

Microbial Metabolism and Energetics

MCB 6417 (1 credit)
Sections 7138 and 1G63
Fall 2022

Instructors

Claudio Gonzalez, Ph.D.

Contact information: email: cfgonzalez@ufl.edu, Department of Microbiology and Cell Science, office hours by appointment.

Julie A. Maupin-Furlow, PhD. twitter - @Maupin_Furlow

Contact information: email: jmaupin@ufl.edu, Office phone: 352-392-4095. Department of Microbiology and Cell Science, office hours by appointment.

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

August 25 -October 7, 2022

On campus meetings are in the Microbiology and Cell Science seminar room 1044 on Tuesdays and Thursdays from 8-10:30 am EST. See course schedule for details on meeting days. ALL ASSIGNMENTS, QUESTION /ANSWER SESSIONS AND OTHER MATERIALS WILL BE AVAILABLE ONLINE ASYNCHRONOUSLY through Canvas.

Students will have 700 min of contact time 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

- To develop the concepts and skills required to understand and critically evaluate research that addresses the physiology and biochemistry of microbes.
- To apply the theories of bacterial cell physiology and metabolism to current problems, such as engineering microorganisms to produce biofuels and other products.
- To utilize knowledge and skills in reviewing peer's projects.

Course Material and Assignments

All required course materials will be available through the Canvas e-Learning site (<http://elearning.ufl.edu/>). Instructions for and submission of assignments will also be through Canvas.

Gonzalez (Weeks 1-3)

During weeks 1 to 3, students will complete the following:

Presentations (100): The group presentations will be done using power point or similar software. The groups will be integrated by a maximum of 4 members. A presentation podcast should be posted online following the schedule provided (See First class Power Point). Grades will be assigned as follow

1) Research ability and critical thinking (50 pts): We will evaluate the ability to select the relevant information. An important component of critical thinking is the ability to generate online discussion and deliver relevant information to the rest of the groups.

2) Quality and clarity (50 Points). We will evaluate the graphic material selected, and originality to display information graphically.

Final report (100 pts): Individual participation will be evaluated according to the ability of each student to summarize and connect all the information provided in a final report. This final paper (4 to 5 pages long) should clearly and rationally establish solid links between all the information discussed during the course.

Maupin-Furlow – Weeks 4-6

Group topics for weeks 4 to 6 are focused on the discovery of novel metabolic pathways through study of microbes, examining how life has adapted to extreme energy limitation, understanding that electron bifurcation can be added to the list of basic forms of energy conservation (along with substrate level phosphorylation and membrane bioenergetics), and theorizing on the bioenergetics of life's origins.

Assignments Weeks 4-6 (see below for details)

100 points	Group presentation (oral report)
75 points	Scientific summaries
25 points	Scientific evaluations

Group presentation – oral report (100 points): The class will be divided into groups. Each group will prepare and present an oral report on a topic related to microbial metabolism and energetics that will be assigned by the instructor (see [Appendix A](#) posted on UF canvas e-learning for details). Each student within the group is responsible for coordinating and presenting with fellow group members the oral report on their assigned topic. **Please note that each student within the group will be graded independently of their group members** (e.g., students within the same group may not necessarily earn the same grade). **Students should initial each slide** they prepared and presented to allow for independent evaluation of their work by the instructor. Each student should also introduce himself/herself prior to speaking.

Overall, the group is expected to prepare and present an oral report of **15-20 min total (estimate ~1 min per slide)**. Students are expected to perform a literature review related to the topic of discussion and synthesize the material into a comprehensive presentation. A reference list is provided for each topic to assist group members in getting started on the literature review and prepare the group presentation. The reference list is not meant to be exclusive. 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 summaries (75 points): Students are expected to **write an independent summary of the material presented by their peer groups** (*not their own group presentation*). This work should be performed by each individual student – it is not a group effort. The scientific summaries should be **1/2 page (typed, double spaced, 1-inch margins)**. Select **8 group presentations** to summarize the science presented for a total of four pages. The group presentations will all be recorded and uploaded to

Canvas for you to view. The scientific summaries should focus on the science presented by the groups. A final sentence at the end of the summary that speculates on future research efforts and/or discoveries that are related to the group topic under discussion is acceptable.

