**BIOS 3380: Microbiology**

**Syllabus – Fall, 2018**

**Lecture: MWF 9:05am-9:55am, L1205 EST**

**Instructors:**

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**Teaching Assistants:**

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**Course description:** This course provides an in-depth overview of microbes and the interactions of microbes with ecosystems. Specific topics will include microbial structure/function, diversity, physiology, metabolism, genetics, ecology, evolution and pathogenesis. The course format will consist of interactive lectures, which will draw on information from the textbook and the latest scientific discoveries in the field of microbiology.

**Textbook:**

Brock Biology of Microorganisms, 15th Edition

By Michael T. Madigan, John M. Martinko, Kelly S. Bender, Daniel H. Buckley, David A. Stahl, Thomas Brock

ISBN-10: 0-321-89739-0

ISBN-13: 978-0-321-89739-8

Publisher: Benjamin Cummings

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Additional reading material will be announced and added to the course website on T-square.

**Prerequisites** (all require a minimum grade of “D”:

BIOS 1107 and (BIOS 1107L and 1207L) or BIOL 1510 or BIOL 1511,

CHEM 2311, Organic Chemistry I

**Course Learning Outcomes**

By the end of this course, you will be able to…

a. Comprehend the ubiquity and enormous diversity of microorganisms on Earth.

b. Be aware of the critical role that microbes play in society, both in providing beneficial services as well as by causing disease.

c. Understand the cellular structures, adaptations, metabolisms, and environmental controls that determine the success of microorganisms in nature.

d. Critically read the primary literature and interpret experimental results.

e. Explain how microbes mediate the functioning of ecosystems.

f. Articulate biomolecular processes in bacteria harnessed to develop useful technologies.

**Grading:**

Four exams - 50 %

Six homework assignments - 50 %

There will be **THREE** (3) lecture exams and one (1) **FINAL EXAM**. The final exam will not be comprehensive and will cover lecture material after exam 3 only. All four exams together comprise 50 % of your final grade. All exams will be closed book and will consist of multiple-choice, short answers and essay questions. Any missed exam will count as 0 and cannot be dropped if missed without documentation. Make up exams will be different than the original exams. Homework assignments will comprise the remaining 50 % of the final grade. There will be **SIX (6) HOMEWORK ASSIGNMENTS** spaced evenly throughout the semester. Each homework assignment will comprise 8.33 % of the final grade. Homework assignments will include reading the primary literature on the latest discoveries in the field of microbiology and then answering questions based on your reading. Answers to homework questions will generally require a close reading of the text and an understanding of the concepts covered in class. You will be free to use whatever resources are necessary (excluding your classmates) to help you answer the homework questions. Homework assignments will be made available on Tsquare and then turned in to the TA at the beginning of the class period, generally one week after the assignment is made available.

**Grading scale:**

100-90% = A to A-

89-80% = B+ to B-

79-70% = C+ to C-

69-60% = D+ to D-

<60% = F

**Extra credit:**

Extra credit **may** be offered if warranted based on class performance. Extra credit activities may involve attending specific departmental seminars and symposia, taking good quality notes, and participating in in-class activities.

**Expectations:**

Students are responsible for knowing the material covered in lectures. Students are expected to read the assigned chapters prior to class to aid in their understanding and participation during lectures. Lecture information will NOT come entirely from the textbook. Students are also responsible for knowing the material covered in the lectures, **even if it has not been covered in the textbook, *Brock Biology of Microorganisms***. It is the responsibility of the student to obtain any missed information, instructions or materials that results from a missed lecture. Students are also expected to be proactive, meeting with their TA or instructors should they encounter difficulties in the class, require assistance or have any unanswered questions. Students are also responsible for knowing the material in the relevant chapters of the textbook *Brock Biology of Microorganisms,* **even if it has not been covered in the lecture**.

**Lecture pdfs posted on T-square are only an outline.** Lecture Powerpoint presentations will be posted on T-square either before or after lecture (at instructor discretion), but always before the respective exam. Additional material may be covered in lectures, and you may be tested on it.

