PCB 4522 Molecular Genetics (Section ) 3 Credits Tuesdays and Thursdays 2:00 p.m.-3:50p.m.(, Boca Campus) Prerequisite:PCB 3063 With A Minimum Grade of C, or Transient Exemption 1

Syllabus Fall 2016

Instructor: Tim C. Theisen, Ph.D.

Boca Office Hours: Tues and Thurs 4:00p.m.-5:30p.m. or by appointment (SC 217)

Davie Office Hours: TBD (DW 443) 954-236-1061 ttheisen@fau.edu

Course Description; Detailed study of molecular mechanisms controlling gene expression, including their role in development and cancer, and a look at genetic research methods

Course Details and Expected Learning Outcomes: This course begins with a review of basic biochemistry as a prelude to studying the molecular details of some common cell processes. These processes, which will include the structure and organization of DNA, DNA replication and its transcription to RNA molecules, protein synthesis, control of gene expression, the synthesis and function of sub-cellular structures, cell cycle including apoptosis, and energy conversion will be used as examples of how the cell integrates molecular switches, molecular machines and other sub-cellular structures to accomplish fundamental tasks. The course concludes with selected topics relating to how the eucaryotic cells of metazoans function in their multicellular habitat, including development of specialized cells and tissues, maintenance of tissue systems, cell signaling and stem cell tissue systems. This course will introduce new material as well as bring together many topics learned as individual lessons in earlier courses. After completing this course students will have learned how molecular switches, machines and other sub-cellular structures are produced and maintained by cells, and how these interact to accomplish the fundamental tasks required for cell survival and reproduction in single-celled as well as multicellular organisms.

Course Format: Lectures will follow PowerPoint presentations, and due to the amount of material that must be covered we often move very quickly. The PowerPoints will be posted onto Blackboard in advance of each lecture. You should print these out as handouts or load them onto a laptop, notepad, smattphone, etc and bring them to class each day. During the lecture you should spend your time listening to the presentation and related discussions, adding notes to your slides as you see fit.

Course Assignments: At the end of this syllabus you will find a lecture schedule. There is a reading assignment listed alongside each lecture topic. These are *REQUIRED* readings, and they are to be completed *BEFORE* coming to lecture. It is expected that proper, thorough reading of these assigned sections and associated studying will take approximately 5-6 hours per assignment, or approximately 10-12 hours per week. Clem·ly, careful scheduling will be required in order to complete these assigned readings prior to each lecture.

Course Examinations: There will be four unit examinations, each worth 100 points. Examinations will consist of multiple choice questions based mostly on understanding fundamental concepts and how they relate to the mechanisms that have evolved to handle some particular task.

Mjssed Exams: Make-up exams will be available only under *exce,utional* circumstances as outlined in the FAU student handbook, and only if taken within 1 week of the missed exam. Any "curve" that may have been applied to the exam taken at the regularly scheduled time will not be applied to make-up exams. All make-up exams will be jn essay format. Reasonable accommodation will also be made for students pruticipating in a religious observance

j>clicker: In-class credit for this course will be made available using the i>clicker polling system. Each student is responsible for obtaining an i>clicker transmitter and bringing it to every lecture (available at the bookstore). At several points during lecture a multiple choice question will be put up on the screen. Students will answer the question using their i>clicker transmitter. Students will be awarded 1 point for answering at least one of the

questions, even ifwrong (maximum points per lecture for answering if all answers are wrong = 1). Students will

also be awarded one additional point if any additional questions are answered correctly. For example, if a student answers 3 questions and they are all wrong, the student will be awarded 1 point. If two of the three questions were answered correctly , the student would be awarded 1 point for answering at least one question, and one additional point for correct answers = 2 points total for that day. These are extra points so there is no penalty for not answering, however you can only earn these points by being in class and answering. *i>clicker*

*points ace only available in class at the time Uze auestion is presented.· no points can be made up jn Uze event*

*a sturient is unable to attend a lecture. regardless ofreqson.*

You must register your i>clicker with this course in order to be able to use it. Registrations can be done *ONLY* from your Molec and Cell Blackboard course page. To register your i>clicker on Blackboard, go to Blackboard and log in to Molecular and Cell Biology. Click on "Tools", then click on the "Register your i>clicker" icon, and follow the instmctions provided.

Gradin: The course grade will be determined from performance on four unit examinations, plus any extra credit i>clicker points that have been earned. Each exam is worth 100 points. Total course points= 400.

Extra Credit: The only extra credit available for this course is through the in-class i>clicker responses. These extra credit points are only available in class at the time the question is presented; no extra credit points can be made up in the event a student is unable to attend lecture. It is important to stay on top of the material, and seek assistance if you encounter any problems in understanding the material.

