Microbial Metabolism and Energetics

MCB 6417 (1 credit)
Sections 7138 and 1G63
Fall 2024

Instructor

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Preferred method for communication regarding the course is by email.

Claudio F Gonzalez, PhD.

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Preferred method for communication regarding the course is by email.

Please resolve technical issues by contacting the UF helpdesk (http://helpdesk.ufl.edu; (352) 392-HELP (4357); *helpdesk*@ufl.edu · HUB 132).

Delivery Method/Meeting Time
Fall 2024 semester: August 27 -October 3

All assignments, question/answer sessions, and other materials will be accessible online through Canvas, enabling asynchronous learning. This policy ensures that all

meetings and class resources are conveniently available on the internet, allowing you to learn at your own pace and within the designated class deadlines.

For students in Gainesville who prefer in-person interactions, there is a designated meeting space available. The conference room 1054, located in the Microbiology and Cell Science building at 981, has been reserved specifically for this purpose. You can gather in this room on Tuesdays and Thursdays from 8-10:30 am EST to engage in discussions related to class materials, group presentations, and arrange meetings with the instructor, providing a comfortable and convenient setting for collaborative learning.

Students will have 15 hours of contact time (plus ~ 30 hours of preparation) associated with this 1 credit course.

Credits - 1

Course Description

MCB6417. Microbial Metabolism and Energetics. Credits: 1. Principles of energy and biosynthetic metabolisms will be examined in aerobic and anaerobic microorganisms. Current biotechnology practices that incorporate these principles will also be discussed.

Course Objectives/Goals/Learning Outcomes

The course aims to achieve the following objectives:
- To foster an understanding of the concepts and skills necessary to analyze and assess research pertaining to microbial metabolism and bioenergetics in a critical manner.
- To gain an understanding of the positive and negative effects that microbes have on global nutrient cycles. This includes exploring how microbes contribute to the cycling of nutrients in a beneficial manner, as well as the potential negative consequences that can arise from microbial activities in nutrient cycles.
- To apply theories of microbial metabolism and bioenergetics to real-world challenges, such as the utilization of microorganisms to produce bioproducts, alter nutrient cycles, and other valuable applications.
- To actively engage in reviewing and providing feedback on peer projects, employing the acquired knowledge and skills to contribute to the learning process of fellow students.

Course Materials

All required course materials will be available online through the Canvas e-Learning site (http://elearning.ufl.edu/) or through the UF library system.

Course Assignments Dr. Maupin-Furlow (JMF section)

Please note that all students will be graded individually on all assignments in the JMF section of the course. **For the group assignments, each student within the group will be evaluated individually and independently of their group members**. As a result, students in the same group may not necessarily receive identical grades. To ensure impartial assessment by the instructor, students are requested to initial each slide they prepare and present. Additionally, it is advised for each student to introduce themselves before speaking.

Each group presentation should be ~**15 min total (estimate ~1 min per slide)**.

The group topics will revolve around microbial metabolism and bioenergetics, encompassing areas such as novel metabolic pathways, life's adaptation to extreme energy limitation, fundamental forms of energy conservation, and speculation on the bioenergetics of life's origins. The instructor will divide the class into groups, with assigned members to promote the generation of fresh ideas and scientific networks.

Group A presentations (100 points): Group A presentations are focused on a topic related to microbial metabolism and energetics. In this group assignment, students are expected to perform a literature review related to the topic of discussion and synthesize the material into a comprehensive presentation. See UF canvas (tabs within "people" section) to find your group number. Once you find this group number, go to **Appendix A** to find your group topic. A reference list is provided in **Appendix A** for each topic to assist group members in getting started on the literature review and preparing the group presentation. The reference list is not meant to be comprehensive. Students are encouraged to find additional literature related to the topic of discussion. Students are expected to critically evaluate the literature and gain a deep understanding of the metabolic process under discussion prior to preparing the oral presentation. Students should clearly explain the topic in a manner that is scientifically accurate using their own words – do not plagiarize. To add excitement to the oral report – please take the time to discover what aspects of the topic may be on the cutting edge of new knowledge in the field.

Scientific questions to group A peer presenters (25 points). This is an individual assignment focused on enhancing scientific discussion of the Group A oral reports. Watch **five** Group A oral reports of your peer groups (not your own group presentation). Develop a thoughtful scientific question for each of the peer Group A oral reports. Read the article under discussion if you are confused by the presentation and need more background to formulate your question. Post your questions to each peer Group A in the "Discussion" section of the course on Canvas. In addition, assemble and upload the questions as a single word document to the assignment section of the course on Canvas for the instructor to review and grade.

In summary, when submitting scientific questions to Canvas:

1) **Discussion Section:** Submit your questions here so presenters can see and engage with the questions from their peers.
2) **Assignment Section:** Submit your questions here to ensure the instructor can track your contributions and award you a grade for this part of the class.

