



Texas A&M University-Commerce

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Biological and Environmental Sciences
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BSc 550 – Microbial Physiology Syllabus (Fall 2015)

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Office Hours: 1-4PM, TR for visiting my office

email & eCollege anytime (no immediate responses guaranteed)

Aug 31 – Dec 18

Web based class

University Statements

Academic integrity: As members of Texas A&M University-Commerce academic community, we all are responsible to uphold the principles of academic integrity expressed by this community. We are expected to watch these principles to be kept and appreciated by others.

- The first instance of cheating will result in an automatic Zero on the exam. A second instance will result in Zero course grade (automatic F).
- Plagiarism is a serious academic violation. You must cite all sources of information with properly accredited citations. Copying material, whether in parts or whole, will result in a grade of Zero for your term paper and can lead to further University disciplinary consequences.

Accommodations: The American with Disability Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other aspects, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have disability requiring accommodation, please contact:

Office of Student Disability Resources or Services

Texas A&M University-Commerce

Gee Library, Room 132

Tel) 903-886-5150, 903-886-5835

Fax) 903-468-8148

Email) StudentDisabilityService@tamuc.edu

Access to student work: Copies of your work in this course including copies of any submitted papers and your portfolios may be kept on file storage for institutional research, assessment, and accreditation purposes. All work used for these purposes will remain anonymous.

Course Description

BSc550, Microbial Physiology, is an advanced microbiology course designed for MS students majoring in biology. Microbial physiology is a study to understand cell structure, growth factors, metabolism and genetic compositions of microorganisms and to comprehend the interrelatedness of microbiology, biochemistry, and genetics in the context of functional bacterial cells. This course provides a survey of microbial physiology with emphasis on bacteria metabolism, regulation, cellular structure, ecology, and adaptation to extreme environments.

REQUIRED Textbook:

Byung H. Kim and Geoffrey Michael Gadd, Bacterial Physiology and Metabolism, Cambridge University Press, ISBN: 978-0-521-71230-9

Prerequisite: Biology (microbiology and biochemistry or equivalents are not required but strongly recommended)

Student learning outcomes

Upon completion of this course, you should be able to;

- 1) Gain a fundamental understanding of cellular composition, membrane transport, energy metabolism.
- 2) Explain the ways microorganisms grow, proliferate, and die in a given environment and mechanisms beneath those life events.
- 3) Understand diversity of metabolic processes
- 4) Develop scientific writing skills.

On-line Class Policy

This is a “web-based” course - you don’t actually attend lecture classes. Instead, all class activities will be held in eCollege enters through MyLeo page. Check the website frequently (daily!!!) for announcements, instructions, and discussions. Try navigating the site early so you know that you can access everything. If you have difficulties with any material, talk to me immediately.

For successful course completion, your participation is essential. Students should check lecture material, assignments, and tests on regular basis. Yes, this course is mainly self-paced. However, it is strongly recommended that you schedule your specific work time that works best for you. Don’t forget that the websites is active 24/7 during the semester (Aug 31 – Dec 18, 2015)

- The material for this class will be organized around content blocks. Students are expected to read the assigned textbook material and lecture notes and comply with given due dates for the assignments
- Exams access will be available only during the pre-announced period of time. After this given period, you will not be able to have an access to that exam.

Technology Requirements

This course is web-based, and will therefore be administered via eCollege (see "ACCESS AND NAVIGATION). All course announcements, which mainly include news about assignments, are posted through eCollege (usually via email). In addition to reading the announcements (my emails), you will be uploading your assignments to the Dropbox. As grades are updated, I update the Gradebook. Thus, the three major components used in eCollege are Announcements, Dropbox, and Gradebook.

The following information has been provided to assist you in preparing to use technology successfully in this course.

- Internet access/connection – high speed recommended (not dial-up)
- Word Processor (Microsoft Word, OpenOffice Writer, et cetera) and Slide Program (Microsoft PowerPoint, OpenOffice Impress, et cetera)

Our campus is optimized to work in a Microsoft Windows environment. This means our courses work best if you are using a Windows operating system (XP or newer) and a recent version of Microsoft Internet Explorer (7.0, 8.0, or newer). Your courses will also work with Macintosh OS X and most Linux distributions. To launch a browser test within any operating system, login in to eCollege, click on the „myCourses“ tab, and then select the "Browser Test" link under Support Services.

Access and Navigation

eCollege Access and Log in Information

This course will be facilitated using eCollege, the Learning Management System used by Texas A&M University-Commerce. To get started with the course, go to <https://leo.tamuc.edu/login.aspx>.

You will need your CWID and password to log in to the course. If you do not know your CWID or have forgotten your password, contact Technology Services at 903.468.6000 or helpdesk@tamuc.edu.

Getting Started

Be sure to explore the class site at eCollege. Use the first couple of days to become familiar with the class site. Remember that this is a GRADUATE level course, and therefore you will be expected to show appropriate levels of effort. You will be expected to take part in discussions in a mature and in-depth manner, to write in a clear and professional voice and you should not need excessive amount of instructor's hand-holding.

