UTRGV COURSE SYLLABUS

BS in Biomedical Sciences: **Mission 11(BMED 4250 and BMED 4260)**
Advanced Cell Biology and Advanced Molecular Biology (4 credits)
Instructor Name: Dr. Saraswathy (Saras) Nair; IF: Cecilia Orta
Spring 2017: Full term
Telephone # and UTRGV email address: 882-5108; Saraswathy.Nair@utrgv.edu
Meeting times and location: Monday 1.40pm -4.10 pm; BSABH: 2.110A
Office location & hours: Brhp 1.103; Friday 2-4 pm; all others by appointment

Textbook and/or Resource Materials
TexApp was not developed for Mission 11. In addition to the required textbooks, instructor will post announcements, resources such as powerpoints, problems, syllabus, videos, weblinks and online assessments as necessary on Blackboard. During mandatory CSHRs, IF will be requested to review materials or provide assessments/activities as decided by instructor.

Required:

1) **Molecular Biology of the Cell, 6th edn (Alberts et al)**

   A: To rent e-book ($38)/to buy e-book ($81):

   https://www.amazon.com/Molecular-Biology-Cell-Bruce-Alberts-ebook/dp/B00PWDH4RW/ref=sr_1_1?ie=UTF8&qid=1417790125&sr=8-1&keywords=9781317563754

   B: To buy new ($199/Hardcopy; $100/Looseleaf)

   http://www.garlandscience.com/product/isbn/9780815344322;jsessionid=JA7tEti0APwg0M8dImElJQ__

2) **Molecular Biology of the gene, 7th edn (Watson et al)**
   To rent hardcover ($38)/To rent e-book ($95); To buy e-book/hard cover/paperback (>$140)
   https://www.amazon.com/Molecular-Biology-Gene-James-Watson/dp/0321762436/ref=mt_hardcover?_encoding=UTF8&me=

3) Libraries in Edinburg and Brownsville also has copies of these textbooks, although maybe limited in quantity.
4) We may use **Explain Everything App on iPads** if everyone has access as a hybrid student.

Course Description and Prerequisites

This course will examine in detail the structures and functions of the cell (including protein sorting, signal transduction and apoptosis) as well as molecular details underlying DNA replication, recombination, repair and gene expression. This senior level course will include flipped classroom model (All assigned readings from textbook and/or papers are homework assignments with readiness assurance tests at beginning of each class), mini-lectures, team-based problem solving and discussions of cases.

Prerequisite:

Requires Approval of Departmental Advisor and satisfactory standing in the BS in Biomedical Sciences program.

Learning Objectives/Outcomes for the Course

Students should be able to **1)** understand and be able to use cell and molecular biology terminology in human disease problems and applications **2)** understand the methodology used in the study of cell and molecular biology to be able to

apply this knowledge in problem based learning **3)** acquire critical thinking skills applied to cell and molecular biology research, translational applications and social implications **4)** link different areas and concepts of cell and molecular biology to form a cross-disciplinary, integrated understanding of the field **6)** Able to research cell and molecular biology literature, critique and communicate in writing and in oral presentations.

Departmental learning outcomes that are met by this course are:

1. Students will be able to demonstrate a substantial factual knowledge base and a grasp of the major concepts of biological systems and be able to relate them to human anatomy/physiology in health and disease.

2. Students will perform satisfactorily in standardized graduate examinations such as MCAT,PCAT,DAT,GRE etc.

3. Students will be able to research a topic using standard electronic and non-electronic methods.

4. Students will be able to communicate complex scientific ideas, concepts and theories by oral and written means.

5. Students will appreciate the role of research in the biological, biomedical and clinical sciences.

Grading Policies

Exams/Quizzes: Your learning will be assessed by **2** major examinations, a mid-tem and a final. These examinations are multiple choice, short answer, passage/problem based, Data analysis type, and/or essay questions. Learning and preparedness will also be assessed by daily and/ or unannounced short quizzes covering the assigned work and readings. Students will be quizzed before (individual) and after team based discussions (Team based) to assess effectiveness of preparedeness for each class. **Final exam is during finals week on 5/4/2017 as scheduled in UTRGV calendar and it is comprehensive.**

Writing assignments will be used to assess your learning.