GradjnScale

|  |  |  |  |
| --- | --- | --- | --- |
| Grade | Percentage | Grade | Percentage |
| A | 2:93 | c | 73-76 |
| A | 90-92 | c | 70-72 |
| B+ | 87-89 | D+ | 67-69 |
| B | 83-86 | D | 63-66 |
| B. | 80-82 | o· | 60-62 |
| c+ | 77-79 | F | ::;59 |

Missed Exam: If a student misses an exam due to circumstances beyond their control, or for University­ approved reasons *(e.g.* participation in University-approved activities, approved religious observance, etc.),.then the instructor may approve a make-up exam. All make-up exams will be essay format. The student will be required to show proof of approved circumstance, and make-up exam must be taken within one week of the

original exam date. *Making sure you take the exam at your regularly scheduled time is strongly encouraged.*

University Policy on the Use of Electronic Devices: "In order to enhance and maintain a productive atmosphere for education, personal communication devices such as cellular telephones and pagers are to be disabled in class sessions." The only permissible use of a cellular telephone during class is to follow the PowerPoint, which may be loaded onto your phone rather than onto a laptop or printed out. However, if at any time a student appears to be using their smart phone for any other purpose (checking e-mail, texting, surfing the internet, etc.), they will be required to turn the phone off and will not be permitted to use it for any purpose the remainder of the semester. It is highly recommended that you either print the PowerPoints as black and white handouts, or download them onto a laptop or tablet, and avoid using your smart phone for that purpose.

Disability policy statement: *In compliance with the Americans with Disabilities Act (ADA), students who require reasonable accommodations due to a disability to properly execute coursework must register with the Office of Student Accessibility Services (SAS) and follow* all *SAS procedures. SAS has offices across three of FAU's campuses- Boca Raton, Davie, and Jupiter, however, disability services are* *available for students on* all *campuses.*

Honor Code Policy Statement: Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty, including cheating and plagiarism, is considered a serious breach of these ethical standards, because it interferes with the University mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the University community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001 at

http://www.fa u.ed u /ctl/4.00 l Code of Academi c Integrit y. pdf

Incomplete Grade: Consistent with FAU policy, an incomplete grade will only be given to a student who fulfills *all* of the following criteria:

1. Misses coursework or exams due to an FAU approved emergency

2. Has a grade of C or better at the time

3. Submits evidence of the emergency and signs an incomplete agreement.

Course Supplies;

Textbook: Molecular Biology of the Cell, Fifth Edition

Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., and Walter, P. Garland Publishing, Inc. New York & London

An e-version ofthe textbook is available at http:/lstore.vitalsource.com/show/9781136844423. In addition to the textbook, ani-clicker transmitter is required to receive extra credit.

Date **Lecture Topic Chapter Pages to read *Before* lecture**

Week 1 Introduction to Molecular Cell Biology 1-23, 26-32, vertebrate

Cells and Genomes genome section pp 38-39

Week 2 Cell Chemistry and Biosynthesis 2 45 - 55, 62 - 65, review 55 - 62

Cell Chemistry and Biosynthesis 2 65 - 86, 10 I - **1** 02, review panels

Week3 Proteins 3 125 - 152

Proteins 3 152 - 161,164 - 187

Week4 DNA and Eucaryotic Chromosome Stmcture 4 195 - 206, 208 - 233

**Exam 1- August 15**

Week 5 DNA Replication and Proofreading 5 263 - 294

DNA Repair and Recombination 5 295-326

Week 6 Transcription 6 329-366

Translation 6 366-399

Week 7 Control of Gene Expression 7 411 - 426, 432 - 447, 493-497

**Exam 2 - October 6**

Week Membrane Structure 10 617 - 648

Membrane Transport and Electrical Properties 11 651 - 692 except 679 of Membranes

Intracellular lar Compa tments and Protein Smting 12 695-702,704 - 710, Week9 713 - 731,734 - 745

Intracellular Compattments and Protein Smting 12 695-702, 704 -710,713-73 I , 734

,..,.c

Week 10 Vesicle Traffic 13 749 -751, 754-809

Energy Conversion 14 840 - 855

Week 11 Energy Conversion 14 813-829

Cell Communication 15 879-902,904-916

Week 12 Cell Communication 15 921 -944

**Exam 3- November 17**

Week 13 Cytoskeleton 16 965 -988, 992- I034

Cell Cycle 17 1053 - 1056, 1060-1092

Week 14 Cell Cycle 17 1092 - 11 1 2

Apoptosis 18 1115 - 1128

Week 15 Cell Junctions, Adhesions, Extracellular lar Matrix 19 1131 - 1196

Stem Cells and Tissue Renewal (on DVD-ROM) 23 1417- 1426, 1450 - 1458,

1476- 1482

Week 1 6

**Exam 4: 1:30 p.m.-2:50p.m. \*\*Note special starting time for Exam 4** !!