**This course moves fast and covers a lot of material.** This is necessary for the objectives and scope of the course, and to prepare you for microbiology courses in graduate or professional school. **We encourage you to ask questions!**

**Classroom policies:**

**Consideration:** Silence all alarms—cell phone, etc. Remove headphones and headsets. No talking unless asking or answering questions relevant to the course.

**Lateness:** Please be on time. **You will not be allowed to stay past the end of class to finish exams, no matter how late you came in.**

**Excuses and Make-up Exams:** Documentation of excused absence must be obtained through the Office of the Dean of Students (<http://deanofstudents.gatech.edu>) and provided by the class period immediately following the exam missed. Valid excuses include: personal emergencies such as being hospitalized, or being in a car accident, excused absence due to official school event, family event over which you do not have control, such as a funeral.

If you have a valid excuse, you can make up the exam during the instructor’s office hours (or at another pre-arranged time) within 3 days of the missed exam. If you do not have a valid excuse, you will receive a 0 for that exam.

**Late or Missed Assignments:** Assignments will not be accepted late- after the class period on the day that they are due. If you have a valid excuse, you will be allowed to skip one assignment. However, your assignment grade will then be determined based on the remaining 5 assignments instead of 6.

**Regrade requests:** Any request for a reconsideration of the grading of a question on an exam, quiz, or problem set must be submitted to either Dr. Kostka or Dr. Rosenzweig in writing. This request must include a clear explanation of why you think your answer should be considered correct.

**Academic Integrity:**

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. For information on Georgia Tech's Academic Honor Code, please visit http://www.catalog.gatech.edu/policies/honor-code/ or http://www.catalog.gatech.edu/rules/18/.

Any student suspected of cheating or plagiarizing on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

**Accommodations for Students with Disabilities:**

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services at (404)894-2563 or http://disabilityservices.gatech.edu/, as soon as possible, to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

**Campus Resources for Students:**

In your time at Georgia Tech, you may find yourself in need of support. Below you will find some resources to support you both as a student and as a person.

**Academic support**

* Center for Academic Success <http://success.gatech.edu>
  + 1-to-1 tutoring <http://success.gatech.edu/1-1-tutoring>
  + Peer-Led Undergraduate Study (PLUS) <http://success.gatech.edu/tutoring/plus>
  + Academic coaching http://success.gatech.edu/coaching
* Residence Life's Learning Assistance Program

<https://housing.gatech.edu/learning-assistance-program>

* + Drop-in tutoring for many 1000 level courses
* OMED: Educational Services (<http://omed.gatech.edu/programs/academic-support>)
  + Group study sessions and tutoring programs
* Communication Center (<http://www.communicationcenter.gatech.edu>)
  + Individualized help with writing and multimedia projects
* Academic advisors for your major

<http://advising.gatech.edu/>

**Personal Support:**

Georgia Tech Resources

* The Office of the Dean of Students: <http://studentlife.gatech.edu/content/services>; **404-894-6367**; Smithgall Student Services Building 2nd floor
  + You also may request assistance at <https://gatech-advocate.symplicity.com/care_report/index.php/pid383662?>
* Counseling Center: <http://counseling.gatech.edu>; **404-894-2575**; Smithgall Student Services Building 2nd floor
  + Services include short-term individual counseling, group counseling, couples counseling, testing and assessment, referral services, and crisis intervention. Their website also includes links to state and national resources.
  + *Students in crisis may walk in during business hours (8am-5pm, Monday through Friday) or contact the counselor on call after hours at* ***404-894-2204****.*
* Students’ Temporary Assistance and Resources (STAR): <http://studentlife.gatech.edu/content/need-help>
  + Can assist with interview clothing, food, and housing needs.
* Stamps Health Services: <https://health.gatech.edu>; **404-894-1420**
  + Primary care, pharmacy, women’s health, psychiatry, immunization and allergy, health promotion, and nutrition
* OMED: Educational Services: <http://www.omed.gatech.edu>
* **Women’s Resource Center:** [**http://www.womenscenter.gatech.edu**](http://www.womenscenter.gatech.edu)**; 404-385-0230**
* **LGBTQIA Resource Center:** [**http://lgbtqia.gatech.edu/**](http://lgbtqia.gatech.edu/)**; 404-385-2679**
* **Veteran’s Resource Center:** [**http://veterans.gatech.edu/**](http://veterans.gatech.edu/)**; 404-385-2067**
* **Georgia Tech Police:** **404-894-2500**

**Statement of Intent for Inclusivity**

As a member of the Georgia Tech community, I am committed to creating a learning environment in which all of my students feel safe and included. Because we are individuals with varying needs, I am reliant on your feedback to achieve this goal. To that end, I invite you to enter into dialogue with me about the things I can stop, start, and continue doing to make my classroom an environment in which every student feels valued and can engage actively in our learning community.

