Course Syllabus

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Description

This course will explore the fundamental principles of bioinformatics. Students will learn how to analyze DNA, RNA and Protein datasets using the R programming language.

Instructors

	Topic	Email
Jared Simpson (coordinator)	DNA (September)	jt.simpson@utoronto.ca
Jesse Gillis	RNA (October)	jesse.gillis@utoronto.ca
Artem Babaian	Protein (November)	a.babaian@utoronto.ca

Office Hours

Wednesday 2-4pm in CCBR (https://goo.gl/maps/22EjArgnre7ipmLe8) 610 (160 College St, 6th floor)

Lectures

The class meets weekly on Monday at 2-4pm in HS 106. The class time will include lectures describing theoretical background, demonstrations by the instructor and guided activities. Students are encouraged to bring a laptop to follow along with the guided activity.

Tutorial

Tutorials take place on Wednesdays at 1pm in MS 4171. These tutorials will be hands-on activities, so please bring a laptop with you. The tutorials include a graded component that must be submitted for marking every Friday (see Marking Scheme, below).

Course Materials

Learning to program in R is a large part of this course. We will be using this free online book:

- YaRrr (https://bookdown.org/ndphillips/YaRrr/)

The first month of class will have assigned preparation work from this book. Check the weekly table in the course homepage for the sections assigned each week.

Required Software

This course relies on the use of the R, Rstudio and git software packages. We **strongly recommend** installing these programs as early as possible as we will start using them in the first week of the course. You will need to submit work for grading using git in the first week. We have written a page describing how to install these programs **here (https://q.utoronto.ca/courses/356065/pages/software-setup?wrap=1)** .

Discussion Board

We have set up a discussion board for general questions and discussion about the course content. You can access Piazza from the link on the left side of Quercus or directly **here (https://piazza.com/class/m0184mjpsw6ar)** .

Email

Please email the course coordinator, Dr. Simpson, for personal questions related to this course (including accommodation requests) and use the discussion board for all technical and content-related questions. Please include "MGY441" in the subject of the email and include your name, student number and UTORid. I will try to reply within 1-2 days but may be delayed if the volume of requests is very high.

Course Prerequisites

BCH210H1/BCH242Y1 and BCH311H1/MGY311Y1/PSL350H1. If you do not have both of the prerequisites email Dr. Simpson to request a waiver and clearly explain why the waiver should be granted.

Marking Scheme and Schedule

Work	**Weight**	**Deadline/Notes**
Weekly tutorial exercise	10% total (best 10 are counted)	Fridays before 10pm
Assignment 1 - DNA	15%	TBD
Assignment 2 - RNA	15%	TBD
Term Test	30%	Monday after Reading week
Final Project	30%	TBD

Tests

There will be an in-person midterm test following reading week that covers the first two parts of the course taught by Dr. Simpson and Dr. Gillis.

Assignments

The assignments will be a mixture of programming exercises in R and written answers to problems. You will be required to submit the assignments using git. Detailed instructions on submitting work using git will be provided in the tutorials.

Final Project

Obelisk Discovery Project: Earlier this year Obelisks were discovered, they are a new category of virus-like infectious agents found all over the world. There of tens of thousands of Obelisk species, and nothing is known about them. For your final project you will be a pioneer and characterise the genome of an unknown Obelisk species, name it, and contextualise where this virus-like agent is found. This project will integrate the concepts taught throughout the course and enable you to make a fundamental contribution to science.

Policies

Late work

Late work will be penalized. We grant a one hour grace period where no marks will be deducted for small issues that arise during assignment submission (for example if the weekly tutorial is due before 10pm, no marks will be deducted if it is submitted before 11:00pm). After that, 10% is deducted per hour.

Lateness	**Deduction**
up to 1 hour	No deduction
up to 2 hours	10%
up to 3 hours	20%
up to 4 hours	30%
up to 5 hours	40%
up to 6 hours	50%
up to 7 hours	60%
up to 8 hours	70%
up to 9 hours	80%
up to 10 hours	90%

up to 11 hours	100%

Important: We are using a version control system for tutorial and assignment submissions and the timestamp of the **most recent** commit for the file will be considered the official submission for marking. If you erroneously make a commit after the deadline that you do not want marked let the course instructors know right away and include the commit ID of the submission that you want marked.

Please note that with git you must commit your work **and** push it to your repository on the gitlab server for it to be visible to the instructors. If you commit without pushing, the changes will remain on your local computer only and not be markable. We **strongly recommend** navigating to your repository on gitlab.ccbr.utoronto.ca to confirm you pushed the version you want marked.

Special Consideration

If you have an illness, emergency or other issue (for example a religious holiday) that prevents you from meeting a course deadline please contact an instructor by email to discuss the situation and a possible accommodation. If you are requesting consideration due to illness or another emergency please also declare the absence on ACORN. Be aware that falsely claiming an illness or emergency is considered an academic offence according to U of T's policy on academic integrity.

Remark Requests

If you feel your assignment was not marked correctly you can request that it is remarked. Remark requests must be submitted **by email within two weeks of the marked work being returned**. In the email requesting a remark please include "MGY441: Remark request" in the subject and a clear description of why you think your work was mis-marked.

Academic Integrity

This course does not have any group assignments so all submissions must be your own work. Copying all or part of a fellow student's work is plagiarism and will be treated very seriously. When using internet resources in your work, like stack overflow, you must **clearly cite** the source of any code you include in your submission. We recommend reviewing the **University policies on academic conduct (https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019)** .

Use of Generative AI/ChatGPT

We believe that Generative AI can be very useful as a learning tool and will allow students to use it throughout the course. As with other resources, its use **must be cited and declared**. Students should refrain from directly copying text or code from a Generative AI program as it is not conducive to learning; instead interact with these programs but think critically about the information they provide and synthesize it with other sources and your own thoughts. Please note that Generative AI programs are prone to false confidence in their answers to some prompts and therefore the information they provide should be treated with great caution. If you submit material from a Generative AI program that is incorrect it will be

penalized accordingly. Finally, please keep in mind that a minimum grade of 40% on the in-person, closed book final exam is required to pass the course, so do not become overly reliant on Generative AI programs for learning the course material.

Accessibility

If you require accommodations for any reasons please contact Accessibility Services (accessibility.services@utoronto.ca, **https://www.studentlife.utoronto.ca/as (https://www.studentlife.utoronto.ca/as)**).

Course Summary:

Date	Details	Due