MICROBIOLOGY BIOL 2421
Department of Life Sciences
Fall 2015

A. COURSE INFORMATION

Course number/section: BIOL 2421.002
Class meeting time: TR 11:00-12:15
Class location: Lecture BH 104; labs in CS 233
Course Website: https://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Jeffrey W. Turner, Ph.D., Assistant Professor
Office location: Science Lab 1, Room 104
Office hours: MW 10:00-11:15
Telephone: (361) 825-6206
e-mail: jeffrey.turner@tamucc.edu
Appointments: Preferred method is by e-mail

C. COURSE DESCRIPTION

Catalog Course Description
“An introduction to microorganisms including the bacteria, fungi, and viruses. Laboratory
involves microbiological techniques and development of basic laboratory skills, or
permission of instructor…Safety training given during a laboratory meeting early in the
semester is required for continued participation in this course.”

Extended Course Description
This course is designed for those students majoring and minoring in Biology, Biomedical
Sciences, Environmental Sciences, Biochemistry, and Chemistry, and for post-baccalaureate
students seeking to fulfill pre-professional requirements. While medical, dental, and
veterinary schools do not require Microbiology, you will take it in those professional
programs and the course content may be found on the MCAT and DAT. For Optometry,
Pharmacy, and Physician Assistant programs, the course is required for many programs.

This course will cover a detailed history of microbiology and its contributors; the structure,
function, growth and metabolism of prokaryotes in general; physical, chemical and antibiotic
methods of controlling microbes; basic genetics and Central Dogma of microbes; taxonomy
and characterization of eight phyla within Domain Bacteria; ecology of microbes, including
their role in biogeochemical cycling; basic structure of viruses; structure and revised
taxonomy of fungi; aspects of algae and protozoans. We may also briefly discuss how
microbes are recognized as non-self by hosts.

The laboratory involves hands-on manipulation of microbes; please see the separate lab
syllabus and schedule. In the first four labs, most organisms are Biological Safety Level
(BSL)-1 (less likely to cause disease) until you perfect basic techniques (aseptic technique, isolation streak of bacteria on plates, transfer bacteria from plate to broth to slant, etc.). In the second part involving biochemical characterization and rapid multi-tests, you are working with BSL-2 that can cause disease, and you are isolating organisms from soil that may cause problems. If you are allergic to molds or fungi, you may be exempted from the soil lab. Please let me and your lab TA know if you are allergic to molds or specific antibiotics, have a history of seizures, are pregnant or immunocompromised in any way.

Microbiology is very relevant to the science curriculum, regardless of your major; not only for medical concerns, but also safety of drinking and recreational water, food, bioremediation, and daily occurrences. Knowledge of microbiology can get you employed, by federal and state agencies (TDSHS, FDA, CDC), local municipalities (health departments, sanitation inspections, water and waste-water treatment), clinical laboratory science in hospitals, and industry (agricultural, breweries, biotechnology).

D. **PREREQUISITES AND COREQUISITES**

**Prerequisites**
Prerequisites: BIOL 1406 with a grade of ‘C’ or above, BIOL 1407, CHEM 1311 [1411], CHEM 1312 [1412]

**Corequisites**
While there are no official co-requisites, most students are concurrently enrolled in Organic Chemistry. Students should also be able to perform basic calculations (add, subtract, multiply and divide using exponents and scientific notation), understand logarithms, and basic mathematical concepts. Casual observations reveal that students with weak mathematical skills (mediocrity in College Algebra or Pre-Calculus) struggle in the course, but there is no mathematical co-requisite.

E. **REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES**

**Required Textbook(s)**
*Microbiology: A Human Perspective*, 7th ed. Please see Citation format below. The sixth edition will also suffice. Figures may be taken from 3rd through the 7th editions, or I may take them from *Brock Biology of Microorganisms*, 13th or 14th ed. (Madigan et al.);
*Microbiology: an evolving science*, 2nd or 3rd ed., (Slonczewski and Foster); or *Prescott Microbiology*, 7th ed. (Willey et al).

