dishonesty includes, but is not limited to, cheating on a test, plagiarism, or collusion. Sanctions for academic dishonesty available to an instructor include: assigning a failing grade, or zero, for a paper or exam; assigning a failing grade for a course (the instructor shall assign an "incomplete" in lieu of a letter grade pending adjudication and final resolution of the complaint.); recommending that a student be dropped from a program; and recommending that a student be suspended from the University.

### **EMERGENCY PROCEDURES:**

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 <http://emergency.siu.edu/>, Department of Safety's website <http://www.dps.siu.edu/> (disaster drop down), and in the Emergency Response Guideline pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance 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.

**REVIEW RUBRICS:****Review Part 2**

Spelling/Grammar/Formatting	No errors/all sections present	Minimal errors	Sections absent, multiple grammar/spelling errors	Possible	Total
	5	2.5	0	5	
Introduction	Key intro points addressed	Close...	Intro does not allow reader to understand following sections		
	5	2.5	0	5	
Problem	Key problem identified	Close...	Not properly identified		
	5	2.5	0	5	
Results	Salient results summarized	Close...	Results improperly summarized		
	5	2.5	0	5	
Conclusion(s)	Summarized and critiqued	Summary with no critique	Conclusions improperly summarized		
	5	2.5	0	5	
				25	

**Review Part 3**

Spelling/Grammar/Formatting	No errors/all sections present, comments and edits addressed	Minimal errors	Sections absent, multiple grammar/spelling errors	Possible	Total
	5	2.5	0	5	
Introduction	Key intro points addressed, comments and edits addressed	Close...	Intro does not allow reader to understand following sections		
	5	2.5	0	5	
Problem	Key problem identified, comments and edits addressed	Close...	Not properly identified		
	5	2.5	0	5	
Results	Salient results summarized, comments and edits addressed	Close...	Results improperly summarized		
	5	2.5	0	5	
Conclusion(s)	Summarized and critiqued, comments and edits addressed	Summary with no critique	Conclusions improperly summarized		
	5	2.5	0	5	
				25	

**Note – Part 3 must include revisions or you will receive a 0.**

## IMPORTANT DATES \*

<u>Semester Class Begins:</u> .....	<b>08/22/2016</b>
<u>Last day to add full-term course</u> (without Dean's signature): .....	<b>08/28/2016</b>
<u>Last day to withdraw from the University with a full refund:</u> .....	<b>09/02/2016</b>
<u>Last day to drop a full-term course for a credit/refund:</u> .....	<b>09/04/2016</b>
<u>Deadline to apply to graduate at the end of this term:</u> .....	<b>09/16/2016</b>
<u>Last day to drop a full-term course (W grade, no refund):</u> .....	<b>10/30/2016</b>
<u>Final examinations:</u> .....	<b>12/12–12/16/2016</b>
<u>Commencement:</u> .....	<b>12/17/2016</b>

*Note: For more detailed information on the above deadlines, please visit <http://registrar.siu.edu/calendars>. For add/drop dates that apply to shorter-than-full-term courses, please look at the Schedule of Classes search results at <http://registrar.siu.edu/schedclass/index.html>.*

## FALL SEMESTER HOLIDAYS

Labor Day Holiday 09/05/2016  
Fall Break 10/08—10/11/2016  
Veterans Day Holiday 11/11/2016  
Thanksgiving Vacation 11/23—11/27/2016

## WITHDRAWAL POLICY ~ Undergraduate only

Students who officially register for a session must officially withdraw from that registration in a timely manner to avoid being charged as well as receiving a failing grade for those classes. An official withdrawal must be initiated by the student, or on behalf of the student through the academic unit, and be processed by the Registrar's office. For the proper procedures to follow when dropping courses and when withdrawing from SIU visit: <http://registrar.siu.edu/students/withdraw.html>

## INCOMPLETE POLICY~ Undergraduate only

An INC grade may be assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments for the course. An INC must be changed to a completed grade within one full semester (undergraduates), and one full year (graduate students), from the close of the term in which the course was taken or graduation, whichever occurs first. Should the student fail to complete the remaining course requirements within the time period designated, the incomplete will be converted to a grade of F and such grade will be computed in the student's grade point average. *For more information 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 more than once. For students receiving a letter grade of A, B, C, D, or F, the course repetition must occur at Southern Illinois University Carbondale. Effective for courses taken Summer 2013 or later, only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned.

This policy will be applied to all transferrable credit in that only the last grade will be used to calculate grade point average. Only those courses taken at the same institution are considered repeats under this policy. *See full policy at*

<http://registrar.siu.edu/students/repeatclasses.html>

## GRADUATE POLICIES

Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please refer to the graduate catalog at <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 contact DSS to open cases. The process involves interviews, reviews of student-supplied documentation, and completion of Disability Accommodation Agreements.

<http://disabilityservices.siu.edu/>

## PLAGIARISM

Student Conduct Code [http://srr.siu.edu/student\\_conduct\\_code/](http://srr.siu.edu/student_conduct_code/)  
Guidelines for Faculty <http://pvcaa.siu.edu/common/documents/Plagiarism/Guide%20to%20Preventing%20Plagiarism.pdf>

## 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: call(618) 453-1492, email [siucares@siu.edu](mailto:siucares@siu.edu), or <http://salukicare.siu.edu/index.html>

## SIU's EARLY WARNING INTERVENTION PROGRAM (EWIP)

Students enrolled in courses participating in SIU's Early Warning Intervention Program might be contacted by University staff during a semester. More information can be found at the Core Curriculum's Overview webpage: <http://corecurriculum.siu.edu/program-overview/>

## EMERGENCY PROCEDURES

We ask that you become familiar with **Emergency Preparedness @ SIU**. Emergency response information is available on posters in buildings on campus, on the Emergency Preparedness @ SIU website, and through text and email alerts. *To register for alerts visit:* <http://emergency.siu.edu/>

## 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 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://math.siu.edu/courses/course-help.php>

## 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/#>

## MILITARY COMMUNITY

There are complexities of being a member of the military community and also a student. Drill schedules, calls to active duty, complications with GI Bill disbursement, and other unforeseen military and veteran related developments can complicate academic life. If you are a member of the military community and in need of accommodations please visit Veterans Services at <http://veterans.siu.edu/>

*Additional Resources:*

**ADVISEMENT:** <http://advisement.siu.edu/>

**SIU ONLINE:** <http://online.siu.edu/>

**SALUKINET:** <https://salukinet.siu.edu/>

**MORRIS LIBRARY HOURS:** <http://www.lib.siu.edu/>