MCB 4403 Prokaryotic Cell: Structure and Function
Section 3376 (3 credits)
University of Florida
Department of Microbiology and Cell Science

FALL SEMESTER 2015

COURSE DESCRIPTION:

MCB 4403. Prokaryotic Cell Structure and Function. Credits: 3; Prereq: CHM 2211; MCB 3020, MCB 3020L with C or better. It is recommended that BCH 4024 or CHM 4207 be taken before or concurrent with MCB 4403. This course explores the structure and physiology of bacterial cells. The principles of energy and biosynthetic metabolism will be examined in aerobic and anaerobic microorganisms. Several current research topics in microbiology will also be covered including quorum sensing, proteases, chaperones, and microbes in extreme environments. Topics in microbial biotechnology will be discussed such as improvement of biological ethanol production and bioremediation.

COURSE INSTRUCTOR: Dr. Julie A. Maupin-Furlow

OFFICE HOURS: Tuesday 3-4 PM or by appointment
Rm. 1153 Microbiology and Cell Science Building (#981)
Phone: 352-392-4095
E-mail: jmaupin@ufl.edu

SCHEDULED CLASS TIMES: Tuesday, Period 9, 4:05 – 4:55 PM
Thursday, Period 8-9, 3:00 – 4:55 PM

DISCUSSION SECTIONS: Microbiology and Cell Science Bldg. 981, Museum Road Seminar Room 1044

COURSE OBJECTIVES:

• To become an expert on the structure and function of prokaryotic cells (bacteria and archaea).
• To gain the concepts and skills needed to understand and critically evaluate research articles that address the physiology and biochemistry of prokaryotes.
• To creatively apply the theories of prokaryotic cell physiology to current problems (e.g. controlling bacterial pathogens, engineering microorganisms for high level production of biofuels and renewable chemicals).

RECOMMENDED TEXTBOOK:

CLASS LECTURES AND NOTES:
Class lectures and associated notes are available on the University of Florida E-learning in Canvas support services under ‘modules’ in video format with slide notes in pdf format. You can access this account from the LSS homepage (http://lss.at.ufl.edu/) using your GatorLink username and password. To obtain a GatorLink account you will need to signup with a UF ID number at https://my.ufl.edu/psp/ps_pwd/EMPLOYEE/EMPL/c/UF_PA_GL_ACCT_MGMT.UF_PA_SS_GL_CREATE.GBL
ADDITIONAL READINGS:
Research articles and reviews written by microbial physiologists (who are experts in their field) are cited in the class lecture notes. The articles are published in research journals available through the UF Marston Science library (http://www.uflib.ufl.edu/msl/) or PubMed (http://www.ncbi.nlm.nih.gov/). Please be sure to use your gatorlink account information to access these articles at no charge.

EVALUATION OF LEARNING:
Learning will be evaluated based on the following criteria:

- 500 points (5 exams × 100 points each)
- 250 points (5 written assignments × 50 points each)
- +50 points (extra credit, optional)

750 points total

Final grades will be based on the following performance standard:

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<th>Percentage Range</th>
<th>Grade</th>
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<tr>
<td>95 - 100 %</td>
<td>A</td>
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<td>90 - 94 %</td>
<td>A-</td>
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<td>87 - 89 %</td>
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<td>Less than 60 %</td>
<td>E</td>
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Exams (5 exams × 100 points each): Five equally weighted exams are scheduled throughout the semester (see course schedule for details on exam times). Each exam is worth 100 points. The exams will focus on the material covered in the online class lectures which is also reviewed in class on ‘catch-up’ days as noted in the schedule. The student should read the textbook chapters noted in parenthesis and print out the lecture notes (in pdf format, online) and then watch the online lectures to enhance understanding of the material. The exams are multiple choice/short answer and will be administered on Canvas e-learning through Proctor U services (http://www.proctoru.com/index.php). ProctorU allows you to take your exam on demand or by appointment. All appointments should be made at least 3 days in advance. To make an appointment, simply create an account at http://go.proctoru.com, then log in, click on the “new exam” link and select the exam, date, and time you desire. You will receive a confirmation email of your reservation at the email address that you provided to ProctorU. Reservations made within 72 hours of your exam are subject to a $5 late reservation fee. Students without an appointment can take their exam on demand within 15, 30 or 45 minutes utilizing “Take it Now”. This premiere feature is designed to give test takers added convenience and only costs $8.75. Late registrations and “Take it Now” are subject to availability.