Citation format: **Please use Council of Science Editors format. A useful link on this format is available at this URL:** [http://writing.wisc.edu/Handbook/DocCSE.html](http://writing.wisc.edu/Handbook/DocCSE.html)
For example, the citation format for the text:

Please note that I will obtain photographs, graphs, tables and other figures from primary journal articles and place in handouts and Power Points in order to remain current—
Microbiology changes very rapidly!!

Required Laboratory Manual (in proper CSE citation format)


Optional Textbook(s) or Other References (Web sites)
Text websites: http://highered.mcgraw-hill.com/sites/0073375314/information_center_view0/ (accessed 04/08/13). The Online Learning Center for Nester is very good; it is not mandatory, and I do NOT use ARIST™ as an assessment system.

Microbiology Online: Spanish Online text from Med. Univ. of South Carolina. It is intended for 2nd-yr. med students, and the Spanish edition is maintained by the Instituto Polytecnico Nacional (http://pathmicro.med.sc.edu/Spanish/bact-span.htm) (8 abril 2013).


CDC: www.cdc.gov (accessed 04/08/13)

Supplies
Lab coats, lab notebooks, and safety goggles as of Spring 2015.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

By the end of this course, students should be able to achieve all outcomes at a level of ≥70%:

SLO 1: List or identify persons involved in the history of microbiology from antiquity to the present;
SLO 2: Discuss the roles and significance of microorganisms within biology, including bacteria, viruses, fungi, algae and protozoa;
SLO 3: Describe the basic elements of microbiology, including structure, metabolism, and genetics of microorganisms;
SLO 4: Perform (in the laboratory component of the course) basic laboratory skills and basic microbiological techniques, including the isolation, culture, and biochemical identification of microorganisms;
SLO 5: Sort the major categories of physical methods and of antimicrobials used in control of microorganisms
SLO 6: Calculate (laboratory and lecture) serial dilutions, and volumes of media from dehydrated stock;
SLO 7: Categorize levels of diversity within the microbial world including bacteria, viruses, fungi, algae and protozoa;
SLO 8: Examine the role of the scientific method in obtaining, critiquing, and confirming microbiological data.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

My instrumental methods include lecturing but also active learning strategies (Socratic Method, “flipping,” problem-based learning, peer instruction, cooperative learning), and to question you, including sending you to the board, but you have plenty of “lifelines”!

H. MAJOR COURSE REQUIREMENTS AND GRADING

Assessments include lecture exams, questioning strategies, pop quizzes.

Lecture makes up 66.7% of total grade: 500 pts
    Three class exams of 50 questions each (100 pts each exam)=300 pts; 40% of total grade
    Cumulative final exam=200 pts; 26.7% of total grade
    Extra credit: minimum of 30 pts at instructor’s prerogative
Lab makes up 33.3% of total grade
    Lab reports (8 total)—20% total grade
    Lab Practical Exam—5% total grade
    Lab Quizzes (minimum of 5)—3% of total grade
    Laboratory TA evaluation and extra credit--5.3% of total grade

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
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<tbody>
<tr>
<td>Exams</td>
<td>66.7%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>Extra credit</td>
</tr>
<tr>
<td>Homework</td>
<td>Extra credit</td>
</tr>
<tr>
<td>Presentations</td>
<td>Not done</td>
</tr>
<tr>
<td>Lab Reports</td>
<td>20%</td>
</tr>
<tr>
<td>Papers</td>
<td>Not done</td>
</tr>
<tr>
<td>Other activities . .</td>
<td>13.3%</td>
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</table>

I. COURSE CONTENT/SCHEDULE

Page/Chapter assignments from Nester et al. 7th ed.
I am placing the handout (HO) and Power Point (PP) on History of Microbiology (Chapt. 1) and on Fungi (Chapt. 12) directly on Blackboard. You are still responsible for History for the first and second tests, and for fungi, on the third test. Both sections will be on the final!