Scientific evaluations and rankings (25 points): Each student should provide an independent scientific review for each peer presentation (*not their own oral report*). This work should be performed by each individual student – it is not a group effort. The reviews should highlight the strengths and weaknesses of the project as well as clearly indicate five evaluation scores (1 highest – 10 lowest) for each of the following: Overall – score; Scientific Accuracy – score; Approach – score; Innovation – score; Impact – score. The evaluation should include justification for each of the criticisms and constructive comments that provide helpful feedback. The evaluations should be **1/2 page (typed, double spaced, 1-inch margins)**. Select **8 group presentations** to evaluate for a total of four pages.

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.

Use the following criteria as a guideline for the oral report(s).

Organization: Did the group state the presentation topic? Was there a main point? Was the presentation clearly organized?
Scientific Presentation: Did the group back up their analysis with scientific facts, statistics, statements from authorities, figures from relevant papers, etc.? Did the group use scientific terms and define these terms for the class?
Analysis and Synthesis: Did the group synthesize the information in the literature or just give a "book report" on what was found?
Use of Visual Aids: Did the visual aids add to the quality of the presentation? Were they visible from the back of the room?
Sources:

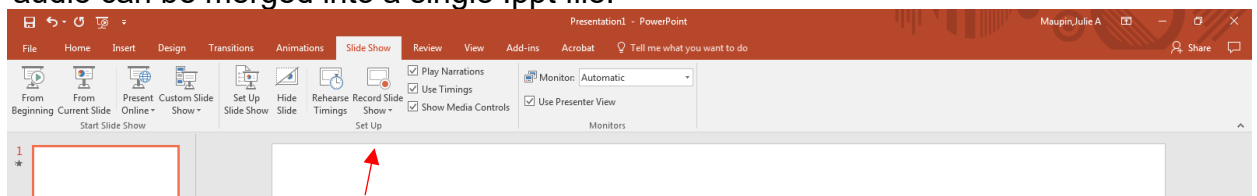
Did the group give proper credit to people whose ideas they borrowed (citations)? Were figures/diagrams properly attributed to specific sources?

Overall Quality:

Was the group prepared? Did the group present adequate information? Could the students hear what the speakers were saying? Was the presentation interesting and intriguing? Did the group have a good command of the material presented?

Additional guidelines for group presentations

1. Develop an outline for the oral presentation as soon as possible. Note that the outline of the group presentation should not be paper 1, paper 2, paper 3, etc. but instead **a synthesis of the literature**.
2. Each student within the group should read the papers of the presentation and assist in synthesizing the material into an outline that will generate a presentation that is comprehensive.
3. Use the outline to divide the labor evenly among each student in the group.
4. Generate the slide presentation. Include slides and an audio recording to teach/guide the viewer. Remember that each slide takes ~ 1 min for a total of 15-20 min. Do not spend long periods of time on a single slide (you will lose the attention of your audience).
5. Make sure that each group member identifies themselves during the recording. Remember that each student will be graded independently, so this step is important. Include student initials on each slide to designate who designed and/or presented the slide. Be sure acknowledge others if they assisted in designing the slide.
6. Record the presentation using Zoom, the 'record slide show' option of Powerpoint, or other related software. If using Powerpoint (version 2016 or higher), the recordings can be performed separately by each student in the group using the "slide show>record slide show" tab option (see below). The slides with audio can be merged into a single .ppt file.



7. Create a pdf file of the slides so that your audience will have notes to follow the presentation.
8. Select a student to submit the group presentation files (recording and pdf files) electronically through Canvas. Often these files are large, so make sure the person who is uploading these files has reliable internet service.
9. Please email me at jmaupin@ufl.edu if you have any questions, concerns, or glitches with the online system.