Grading Policy

Term paper (see details on next page)	= 100 points
(20 pts. Topic selection & white paper + 80 pts. Term paper)	
Peer-review of Term paper	= 50 points
5 quizzes (10 pts. each)	= 50 points
4 lecture exams (100 pts. each)	= 400 points
Total	600 points

Grading Scale

The final course grade will be assigned based on the following break-down;

90 – 100%	= A
80 – 89%	= B
70 – 79%	= C
60 – 69%	= D
59% and below	= F

Teaching Methodology

Web-based Course This course is partially self-paced. Therefore, it is VERY important to keep up with the material (if you fall behind, there isn't much time to catch up!!!). Students are strongly encouraged to print lecture slides and use them as study guide. Periodically check (daily!!) course homepage as well as your email for course announcements.

Term paper Write a review paper on one of the current research topics related to microbial physiology. Topic selection and white paper is due by **Sept 26**, and the paper is due by **Dec 10**. Both white paper and term paper need to be prepared in MS word (.doc or .docx) and uploaded to the corresponding "dropbox". Misplaced assignments will not be graded. You have to provide 1- page white paper of your term paper outline along with minimum 3 references (full-text scientific research papers in PDF format) covering your term paper topic selection(Due: Saturday, Sept 26).

- **Contents of the paper:** Discuss a focused "hot topic", with sufficient discussion of background information to allow anyone taking the class to understand the significance. Research approaches and future directions should also be briefly discussed. The length of the paper is minimum 8 pages of double spaced text (font size no bigger than 12). You can provide figures. Write with your classmates as the targeted readers. You should not "reuse" a topic used for other courses.
- **Sources and their use:** In recent years there has been a tendency to rely more heavily on web pages as sources. Students are warned that plagiarizing any source is a serious violation of academic standards—credit and use your sources properly. A definition of plagiarism can be found in the section of University Statement. ****Note:** I allow the use of some figures downloaded from the web, but you should cite the reference or give the website. Figure legends should be your own with succinct and clear information.
- **Style:** Papers will be judged on their organization and the clarity of writing. Papers that have numerous misspellings or grammatical errors will be rated poorly and this rating will seriously impact the grade. Proofread carefully. Use spelling checkers. Have others read the paper both for clarity and content. The paper should follow a review paper writing style with citation systems of either Citation-Sequence or Name-Year.
- Categories of term paper topics you can choose from;
 - Life in extreme environment; molecular basis of extremophiles such as;
 - Acidophiles
 - Alkaliphiles
 - Hyperthermophiles
 - Psychrophiles
 - Xerophiles

- Halophiles
- And other extremophiles
- Why oxygen is toxic to anaerobic respirators
- Molecular basis of radio-tolerant microorganisms
- ANAMMOX and global nitrogen cycle
- Biodegradation of aromatic hydrocarbons
- Bacterial synthesis of biodegradable plastics

Student may further develop and use a specific sub-topic from each category.

Peer-review You will upload your working draft of term paper by **Nov. 18** and start to receive comments and suggestions from your class mates. You will incorporate those suggestions and recommendations in your finalized term paper. To receive full credit, i) you have to upload your draft by **Nov. 18**, ii) read and provide feedback on minimum 3 drafts of your classmates (due by **Dec. 5**), and iii) update your draft based on your classmates' comments and suggestions.

Exams There will be 4 exams. Exams are “take-home” style and are accessible for the duration of 1hr at a given date (**unless otherwise announced, the exam date will be Friday of each week**). The exams will consist of multiple choices, short answer questions, and essay-type questions. Essay-type questions will ask bigger picture of class lecture topics. One example of such question would be “Explain two membrane transport models”.

Makeup Since there are no actual class meetings or sit-down exam periods, there isn't any necessity for “make-up”. All work will have a due date posted. Assignments may be accepted late, but will be penalized heavily on an increasing scale (the later it is, the more point it loses). Please contact me immediately if you are “absent/inactive” long enough to miss any due dates. However, I STRONGLY RECOMMEN planning ahead to avoid such problems. Extreme circumstances will always be taken into consideration; talk to me before you assume anything.

Class Schedule

Week 1

Chapter 1- Introduction

Chapter 2 – Composition and Structure of Prokaryotic cells

Week 2

Chapter 3 – Membrane transport

Chapter 4 – Glycolysis I

Week 3

Chapter 4 – Glycolysis II

Week 4

Topic selection & White paper due (Sept. 26)

Exam I (Chapters 1-3)

Week 5

Chapter 5 – TCA cycle, electron transport and oxidative phosphorylation I

Week6

Chapter 5 – TCA cycle, electron transport and oxidative phosphorylation II

Week7

Chapter 6.I – Biosynthesis and metabolism I

Week8

Chapter 6.II – Biosynthesis and metabolism II

Exam II (Chapters 4-5)

Week9

Chapter 6.III – Molecular basis of microbial growth

Week10

Chapter 11 – Photosynthesis

Week11

Chapter 11 – Photosynthesis

Week12

Chapter 11 – Photosynthesis

Exam III (Chapter 6)

Week13

Thanksgiving break

Week14

Peer-review (Term paper draft uploading due by Nov. 22; review due by Dec. 5)

Week15

Wrap up your term paper (**Term paper due: Dec. 10**)

Week16

Exam IV (Chapter 11)

All dates and assignments are tentative and subject to change.