

THE UNIVERSITY OF TEXAS RIO GRANDE VALLEY- Brownsville Campus
BMED 4220-02: Medical Bioinformatics, Genomics and Systems Biology
Spring 2017, Mondays 12-1:40pm, room LHSB 1.410

COURSE SYLLABUS

Instructor: Dr. Andrea Schwarzbach
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BRHB, room 1.121

Contact Methods:

You may contact me using any of the information shown above, preferably email. Please feel free to reach me if you have any questions regarding content, if you need clarification, or would like assistance.
Office hours: Mondays 2-4pm, Tuesdays 10am-1pm or by appointment

Format: Active learning, cases, some lecture and discussions. Students will analyze data and do research on a topic using medical bioinformatics techniques. Students can use their own laptops or class laptops for analysis.

Textbook: no textbook required, reading materials or links will be posted on blackboard and information handed out in class.

Co-or Prerequisites: 4230 Advanced Medical Genetics and Genomics

Also helpful is taking Biochemistry, Advanced Molecular and Advanced Cell Bio before this class. The students need a solid understanding of molecular biology and genetics before taking this advanced course.

Course Description:

This course presents a problem solving approach to understanding genomics using bioinformatics applications as used in the field of precision medicine. Covering the latest techniques that enable the study of the genome in ever-increasing detail, this course explores what the genome reveals in health and disease. This is a course where students will learn how to work with genomic data. The course will cover the theory and latest techniques used to sequence DNA, functionally analyze mRNA, DNA etc. and study genes and genomes using available databases.

Learning outcomes:

1. students should understand genomics principles and be able to apply them to medical situations.
2. students should be able to evaluate scientific observations and apply several biological principles to explain observations that may be encountered in clinical practice or medical research relating to genomics principles.
3. students should gain some insight into the methods used by genomics biologists and bioinformaticists in their research especially as it relates to large-scale high-throughput biology.
4. students should be able to interpret figures, tables and charts and use common genomics databases.
5. the student should develop an appropriate genomics and bioinformatics vocabulary to express in verbal and written form observations, principles and theories as they relate to genomics, bioinformatics and systems biology.

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 be able to research a topic using standard electronic and non-electronic methods
3. Students will be able to communicate complex scientific ideas, concepts and theories by oral and written means
4. Students will appreciate the role of research in the biological, biomedical and clinical sciences

Grading Policies:

The grade for this course will be determined based on

- attendance, participation in class activities and discussions 12.5% (125 points),
 - one practical/theory exam covering methods and theory learned in class, worth 15% (150 points) will be given.
 - short 3 IRAT/TRAT on various topics throughout semester 20% (200 points), Lowest of iRAT/tRAT will be dropped.
 - students are required to give a powerpoint presentation individually or as a team of 2 on a genomic case study, also worth 10% of grade (100 points).
 - each student is doing an individual research project requiring data analysis that is written up as a final paper worth 20% of the grade (200 points).
 - Class exercises are leading to the final data analysis need to be turned in during the semester (150 points total). See Blackboard for schedule and due dates
 - three short writing assignments based on videos are each worth 7.5% (25 points each, total of 75 points) of the grade.
- adding to a total of 1000 points.

Grades: up to 599 points: F, 600-699: D, 700-799: C, 800-899: B, 900-1000: A

Lecture videos links are posted and need to be watched before class in preparation for class. Students are expected to prepare for class, e.g. bring questions for discussion, and follow instructions for posted assignments or readings as well as postings for deadlines of assignments. Readiness for class is tested with iRATs and tRATs. Students are required to frequently check the course page on blackboard for any updates regarding course content. No additional extra credit projects, papers etc. will be accepted as a substitute at the end of the semester. Additional info for details on assignments will be provided and explained in class during the first class day and during the semester.

Other Course Information

Assignment Details:

Participation: Watch assigned videos, read assigned papers, bring written questions to class for discussions.

Prepare for IRAT/TRAT. Lowest score of IRAT/TRAT will be dropped

Three writing assignments, each 25 points:

Watch the three episodes of the documentary "The emperor of all maladies".

Write a short essay about your thoughts on a topic of your choice of the videos, either a historical issue, or a patient case and the treatment for example.

Write 500-600 words of text per episode. Provide word count or paper will be rejected. Upload links for papers are on blackboard. Late submission will receive point deductions (up to 6hrs late -5, up to 12 hrs -10 points etc.). Due dates are on schedule in blackboard.

Link: <http://video.pbs.org/program/story-cancer-emperor-all-maladies/>

Presentations of a paper/study/case using bioinformatics/genomics methods in medicine. Each student or group of 2 will have an assigned day and self chosen cancer gene(s) as approved by instructor.

This presentation should be a powerpoint presentation, 6-8 min for individuals and 10-12min for groups of two. All presentations need to be submitted to instructor the day before presentation is scheduled by 5pm to receive full points. If submission deadline is missed students need to submit written paper (5 page minimum) instead. Please observe deadlines for paper topics.

The final research project paper is summarizing practical work done in the class. A research question and hypothesis needs to be chosen, then researched and written up as a paper of at least 100 lines of text length (add numbering to text), 10 point font, 1 inch margin, double spaced. Figures and tables as well as references are extra. This should be written in your own words, no plagiarizing allowed. Structure of paper should be

1. Title
2. Introduction with background information about the type of cancer and gene that was chosen as well as the hypothesis that is tested.
3. Materials and methods: where did data come from, how were data analyzed, what software was used, what settings.
4. Results and discussion: What did data analysis show in relation to hypothesis that is tested, discuss results. Use tables and figures to illustrate results as needed and cite in text.
5. References cited.

Attendance Policy:

It is required that you attend ALL classes unless you have a true unforeseen emergency.

You can miss one regular class day for any emergency or illness or other valid and documented excuse (e.g. presenting at a scientific meeting, taking MCAT etc.) without a penalty. ANY class missed after that will result in a deduction of 50 points from the attendance points for each incidence. Partial non-attendance will result in partially lost points. Missing a presentation assignment or otherwise scored event requires solid documentation of the emergency in order to get a chance to make-up the points.

In order to recover any lost attendance points you have to write a 5-page paper on a topic and format determined by the instructor usually based on a scientific journal paper chosen by the instructor. You can only make-up a maximum of two missed events, but only if valid documentation for reason of absence is provided. In order to keep deadlines for assignments it is important to start early. Students need to inform instructor as soon as possible of any scheduled absences due to presentations at meetings outside town or medical school interviews etc.

Important dates:

Jan 16	MLK Holiday and Day of Service
Jan 17	First day of class for full semester
Jan 30	Last day to add a class for spring 2017 semester
Mar 13 – 18	Spring Break, no classes
Apr 13	Last day to drop (DR grade) a class or withdraw (grade of W)
Apr 14 – 15	Easter holiday, no classes
May 3	Last day of classes for full semester
May 4	Study Day, no classes
May 5 - 11	Final Exams (Schedule)

Other Course Information

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 ability@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 ability@utrgv.edu.

MANDATORY COURSE EVALUATION PERIOD:

Students are required to complete an ONLINE evaluation of this course, accessed through your UTRGV account (<https://my.utrgv.edu/home>); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available:

Feb 15 – Feb 21 for Module 1 courses

Apr 12 – Apr 18 for Module 2 courses

Apr 12 – May 3 for full spring semester courses

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.