Weekly Course Schedule

For on-campus students, the UF Microbiology and Cell Science seminar room 1044 will be open from 8:30-10 AM each Tuesday and Thursday for students to meet and prepare their oral/group presentations.

For online students, the class is organized to accommodate students who are not physically located on campus. Online students will be grouped together to allow for students who have schedules outside of the 8:30-10 AM period to meet via UF canvas, zoom, and other appropriate online platforms to organize their presentations.

Remember the instructors are available throughout the course to answer any questions that may arise, such as how to interpret the scientific literature, understand biochemical mechanism, organize the presentation, or other topics related to the course. Please contact the instructor via email to arrange a meeting time or to send questions in writing. Remember that the instructor is here to help guide you in understanding the scientific literature, so don't hesitate to ask for help (also don't wait until right before the deadline to ask for help).

Gonzalez – (CG weeks 1-3)

Week 1

R 08/25 Meet the Instructor and Introduction to the course
Introduction – Surprising Metabolic Intersection to Maximize Metabolic Efficiency – Carbon Overflows.
T 08/30 Group Presentations (students should work in presentations)

R 09/01 **Labor Day - Holiday**

Week 2

T 09/06 Group Presentations (students should work in presentations)
R 09/08.....Group Presentations (students should work in presentations)

Week 3

T 09/13 **Deadline - Presentations should be posted in Canvas:** Consequences of Metabolic Overflow - Engineering pathways – Metabolic regulation with multiple connections.
R 09/15 Feedback on presentations
R 09/22 **Deadline for Gonzalez Final Report** (GC weeks 4-6).

Maupin-Furlow – (JMF weeks 4-6)

Week 4

T 09/20 Meet the Instructor - JMF
Introduction to weeks 4-6 of the module: meet your new group mates

By the end of the week: assemble and read research literature related to your group topic, prepare an outline, start organizing group by assigning specific subtopics related to the main topic

R 09/22 Prepare group presentations

Week 5

T 09/27 Prepare and record group presentations

R 09/29 Finalize recording and deadline for uploading group presentations

Week 6

T 10/04 Review group presentations

R 10/06 Deadline for upload of:

1. Scientific summaries of group presentations
2. Scientific evaluations of group presentations

F 10/07 Homecoming - Holiday

[Upload all material onto the Canvas Course Website](#)

GENERAL REFERENCE TEXTBOOKS:

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

09/15	Presentations (Gonzalez section, 50 + 50 pts)
09/22	Final Report (Gonzalez section, 100 pts)
09/29	Deadline for group oral presentations (100 pts, JMF section)
10/06	Scientific summaries of peer groups (75 pts, JMF section)
10/06	Scientific evaluations of peer groups (25 pts, JMF section)

Evaluation of Learning/Grades

MCB 6417 learning will be evaluated based on the following criteria:

100 points	Group oral presentation (JMF section)
75 points	Scientific summaries (JMF section)
25 points	Scientific evaluations (JMF section)
50 points	Presentations quality. (CFG)
50 points	Research ability and critical thinking (CFG)
<u>100 points</u>	Final Report (CFG)

400 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

Excused absences are consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation. Excused absences from exams and/or assignments (e.g., illness, serious family emergency, military obligations, religious holidays) must be communicated by formal signed documentation to the instructor prior to the missed exam or assignment. Appropriate documentation **MUST** be provided for the absence caused by serious illness, accident, jury duty or death in the immediate family. You **MUST** contact the instructor **IN ADVANCE** of the missed exam or assignment. An alternative time for the exam and/or assignment will be arranged by the instructor.

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 expected to arrive to class on time and behave in a manner that is respectful to the instructor and to fellow students. Please avoid the use of cell phones and restrict eating to outside of the classroom. Opinions held by other students should be respected in discussion, and conversations that do not contribute to the discussion should be held at minimum, if at all.

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 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.