Course Information

1. General Course Information

Course: BIOL501

Course title: Advances in Molecular Biology of Host-Microbiome

Pre-requisites: (Level 4 or above and registration in a Biology Honours Plan and a minimum GPA of 2.0 in the Biological Foundations List) or permission of the Department.

Semester and year: Winter 2026

Number of credits: 3.0

Learning hours: 120

Modality (on campus, blended, or online): On Campus

Classroom accessibility: Consult Queen's building guide

2. Course Description

This course explores recent advances in the molecular biology of microbiome interactions across a range of host systems, including plants, insects, and mammals (including humans). Through critical analysis of current scientific literature, students will investigate the molecular mechanisms that govern these complex relationships. Topics may include the host's genomic responses to microbial colonization, microbial influences on host gene expression, host–microbe molecular communication, and the molecular basis of symbiotic and pathogenic interactions. Emphasis is placed on current research techniques, experimental approaches, and emerging concepts in the field. Students will engage with the material through seminar presentations, written critiques, and the development of scientific reviews.

3. Topics

Week(s)	Topic
1	Course Introduction; Microbiome Background; News & Views
2	Methods in Microbiome Research; How to Present; News & Views
3	How to Prepare a Proposal; Primary Literature Discussion Leadership; News & Views
4 - 5	Primary Literature Discussion Leadership; News & Views
6	News & Views; Mock Research Exercise
7 - 8	Primary Literature Discussion Leadership; News & Views
9 - 10	News & Views; Scientific Debate
11 -12	Research Proposal Seminars

4. Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Critically analyze primary literature and identify key research questions and knowledge gaps in host–microbiome molecular biology.
2. Develop and communicate research ideas through proposals, oral presentations, and debates.
3. Collaborate effectively with peers on data analysis, discussions, and research exercises.

4. Apply data analysis and bioinformatics tools to interpret microbiome datasets and draw evidence-based conclusions.
5. Engage in scientific discourse by providing and responding to constructive peer feedback.
6. Translate complex scientific findings into accessible language for non-specialist audiences.
7. Demonstrate professional, ethical, and inclusive conduct in all seminar activities.

5. Important University Dates

Please visit the Faculty of Arts and Sciences Sessional Dates website for all academic deadlines.

Inclusion

6. Land Acknowledgement

Let us acknowledge that Queen's University occupies traditional Anishinaabe and Haudenosaunee territory. To acknowledge this traditional territory is to recognize its longer history, one predating the establishment of the earliest European colonies. It is also to acknowledge this territory's significance for the Indigenous Peoples who lived, and continue to live, upon it and whose practices and spiritualties are tied to the land and continue to develop in relationship to the territory and its other inhabitants today. Indigenous communities in Kingston/Katarokwi continue to reflect the area's Anishinaabe and Haudenosaunee roots. There is also a significant Métis community and First Peoples from other Nations across Turtle Island present here today. To read more about the history of the land, see the Queen's Encyclopedia and to learn more about land acknowledgements, see the Office of Indigenous Initiatives.

7. Equity, Diversity, and Inclusivity Statement

Queen's University recognizes that the values of equity and diversity are vital to and in harmony with its educational mission and standards of excellence. It acknowledges that direct, indirect, and systemic discrimination exists within our institutional structures, policies, and practices and in our community. These take many forms and work to differentially advantage and disadvantage persons across social identities such as race, ethnicity, disability, gender identity, sexual orientation, faith, and socioeconomic status, among other examples. In this class I will work to promote an anti-discriminatory, anti-racist and accountable environment where everyone feels welcome. Every member of this class is asked to show respect for every other member.

8. Building a Classroom Community

University is a place to share, question, and challenge ideas. Each student brings a different set of lived experiences. You can help to create a safer, more respectful classroom community for learners by following these guidelines:

- Make a personal commitment to learn about, understand, and support your peers.
- Assume the best of others and expect the best of them.
- Recognize and value the experiences, abilities, and knowledge each person brings to the course.
- Acknowledge the impact of oppression on other people's lives and make sure your words and tone are respectful and inclusive.
- Encourage others to develop and share their ideas.
- Pay close attention to what your peers say/write before you respond. Think through and re-read what you have written before you post online or send your comments to others.