Scientific answers to group A peer questioners (25 points). This is a group assignment but all individuals within the group are expected to answer questions asked by their peers within the discussion section of Canvas. To monitor this activity, please assemble the questions asked by your peers and equally divide the load. Once the questions have been answered on the discussion panel, choose a group leader to assemble the questions and answers into a Word document. Initial each group member's answer. Upload this document to the Canvas assignment section of the course.

In summary, when submitting scientific answers to Canvas:

1) **Discussion Section:** Submit your answers here so questioners can see and engage with the answers from their peers.
2) **Assignment Section:** Chose a group leader to assemble and submit all answers here. Make sure your answers are initialed to ensure the instructor can track your contributions and award you a grade for this part of the class.

Plagiarism: Please note that plagiarism is against the UF honor code (for details see https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) (online modules are also available to assist you with making ethical decisions regarding plagiarism and other codes of conduct at https://www.dso.ufl.edu/sccr/seminars-modules/).

"(a) Plagiarism. A student shall not represent as the student's own work all or any portion of the work of another. Plagiarism includes but is not limited to:

1. Quoting oral or written materials including but not limited to those found on the internet, whether published or unpublished, without proper attribution."

You **must use your own words** to communicate oral and written materials presented in the oral reports, scientific evaluations, and summaries of this course.

Course Assignments Dr. Claudio Gonzalez

***Oral Presentation (Group) (50 points)*:** Each group will have eight days to complete the presentation. Each group will work on a set of closed-related articles (2-3 articles), selecting a topic of interest from a list displayed on Canvas. The group presentation (20 minutes maximum should address the main topics discussed during the Introduction to the course. [Due date 09/26].

Individual Quiz (50 points). This individual assignment focused on enhancing students' comprehension of the oral reports. Each student should watch the oral reports to complete the quiz. The students should also read the articles under discussion in case they need more background to work on the quiz.

Individual report (50 points). Each student, working individually, will submit a final report of 5 pages. In this report, each student should use the information presented by two groups. The information presented in this report should be rationally connected and discussed. The students are encouraged to use the reviews provided by the instructor to facilitate discussion and conclusion of the final report. [Due date 10/03]

Total points Gonzalez Assignments 150 points.

Weekly Course Schedule

Schedule – Fall 2024

Week 1
T 08/27   Meet the Instructor
               [Dr. Maupin-Furlow, optional – Online Zoom 4-5:30 PM EST]
               Introduction to the course [Online Canvas]
R 08/29   Work on Group A Presentations [Group work]

Week 2
T 09/03   Work on Group A Presentations [Group work]
R 09/05   Deadline Group A Presentations
               [Chose one member of group to submit in assignment section of Canvas]

Week 3
T 09/10   Deadline Group A questions to peers
               [Submit questions in the assignment **AND** discussion sections of Canvas]
F 09/13   Deadline for Group A answers to scientific questions
               [Submit answers in the assignment **AND** discussion sections of Canvas]

Week 4
09/17   Meet the Instructor – Introduction. [Dr. Gonzalez, Online Zoom]
09/19   Topic Selection - Working on Presentations. [Group work]

Week 5
09/24   Working on Presentations. [Group work]
09/26   Presentations submission [Due date].

Week 6
T 10/1   General Quiz Due date. [Individual work]
R 10/3   Final Report Due Date. [Individual work]

Upload all material onto the Canvas Course Website

GENERAL REFERENCE TEXTBOOK (RECOMMENDED):

White, D. 2006. *The Physiology and Biochemistry of Prokaryotes*. Third Edition. Oxford University Press, New York, NY. ISBN 0-19-530168-4.

[Exam Dates/Calendar/Critical dates and deadlines]

Deadlines
T 09/05   Deadline for Group A presentations
T 09/10   Deadline for Scientific questions to Group A peers
R 09/13   Deadline for Group A answers to scientific questions
R 09/26   Deadline for submission of presentation
T 10/1   General Quiz Due date. [Individual work]
R 10/3   Final Report Due Date. [Individual work]

Evaluation of Learning/Grades

MCB 6417 learning will be evaluated based on the following criteria:
100 points   Group A presentation (JMF section)
  25 points   Scientific questions to Group A peers (JMF section)
  25 points   Group A answers to scientific questions (JMF section)
  50 points   Group presentation (CG section)
  50 points   General Quiz (CG section)
  50 points   Final Report (CG section)
300 points total

[Materials and Supplies Fees]
There are no additional fees for this course.

Grading Policy
Final grades will be based on the following performance standard:

95 - 100 %   = A
90 - 94 %   = A-
87 - 89 %   = B+

84 - 86 %   = B
80 - 83 %   = B-
77 - 79 %   = C+
74 - 76 %   = C
70 - 73 %   = C-
60 - 69 %   = D
Less than 60 %   = E

More information on grades and grading policies is here:
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Class Attendance and Make-Up Policy

As an online class, this course does not have a designated meeting time. However, it is important to note that class deadlines must be adhered to. Furthermore, collaboration with peers to coordinate and prepare group presentations will require mutually agreed-upon meeting times as per the course requirements.

