

MICROBIOLOGY 418

Industrial Microbiology and Biotechnology

MICB 418 [3]

ACKNOWLEDGEMENT

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xwməθkwəy̓əm (Musqueam) people. The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.

Homepage: <http://canvas.ubc.ca> (follow the links to MICB 418)

Location and time: MCLD 3018, Thurs 11am-12:20pm. Lectures will not be recorded.

Instructors:

Dr. David Oliver (January 8th – February 8th, 2024)

Office Hours: Tues and Thurs 12:30pm – 1pm (after class), or by appointment

Email: dcoliver@mail.ubc.ca

Dr. Jared Taylor (starting on February 13th, 2024)

Office Hours: TBD via Zoom

Email: jared.taylor@ubc.ca

Teaching Assistants:

Anne Lalande

Email: lalande@student.ubc.ca

Tutorials:

TBA

Textbook:

There is no text book for the course. Several textbooks available in the library are useful, but not essential resources.

1. Biopharmaceuticals: Biochemistry and Biotechnology, 2nd edition, Gary Walsh. Wiley.

2. Microbial Biotechnology; Fundamentals of Applied Microbiology, 2nd edition, A.N. Glazer and H. Nikaido.

W.H. Freeman and Company.

3. Introduction to Biotechnology, W.J. Thieman and M.A. Palladino, Pearson.

4. Basic Biotechnology 3rd edition, eds. by C. Ratledge and B. Kristiansen. Cambridge University Press.

5. Molecular Biotechnology: Principles and Applications of Recombinant DNA, 4th edition, B.R. Glick, J.J. Pasternak, and C.L. Patten. ASM Press.

6. Industrial Microbiology, eds. D.B. Wilson, H. Sahn, K.P. Stahmann and M. Koffas. Wiley-VCH.

Assessments:

Block I, Dr. Oliver

- Midterm Exam [40%]: Thursday February 8th, 2024 (during class, Vancouver time)
- Infographic Assignment [10%]

Block II, Dr. Taylor

- Final Exam [40%] (scheduled during exam period)
- Assignments/Presentations/Participation [10%]

The exams are not cumulative.

Exam structure will be discussed in class and tutorials.

Exam policies:

Midterm exams. If you are unable to write a midterm exam for any reason, to avoid getting a mark of zero, **please inform Dr. Oliver within one week of the midterm.** An alternate time to write the exam will be arranged.

Final exam. For missed final exams, please refer to UBC's policies for final exams.

University Policies:

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available on [the UBC Senate website: https://senate.ubc.ca/policies-resources-support-student-success](https://senate.ubc.ca/policies-resources-support-student-success)

Copyright:

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MICB 418 - Industrial Microbiology and Biotechnology

Dr. David Oliver – Block I

Topic 1 – Modern Biotechnology (with emphasis on Molecular Biology and Microbiology)

- Part I (1930s – 1960s) - Landmark discoveries in early molecular biology
- Part II (1970s) - The dawn of recombinant DNA technology and biotechnology
- Part III (1980s and 1990s) - Protein expression technologies take off; genomics, bioinformatics and systems biology emerge
- Part IV (2000s ...) - Synthetic biology and genome editing – bringing it all together

Please refer to the detailed course outline and readings document posted to Canvas.

Block I will conclude with an open book, 80-minute in-class midterm exam (40% of course grade) on Tuesday Feb 6th during our scheduled class time. More information about this exam will be provided in class.

Dr. Jared Taylor – Block II

Topics (subject to change)

Topic 1 – Bread, beer, and wine (industrial fermentation)

Topic 2 – Anaerobic digestion and bioenergy

Topic 3 – Aerobic digestion and composting

Topic 4 – Recombinant protein production

Topic 5 – Natural products and therapeutics

Topic 6 – **Group Presentations:** The legalities and ethics of biotechnology and industrial microbiology

Detailed course outline will be provided on Canvas at the start of Block II. In general, Block II will build upon Block I and the experience of reading journal papers related to industrial microbiology. During Block II, students will work in small groups on a weekly basis to read, analyze, and present salient information about relevant papers.

More information about final exam will be provided in class.

LEARNING OUTCOMES

By the end of this section of the course you can expect to:

- 1) Understand the historical development of modern biotechnology
- 2) Be able to read about, explain, and appreciate key discoveries, experiments, and technological advancements in the development of modern biotechnology
- 3) Be able to explain the scientific principles and concepts underpinning key technologies in the development in biotechnology
- 4) Be able to present and teach salient points about relevant microbiology concepts and journal papers (i.e. gain experience in teaching each other about relevant concepts)
- 5) Generate relevant questions about industrial microbiology research and journal papers.

ACADEMIC INTEGRITY

Please refer to the [UBC Academic Integrity website](#) for more information about [what academic integrity is](#) and why it is important at UBC.

Each instructor will outline their expectations and guidelines for their part of the course, and all students in MICB 418 are expected to adhere to these guidelines.

About Generative AI tools: the expectation is that all class work and assignments are completed without the help of any generative AI tool such as ChatGPT, except in cases where the instructors give specific allowances for this. Please ask us if in doubt. The unauthorized use of AI tools will constitute academic misconduct in MICB 418.