- Be open to having your ideas challenged and challenge others with the intent of facilitating growth.
- Look for opportunities to agree with one another, building on and intentionally referencing peers' thoughts and ideas; disagree with ideas without making personal attacks, demeaning, or embarrassing others.

9. Fostering Accessibility

All of us have a shared responsibility for reducing barriers to learning and fostering accessibility, and promoting meaningful inclusion of those with disabilities. The Accessibility Hub at Queen's University's Human Rights & Equity Office offer a host of tutorials that provide us all with practical tips for:

- creating accessible documents, e.g., to submit to your teaching team or share with peers in peer feedback activities/in a presentation,
- emails, e.g., while communicating with group members or your teaching team, and
- meeting practices (e.g., in tutorials/labs/seminars or virtual meetings.

10. Name/Pronoun

If, for whatever reason, you wish to change how your name appears in onQ and/or on class lists, please follow these steps. You may also use this process to add your pronouns to the appearance of your name.

1. Log into SOLUS.
2. Click on Personal Information tab.
3. Click on the Names tab
4. Click on the Add New Name tab
5. Choose Preferred from the Name Type drop down menu
6. Enter the name you would like to appear in onQ and/or on class lists.
7. Click Save.

Please allow 24 to 48 hours for your name to be registered within the system. If you have further questions or concerns, please contact ITS at Queen's University.

Course Materials & Technologies

No text is required in this course. All readings will be made available through the library or onQ.

11. Other Required Materials or Technologies

Resource	Resource Type	Access	Cost
PowerPoint Slides	Course Notes	onQ	none

12. Supplemental Materials

Resource	Resource Type	Access	Cost
Journal Articles	Other	Library or onQ	none

13. Educational Technologies, Help, Privacy, and Accessibility

This course makes use of the following website(s), program(s), and/or application(s) for specific educational use/purposes.

Privacy: Be aware that your independent use of the website(s), programs, and/or application(s) used in this course*, beyond what is required,* is subject to their terms of use and privacy policy. You are encouraged to review the applicable privacy statements before using the site. Please see below.

Accessibility: Queen's University is committed to developing courses that are accessible. For further information on accessibility compliance of the website(s), program(s) application(s) used in the course, please consult the links below.

Software	Use	Support	Privacy	Accessibility
onQ	Online learning	Queen's ITS	Queen's ITS	Queen's ITS

14. Copyright of Course Material

Course materials created by the course instructor, including all slides, presentations, handouts, tests, exams, and other similar course materials, are the intellectual property of the instructor. It is a departure from academic integrity to distribute, publicly post, sell or otherwise disseminate an instructor's course materials or to provide an instructor's course materials to anyone else for distribution, posting, sale or other means of dissemination, without the instructor's express consent. A student who engages in such conduct may be subject to penalty for a departure from academic integrity and may also face adverse legal consequences for infringement of intellectual property rights.

Communication

15. Questions about the Course and Contacting the Teaching Team

Please see onQ page for information about contacting the teaching team.

16. Queen's Email

The university communicates with students via Queen's email. Please check your email regularly to ensure you do not miss important information related to your course.

17. Course Feedback

At various points during the course, you may be asked to take part in a variety of feedback activities, such as surveys and questionnaires. This feedback enables the teaching team to improve the course. All surveys are anonymous and are directly related to activities, assessments, and other course material.

