BINF 401 – Introduction to Bioinformatics Part 1
Fall 2018 – Full Semester
Tu, Thur 5:55-7:10pm, Exploratory Hall Room 2602
Credits: 3

Instructor: Dr. Bob Brown **E-Mail: rbrownf@gmu.edu**
Office:Johnson Center **Phone: (703) 927-9019**
Office hours: by appointment

Undergraduate Learning Assistant: TBD
E-Mail:

Course Description

Through this course, students will learn about several bioinformatics techniques and some tools plus the underlying concepts. It will combine the Biology with Computer Science introductory skills that will set you apart. Students will learn about the following topics: the growth of and different fields within bioinformatics, data access, pairwise and multiple sequence alignment, phylogenetic tree building, Bioinformatic resources, some tools used in the field, analysis of high-throughput DNA and RNA data, comparative genomics, etc. Students will learn through a combination of lectures, hands-on computer exercises, projects, and reading and presentation of scientific papers. Students will benefit most from this class by being inquisitive and proactive learners.

Course Objectives

1. Students learn and then create their own rudimentary bioinformatic tools.
2. Students will learn how the underlying technology handles biological data and methods for storage and retrieval.
3. Students will research, graphically present, communicate their scientific findings in a poster session.

Course Assignments and Grades

Your grade will be determined by a combination of attendance and participation, and mastery of the material.

Blackboard

We will use the learning management system Blackboard in this class. Lecture notes, instructions for hands-on exercises, etc be posted to this site. Log in at http://mymason.gmu.edu.

Text book

Bioinformatics and Functional Genomics by J. Pevsner (3rd Edition) It also comes in a Kindle version.
Powerpoints of the Lectures are at:
http://magik.gmu.edu/cgi-bin/Pwebrecon.cgi?BBID=3821698

Laptop
You should own a laptop that meets or exceeds the specifications set by the Biology Department and bring the laptop to class. The preferred OS is Mac or Linux.

Graded work
Your final grade is calculated as a percentage out of 100, divided in the following way:

20% Protein analysis project
15% Homework assignments
20% Final examination
20% In-class computer exercises
15% Mid-Term examination
10% Class participation

Protein analysis project (tentative due data: 11/26 poster and presentation)
Each student will complete a report and present the results for a select protein project. For this project, a student will select a protein, discuss web site analysis function etc. and present the material as a poster.

Mid-term examination
Students will take an in-class first half cumulative examination at the mid-point of the semester.

Final examination
Students will take an in-class cumulative examination at the end of the semester.

In-class computer exercises
Students need to complete and turn in worksheets at the end of each in-class computer exercise. We will cover databases, Python, Linux Commands, and some common presentation tools.

Class participation
Students are expected to participate actively during computer sessions and class discussion.
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Attendance and Late Work Policy
Regular attendance and participation are expected. Attendance and grades are highly correlated in any class. Except in the very rare case of last minute emergencies (e.g.: you were hit by a car as you were walking to class and were taken to the emergency room), you should let me know about any excused absences and make arrangements for making up any missed work in advance. I do not consider work-related absences, work in other classes, oversleeping, or meetings with other professors a personal emergency.

Unless otherwise announced, homeworks are due at the beginning of class on the due date. Late work will not be accepted except in the case of a documented personal emergency or excused absence. You will not be allowed to make up in-class assignments or exams unless

you have a documented, excused absence. It is your responsibility to provide **written documentation** from a third party of your emergency or university-excused absence

Grading
Your final grade will be based on your percent out of 100. See below for grading scale. All inquiries about homework partial credits or potential grading mistakes need to be addressed soon after the homework is returned, not toward the end of semester.