Problem-Based Learning (PBL) consists of small group (team based) exercises of assigned problems or clinical scenarios in the BMED program. Participation in the group exercises is required to pass the course. These exercises will be open book, open notes, and open discussion. After a defined interval students will be asessed. On some occasions students will be quizzed before (individual) and after team based discussions (Team based) to assess effectiveness of peer-based learning.

The final grade will be calculated according to the following:

A. Two exams each having a weight of **25 %** each. **Total-50%**

B. Writing assignment **20%** : Written report (**In your own words (if plagiarized, you will get a zero**) on an instructor approved human disease (Minimum 2-3 pages, single spaced, 11-12 font Arial/Times New Roman) **(Should include the subheadings as follows: a) Introduction:** history and description of the disease **b) Pathophysiology:** biochemical/molecular/ cellular process defects underlying the disease **c)Treatment options:** explain the pharmacology/process of how the molecular or cellular defect is corrected **d) Gaps in knowledge in the field:** what do biomedical researchers not know or are currently investigating about this disease?). Scientific citations should be within text like scientific articles-statements in paper should be supported by literature **(Use PubMed-NO wikipedia/google links will be acceptable).** Bibliography should have a minimum of 15 citations in AMA/APA/any scientific article format-**Due date 5/3/17 by 11pm CST.**

C. Readiness assurance Quizzes/Questions on problems and/or cases **30%**. Teams will be assigned by instructor, and rearranged if instructor wants to, at any point during the semester.

D. ***Bonus points*** **10 pts (first place) and 5 points (second place)** to be added to final grade depending on peer judging of a 20 + 10 minute for questions /team competition between 2 team presentations of assigned topics. **Topics should include a) Introduction:** history and description of the disease **b) Pathophysiology:** biochemical/molecular/ cellular process defects underlying the disease **c)Treatment options:** explain the pharmacology/process of how the molecular or cellular defect is correcte**d d) Gaps in knowledge in the field:** what do biomedical researchers not know or are currently investigating about this disease?). These presentations will be judged based on adequate preparation by team, quality of power point slides and quality of verbal presentation by all team members, distribution of time (20 min) between team members and finishing on time, understanding of topic and ability to answer as revealed by questions posed by instructor and peers (10 min). The instructor reserves the right to intervene and overrule judging if peer consensus is not present and/or instructor disagrees with judging. The teams will be the same as the TBL/PBL teams. The 2 opposing/competing teams will be randomly assigned. All students will participate in team presentations and judging. ***NOTE: If Instructor evaluates a team presentation to be subpar zero bonus points will be awarded, regardless of peer evaluation.***

Absence and Makeup Policy
If an absence is unavoidable, at the professor's sole discretion (and a documentable valid excuse), students may complete an alternate assignment which may include completing an individual version of the Team-based Learning activity or reading and summarizing a scientific article chosen by the professor or take a makeup exam.

Other policies in class

Cell phones need to be on vibrate/turned off during class. Instructor reserves the right to dismiss disruptive students from the classroom. Disruptive behavior includes constant chatting, texting, video/screen sharing, sharing jokes among students etc. while the instructor is talking. Disrespectful behavior such as sleeping in class or disrespecting instructor or peers (by action or words or behavior) will not be tolerated, and are grounds for dismissal from class. If instructor asks a question, student should try to respond instead of saying "I don't know". If you are not paying attention, instructor will most likely pay specific attention to you! ***Also, note taking while listening is an excellent form of learning and reinforcing learning-This is highly recommended.***

Estimated Calendar of Activities-Draft

Module 1 Review of cell and molecular biology (Weeks 1 and 2)

Unit 1 Molecules and Cells Review

Subunit 1 Macromolecules
Subunit 2 Overview of cell structure and function

Unit 2 Cell structure and function, and techniques

Subunit 1 Plasma membrane domains

Subunit 2 Cytoplasm and organelles

Subunit 3 Biotechnology

Module 2 Protein sorting, molecular motors, and cytoskeleton (Weeks 3 and 4)

