BTEC5333   Spring 2016
Bioinformatics: Methodologies and Applications

Meeting: Thursday, 2.00 – 5.00. #120, Experimental Sciences Building

Instructor: Office Hours by Appointment

Dr. Chiquito Crasto   chiquito.crasto@ttu.edu   834-5448

Course Material:
Reading assignments from the literature, handouts of class presentation, and links to videos of the class will be provided by the instructor.

Course Description:
BTEC 5333 is a required course for students enrolled in the Bioinformatics Track of the Master of Science program in Biotechnology administered through the TTU Center for Biotechnology and Genomics. This course however, is open to graduate students, university-wide. Senior-level undergraduate students at TTU will also be allowed to take this course, as long as they meet certain prerequisites. The preparedness of an undergraduate to take this course will be assessed by the course instructor.

   The Advanced Bioinformatics course will focus on the developmental aspects of Bioinformatics and Computational Biology. This course will train students in software, database and web development, focused on Bioinformatics-based solutions to biological problems. This course will also train students in protein modeling, protein-ligand, protein-protein docking and carrying out simple molecular dynamics simulations. The philosophy of the course is that it is imperative that if an individual wishes to be a Bioinformatics specialist he or she must understand and be trained in the systems required to design and create Bioinformatics-based tools. Students will be trained to use the tools they develop within a High Performance Computing Environment. The Experimental Sciences building which houses the Center for Biotechnology and Genomics

   The first part of the course will be used to introduce and get students to learn how to write computer programs. Later they will be introduced to specialized software that is designed to help the Bioinformatics Specialists. Students will also be taught to create and maintain databases. Students will learn to develop web-based tools. These tools are essential because most bioinformatics software is Internet accessible. Database and Web development also enables the practitioner to understand warehousing of data and efficacious dissemination to users (typically experimental scientists).

Topics:

Introduction to Python Programming
Python Programming in Bioinformatics Applications
Use of BioPython in Bioinformatics
Database Development—Creation and Maintenance of Databases
Web Development for Internet based tools (Bioinformatics and Proteomics)
Proteomics: Homology Modeling of Proteins

Proteomics: Computational Docking of Ligand-Protein and Protein-Protein complexes

Special Conditions:

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services (AccessTECH). No requirement exists that accommodations be made prior to completion of this approved university process.

Assessments and Grading:

1. Homework will be assigned every week. This will test the students' ability to work on problems of topics covered in class. (25% of Course Grade)

2. Programming in Bioinformatics Project. (25% Course Grade)

3. One In-Class Mid-Term Examination (25% of the Course Grade)

4. One Take-Home Final Examination (25% of the Course Grade)

A final letter grade will be determined by performance of the above criteria. While it is typical that a 90% is the A/B cutoff, 80% is the B/C cutoff, 70% is the C/D cut off and 60% is the D/F cutoff, the instructor will use his discretion in using a curving scheme to assign grades, if necessary. A grade of "I" (Incomplete) will be awarded by the instructor prior to the end of the semester only when failure to complete the work has been due to causes beyond the student's control and when class performance has been satisfactory. Texas Tech regulations require that a form explaining the reason for the Incomplete and the method to be used to make up the missed work be submitted, after being signed by both the student and instructor, to the Registrar. Incomplete grades that are not replaced by an A, B or C grade within one year are automatically replaced by an F.

Academic Honesty: It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and a high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

"Scholastic dishonesty" includes, but not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student or the attempt to commit such and act.

Cheating:
Dishonesty in examinations, quizzes, or homework assignments, illegal possession of examinations, the use of unauthorized notes during an examination or quiz, obtaining information during an examination from the

examination paper or otherwise from another student, assisting others to cheat, alteration of grade records, illegal entry to or unauthorized presence in an office are instances of cheating.

Plagiarism:
Offering the work of another as one's own, without proper acknowledgement, is plagiarism; therefore any student who fails to give credit for quotations or an essentially identical expression of material taken from books, encyclopedias, magazines, internet web sites, and other reference works, or from the themes, reports or other writings of a fellow student is guilty of plagiarism.

Civility in the Classroom:
Students are expected to assist in maintaining a classroom environment that is conducive to learning. In order to ensure that all students have an opportunity to gain from time spent in class, unless otherwise approved by the instructor students are prohibited from using cellular phones or beepers or engage in any other form of distraction. No food or drink allowed in the class. Socializing in the class room should be kept to a minimum. Inappropriate behavior in the class room will result in a request to leave the class.

Attendance:
Lectures and laboratory-based exercises will include information that is not in handouts. **It is therefore necessary and expected that you will <u>attend and participate</u> in every scheduled class. There are no makeup classes.** If there is a reason for missing a class you must contact your instructor as soon as possible to make necessary arrangements to discuss the outcome of the absence. You may need to provide a note from your physician excusing your absence if you are absent from a class or a lab more than a day due to an illness.

Religious Holy Day:
A student who intends to observe a religious holy day should make that intention known to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.