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>W Jan 21</td>
<td>Microbial Structure I</td>
<td>3</td>
<td>HO A (History); B (Koch Postul)</td>
</tr>
<tr>
<td>F Jan 23</td>
<td>Microbial Structure II</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>M Jan 26</td>
<td>Microbial Structure III</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>W Jan 28</td>
<td>Microbial Structure IV</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>F Jan 30</td>
<td>Metabolism I</td>
<td>2, 6</td>
<td>HO C (Metabolism)</td>
</tr>
<tr>
<td>M Feb 2</td>
<td>Metabolism II</td>
<td>2, 6</td>
<td>HO C (Metabolism)</td>
</tr>
<tr>
<td>W Feb 4</td>
<td>Metabolism III</td>
<td>2, 6</td>
<td>HO C (Metabolism)</td>
</tr>
<tr>
<td>F Feb 6</td>
<td>Metabolism IV</td>
<td>2, 6</td>
<td></td>
</tr>
<tr>
<td>M Feb 9</td>
<td>EXAM I</td>
<td>1, 2, 3, 6</td>
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<tr>
<td>W Feb 11</td>
<td>Growth of Microbes I</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>F Feb 13</td>
<td>Growth of Microbes II</td>
<td>4</td>
<td>HO D (Dilutions)</td>
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<tr>
<td>M Feb 16</td>
<td>Growth of Microbes III</td>
<td>4</td>
<td>HO D (Cell counts)</td>
</tr>
<tr>
<td>W Feb 18</td>
<td>Growth of Microbes IV</td>
<td>4</td>
<td>HO G (Media)</td>
</tr>
<tr>
<td>F Feb 20</td>
<td>Control of Microbes I</td>
<td>5</td>
<td>HO E (Chem)</td>
</tr>
<tr>
<td>M Feb 23</td>
<td>Control of Microbes II</td>
<td>5</td>
<td>HO RR Rad Bact.</td>
</tr>
<tr>
<td>W Feb 25</td>
<td>Control of Microbes III</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>F Feb 27</td>
<td>Genetics I: Central Dogma</td>
<td>7</td>
<td>HO N Hist Mol Biol</td>
</tr>
<tr>
<td>M Mar 2</td>
<td>Genetics II: Central Dogma</td>
<td>7</td>
<td>HO M Cent. Dogma</td>
</tr>
<tr>
<td>W Mar 4</td>
<td>Genetics III: Central Dogma</td>
<td>7</td>
<td>HO M, J</td>
</tr>
<tr>
<td>M Mar 9</td>
<td>Genetics V: Biotech</td>
<td>8, 9</td>
<td>HO J Mol Tech.</td>
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<tr>
<td>W Mar 11</td>
<td>Genetics VI: Methods</td>
<td>8, 9</td>
<td>HO J Mol Tech.</td>
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<td>F Mar 13</td>
<td>Exam II</td>
<td>4, 5, 7, 8, 9</td>
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<td>Mar 16-Mar 20</td>
<td>Spring Break</td>
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<tr>
<td>M Mar 23</td>
<td>Antibiotics I</td>
<td>21</td>
<td>HO 2F</td>
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<tr>
<td>W Mar 25</td>
<td>Antibiotics II</td>
<td>21</td>
<td>HO 2F</td>
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<td>F Mar 27</td>
<td>Antibiotics III</td>
<td>21</td>
<td>HO 2F</td>
</tr>
<tr>
<td>M Mar 30</td>
<td>Prokaryotic Diversity I</td>
<td>10, 11</td>
<td>HO P</td>
</tr>
<tr>
<td>W Apr 1</td>
<td>Prokaryotic Diversity II</td>
<td>10, 11</td>
<td>HO P</td>
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<tr>
<td>DATE (BY DAY OR WEEK)</td>
<td>TOPIC</td>
<td>CHAPTER(S)</td>
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<tr>
<td>F Apr 3</td>
<td>Fungi and Algae</td>
<td>12</td>
<td>HO T Fungi</td>
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<tr>
<td>M Apr 6</td>
<td>Prokaryotic Diversity III</td>
<td>10, 11</td>
<td>HO P</td>
</tr>
<tr>
<td>W Apr 8</td>
<td>Prokaryotic Diversity IV</td>
<td>10, 11</td>
<td>HO P</td>
</tr>
<tr>
<td>F Apr 10</td>
<td>Prokaryotic Diversity V</td>
<td>10, 11</td>
<td>HO P</td>
</tr>
<tr>
<td>M Apr 13</td>
<td>Microbial Ecology I</td>
<td>30 (6th ed), 29 (7th)</td>
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<tr>
<td>W Apr 15</td>
<td>Microbial Ecology II</td>
<td>30 (6th ed), 29 (7th)</td>
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<tr>
<td>F Apr 17</td>
<td>Microbial Ecology III</td>
<td>30 (6th ed), 29 (7th)</td>
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<td>M Apr 20</td>
<td>Microbial Ecology IV</td>
<td>30 (6th ed), 29 (7th)</td>
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<tr>
<td>W Apr 22</td>
<td>Exam III</td>
<td>10, 11, 12, 21, 29</td>
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<tr>
<td>F Apr 24</td>
<td>Viruses I</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>M Apr 27</td>
<td>Viruses II</td>
<td>13</td>
<td></td>
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<tr>
<td>W Apr 29</td>
<td>Immune Response I</td>
<td>14, 15</td>
<td></td>
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<tr>
<td>F May 1</td>
<td>Immune Response II</td>
<td>14, 15</td>
<td></td>
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<tr>
<td>M May 4</td>
<td>HIV/AIDS</td>
<td></td>
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<tr>
<td>W May 13</td>
<td>Final Exam</td>
<td>ALL-comprehensive</td>
<td>Note different time!</td>
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</tbody>
</table>

