Microbial Metabolism and Energetics  
MCB 6417 (1 credit) – section 7138  
University of Florida  
Department of Microbiology and Cell Science  

FALL SEMESTER 2015  

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:  
Dr. Claudio Gonzalez  
Rm. GI306, GI Bldg.  
Phone: 273-8088  
E-mail: cfgonzalez@ufl.edu  
Dr. Julie A. Maupin-Furlow  
Rm.1153, MCS Bldg.  
Phone: 392-4095  
E-mail: jmaupin@ufl.edu  

LECTURES:  
Tuesday and Thursday, Periods 2 - 3 (8:30 – 10:00 AM) (If there is a break after the first period, the class extends to 10:15 AM.)  
Room:  
Microbiology and Cell Science Bldg. 981, rm. 1054  

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:
During weeks 1 and 2, students

*Presentations (100)*: The group presentations will be done using power point or similar software. The groups will be integrated by a maximum of 3 members.

*Participation in class and critical thinking (50)*: The student should participate in class with questions regarding the material presented. Individual participation will be evaluated according to the ability of each student to answer and formulate questions in the classroom.

*Final summary (100)*: The students will submit a final integrative summary including all the material presented in class. The summary will be no longer than 5 pages, single space in Arial 12ppt. The due date for this assay is September 30 of 2015.

*Presentations*: At the beginning of the semester, students will be divided into groups (3 persons per group max.) focused on topics related to microbial metabolism and energetics (see topics listed on course schedule below). Each student within the group is responsible for coordinating and presenting with fellow group members an oral presentation on their assigned topic. The group members are expected to prepare and lead a 90 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 in performing a literature review and preparing for their group presentation. The reference list is not meant to be exclusive. Students are encouraged to find additional literature related to the topic of discussion. Initially, read the review articles to gain a broad understanding of the topic and then read the relevant research articles. Students are expected to critically evaluate the literature and gain a deep understanding of the metabolic process under discussion.

*Participation*: Each student 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 the presentation by group 2, etc.).

The following criteria can be used to guide the groups as they prepare their seminars.

<table>
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<th>Organization:</th>
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<td>Did the group state the presentation topic? Was there a main point? Was the presentation clearly organized?</td>
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<th>Scientific Presentation:</th>
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<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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<th>Analysis and Synthesis:</th>
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<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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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?

Final grades will be based on the following performance standard (250 points total):

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<th>% Range</th>
<th>Grade</th>
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<tr>
<td>92 - 100 %</td>
<td>A</td>
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<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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<td>65 - 69.9 %</td>
<td>D+</td>
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<td>60 - 64.9 %</td>
<td>D</td>
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<tr>
<td>Less than 60 %</td>
<td>E</td>
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COURSE SCHEDULE:

Gonzalez
Week 1
09/08 Introduction – Surprising Metabolic Intersection to Maximize Metabolic efficiency – Carbon overflows. (Claudio Gonzalez)

Group Presentations

Mandatory reading for the full course. Carbon catabolite control of the metabolic network in Bacillus subtilis (Y. Fujita., 2009)

09/10  Group 1: CcpA regulates arginine biosynthesis in S. aureus through repression of proline metabolism (Nuxoll, et al., 2012).
         Group 2: CodY orchestrates the expression of virulence determinants in emetic Bacillus cereus by impacting key regulatory circuits (Frenzel, E., 2012).

Week 2
R 09/15 Group 3: Hierarchical expression of genes controlled by the Bacillus subtilis global regulatory protein CodY. (Brinsmade, S., et al., 2014)
         Group 5: Coordinating bacterial cell division with nutrient availability: A role for
Glycolysis (Monahan, L., et al., 2014)

**Group 6:** Importance of branched chain amino acid utilization in *Francisella* intracellular adaptation (Gesbert G., et al., 2015)

**Group 7:** Co-inactivation of GlnR and CodY regulators impacts Pneumococcal cell wall physiology. (Johnston, C. et al., 2015)

**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 it 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).