A+	97-100	B	83-86	C-	60-69
A	93-96	B-	80-82	F	59 or less
A-	90-92	C+	77-79		
B+	87-89	C	70-76		

Disability Accommodations
If you have a learning or physical difference that may affect your academic work, you will need to furnish appropriate documentation to the Office of Disability Services. If you qualify for accommodation, the ODS staff will give you a form detailing appropriate accommodations for your instructor. In addition to providing your professors with the appropriate form, please take the initiative to discuss accommodation with them at the beginning of the semester and as needed during the term. Because of the range of learning differences, faculty members need to learn from you the most effective ways to assist you. If you have contacted the Office of Disability Services and are waiting to hear from a counselor, please let your instructor know.

Diversity
George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. Through its curriculum, programs, policies, procedures, services and resources, Mason strives to maintain a quality environment for work, study and personal growth.

An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

The reflection of Mason's commitment to diversity and inclusion goes beyond policies and procedures to focus on behavior at the individual, group and organizational level. The implementation of this commitment to diversity and inclusion is found in all settings, including individual work units and groups, student organizations and groups, and classroom settings; it is also found with the delivery of services and activities, including, but not limited to, curriculum, teaching, events, advising, research, service, and community outreach.

Acknowledging that the attainment of diversity and inclusion are dynamic and continuous processes, and that the larger societal setting has an evolving socio-cultural understanding of diversity and inclusion, Mason seeks to continuously improve its environment. To this end, the University promotes continuous monitoring and self-assessment regarding diversity. The aim is to incorporate diversity and inclusion within the philosophies and actions of the individual, group and organization, and to make improvements as needed.

Canceled and missed class
If for some reason class is canceled, then the following class will cover the material for the missed class. This is particularly important should an exam day be canceled for whatever reason (the exam will take place in our next scheduled class).

If you are having problems: please come and see us. We are here to help you learn this material and master biostatistics. We will do what we can to make sure that you make it successfully. Please don't wait too long if you are having difficulties.

Academic Integrity
The integrity of the University community is affected by the individual choices made by each of us. GMU has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct. Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Paraphrased material must also be cited, using MLA or APA format. A simple listing of books or articles is not sufficient. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me. For more information about the honor code, please see http://oai.gmu.edu/.

Class Etiquette
You will be expected to come to class on time and participate while you are here. You will be in charge of your own progress and must meet the benchmarks specified in the syllabus.

Privacy
Student privacy is governed by the Family Educational Rights and Privacy Act (FERPA) and is an essential aspect of any course. Your instructor cannot discuss your educational record with your parents, your friends, or anyone except for you. Because your GMU email is the only one that we can explicitly identify as belonging to you, your instructor will only communicate with you via email using your GMU address, and your instructor will not discuss grades via email. **Students must use their MasonLive email account** to receive important University information, including messages related to this class. See http://masonlive.gmu.edu for more information.

BINF 401				
FALL 2019		Introduction to Bioinformatics Part 1 of 2		
DATE Week starts	**Week**	**Tuesday**	**Thursday**	**Homework due**
8/27/17	1	Ch1 Introduction	Ch1 Introduction	
9/3/17	2	Set up tools on laptop	Chapter2 Access Information	
9/10/17	3	Linux Command intro	Ch2 Access Information	hw 1
9/17/17	4	Ch3 Pairwise Alignment	Intro to Python	
9/24/17	5	Ch3 Pairwise Alignment	Write Pairwise Allignment tool	hw 2
10/1/17	6	Ch4 BLAST	Ch4 BLAST /Test Prep	
10/8/17	7	test prep	**Mid Term Exam**	
10/15/17	8	Review Exam and choose Project Protein	MySQL overview	hw 3
10/22/17	9	Mysqlworkbench	Ch5 Advanced Database Search	
10/29/17	10	Ch5 Advanced Database Search	Guest Lecture	hw 4
11/5/17	11	Ch6 Multi-Sequence Allignment	Ch6 Multi-Sequence Allignment	
11/12/17	12	Galaxy / Cytoscape	More Python	
11/19/17	13	Ch7 Phylogeny	Project Presentations	
11/26/17	14	Project Presentations	Thanksgiving Day off	Project
12/3/17	15	CrispR and Single Cell Analysis	Review for Final Exam	
12/17/17		**Final Exam**		