Make-up policies are according to UF guidelines (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation. If a student is unable to complete classwork due to circumstances like illness, serious family emergencies, military obligations, jury duty, or immediate family bereavement, they must communicate the need for make-up by submitting formal signed documentation. It is crucial to notify the instructor in advance of the missed exam or assignment and provide appropriate documentation for the absence. Contacting the instructor in a timely manner allows for scheduling an alternative time to complete the missed classwork.

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Campus Resources

Resources are available on campus for students having personal problems or lacking clear career and academic goals, which interfere with their academic performance. These resources include:

Health and Wellness

- U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.
- Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575;
- Sexual Assault Recovery Services (SARS) at the Student Health Care Center, 392-1161.
- For emergencies call: University Police Department, 392-1111 (or 9-1-1 for emergencies). http://www.police.ufl.edu/

Academic Resources

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.
- Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. http://www.crc.ufl.edu/
- Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. http://teachingcenter.ufl.edu/
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. http://writing.ufl.edu/writing-studio/

Course Evaluation

"Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/."

Class demeanor

Students are required to actively participate in class and maintain a respectful attitude towards both the instructor and their peers. It is important to show respect for the opinions of others during discussions and keep conversations that do not contribute to the topic at hand to a minimum, or avoid them altogether.

Netiquette guide for online courses

It is important to recognize that the online classroom is in fact a classroom, and certain behaviors are expected when you communicate with both your peers and your instructors. These guidelines for online behavior and interaction are known as netiquette.

http://teach.ufl.edu/wp-content/uploads/2012/08/NetiquetteGuideforOnlineCourses.pdf

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Microsoft Office 365 Software is free for UF students

http://www.it.ufl.edu/gatorcloud/free-office-365-downloads/

Other free software is available at:

http://www.software.ufl.edu/

To check for availability of the media and technical requirements, contact the UF Computing Help Desk at (352)392-HELP(4357).

University of Florida Complaints Policy and Student Complaint Process

Most problems, questions and concerns about the course will be resolved by professionally communicating with the instructor or the TAs.

The University of Florida believes strongly in the ability of students to express concerns regarding their experiences at the University. The University encourages its students

who wish to file a written complaint to submit that complaint directly to the department that manages that policy.

If a problem really cannot be resolved by communicating with the instructor or the TAs you can contact
- Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

- Online Course: http://www.distance.ufl.edu/student-complaint-process.

University of Florida U Matter

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

UF In Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor. A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without the permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine,

newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Course Syllabus Policy: Use of Artificial Intelligence

1. Ethical Use of AI:
1.1. Students are expected to adhere to ethical guidelines when using AI tools and resources. This includes respecting privacy, security, and confidentiality of data, as well as ensuring fairness, transparency, and accountability in their AI applications.
1.2. Students should consider the potential biases and implications of their AI models and make efforts to mitigate any discriminatory or harmful effects.
1.3. Any use of AI for illegal or unethical purposes is strictly prohibited and may result in academic penalties.

2. Data Collection and Usage:
2.1. Students should obtain and use datasets in compliance with applicable legal and ethical standards. They should ensure that they have proper authorization, consent, or rights to use the data.
2.2. Students should handle personal or sensitive data responsibly and take appropriate measures to protect the privacy and security of such data.

3. AI Tools and Libraries:
3.1. Students are encouraged to explore and utilize a variety of AI tools and libraries, such as TensorFlow, PyTorch, scikit-learn, and others, to enhance their understanding and practical skills.
3.2. When using AI tools, students should ensure that they comply with the respective licenses and terms of use set by the tool developers.
3.3. Students should properly attribute any code or resources used from external sources, including AI libraries, frameworks, or pre-trained models.

4. Academic Integrity:
4.1. Students should uphold academic integrity at all times. Plagiarism, cheating, or any form of dishonesty is strictly prohibited.
4.2. If students use existing AI models, algorithms, or code in their projects, they should clearly acknowledge the source and provide appropriate citations.

5. Collaboration:
5.1. Collaboration among students is encouraged, as it fosters a collaborative learning environment. However, students should submit their own original work, and any collaborative effort should be appropriately acknowledged.
5.2. In group projects, each team member is responsible for contributing to the project's development and should be able to demonstrate their individual understanding of the concepts covered in the course.

6. Responsible AI Deployment:
6.1. Students should consider the broader societal impact and implications of AI applications. They should be mindful of the potential consequences, biases, and risks associated with AI deployment.
6.2. Throughout the course, students will engage in discussions on responsible AI practices, and they are expected to critically analyze and reflect on the ethical, legal, and social implications of AI.