



Texas A&M University-Commerce

2600 S. Neal St, Commerce, TX 75429-3011
Biological and Environmental Sciences
Tel) 903-886-5378 Fax) 903-886-5997

BSc 306 – Applied Microbiology Syllabus (Spring 2019, Jan 14 – May 10)

Instructor: DongWon Choi, PhD
Office: 260 Science (STC)
Office Hours: TR 9-10AM; MW 1-3PM
Phone: 903-468-8153
Fax: 903-886-5997
Email: dongwon.choi@tamuc.edu
Preferred Form of Communication: Email
Communication Response Time: 3 days

11:00 – 11:50 AM, MWF
Classroom: STC 123

Course Description

BSc 306 is a course for biology undergraduate students designed to provide important key principles of microbial life. The important key principles will then be expected to be applied to real-life examples to better understand dynamics of microbial world as a part of global ecosystem. Although relatively simple and primitive, microorganisms are considered as the most successful form of life. They are virtually everywhere and they are in tight relationship with other forms of life on earth. Unlike macroorganisms (i.e. animals, plants, insects, etc), microorganisms carry out their life processes such as energy metabolism, growth, and reproduction independently from other cells. This unique feature makes microorganisms a great tool to study the nature of life. The course will cover eukaryotic and prokaryotic microbes and viruses, but will emphasize bacteria.

REQUIRED textbook:
BROCK BIOLOGY OF MICROORGANISMS (LOOSE), MADIGAN, 15th ed, 2018,
ISBN: 9780134626109

Student learning outcomes

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

1. Compare and distinguish the basic groups of microbes, especially prokaryotic microbes (archaea, bacteria).
2. Understand the processes needed for one bacterium to become two, and understand the mechanisms involved.
3. Compare and contrast major pathways of catabolism, specify the relative energy yield from each pathway, list the key products of each pathway, and

- describe biochemical pathways used for microbial taxonomy.
4. Compare and contrast major pathways of biosynthesis and list the key products of each pathway.
 5. Draw a typical microbial growth curve, and predict the effect of different environmental conditions on microbial growth.
 6. Compare and contrast eukaryotic and prokaryotic genomes, and gene expression in each group.
 7. Compare and contrast the acquisition of novel genetic information in microbes via mutations and genetic exchange, specifically conjugation, transformation and transduction.
 8. Specify the role of microbes in global C and N cycles, and list examples of microbes that contribute to key metabolic aspects of these cycles.
 9. List different types of symbiotic interactions between microbes and other organisms, including commensalism, mutualism, and parasitism, and provide examples of each.
 10. Summarize common features of microbial pathogens, with emphasis on bacterial pathogens.
 11. Have a solid grasp of the scope of microbial life and its central roles in both human activities and the web of life on Earth.

Classroom Policy

- For successful course completion, your presence and participation is essential. Your attendance grade will be determined by your presence, your participation in class discussion, and your attention to the class discussion, whether by the instructor or a fellow student.
- Students should arrive ON TIME. Late arrivals are NOT acceptable.
- Students are expected to read the assigned textbook material prior to the class.
- To create a pleasant learning environment, students MUST TURN OFF their cell phones and other potentially disruptive electronic devices. Only laptop computers are allowed to take class notes. Those laptop computers should be operated with MUTE function on (i.e. sound off). Remember, laptop is only for taking notes. You give up the privilege of using your laptop computers in class if you are caught using your computer for other activities such as reading emails, chatting, watching videos, etc.

Grading Policy

The final course evaluation will be comprised of the lecture grade portion (75%) and the laboratory grade portion (25%). Lecture grade portion consists as below.

Term paper (see details below)	= 50 points
3 Mid-term exams (100 pts. each)	= 300 points
Comprehensive Final	= 150 points
5 quizzes (10 pts. each)	= 50 points
Attendance	= <u>50 points</u>

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-Enhanced Course Classroom lecture will be supplemented with lecture slides and answer keys for quizzes via eCollege. Students are strongly encouraged to print lecture slides (2-3 slides per page) prior to the class and bring to the class. Periodically check course homepage as well as your email for course announcements.

Term paper Write a synopsis about one recent research article related to microbiology. Topic selection (10pts) before the Exam 1 (due by week 4), and the paper (40pts) is due by the Exam 3 (week 13).

- **Topic selection:** Choose a topic relevant to microbiology. To complete the topic selection, you have to find one **Full** research article (published in a peer-reviewed scientific journal) covering your topic and upload to the **topic selection Dropbox** of the eCollege course shell. The full research article **must** be a **PDF format**.
- **Contents of the paper:** Discuss your chosen “general topic” related to microbiology, with sufficient discussion of background information to allow anyone taking the class to understand the significance. Research approaches and future directions may also be briefly discussed. The length of the paper is about 10 pages of double-spaced text. 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.