Class Handouts

1. HO A v4 History of Microbiology
2. HO B v2 Koch Postulates
3. HO C v16 Metabolism
4. HO D6 Dilutions and Cell Counts
5. HO E Antimicrobial Chemicals
6. HO 2F v16 Antibacterial Drugs
7. HO G v7 Bacteriological Media
8. HO J4 v8 Molecular Techniques
9. HO M5 Central Dogma
10. HO N v4 History of Molecular Biology
11. HO P v9 Prokaryotic Diversity SP14
12. HO RR1 Radiation Tolerant Bacteria
13. HO T v2 Fungi_Algae FA14

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

Important Dates:  
M Feb 9—Exam I;  
F Mar 13—Exam II;  
W Apr 22—Exam III  
F Apr 10—Last day to drop course;  
M May 4—Last day to withdraw from University  
Final Exam—W May 13 11:00 am-1:30 pm
J. COURSE POLICIES

Attendance/Tardiness
Students are expected to attend every scheduled class and laboratory meeting. It is the responsibility of the student to obtain any material missed during an absence from his/her classmates. Power Points are not placed in the library, and only Power Points from certain sections (e.g., Intro to Microbiology) will be placed on Blackboard™ 9, or on a website. Professor will not take roll, but with Socratic Method, he will know if you are in class or not. For labs, the instructor (TA) should be notified PRIOR to lab if the student will be absent (except in emergency situations). Students must attend the laboratory section for which they originally registered. “Make-up” by attending other lab sections is NOT permitted except in emergencies, only with a signed green permission slip from either Dr. Buck or Dr. Doyungan & depending upon space in the laboratory section. Tardiness for lab is not allowed due to safety reasons. Quiz make-up in lab is not allowed.

Late Work and Make-up Exams
Late work is not accepted for either lecture work or lab reports.

Extra Credit
A minimum of 30 pt extra credit is assured as pre- and post-test assessments. No make-ups are given for pre- and post-tests. Other extra credit assignments may be given at instructor or lab TA’s prerogative. Instructor or TA is not obligated to give make-up assignments for extra credit opportunities, whether excused or unexcused. The ONLY possible exception is for students with a university-approved scheduled absence. The make-up (if given) may not be the exact same assignment given to the class.

