**MICB405: Bioinformatics**

**COURSE OVERVIEW**

**MICB405: Bioinformatics** introduces students to the concepts and applications of sequence-based bioinformatics research across several broad topic areas including: unix/linux and the command line; massively parallel sequencing; applications of massively parallel sequencing including; genomics, functional genomics, metagenomics, sequence assembly and sequence similarity.  From a biological perspective, the main considerations and applications of the computational tools used in each of these subject areas are discussed.  Team projects where students work within groups to apply bioinformatic tools introduced in class to an experimental datasets supplements lecture materials.

Students are expected to have access to a computer to complete projects for MICB405. A personal unix account will be provided to each student to log-in to the MICB405 server through Terminal (installed on Mac OSX: /Applications/Utilities/Terminal) or Ubuntu [Windows Subsystem for Linux](https://www.microsoft.com/en-ca/p/ubuntu/9nblggh4msv6?activetab=pivot:overviewtab) on Windows. Students are expected to abide by UBC policies on the [Acceptable use of Electronic Information and Systems](http://www.universitycounsel.ubc.ca/files/2013/06/policy104.pdf) when accessing the MICB405 server. To ensure system availability and security activity on the MICB405 server is monitored and recorded.

**COVID SAFETY**

**Masks**: Masks are **required** for all indoor classes, as per the BC Public Health Officer orders. For our in-person meetings in this class, it is important that all of us feel as comfortable as possible engaging in class activities while sharing an indoor space. For the purposes of this order, the term “masks” refers to medical and non-medical masks that cover our noses and mouths. Masks are a primary tool to make it harder for Covid-19 to find a new host. You will need to wear a medical or non-medical mask for the duration of our class meetings, for your own protection, and the safety and comfort of everyone else in the class. You may be asked to remove your mask briefly for an ID check for an exam, but otherwise, your mask should cover your nose and mouth. Please do not eat in class. If you need to drink water/coffee/tea/etc.., please keep your mask on between sips. Please note that there are some people who cannot wear a mask. These individuals are equally welcome in our class.

**Vaccination**: If you have not yet had a chance to get vaccinated against Covid-19, vaccines are available to you, free, and on campus (**http://www.vch.ca/covid-19/covid-19-vaccine)**. The higher the rate of vaccination in our community overall, the lower the chance of spreading this virus. You are an important part of the UBC community. Please arrange to get vaccinated if you have not already done so.

**Seating in class:** To reduce the risk of Covid transmission, please sit in a consistent area of the classroom each day. This will minimize your contacts and will still allow for the pedagogical methods planned for this class to help your learning.

**Your personal health: If you’re sick, it’s important that you stay home – no matter what you think you may be sick with (e.g., cold, flu, other).**

* A daily self-health assessment is required before attending campus. Every day, before coming to class, complete the self-assessment for Covid symptoms using this tool:<https://bc.thrive.health/covid19/en>
* Do not come to class if you have Covid symptoms, have recently tested positive for Covid, or are required to quarantine. You can check this website to find out if you should self-isolate or self-monitor: <http://www.bccdc.ca/health-info/diseases-conditions/covid-19/self-isolation#Who>.
* Your precautions will help reduce risk and keep everyone safer. In this class, the marking scheme is intended to provide flexibility so that you can prioritize your health and still be able to succeed

**If you do miss class because of illness:**

* Make a connection early in the term to another student or a group of students in the class. You can help each other by sharing notes. If you don’t yet know anyone in the class, post on the discussion forum to connect with other students.
* Consult the class resources on Canvas.
* Use the online discussion forum for help.
* Come to virtual office hours.
* See the marking scheme for reassurance about what flexibility you have.
* If you are concerned that you will need to miss a particular key activity due to illness, contact us to discuss.

**If you are sick on a midterm exam day:** please email the instructor as soon as you are confident you should not come to the scheduled exam. We would strongly prefer that you contact us to make an alternate arrangement than for you to come to the exam while you are ill. If you do show up for an exam and you are clearly ill, you will not be able to write the exam and we will make alternate arrangements with you. It is much better for you to email ahead of time and not attend. Remember to include your full name and student number in your message.