Assessments

18. Weighting and Alignment with Course Learning Outcomes (CLOs)

Assessment	Alignment with CLOs	Weighting
Seminar Participation	1,2, 3, 5, 7	10%
News & Views	2, 6, 7	5%
Primary Literature Discussion Leadership	1, 2, 3, 5, 7	2 x 7.5% = 15%
Mock Research Exercise	2, 3, 4, 5, 7	5%
Scientific Debate	2, 3, 5, 7	15%
Research Proposal (Parts 1 -5)		
Part 1: Topic Section and Research Article Analysis	1, 2, 5	5%
Part 2: Draft Research Proposal	1, 2, 4, 5	10%
Part 3: Peer Review	3, 5, 7	10%
Part 4: Final Research Proposal	1, 2, 4, 5, 7	15%
Part 5: Final Proposal Seminar	2, 5, 6, 7	10%
Total		100%

19. Assessment Flexibility

This course is universally designed to allow all students to perform at their best. For example, many written assessments can be completed in a few days, but several weeks are allotted to accommodate individuals who require extra time due to special needs.

20. Descriptions of Learning Activities and Assessments

Seminar Participation

Active participation is essential in this upper-year seminar course. This course is designed around discussion, debate, and collaborative research exercises, and engagement is critical for student learning and the learning of their peers. Participation will be evaluated continuously throughout the course and is based on preparation, contribution, and professional engagement during all seminar activities.

News & Views

In this low-stakes assessment, students will select a recent primary research article in the field of molecular biology of host–microbiome interactions and deliver a short News & Views–style talk to the class. The aim is to communicate complex scientific findings in a way that is clear, engaging, and understandable to a general audience, similar to a popular science magazine article. This activity develops skills in science communication, summarization, and accessibility, which are essential for professional scientists interacting with non-specialist audiences, policy makers, or the broader public. The focus is on verbal clarity and engagement. These will be presented during scheduled seminar time.

Primary Literature Discussion Leadership

In this assessment, students will work in pairs to lead an in-depth, discussion-based analysis of a recent primary research paper focused on the molecular biology of host–microbiome interactions. This activity is designed to mirror how scientists critically engage with new research in lab meetings, journal clubs, and conferences. Rather than delivering a traditional presentation, you will act as discussion leaders, guiding your

peers through the key concepts, experimental approaches, data interpretation, and broader implications of the study. Each paper discussion will take place during the scheduled seminar time, and each student will present two research papers over the course of the term.

Scientific Debate

In this assessment, students will work in pairs to participate in a structured classroom debate on a controversial or debated topic in the field of molecular biology of host–microbiome interactions. The goal is to develop and defend a scientific position, critically evaluate evidence, anticipate counterarguments, and engage peers in thoughtful discussion. Each debate will feature two pairs, each representing opposing viewpoints. Students will be responsible for presenting their arguments, responding to their opponents, and interacting with the class during audience questioning. The debates are designed to reflect the rigour and discourse of scientific argumentation, promoting advanced critical thinking and communication skills.

Mock Research Exercise

In this assessment, students will work collaboratively in class to simulate a research experience, analyzing real microbiome datasets as part of a mock experiment. Using open-source bioinformatics tools, students will explore, visualize, and interpret data as if conducting a genuine microbiome research project. The activity emphasizes peer collaboration, problem-solving, and critical thinking, allowing students to experience the research process—from data analysis to interpretation and communication of findings. At the conclusion of the session, each group will prepare a short summary of their results, highlighting key findings and insights, similar to reporting preliminary results in a lab or research group setting.

Research Proposal

This assessment is the culminating project for the course and is designed to simulate an authentic research experience in the field of molecular biology of host–microbiome interactions. Over the term, students will critically engage with a primary research article, develop novel research questions, receive and provide peer feedback, and produce a full research proposal that integrates iterative revision and scientific critique.
The assignment is completed in multiple stages, each building toward the final research proposal.