**Syllabus change policy:**

Syllabus changes substantially affecting the grading of the course will not be made. \*\***Other syllabus changes may be made and will be announced.\*\***

**Important Georgia Tech Dates:**

|  |  |  |
| --- | --- | --- |
| Monday | 8/20/18 | Classes begin |
| Friday | 8/24/18 | Last day to register and/or make schedule changes |
| Monday | 9/3/18 | Official school holiday |
| Monday, Tuesday | 10/8/18-10/9/18 | Fall Recess |
| Thursday, Friday | 11/21/18-11/23/18 | Official school holiday |
| Friday | 12/3/18 – 12/4/18 | Final Instructional Class Days |
| Monday to Friday | 12/6/18-12/13/18 | Finals week |

**Course Schedule:**

Please note that topics may be modified/ omitted or and exam dates may be changed. **\*\*Changes will be announced either in lecture or via T-Square.\*\***

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Topic** | **Chapters** | **Instructor** |
|  |  |  |  |
| 1 | Overview of microbial life; Zombie diseases  8/20 Assign 1 on Tsquare | 1 | Kostka |
| 2 | Cell components, cell structure/ function, antibiotic resistance  8/27 Assign 1 due; Assign 2 on Tsquare | 2 | Kostka |
| 3 | Finish Cell Components; 9/5 Assign 2 due | 2 | Kostka |
| 4 | Microbial Metabolism  Review session: Monday 9/10 7:30 pm | 3 | Kostka |
| **Exam 1** | **Wednesday, September 12th** |  | Kostka |
| 5 | Growth and Environmental Controls of Microbial Communities; Ebola outbreak discussion; Nitrogen Cycle | 5,  20.1-20.3  21.1-21.3  21.8 | Kostka |
| 6 | Carbon Cycle, Food/ Waterborne Pathogens, Metagenomics  9/26 Assign 3 on Tsquare | 13-III  19-III  32.1, 32.3, 32.6, 32.20 | Kostka |
| 7 | Microbial ecology, habitats, and diversity; Arctic ecosystems and cultivation-based approaches;  10/3 Assign 3 due | Rest of 19 | Kostka |
| 8 | Bioremediation, microbes and oil spills  Review session: Tuesday 10/9, 7:30 pm | 20.9 | Kostka |
| **Exam 2** | **Friday, October 12th** |  | Kostka |
| 9 | Molecular Information Flow and Protein Processing  10/15 Assign 4 on Tsquare | 4 | Rosenzweig |
| 10 | Molecular Information Flow and Protein Processing  10/22 Assign 4 due; Assign 5 on Tsquare | 4 | Rosenzweig |
| 11 | Microbial Genomics, Viruses, Viral Genomics  10/29 Assign 5 due | 6, 8, 9.1-9.2 | Rosenzweig |
| 12 | Metabolic Regulation (gene expression) | 7.1-7.7,7.9,7.14-7.18 | Rosenzweig |
| **Exam 3** | **Friday, November 9th** |  | Rosenzweig |
| 13 | Genetics of Bacteria and Archaea, and Genetic Engineering  11/12 Assign 6 on Tsquare | 10,11 | Rosenzweig |
| 14 | Genetics of Bacteria and Archaea, and Genetic Engineering  11/19 Assign 6 due | 10,11 | Rosenzweig |
| 15 | Overview of bacterial diseases (Epidemiology and Person-to-Person Diseases) | 28,29 | Rosenzweig |
| 16 | Overview of bacterial diseases (Epidemiology and Person-to-Person Diseases) | 28,29 | Rosenzweig |
| **Final Exam** | **Week of 6-13 December (Exam 4)** |  | Rosenzweig |