Assignments (5 x 50 points each): Written assignments related to lecture material are due throughout the semester (see course schedule for details on the deadlines). The goal of these assignments is to enhance your understanding of the lecture material. The assignments also provide you with the opportunity to read scientific literature (outside of the textbook) and express yourself in written format (not simply answer multiple choice questions).
For each assignment (5 x 50 points each), students must:

a. Obtain a copy of the assigned research article/review. Please note that all of the assigned literature is available online FREE of charge to UF students in pdf format through Medline or the UF library at http://www.uflib.ufl.edu/ (be sure to sign in via off-campus access if using a computer that is not linked to the UF mainframe). Please see the course instructor if you require assistance in gaining free access (you should not have to pay for this service).

b. Read the assigned research article/review.

c. Write a brief summary of the research article/review. The summary should be approximately **700 words** (typed) and encompass the major points. You will not receive a higher grade if you go over 700 words so please keep your summary focused. Discussion of future directions and applications is appropriate.

d. DO NOT PLAGIARIZE (see http://web.uflib.ufl.edu/msl/07b/studentplagiarism.html for details).

e. Upload the assignment onto Canvas (e-learning course website) by 5 PM on the deadline. Deadlines are posted below and in the “COURSE SCHEDULE”. Submit only one attachment per assignment. Only use file types: Word, PDF, HTML, RTF, or plain text. Always include file extension.

**Choose only one research review/article per assignment for your 700 word summary:**

**Assignment 1.**


**Assignment 2.**


**Assignment 3.**


**Assignment 4.**


**Assignment 5.**


Extra Credit (50 points, optional, Due 12/08):
Please provide a comprehensive 700 word summary that includes a brief discussion of your opinion based on all of the following articles listed:


COURSE SCHEDULE:

Week 1
T 08/25 Introduction to course / syllabus (meet in classroom – syllabus online)
R 08/27 Structure and Function (Ch. 1A-E, 106 min total) (no meeting scheduled)

Week 2
T 09/01 Catch up (meet in classroom to review material)
R 09/03 Cell Division and Chromosome Replication/Partitioning (Ch 2-3 A-C, 75 min total) (no meeting scheduled)

Week 3
T 09/08 Catch up (meet in classroom to review material)
R 09/10 Membrane Bioenergetics and Electron Transport (Ch 4-5 A-D, 93 min total); Photosynthesis (Ch. 6 A-C, 43 min total) (no meeting scheduled)
Assignment 1 – due by 5 PM

Week 4
T 09/15 Catch up (meet in classroom to review material)
R 09/17 Exam 1 (Chapters 1-6)

Week 5
T 09/22 Regulation of Metabolic Pathways (Ch 7 A-C, 88 min total) (no meeting scheduled)
R 09/24 Central Metabolic Pathways (Ch. 8-9 A-E, 134 min total; no meeting scheduled)
Assignment 2 – due by 5 PM

Week 6
T 09/29 Catch up (meet in classroom to review material)
R 10/01 Exam 2 (Chapters 7-9)

Week 7
T 10/06 Metabolism of Lipids, Nucleotides, Amino Acids and Hydrocarbons (Ch. 10 A-C, 91 min total)
R 10/08 Cell Wall and Capsule Biosynthesis (Ch. 12 A-B, 41 min total) (no meeting scheduled)

Week 8
T 10/13 Catch up (meet in classroom to review material)
R 10/15 Inorganic Metabolism (Ch. 13 A-C, 115 min total) (no meeting scheduled)
Assignment 3 – due by 5 PM

Week 9
T 10/20 Catch up (meet in classroom to review material)
R 10/22 Exam 3 (Chapters 10, 12-13)

Week 10
T 10/27 C1 Metabolism (Ch. 14 A-D, 131 min total) (no meeting scheduled)
R 10/29 Fermentations (Ch. 15 A-D, 94 min total) (no meeting scheduled)