**If you are sick on a final exam day**, do not attend the exam. You must apply for deferred standing (an academic concession) through Science Advising no later than 48 hours after the missed final exam/assignment. Students who are granted deferred standing write the final exam/assignment at a later date. Learn more and find the application online:<https://science.ubc.ca/students/advising/concession>

For additional information about academic concessions, see the UBC policy here:<http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,329,0,0>

**If I (the instructor) am sick:** I will do my best to stay well, but if I am ill, develop Covid symptoms, or test positive for Covid, then I will not come to class. If that happens, here’s what you can expect:

* The other instructor or TA will substitute
* If I am well enough to teach, but am taking precautions to avoid infecting others, we may have a synchronous online session or two. If this happens, you will receive an announcement in Canvas telling you how to join the class. You can anticipate that this would very likely be a last minute email. Our classroom will still be available for you to sit and attend an online session, in this (hopefully rare) instance.
* You may receive a message from me with a recording of the lecture material for you to watch on your own time.

**LEARNING OBJECTIVES**

1. Provide students with a foundation in principles of DNA sequence based bioinformatics.
2. Students will be able to navigate a unix/linux file system and execute basic commands.
3. Students will be able to describe the principles of DNA sequencing and standard sequence file types in its analysis.
4. Students will become familiar with a set of standard sequence based bioinformatic tools.
5. Students will be able to perform bioinformatic analyses utilizing command line software packages and public web and file-based resources.

**COURSE FORMAT**

**Classes run:**

**Thursday, September 9th, 2021 - Tuesday, December 7th, 2021**

**Location: P. A. Woodward Instructional Resources Centre 4**

**Meeting days:**Tuesday, Thursday, Friday

**Meeting times:**

12:30PM – 2:00PM Pacific Time (Tues, Thurs): Lectures

10:00AM - 11:00AM Pacific Time (Fri): Tutorial

 2:00PM - 3:00PM Pacific Time (Fri): Tutorial

**Midterm Exam:**October 15th, 2020

**Final:**  TBA\*

**Prerequisites:**One of MICB 324; BIOC 300; BIOC 302; BIOC 303; BIOL 335

**URLs:**Course material will be posted to https://canvas.ubc.ca

\* Do not plan travel until after exam period

**INSTRUCTORS**

**Name:**Martin Hirst (course coordinator)

**Email, phone:**hirstm@mail.ubc.ca, (604) 822-6373

**Virtual Office hours:**Thursdays 12:30-1:30PM

**Name:** Stephan Koenig (Teaching Fellow)

**Email, phone**: stephan.koenig@ubc.ca

**Virtual Office Hours:** Fridays 10 AM – 12 PM

**Name:**Axel Hauduc (course Teaching Assistant)

**Email, phone:**hauduc@alumni.ubc.ca.

**Virtual Office hours: Tuesdays 11:30AM-12:30PM and Thursdays 2-3PM**

**GRADING**

**Final Grade**

Quizzes: 20%

Midterm Exam: 20%

Team Projects: 20%

Final Exam: 30%

Group Participation: 10%

**Note:**  If you fail to write the midterm, the weighting will be adjusted to the final exam.  You must have a passing average on the exam(s) to pass the course.

**CLASS SCHEDULE**

The class schedule is available on the UBC Canvas homepage for MICB405 (MICB405\_lecture\_schedule\_2021.pdf) and through the Syllabus link on the CANVAS. Selected core concepts and bioinformatic tools will be reviewed during weekly tutorials. As the course progresses is it possible that the schedule will need to be adjusted however the exam date will not change. When an updated schedule is posted to Canvas an email alert will be sent to the class.

**KEY DATES:**

**September 7th (Tue.) –** Imagine Dayno undergrad classes (except the few that start at or after 5:00 pm and meet only once per week). Instead, all students (new and returning) are invited to various virtual orientation events.

**Sept. 9th (Thurs.) –** First day of MICB405.

**Sept. 27th (Tue.) –** last day for dropping first-term courses without a “W”

**November 276h (Fri.) –** last day to withdraw from MICB405.

**December 7th (Thurs.) –** Last day of MICB405

**December 11th (Sat.) to December 22nd (Wed.) –** Exam period (inclusive). Please do not plan to be away until you see the actual exam schedule, which is published in the middle of the term.

**ACADEMIC INTEGRITY**

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President’s Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences. A more detailed description of academic integrity, including the University’s policies and procedures, may be found in the [Academic Calendar](http://calendar.ubc.ca/vancouver/index.cfm?tree=3,54,111,0).