Part 1 (Topic Selection and Research Article Analysis): Students will select a recent, peer-reviewed research article related to advances in the molecular biology of host–microbiome interactions. The data presented in this article will serve as the conceptual preliminary data for developing new research questions and hypotheses. Upon selection of their article, students will demonstrate their ability to critically read primary literature and identify meaning gaps that motivate new research. [Due Feb 6, 2026]

Part 2 (Draft Research Proposal): Students will prepare a complete draft of their research proposal. This draft is intended to represent their best version of the proposal (though it is not yet final). The purpose of the draft is to subsequently receive formative feedback that will help refine the research questions, experimental design and scientific argumentation. [Due Feb 27, 2026]

Part 3 (Peer Review): Critical evaluation is the cornerstone of the scientific method. Here, students will practice providing scientific critiques of two of their peers' draft research proposals. [Due Mar 6, 2026]

Part 4 (Final Research Proposal): This is the finalized version of the Research Proposal. This final proposal must demonstrate how the student has incorporated feedback from both their peers and the instructor. [Due Apr 6]

Part 5 (Final Proposal Seminar): Students will present their proposed research in a formal seminar format during Weeks 11 and 12. The presentation will consist of both an oral presentation and a question-and-answer period.

21. Assignment Submission Policy

Students with letters of accommodation should, if possible, confirm the implementation of their accommodations prior to the listed due date. Please see the "Accommodations for Disabilities" section of this syllabus for more information.

Students experiencing short-term extenuating circumstances that are beyond their control and may affect their academic work should submit a request to their faculty office for academic consideration. Please see the "Academic Considerations for Students in Extenuating Circumstances" section of this syllabus for more details.

Built-in Grace Period – Selected Assessments
To build in flexibility and promote accessibility and inclusion for all students, this course has been designed with built-in grace periods where possible.

Written Submissions: The written submissions (i.e., Research Proposal (Parts 1, 2, 3 and 4)) have a built-in three-day grace period, which aligns with the Faculty of Arts and Science's policy for Academic Considerations. If you have extenuating circumstances when a submission is due, and these circumstances will last up to three (3) days, you can use the grace period without applying for formal Academic Considerations through the Portal. The grace period is automatically applied to papers submitted up to three (3) days late. However, if your circumstances will last more than three (3) days and you have documentation, please use the Academic Considerations Portal.

Discussions, Presentations, and In-class activities: Unlike the written submissions, some assessments (i.e., News & Views, Primary Literature Discussion Leadership, Scientific Debate, Mock Research Exercise, and Research Proposal Seminar) do NOT have built-in grace periods. This is because of the interactive nature of these assessments and activities. Thus, students are asked to use the Academic Considerations Portal when relevant for these assessments.

Please see the Academic Considerations for Students with Extenuating Circumstances and Accommodations for Disabilities sections of the syllabus for more information.

22. Policy Review of Graded Work

Requests for assessment regrading may be made to your instructor minimum of 48 hours after you have received the marked copy of your assessment, but no more than 10 days later. Be sure to read the provided feedback carefully before you submit a review of graded work. To request that your assessment be reviewed, please include the following in your email:

- Your name and student number
- The original copy of your marked assessment, attached.
- Your reason for the request:
    - The specific aspects of your assessment that you believe were not sufficiently awarded, referring to the categories of the rubric.

- Why you believe that your assessment meets the criteria for a higher mark for each of the categories of the rubric that you indicated above. Please make explicit reference to the detailed descriptions of each category provided in the rubric.

If a review of graded work results in only a slightly different final grade, the original grade will stand. Should we find an error where marks were not assigned when they should have been, or were missed in adding up the total score or were added up incorrectly, resulting in a higher score than earned, the grade will be changed so that it is accurate. Grades would only increase or decrease if there was evidence of an error in marking, not simply because the regrader interprets or applies the rubric slightly differently than the original grader.

Policies

23. Class Attendance

Your presence and participation in class contributes to the knowledge and skills that you will develop throughout this course. I expect that you attend class regularly, participate in class conversations and learning activities. These types of activities provide active engagement, promote a deeper understanding of the course content, and contribute to your success in this course.

