COURSE DESCRIPTION:

MCB6417. Microbial Metabolism and Energetics. Credits: 1. Principles of energy and biosynthetic metabolism will be examined in aerobic and anaerobic microorganisms. Current biotechnology which incorporates these principles will also be discussed.

COURSE INSTRUCTORS & OFFICE HOURS:

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<tr>
<th></th>
<th>Dr. Claudio Gonzalez</th>
<th>Dr. Julie A. Maupin-Furlow</th>
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<tr>
<td></td>
<td>Rm. GI306, GI Bldg.</td>
<td>Rm.1153, MCS Bldg.</td>
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<tr>
<td>Monday morning</td>
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<td>Wednesday 9 – 10 AM</td>
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<tr>
<td>Phone: 273-8088</td>
<td></td>
<td>Phone: 392-4095</td>
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<tr>
<td>E-mail: <a href="mailto:cfgonzalez@ufl.edu">cfgonzalez@ufl.edu</a></td>
<td></td>
<td>E-mail: <a href="mailto:jmaupin@ufl.edu">jmaupin@ufl.edu</a></td>
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LECTURES: Tuesday and Thursday, Periods 2 - 3 (8:30 – 10:25 AM)

COURSE OBJECTIVES:

- 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 (e.g. engineering microorganisms for the high level production of biofuels and other products).

STUDENT RESPONSIBILITIES:

ATTENDANCE: Class attendance is required to achieve the objectives of this course.

DEADLINES: Students are expected to meet the deadlines for their oral presentation.
STUDENT EVALUATION:

Gonzalez (125 points total):
During weeks 1 and 2, students

Presentations (80): The group presentations will be done using power point or similar software. The groups will be integrated by a maximum of 3 members.

Research ability and critical thinking (20): We will evaluate the ability to perform research on line and the critical thinking to select relevant literature. The students will have to select scientific literature (on line) that displays similar research strategy to those discussed in class.

Selection criteria: 1) Each group will select a scientific work in which the same techniques and similar research strategies than the model paper are utilized. This group will also define the relevant aspects of the paper to be discussed in the presentation.

2) The selected paper will be assigned to a new group for its presentation.

Class participation (25): Individual participation will be evaluated according to the ability of each student to answer and formulate questions in the classroom.

Maupin-Furlow
Students will evaluated during weeks 3 and 4 based on the following criteria:
100 points - Oral presentation
25 points - Class participation

Presentations (100 points): At the beginning of the semester, students will be divided into 4 groups focused on topics related to microbial metabolism and energetics (e.g., methanogens, sulfate reducing bacteria, anaerobic oxidation of methane, chemiosmosis in the origin of life). Each student within the group is responsible for coordinating and presenting with their fellow group members an oral PowerPoint on their assigned topic on the date outlined in weeks 3 and 4 of the course schedule. The group members are expected to prepare and lead a 100 min class period that includes presenting the material and leading a class discussion focused on the material. References are provided for each topic to assist group members with initiating their literature review and to prepare for the group presentation. The reference list is not meant to be exclusive, and students are encouraged to find additional literature related to the topic of discussion. It is highly recommended that the students first read the current review articles to gain a broad understanding of the topic and then read the relevant research articles. Students will be expected to critically evaluate the literature and gain a deep understanding of the metabolic process under discussion. Each student should also write a brief (1 page, typed, double spaced) summary which evaluates how each member of their group contributed to the success of the presentation (please also include a discussion of your efforts). This brief summary is due by no later than the end of week 4 (F 9/15).

Participation (25 points): Each student within the class will be evaluated by the instructor for his/her participation in class discussions. Students are expected to ask educated questions of the group presenters. Therefore, all students should familiarize themselves with the topic of discussion for each class period (e.g., members of group 1 should read literature related to sulfate reducing bacteria prior to the presentation by group 2, etc.). To
assist you with this process, key papers are highlighted in bold and noted by an asterisk for each topic to be discussed. Students are also expected to write a brief summary of the presentations by the other groups (e.g., members of group 1 should write summaries for the groups 2-4 presentations). The summaries should be 1 ½ - 2 pages (typed, double spaced, 1 inch margins) and are due by no later than the end of week 4 (F 9/15).

The following criteria will be used to by the instructor during week 3 and 4 to evaluate the group presentations.