Week 11
T 11/03 Catch up (meet in classroom to review material)
R 11/05 Assignment 4 – due by 5 PM (no meeting scheduled)
Week 12
T 11/10  Catch up (meet in classroom to review material)
R 11/12  Exam 4 (Chapters 14-15)

Week 13
T 11/17  Solute Transport/ Protein Transport and Secretion (Ch. 17/18 A-D, 125 min total)(no meeting scheduled)
R 11/19  Responses to Environmental Stress/Other Cues and Chemotaxis
         (Ch. 16/19A-E and Ch. 20, 138 min total)(no meeting scheduled)

Week 14
T 11/24  Assignment 5 – due by 5 PM (no meeting scheduled)

Week 15
T 12/01  Catch up (meet in classroom to review material)
R 12/03  Exam 5 (Chapters 16, 19-20)

Week 16
T 12/08  Catch up (meet with instructor by appointment to review material as needed)
         Extra Credit Assignment – due by 5 PM (optional)

Week 17
M 12/14  Cumulative Final Exam (optional)

EXCUSED ABSENCES and MAKE-UP POLICY:
Excused absences follow the criteria of the UF Undergraduate Catalogue (e.g., illness, serious family emergency, military obligations, religious holidays) and must be communicated by formal signed documentation to the instructor prior to the missed exam or journal colloquy. 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 journal colloquy. An alternative time for the exam will be arranged by the instructor.

ACADEMIC HONESTY:
As a result of completing the registration form at the University of Florida, every student has signed the following statements: “I understand that 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.”

UF COUNSELING SERVICES:
Resources are available on-campus for students having personal problems or lacking clear career and academic goals that interfere with their academic performance. These resources include:
1. University Counseling Center, 301 Peabody Hall, 392-1575. Personal and career counseling.
2. Student Mental Health, Student Health Care Center, 392-1171. Personal counseling.
3. Sexual Assault Recovery Services, Student Health Care Center, 392-1161. Sexual assault counseling.

COURSE MATERIALS:
PLEASE NOTE THAT THE COURSE INSTRUCTOR CONSIDERS ALL UNAUTHORIZED ONLINE POSTING OR DISTRIBUTION OF COURSE MATERIALS A FORM OF ACADEMIC DISHONESTY, AND SUCH ACTIONS WILL BE TREATED ACCORDINGLY. All course materials posted on the course website are assembled and intended for students taking MCB4403/6937 ONLY, this is why they are only available for student use from the secure Sakai MCB4403/6937 course website. Unauthorized posting of course materials infringes on UF's copyright policies and the "Fair Use" Act. These policies 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.
We, the member of the University of Florida, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

ACOMMODATIONS FOR STUDENTS WITH DISABILITIES:
The Dean of Students Office provides individualized assistance for students with documented disabilities. Services are based upon student need and impact of their specific disability. There is no requirement for any student to self-identify as having a disability. However, students requesting academic accommodations must register with the Dean of Students Office and provide the appropriate documentation verifying their disability. The Dean of Students Office determines what is and is not appropriate documentation. Examples of accommodations that are available to students include, but are not limited to, registration assistance, approval of reduced course load, course substitutions, classroom and examination accommodations, auxiliary learning aids, additional course drops when disability related, and assistance in other university activities. The designated coordinator for compliance with Section 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) is the Assistant Dean of Students responsible for Students with Disabilities Programs, P202 Peabody Hall, 392-1261 (Voice), or 392-3008 (TDD).

IMPORTANT LIBRARY LINKS:
Library Homepage  http://www.uflib.ufl.edu/ (for all library services and collections)
Course Reserves  https://ares.uflib.ufl.edu/ (for hard copy and/or electronic reserves)
Ask-A-Librarian  http://www.uflib.ufl.edu/ask/ (direct email or online chat for assistance)
IR @ UF  http://ufdcweb1.uflib.ufl.edu/ufdc/?g=ufirg (to access the UF digital Institutional Repository)
Library Tools and Mobile Apps  http://www.uflib.ufl.edu/tools/ (smart phone apps, RSS feeds, and much more)
Subject Guides/Specialists  http://apps.uflib.ufl.edu/staffdir/SubjectSpecialist.aspx (by discipline and/or course)

Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See http://distance.ufl.edu/student-complaints for more details.