24. Academic Support

All undergraduate students face new learning and writing challenges as they progress through university: essays and reports become more complex; effectively incorporating research into writing becomes more important; the types of assignments become more diverse; managing your time and developing the skills you need to read and think critically gets more challenging. I encourage students to contact Student Academic Success Services (SASS). SASS offers many different ways to receive support:

- Free online or in-person appointments to get personalized support on writing and academic skills from expert staff and trained peers.
- Workshops and drop-in programs. SASS' Events Calendar lists events coming soon.
- Online resources that provide strategies for academic skills and writing development at university.
- If English is not your first language, SASS has specific resources for English as Additional Language students, including weekly programs and EAL academic skills appointments. You can meet on an ongoing basis with an EAL consultant to work on your academic writing, speaking, listening, and reading skills.

25. Accommodation for Disabilities

Queen's University is committed to working with students with disabilities to remove barriers to their academic goals. Queen's Student Accessibility Services (QSAS), students with disabilities, instructors, and faculty staff work together to provide and implement academic accommodations designed to allow students with disabilities equitable access to all course material (including in-class as well as exams). If you are a student currently experiencing barriers to your academics due to disability related reasons, and you would like to understand whether academic accommodations could support the removal of those barriers, please visit the QSAS website to learn more about academic accommodations or start the registration process with QSAS by clicking ***Access Ventus*** button at **Ventus | Accessibility Services | Queen's (queensu.ca)**

VENTUS is an online portal that connects students, instructors, Queen's Student Accessibility Services, the Exam's Office and other support services in the process to request, assess, and implement academic accommodations.

To learn more go to: https://www.queensu.ca/ventus-support/students/visual-guide-ventus-students

Academic Consideration for Students in Extenuating Circumstances

Academic Consideration is a process for the University community to provide a compassionate response to assist students experiencing unforeseen, short-term extenuating circumstances that may impact or impede a student's ability to complete their academics. This may include but is not limited to any extenuating circumstance (illness, bereavement, traumatic event, injury, family emergency, etc.) which is short-lived, begins within the term, and will not last longer than 12 weeks - see Academic Consideration webpage for details (https://www.queensu.ca/artsci/undergraduate/student-services/academic-consideration)

> Each Faculty has developed a protocol to provide a consistent and equitable approach in dealing with requests for academic consideration for students facing extenuating circumstances. For more information, undergraduate students in the Faculty of Arts and Sciences should consult the Faculty's webpage on Academic Consideration in Extenuating Circumstances and submit a request via the Academic Consideration Request Portal. Students in other Faculties and Schools who are enrolled in this course should refer to the protocol for their home Faculty.

Students are encouraged to submit requests as soon as the need becomes apparent and to contact their instructor and/or course coordinator as soon as possible once academic consideration has been granted. Any delay in contact may limit the options available for academic consideration. While we encourage instructors to accommodate, each instructor has discretion in deciding whether or how to apply the Academic Consideration. For more information on the Academic Consideration process, what is and is not an extenuating circumstance, and to submit an Academic Consideration request, please see the Faculty of Arts and Science's Academic Consideration website. ASO courses include links to information on **Academic Consideration** on your **Course Homepage** in onQ.

Please see the Teaching Team page for contact information for your instructor and TA(s), where relevant.

For more information, please see the Senate Policy on Academic Consideration for Students in Extenuating Circumstances.

Queen's Policy Statement on Academic Integrity

Queen's University is dedicated to creating a scholarly community free to explore a range of ideas, to build and advance knowledge and to share the ideas and knowledge that emerge from a range of intellectual pursuits. Each core value of academic integrity, as defined in the Senate Academic Integrity Policy, gives rise to and supports the next.

Honesty appears in presenting one's own academic work, whether in the context of an examination, written assignment, laboratory or seminar presentation. It is in researching one's own work for course assignments, acknowledging dependence on the ideas or words of another and in distinguishing one's own ideas and thoughts from other sources. It is also present in faithfully reporting laboratory results even when they do not

conform to an original hypothesis. Further, honesty is present in truthfully communicating in written and/or oral exchanges with instructors, peers and other individuals (e.g. teaching assistants, proctors, university staff and/or university administrators).