<table>
<thead>
<tr>
<th><strong>Organization:</strong></th>
<th>Did the group state the presentation topic? Was there a main point? Was the presentation clearly organized?</th>
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<tr>
<td><strong>Scientific Presentation:</strong></td>
<td>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?</td>
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<td><strong>Analysis and Synthesis:</strong></td>
<td>Did the group synthesize the information in the literature or just give a &quot;book report&quot; on what was found?</td>
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<td><strong>Use of Visual Aids:</strong></td>
<td>Did the visual aids add to the quality of the presentation? Were they visible from the back of the room?</td>
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<td><strong>Sources:</strong></td>
<td>Did the group give proper credit to people whose ideas they borrowed (citations)? Were figures/diagrams properly attributed to specific sources?</td>
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<td><strong>Overall Quality:</strong></td>
<td>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?</td>
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Final grades will be based on the following performance standard (250 points total):

<table>
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<th>Points</th>
<th>Grade</th>
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<tr>
<td>92 - 100 %</td>
<td>A</td>
</tr>
<tr>
<td>85 - 91.9 %</td>
<td>B+</td>
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<tr>
<td>80 - 84.9 %</td>
<td>B</td>
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<tr>
<td>75 - 79.9 %</td>
<td>C+</td>
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<tr>
<td>70 - 74.9 %</td>
<td>C</td>
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<tr>
<td>65 - 69.9 %</td>
<td>D+</td>
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<tr>
<td>60 - 64.9 %</td>
<td>D</td>
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<tr>
<td>Less than 60 %</td>
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**COURSE SCHEDULE:**

Gonzalez
Week 1
Main Metabolic Pathways overview – Research strategies - Connecting metabolites with gene control

Knockout mutants – Global gene regulation gene arrays and The power of the proteomics. Transcriptional regulation of main metabolic pathways – A global regulatory role of gluconeogenic genes – The fitness of 

Before the second week the students should send the selected papers (group research) to the respective groups.

Maupin-Furlow

Week 3
T 09/06 Group 1 – Methanogens
R 09/08 Group 2 – Sulfate reducing bacteria

Week 4
T 09/13 Group 3 – Anaerobic oxidation of methane
R 09/15 Group 4 – Chemiosmosis in the origin of life

Group 1 – Methanogens

References:
2010

2009

2008


2006

2004

Group 2 – Sulfate reducing bacteria

2011

2010

2002.

2008

1996

2008

2008

2006

2006

References:


2005


2004


Group 4 – Chemiosmosis in the origin of life

References:
2010


2009

2008

GENERAL REFERENCE TEXTBOOKS:


Academic Honesty, Software Use, Services for Students with Disabilities, UF Counseling Services

The University of Florida requires all members of its community to be honest in all endeavors. Cheating, plagiarism, and other acts diminish the process of learning. When students enroll at UF they commit themselves to honesty and integrity. Your instructor fully expects you to adhere to the academic honesty guidelines you signed when you were admitted to UF.
As a result of completing the registration form at the University of Florida, every student has signed the following statement:

“I understand the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.” Furthermore, on work submitted for credit by UF students, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”

It is to be assumed all work will be completed independently unless the assignment is defined as group project, in writing by the professor. This policy will be vigorously upheld at all times in this course.

**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.

**Campus Helping Resources**

Students experiencing crisis or personal problems that interfere with their general wellbeing are encouraged to utilize the university’s counseling resources. Both the Counseling Center and Student Mental Health provide confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal or lacking clear career and academic goals, which interfere with their academic performance. The Counseling Center is located at 301 Peabody Hall (next to Criser Hall). Student Mental Health is located on the second floor of the Student Health Services in the Infirmary.

1. **University Counseling Center**, 301 Peabody Hall, 392-1575; personal and career counseling: [www.counsel.ufl.edu](http://www.counsel.ufl.edu)
2. **Student Mental Health**, Student Health Care Center, 392-1171, personal counseling: [www.hsc.ufl.edu/shcc/smhs.htm](http://www.hsc.ufl.edu/shcc/smhs.htm)
3. **Sexual Assault Recovery Services (SARS)**, Student Health Care Center, 392-1161, sexual assault counseling; and
4. **Career Resource Center**, Reitz Union, 392-1601, career development Assistance and counseling.

**Students with Disabilities Act**

The Dean of Students Office coordinates the needed accommodations of students with disabilities. This includes the registration of disabilities, academic
accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services, and mediating faulty-student disability related issues.

*Dean of Students Office, 202 Peabody Hall, 392-7066, [www.dso.ufl.edu.](http://www.dso.ufl.edu)*