Exams

No exam grades will be dropped. Any student caught cheating on an exam will receive a zero for that exam. Students are responsible for supplying their own Scantron cards (Form 882-E, narrow green, 50 questions per side)

Mid-term Exams There will be 3 exams. The exams will consist of multiple choices

(40%), short answer questions (40%), and short essay-type questions (20%). Large portion of EXAM questions will be drawn from the same test pool as quiz pool. Thus, make sure to study materials covered by quiz-pool first. Essay-type questions will ask bigger picture of class lecture topics. Exams will be taken in class hours.

Comprehensive Final The final exam will consist of multiple choices and short answer questions (80% combined), as well as essay-type questions (20%). The exam will cover all class materials covered through the semester.

Quizzes There will be 5 quizzes given during the semester. Quiz schedule will be announced during class hours one week prior to the quiz. A typical quiz comprises seven 1-point questions. You will get 3 automatic points by simply taking the quiz.

Makeup The student is responsible for requesting a makeup when they are unable to take the regularly scheduled exams. The request should be made within 7 days of the absence. Makeup exams will be scheduled only in the event of EXCUSED absence (as defined in the Student's Guidebook). If the test is not made-up, the student will receive Zero for that exam. **No make-ups for quizzes.** Excused absences include;

- Verified illness (with Doctor's note)
- Death in a student's immediate family
- Obligation of student at a legal proceedings in fulfilling responsibility as a citizen
- Elective TAMUC activities (with the activity director's note)

ACCESS AND NAVIGATION

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or helpdesk@tamuc.edu.

Note: Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

COMMUNICATION AND SUPPORT

Brightspace Support

Need Help?

Student Support

If you have any questions or are having difficulties with the course material, please contact your Instructor.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778 or click on the **Live Chat** or click on the words “[click here](#)” to submit an issue via email.



System Maintenance

D2L runs monthly updates during the last week of the month, usually on Wednesday. The system should remain up during this time unless otherwise specified in an announcement. You may experience minimal impacts to performance and/or look and feel of the environment.

University Specific Procedures

Student Conduct

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in detail in the [Student Guidebook](#).
<http://www.tamuc.edu/Admissions/oneStopShop/undergraduateAdmissions/studentGuidebook.aspx>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: [Netiquette](#)
<http://www.albion.com/netiquette/corerules.html>

TAMUC Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

ADA Statement

Students with Disabilities

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

Office of Student Disability Resources and Services

Texas A&M University-Commerce

Gee Library- Room 162

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: studentdisabilityservices@tamuc.edu

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

Nondiscrimination Notice

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url:

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf>

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M-Commerce campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.

Class Schedule

Week 1 (Jan 14)

- Chapter 1, Introduction

Week 2 (Jan 21)

- Chapter 2, Cellular structure and functions

Week 3 (Jan 28)

- Chapter 3, Microbial Metabolism

Week 4 (Feb 4 : **Topic Selection Due at Feb 9**)

- Chapter 3, Microbial Metabolism
- **Exam 1 (Feb 8, Chap. 1-3)**

Week 5 (Feb 11)

- Chapter 4, Molecular information flow and Protein Processing-I

Week 6 (Feb 18)

- Chapter 4 -II
- Chapter 5, Microbial growth and Control

Week 7 (Feb 25)

- Chapter 5 -II

Week 8 (Mar 4)

- Chapter 8, Viruses and Their replication
- **Exam 2 (Mar 8, chapter 4, 5, 8)**

Week 9 (Mar 11)

- Chapter 8-II

Week 10 (Mar 18) Spring Break

No classes

Week 11 (Mar 25)

- Chapter 13, Microbial Evolution and Systematics

Week 12 (Apr 1)

- Chapter 13-II
- Chapter 21, Nutrient cycle

Week 13 (Apr 8; **Term Paper Due at Apr 13**)

- Chapters 21, 22.1, 23.3
- **Exam 3 (Apr 12, chapter 8, 13, 21, 22.1, 23.3)**

Week 14 , 15 (Apr 15)

- Chapter 24, Microbial Symbiosis with Humans
- Chapter 25, Microbial Infection and Pathogenesis
- Chapter 29.3, Transmission

Week 16 (Apr 29)

Comprehensive Final Exam (10:30-12:30, Wednesday, May 8)

All dates and assignments are tentative and subject to change.