Trust exists in an environment in which one's own ideas can be expressed without fear of ridicule or fear that someone else will take credit for them.

Fairness appears in the proper and full acknowledgement of the contributions of collaborators in group projects and in the full participation of partners in collaborative projects.

Respect, in a general sense, is part of an intellectual community that recognizes the participatory nature of the learning process and honours and respects a wide range of opinions and ideas. However, "respect" appears in a very particular sense when students attend class, pay attention, contribute to discussion and submit papers on time; instructors "show respect by taking students' ideas seriously, by recognizing them as individuals, helping them develop their ideas, providing full and honest feedback on their work, and valuing their perspectives and their goals" ("The Fundamental Values of Academic Integrity", 3rd Edition, p. 8).

Ultimately, responsibility is both personal and collective and engages students, administrators, faculty and staff in creating and maintaining a learning environment supported by and supporting academic integrity.

Courage differs from the preceding values by being more a quality or capacity of character – "the capacity to act in accordance with one's values despite fear" ("The Fundamental Values of Academic Integrity", 3rd edition, p. 10). Courage is displayed by students who make choices and integrous decisions that are followed by action, even in the face of peer pressure to cheat, copy another's material, provide their own work to others to facilitate cheating, or otherwise represent themselves dishonestly. Students also display courage by acknowledging prior wrongdoing and taking proactive measures to rectify any associated negative impact.

All of these values are not merely abstract but are expressed in and reinforced by the University's policies and practices.

Syllabus statements for Generative Artificial Intelligence (GenAI) Tools
Not Permitted: Use of GenAI tools is not allowed in any part of student work for this course. Submitting AI-generated content constitutes a departure from academic integrity as defined by university Academic Integrity procedures.

Queen's Student Academic Success Services (SASS) offers a self-directed, online academic integrity module which we encourage all students to take which will help with:

- Understanding the nature of the academic integrity departure
- Understanding the expectations of and role of sources in scholarly writing
- Integrating sources into your writing (paraphrasing, quoting, summarizing)
- Understanding when and how to cite your sources
- Managing your time effectively to avoid the need for shortcuts
- Taking effective notes to ensure accuracy of source material and correct attribution

26. Turnitin Statement-Mandatory if using Turnitin

This course makes use of Turnitin, a third-party application that helps maintain standards of excellence in academic integrity. Normally, students will be required to submit their course assignments through onQ to Turnitin. In doing so, students' work will be included as source documents in the Turnitin reference database, where they will be used solely for the purpose of detecting plagiarized text in this course. Data from submissions is also collected and analyzed by Turnitin for detecting Artificial Intelligence (AI)-generated text. These results are not reported to your instructor at this time but could be in the future.

Turnitin is a suite of tools that provide instructors with information about the authenticity of submitted work and facilitates the process of grading. The similarity report generated after an assignment file is submitted produces a similarity score for each assignment. A similarity score is the percentage of writing that is similar to content found on the internet or the Turnitin extensive database of content. Turnitin does not determine if an instance of plagiarism has occurred. Instead, it gives instructors the information they need to determine the authenticity of work as a part of a larger process.

Please read Turnitin's Privacy Policy, Acceptable Use Policy and End-User License Agreement, which govern users' relationship with Turnitin. Also, please note that Turnitin uses cookies and other tracking technologies; however, in its service contract with Queen's Turnitin has agreed that neither Turnitin nor its third-party partners will use data collected through cookies or other tracking technologies for marketing or advertising purposes.

For further information about how you can exercise control over cookies, see Turnitin's Privacy Policy.

Turnitin may provide other services that are not connected to the purpose for which Queen's University has engaged Turnitin. Your independent use of Turnitin's other services is subject solely to Turnitin's Terms of Service and Privacy Policy, and Queen's University has no liability for any independent interaction you choose to have with Turnitin.

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