Cell Phone Use
DO NOT USE CAMERA PHONES IN LECTURE OR LAB. DO NOT SEND TEXT MESSAGES DURING CLASS. Please turn off all cell phones, beepers, Bluetooth devices, Palm Pilots, Black Berries, etc., before entering the classroom, or at least place them on silent mode. Cell phones may not be used in the laboratory; we prefer that you not bring them into CS 233. Please place these in the lockers outside CS 233 (locks not provided by university). I would prefer that earpieces not be worn in lecture or laboratory. DO NOT TAKE PHOTOS of Power Point slides or videos with your cell phone camera unless otherwise instructed. Recording of lectures with recorders can only be done with permission of instructor—please see me privately.

Laptop Use
I have no problems with any student using a laptop in class, as long as they are not looking at pornography, anime, videos, etc.

Food in Class
I prefer that you not eat or drink in class, but I will not throw you out or ask you to leave. NO EATING OR DRINKING is allowed in lab.
Missed Exam
Excused only per TAMU-CC guidelines; such exams are given only under EXTREME circumstances, and will be total essay.

Participation
I expect that all members in the class will participate in the questioning, discussions, and interactions within the lecture and lab. While I do not tabulate every time you answer in class, I have a good idea.

Others
Laboratory Safety: You must take SMTE 0092 before you are admitted to lab—no exceptions!

K. COLLEGE AND UNIVERSITY POLICIES

- Academic Integrity (University)
  It is expected that university students will demonstrate a high level of maturity, self-direction, and ability to manage their own affairs. Students are viewed as individuals who possess the qualities of worth, dignity, and the capacity for self-direction in personal behavior.
  See Full University Policy at http://catalog.tamucc.edu/content.php?catoid=10&navoid=313#Academic_Integrity

- Classroom/Professional Behavior
  “Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior (including excessive text messaging) may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.”

- Deadline for Dropping a Course with a Grade of W (University)
  The grade of W will be assigned to any student officially dropping a course by November 6, 2015. No student is eligible to receive a W without completing the official drop process by this deadline. Visit the Office of the University Registrar for the Course Drop Form that must be submitted. After November 6, 2015, a student will not be allowed to drop a course.

- Grade Appeals (College of Science and Engineering)
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to
demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- Disability Services
  Disability Services (DS) is the hub for coordinating services and accommodations to ensure accessibility and utilization of all programs for all Texas A&M University-Corpus Christi students with disabilities. Our services are designed to meet the unique educational needs of enrolled students with documented permanent or temporary disabilities. DS provides intake and consultation services to students seeking to register with our office. DS reviews an individual’s documentation of disability and assesses eligibility for services and the determination of reasonable accommodations. For more information visit the Disability Services Office at 116 Corpus Christi Hall or go to http://disabilityservices.tamucc.edu/

- Other information: List serve
  All students are on the Blackboard list serve for the course, and to a second opportunities-list serve.
  To subscribe, send a separate e-mail to opportunities-list-request@listserv.tamucc.edu.
  Make sure that your e-mail appears in the “From” heading. In the subject heading, type “subscribe,” then send the e-mail. Next, you will receive a second message with a long set of letters and numbers in the subject line. You must also reply to that message in order to be subscribed to the list-serve.

After the initial message to subscribe, to send items on the list-serve, just type opportunities-list@listserv.tamucc.edu (do NOT add –request after list). You may not receive the messages from the list-serve if your Internet service provider (Yahoo, Hotmail, Excite, Roadrunner, Grande, etc.) keep these messages from being placed in junk-mail. The University administration prefers that you use the islander.tamucc.edu accounts.

At the end of the course, send an e-mail that contains your e-mail address in the “From” heading to opportunities-list@listserv.tamucc.edu. In the subject heading, type the word “unsubscribe,” then send the e-mail. I hope that students will continue to subscribe to opportunities-list@listserv.tamucc.edu!
L. **OTHER INFORMATION**

How to successfully complete BIOL 2421:

1. Read the book before class
2. In class, listen and take notes not on every word on every slide, but what are the main points being discussed
3. Go back after lecture and fill in gaps of what was not understood with your text
4. Don’t just highlight your text! Make an outline of the lecture and see if you can describe, define, compare/contrast, analyze, evaluate or justify. Do not just memorize—make connections!

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.