*We recognize and acknowledge that McMaster University meets and learns on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the “Dish With One Spoon” wampum, an agreement amongst all allied Nations to peaceably share and care for the resources around the Great Lakes.*

**BIOCHEM 3MI3 – MICROBIAL INTERACTIONS**

**2024 Fall Term**

**Instructors:** Drs. Lindsay Kalan and John Whitney **| Email:** [kalanlr@mcmaster.ca](mailto:kalanlr@mcmaster.ca) [jwhitney@mcmaster.ca](mailto:jwhitney@mcmaster.ca)

**Teaching Assistants:** Marie-Ange Massicotte; [massicom@mcmaster.ca](mailto:massicom@mcmaster.ca) **|** Owen McArthur; [mcarthuo@mcmaster.ca](mailto:mcarthuo@mcmaster.ca)

**COURSE DESCRIPTION**

This course examines how interactions with bacteria influence all cellular life on earth. Topics include conflict and collaboration between bacteria, host-pathogen and host-symbiont interactions, and biological innovations arising from battles between bacteria and bacteriophages. It is our hope that over the course of this semester, you will come to appreciate that the classification of bacteria as symbionts, commensals and pathogens is a consequence of the outcome of their interactions with other microbes and hosts.

**Course Details**

**Lectures:** Monday and Wednesday 1:30-2:20, BSB 119

**Tutorial:** Tuesday 9:30-10:20, BSB 121 (Group A); Wednesday 9:30-10:20, MDCL 1010 (Group B)

**Office Hours:** By request

**MATERIALS & FEES**

There is no required textbook for this course

**COURSE OVERVIEW AND ASSESSMENT**

***Lecture Schedule***

*Themes of 3MI3*: Introduction to bacteriology, bacteria-bacteria interactions, bacteria-bacteriophage interactions, Interactions between bacteria and their hosts

|  |  |  |  |
| --- | --- | --- | --- |
| **WEEK** | **DATE** | **TOPIC** | **RECOMMENDED READING** |
| 1 | Sept. 4th | History of Microbiology (Kalan) | Uploaded to A2L |
|  | Sept. 9th | Introduction to Symbiosis (Kalan) | 23391737\* |
| 2 | Sept. 11th | Bacterial Cell Structure I (Whitney) | 20452953 |
|  | Sept. 16th | Bacterial Cell Structure II (Whitney) |
| 3 | Sept. 18th | Host-Associated Microbiomes (Kalan | 22411464 |
|  | Sept. 23rd | Human early life microbiome (Kalan) | 34256346 |
| 4 | Sept. 25th | Nutrient Acquisition in Host Environments (Kalan) | 20649986 |
|  | Sept. 30th | Interactions in the human skin microbiome (Kalan) | 35550666 |
| 5 | Oct. 2nd | Microbial Biofilms (Kalan) | 27510863 |
|  | Oct. 7th | Cross-kingdom interactions (Kalan) | 33526565 |
| 6 | Oct. 9th | Bacteriocins and Secondary Metabolites (Kalan) | 21498065 |
| 7 | Oct. 14th | READING WEEK |  |
|  | Oct. 16th | READING WEEK |  |
| 8 | Oct. 21st | MIDTERM |  |
|  | Oct. 23rd | MIDTERM Discussion (Kalan) |  |
| 9 | Oct. 28th | Introduction to Bacteriophages (Hynes) |  |
|  | Oct. 30th | Phage Infection Cycles (Hynes) |  |
| 10 | Nov. 4th | Resistance to Phage Infection (Hynes) | 20348932 |
|  | Nov. 6th | How Phage Overcome Resistance (Hynes) | 23979432 |
| 11 | Nov. 11th | Bacterial Motility (Whitney) | 20694026 |
|  | Nov. 13th | Bacterial Communication: Quorum Sensing (Whitney) | 10607620 |
| 12 | Nov. 18th | Multicellular Bacteria (Whitney) | 24384602 |
|  | Nov. 20th | Antibacterial Toxin Delivery Systems (Whitney) | 24581686 |
| 13 | Nov. 25th | Enteric Pathogens of Humans (Coombes) | 25023120 |
|  | Nov. 27th | Bacterial Exotoxins (Whitney) | 20711357 |
| 14 | Dec. 2nd | Intracellular Pathogens (Whitney) | 18785836 |
|  | Dec. 4th | Plant Pathogenic Bacteria (Whitney) | 22672649 |

\*This number is a PubMed ID (PMID). If you go to [www.ncbi.nlm.nih.gov/pubmed/](http://www.ncbi.nlm.nih.gov/pubmed/) and type in this number, you will be directed to the recommended reading. The reading material will also be made available on Avenue to Learn.

