

COURSE SYLLABUS
BIOS 4418/BIOL 6418 MICROBIAL PHYSIOLOGY
SPRING SEMESTER 2021
PROFESSOR DICHRISTINA

I. COURSE INFORMATION

Scheduled class time: TR 2:00-3:15 PM via BlueJeans (Class meeting site: 958 664 3933)

Required class material: PowerPoint slides will be uploaded to Canvas prior to each class.

Prerequisite: BIOS 3380 (Introductory Microbiology)

Office hours: By appointment via BlueJeans

E-mail address: thomas.dichristina@biology.gatech.edu

II. COVID-19 INFORMATION

Microbial Physiology will be carried out in a "Hybrid touch points" model. Class lectures will be held remotely in a synchronous manner (i.e., during regular class time) and on-line class participation is required. If COVID-19 conditions improve during the semester, we will discuss the possibility of implementing in-person classes that will also be provided synchronously on-line for students who continue to prefer remote instruction. In addition to microbial physiology lectures, class discussions will also include current hot topics in microbiology. According to student preference, Dr. DiChristina will meet each student either remotely or in-person to discuss class performance. Final grades will be based on quizzes, class participation, and a final exam.

III. COURSE DESCRIPTION

Microbial Physiology examines the strategies by which microorganisms obtain the energy and nutrients required to live and reproduce. Microorganisms employ a myriad of metabolic strategies and individual microbial species may be differentiated based on metabolic characteristics. Specific microbial metabolic properties determine microbial ecological niches in nature (and vice versa), drive industrial processes, and catalyze the biogeochemical cycling of elements, which impact climate change.

IV. COURSE MATERIALS

PowerPoint slides will be added to the file folder of the 4418/6418 Canvas website prior to each class.

Recommended Textbook (on reserve at library):

Brock Biology of Microorganisms, 15th Edition (2017)

Authors: Madigan, Martinko, Bender, Buckley, Stahl, and Brock

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

Publisher: Benjamin Cummings

V. GRADING SCALE (CURVED):

Two midterm exams: 25% each

Final Exam (Semi-cumulative): 40%

Tuesday 15-minute summary of Science or Nature paper: 10%

VI. EXPECTATIONS:

Students are responsible for knowing the material covered in lectures. Students may (but are not required) 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. Students are responsible for obtaining any missed information, instructions or materials that result from a missed lecture. Students are also expected to be proactive, meeting with Dr. DiChristina if they encounter difficulties in class, require assistance, or have any unanswered questions.

VII. CLASS POLICIES

Consideration: Silence all cell phones. Refrain from talking during BlueJean lectures unless asking or answering questions relevant to the course.

Lateness: Please log in to BlueJeans on time.

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

Regrade requests: Any request for a reconsideration of the grading of a question on a quiz should be submitted to Dr. DiChristina in writing. This request must include a clear explanation of why you think your answer should be corrected.

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 and 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 Dr. DiChristina as soon as possible in order to set up a time to discuss your learning needs.

VIII. CAMPUS RESOURCES FOR STUDENTS

In your time at Georgia Tech, you may find yourself in need of academic and personal 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 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 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>; **404-385-0230**
- LGBTQIA Resource Center: <http://lgbtqia.gatech.edu/>; **404-385-2679**
- Veteran's Resource Center: <http://veterans.gatech.edu/>; **404-385-2067**
- Georgia Tech Police: **404-894-2500**

IX. 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.

X. 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 our class an environment in which every student feels valued and can engage actively in our learning community.

Class Schedule

<u>DATE</u>		<u>LECTURE</u>	<u>PAGES</u>
January	14	Introduction	1-24
	19	Taxonomy	347-378
	21	Cell Structure	25-72
	26	Motility & Chemotaxis	56-63, 226-228
	28	Lipid Vesicle & Cell Wall	25-72
February	2	Energy Generation	74-95
	4	Energy Generation	74-95
	9	ATPase: Structure & Function	74-95
	11	TBD	---
	16	Quiz review	---
	18	Quiz No. 1	---
	23	Photophosphorylation	379-392, 433-446
	25	Oxidative Phosphorylation I	86-95
March	2	Oxidative Phosphorylation II	86-95
	4	Terminal Reductase Complex	86-95
	9	Nitrogen Cycle	398, 411, 452-455, 636
	11	Iron Cycle	396, 421, 456-458, 639
	16	No Class – Mid-Semester Break	---
	18	Sulfur Cycle	395, 413, 447-451, 638
	23	Carbon Cycle	415-417, 459-461, 632-634
	25	Quiz review	---
	30	Quiz No. 2	---
	April	1	Central Metabolism
6		P-P Shunt & Carbon fixation	97, 390-394, 633, 698-699
8		Iron Assimilation	717-720
13		Nitrogen Assimilation	224-226, 386
15		Nitrogen Assimilation	453-454, 386
20		Sulfur and Phosphorous Assimilation	413-415
22		Signal Transduction	74, 586, 225-231
27		Final Exam review	---
May	4 (Tuesday)	Final Exam (2:40 PM)	---

Grading:

Two mid-semester quizzes: 25% each

Final Exam (Semi-cumulative): 40%

Tuesday 15-minute summary of 2020 or 2021 Science or Nature paper: 10%

Schedule for Tuesday 15-minute summary of 2020 or 2021 Science or Nature paper:

<u>Date</u>	<u>Name</u>
January	19 Open
	26 Tony Boever – Microbial Sulfate Reduction Linked to Organic Sulfur Formation
February	2
	9
	16
	23
March	2
	9
	16 No Class – Mid-Semester Break
	23
	30
April	6
	13
	20
	27 Last day of class