Unit 1 Protein sorting

Subunit 1 Nuclear transport

Subunit 2 ER transport

Subunit 3 Golgi transport

Subunit 4 Plasma membrane transport

Subunit 5 Lysosome transport

Subunit 6 Mitochondrial transport

Unit 2 Molecular motors and Cytoskeleton

Subunit 1 Actin and myosin

Subunit 2 Microtubules and Dynein and Kinesin

Module 3 cell communication and adhesion (Weeks 5 and 6)

Unit 1 Signal transduction

Subunit 1 general principles

Subunit 2 cell surface receptors

Subunit 3 intracellular receptors and signaling cascade

Subunit 4 GPCR signaling

Subunit 5 Enzyme-coupled receptor signaling

Subunit 6 Ion-channel coupled receptor signaling

Unit 2 Cell junctions and extracellular matrix

Subunit 1 gap junctions,

Subunit 2 tight junctions

Subunit 3 cell adhesion

Subunit 4 extracellular matrix

Subunit 5 integrins and cytoskeleton

Midterm March 6, 2017 or March 6-10, 2017 week

Spring break March 13-18

Module 4 Nucleus, transcription factors, and gene expression (weeks 9, 10 and 11)

Unit 1 Transcription in bacteria

Subunit 1 Lac operon

Subunit 2 Ara operon

Subunit 3 Trp operon

Subunit 4 Riboswitches

Unit 2 Transcription in eukaryotes

Subunit 1 Eukaryotic RNA polymerases

Subunit 2 Promoters

Subunit 3 Enhancers and silencers

Subunit 4 Transcription factors

Subunit 5 Transcription activators and inhibitors

Unit 3 Post-transcriptional events

Subunit 1 RNA processing and Splicing

Subunit 2 Capping and polyadenylation

Subunit 3 MicroRNAs and RNAi

Unit 4 Translation

Subunit 1 Bacterial translation

Subunit 2 Eukaryotic translation

Module 5 Cell division (Weeks 12 & 13)

Unit 1 DNA replication

Unit 2 DNA recombination and repair

Module 6 Apoptosis (Week 14)

Unit 1 Apoptosis

Finals weeks 5/4-5/11 as UTRGV scheduled.
The UTRGV academic calendar can be found at http://my.utrgv.edu at the bottom of the screen, prior to login.

UTRGV Policy Statements

STUDENTS WITH DISABILITIES:
If you have a documented disability (physical, psychological, learning, or other disability which affects your academic performance) and would like to receive academic accommodations, please inform your instructor and contact Student Accessibility Services to schedule an appointment to initiate services. It is recommended that you schedule an appointment with Student Accessibility Services before classes start. However, accommodations can be provided at any time. **Brownsville Campus**: Student Accessibility Services is located in Cortez Hall Room 129 and can be contacted by phone at (956) 882-7374 (Voice) or via email at accessibility@utrgv.edu. **Edinburg Campus:** Student Accessibility Services is located in 108 University Center and can be contacted by phone at (956) 665-7005 (Voice), (956) 665-3840 (Fax), or via email at accessibility@utrgv.edu.

MANDATORY COURSE EVALUATION PERIOD:
Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (http://my.utrgv.edu); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades.

ATTENDANCE:
Students are expected to attend all scheduled classes and may be dropped from the course for excessive absences. UTRGV's attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; for observance of religious holy days; or for military service. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

SCHOLASTIC INTEGRITY:
As members of a community dedicated to Honesty, Integrity and Respect, students are reminded that those who engage in scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and expulsion from the University. Scholastic dishonesty includes but is not limited to: cheating, plagiarism, and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts. Since scholastic dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced (Board of Regents Rules and Regulations and UTRGV Academic Integrity Guidelines). All scholastic dishonesty incidents will be reported to the Dean of Students.

SEXUAL HARASSMENT, DISCRIMINATION, and VIOLENCE:
In accordance with UT System regulations, your instructor is a "responsible employee" for reporting purposes under Title IX regulations and so must report any instance, occurring during a student's time in college, of sexual assault, stalking, dating violence, domestic violence, or sexual harassment about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at www.utrgv.edu/equity, including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect in an environment free from sexual misconduct and discrimination.

COURSE DROPS:
According to UTRGV policy, students may drop any class without penalty earning a grade of DR until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the "3-peat rule" and the "6-drop" rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.