**\*\*\*FINAL EXAM TO BE SCHEDULED BY THE REGISTRAR\*\*\***

**Tutorial Schedule**

|  |  |  |
| --- | --- | --- |
| WEEK | DATE | TOPIC |
| 1 | September 4th | **No Tutorial** |
| 2 | September 9th | Introduction |
| 3 | September 16th | **No Tutorial** |
| 4 | September 23th | Group presentations |
| 5 | September 30th | Group presentations |
| 6 | October 7th | Group presentation |
| 7 | READING WEEK |  |
| 8 | October 21th | **No Tutorial** |
| 9 | October 28th | Group presentations |
| 10 | November 4th | Group presentations |
| 11 | November 11th | Group presentations |
| 12 | November 18th | Group presentations |
| 13 | November 25th | Group presentations |
| 14 | December 2nd | **No Tutorial** |

Tutorial attendance is mandatory and consists of group presentations. These presentations will be run in the style of a journal club. At the start of the semester, you will be divided into small groups and assigned a journal article that is related to one of the topics we discussed in class. Groups are expected to meet outside of class time and learn the contents of the article. Each group will then present their article to the class and answer audience questions. Groups will be evaluated based on their understanding of the paper, oral presentation style and ability to answer questions. Each group will be evaluated by the teaching assistants and your grade counts as the presentation component of your final grade (25%).

**EVALUATION**

* Midterm Exam 25% (held in class, refer to schedule above for date)
* Journal Club Presentation and Participation 25% (see tutorial schedule above)
* Written Assignment 25% (two *News & Views* style articles)
* Final Exam 25% (to be scheduled by the Registrar)

**Written Assignment**

An essential component of being a researcher in the biomedical sciences is scientific literacy and communication. These skills not only allow scientists to effectively communicate their own findings but also summarize the findings of others. *News and Views* articles are succinct commentaries on articles published in high impact journals such as *Nature* or *Science* (refer to <http://www.nature.com/news/newsandviews> for examples). These pieces are typically short (~1000 words) and are written in the style of a **journalistic news report**. The objective of these articles is to concisely summarize the findings of complex journal articles and convey these to a ***lay*** audience. Additionally, they also contain a discussion of the importance of the work and provide a critical evaluation of the research. These articles typically contain **one original figure,** which provides a pictorial overview of the major findings. Twice during the semester, you will be assigned a tutorial presentation to write a *News and Views* article on. The first article is due on **Friday, October 11th** and the second on **Friday, December 6th**. Together they are worth 25% of your final grade.

**Avenue to Learn**

In this course, we will be using Avenue to Learn (A2L). Students should be aware that, when they access the electronic components of this course, private information such as first and last names, usernames for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure.

All written work will be marked on grammar, clarity of writing, and organization, as well as content and analysis. The writing assignment must be properly referenced. It is suggested that students have Mendeley to keep track of references. This is a free reference software program offered to McMaster Students. Students are encouraged to visit the Centre for Student Development to improve their essay skills (MUSC B107; x24711). For information about the Writing Clinic and the Centre’s other services, visit the Centre’s website: <http://csd.mcmaster.ca>

**REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK**

[McMaster Student Absence Form (MSAF):](https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/msaf-mcmaster-student-absence-form/) In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

**ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES**

Students with disabilities who require academic accommodation must contact [Student Accessibility Services (SAS](https://sas.mcmaster.ca/)) at 905-525-9140 ext. 28652 or [sas@mcmaster.ca](mailto:sas@mcmaster.ca) to make arrangements with a Program Coordinator. For further information, consult McMaster University’s [*Academic Accommodation of Students with Disabilities*](https://secretariat.mcmaster.ca/app/uploads/Academic-Accommodations-Policy.pdf) policy.

**ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)**

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the [RISO](https://secretariat.mcmaster.ca/app/uploads/2019/02/Academic-Accommodation-for-Religious-Indigenous-and-Spiritual-Observances-Policy-on.pdf) policy. Students should submit their request to their Faculty Office ***normally within 10 working days*** of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

**COURSES WITH AN ON-LINE ELEMENT**

***Some courses may*** use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

**ONLINE PROCTORING**

**Some courses may** use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

**ACADEMIC INTEGRITY**

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

**It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. For information on the various types of academic dishonesty please refer to the [*Academic Integrity Policy*](https://secretariat.mcmaster.ca/app/uploads/Academic-Integrity-Policy-1-1.pdf)*,* located at [https://secretariat.mcmaster.ca/university-policies-procedures- guidelines/](https://secretariat.mcmaster.ca/university-policies-procedures-%20guidelines/)

**The following illustrates only three forms of academic dishonesty:**

* plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
* improper collaboration in group work.
* copying or using unauthorized aids in tests and examinations.

**The Use of Generative Artificial Intelligence (AI)**

Students may use generative AI for [editing/translating/outlining/brainstorming/revising/etc] their work throughout the course so long as the use of generative AI is referenced and cited. Use of generative AI outside the stated use of [editing/translating/outlining/brainstorming/revising/etc] without citation will constitute academic dishonesty. It is the student’s responsibility to be clear on the limitations for use and to be clear on the expectations for citation and reference and to do so appropriately.

**AUTHENTICITY / PLAGIARISM DETECTION**

***Some courses may*** use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster’s use of Turnitin.com please go to [www.mcmaster.ca/academicintegrity.](http://www.mcmaster.ca/academicintegrity)

**CONDUCT EXPECTATIONS**

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all our living, learning and working communities. These expectations are described in the [*Code of Student Rights & Responsibilities* (the “Code”).](https://secretariat.mcmaster.ca/app/uploads/Code-of-Student-Rights-and-Responsibilities.pdf) All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students’ access to these platforms.

**COPYRIGHT AND RECORDING**

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

**RESEARCH ETHICS** – NA

**EXTREME CIRCUMSTANCES**

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.