1) Course Information
This course consists of a series of lectures and laboratory exercises designed to familiarize students with current techniques in microbiology and to teach students the basics of scientific inquiry and writing.

Course Description
Laboratory techniques used in the broad discipline of microbiology, including bacteriology and virology. Laboratory exercises include the staining, biochemical characteristics and identification of live bacteria, plus genetic techniques used to study microorganisms. This course runs parallel to, and applies basic principles acquired in, Microbiology and Immunology 3100A

Learning Outcomes
The primary purpose of this course is to familiarize students with commonly used laboratory methods used for microbiology research, clinical testing, and for industrial use. In addition, students’ will be taught basic scientific writing skills and will learn how to properly design and apply data collection, data analysis and data presentation.

Course Expectations
Students are expected to attend all lectures, labs and lab follow-up session. Students will need to complete some on-line assignments prior to some lectures and to actively participate during in-lecture activities and assignments. Prior to each lab, student must read and familiarize themselves with the lab procedures and prepare a pre-lab report in their lab notebook. Over the course, students will develop a working knowledge of the microbiological techniques taught in lab, an ability to properly prepare a written scientific document, and learn the proper methods for data collection, analysis and presentation.

LECTURES: Tuesdays 1:30 – 2:20 PM, Dental Sciences Building (DSB) 2016.
Lectures consist of a mixture of traditional lectures and in-class individual and group exercises. Viewing of short videos &/or instillation of free software on students’ personal laptops may be required before some lectures. In-lecture assignments will be used for grading purposes and to measure lecture participation. Lectures will contain information on scientific writing, the scientific process, data analysis, and upcoming labs.

LABS: Tuesday or Wednesday, 2:30 to 5:30PM, MSB 120
Students will learn and perform a range of microbiological assays and procedures during the lab sessions, as well as collect the data which all lab reports, the mid-term assignment, and final assignment, are based upon. Students must complete the on-line biosafety quiz and ethics quizzes and received a grade of 100% on both before beginning lab #3 (week of September 30). Students must also sign a code of conduct at the beginning of the first lab. Students who fail to complete the biosafety test on-time, or who fail to abide by the code-of-conduct, will not be allowed in the lab. Make-up labs will not be provided for any absences, however, substitute data will be provided for any labs missed during an approved absence.
2) Pre, Co- and Anti-Requisites

- **Prerequisites:** Biology 2581B; Microbiology and Immunology 2500A/B.
- **Pre- or Co-requisites:** Biochemistry 3381A; Microbiology and Immunology 3100A
- **Anti-requisites:** The former Microbiology and Immunology 2100A and 3600G

**Senate regulation regarding requisites; student responsibilities:**
Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

3) Instructor Information

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Office</th>
<th>E-mail</th>
<th>Office Hours</th>
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<tbody>
<tr>
<td>Dr. Bryan Heit</td>
<td>HSA H320</td>
<td><a href="mailto:bheit@uwo.ca">bheit@uwo.ca</a></td>
<td>Through OWL or by appointment.</td>
</tr>
<tr>
<td>Teaching Assistants</td>
<td>TBA</td>
<td>TBA</td>
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</tr>
<tr>
<td>Lydia Dafoe (Lab Manager)</td>
<td>MSB 120</td>
<td>N/A</td>
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Most issues should be directed to Dr. Bryan Heit using the above email address. Teaching assistants will outline how, and when, they should be contacted at the start of the first lab.

4) Lecture & Lab Schedule

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<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Lab</th>
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<tbody>
<tr>
<td>September 9</td>
<td>Introduction, Scientific Writing &amp; Biosafety.</td>
<td>No Lab</td>
</tr>
<tr>
<td>September 16</td>
<td>The Big Picture, Introductions and Principals of Scientific Enquiry</td>
<td>Basic Methods</td>
</tr>
<tr>
<td>September 23</td>
<td>Materials &amp; Methods and Analysis of Image-Based Data</td>
<td>Microscopy &amp; Bacterial Stains</td>
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<tr>
<td>September 30</td>
<td>Results and Analysis of 16S rRNA Sequences</td>
<td>Bacterial Identification Lab I</td>
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<tr>
<td>October 7</td>
<td>Figures and Presentation of Numerical Data</td>
<td>Conjugation</td>
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<tr>
<td>October 14</td>
<td>Discussions and Statistical Analysis</td>
<td>Bacterial Identification Lab II</td>
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<tr>
<td>October 21</td>
<td>Abstracts and Assessing Data Quality I</td>
<td>Environmental &amp; Clinical Micro</td>
</tr>
<tr>
<td>October 28</td>
<td>The Little Bits, Introduction to the Final Report and Assessing Data Quality II</td>
<td>Cloning Lab A</td>
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<tr>
<td>November 4</td>
<td>Reading Week – No Labs or Lecture</td>
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<tr>
<td>November 11</td>
<td>Referencing &amp; Fun with Data Analysis I</td>
<td>Cloning Lab B</td>
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<tr>
<td>November 18</td>
<td>Finding &amp; Assessing the Scientific Literature &amp; Fun with Data Analysis II</td>
<td>Cloning Lab C</td>
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<tr>
<td>November 25</td>
<td>Probiotics &amp; Fun with Data Analysis III</td>
<td>Lactic acid bacteria &amp; probiotics</td>
</tr>
<tr>
<td>December 2</td>
<td>Introduction to Bioinformatics</td>
<td>Bioinformatics</td>
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</table>

**Final report due on December 10 (Tuesday lab) or December 11 (Wednesday lab).**

*Note: a calendar containing the dates of all lectures, labs, and due dates can be found on the MicroImm3610 OWL site.*
5) Course Materials

Course OWL Site: Western OWL system will be used to communicate information about the course. Students are responsible for checking the course OWL site at regular intervals. Lecture notes in PDF format will be posted on OWL prior to each lecture, as will instructions for preparing the writeups for each lab. Students are required to bring their lab manual each lab. Students can bring hard copies (printouts) of the lab writeup guidelines to the labs, but this is not required.

Internet Access: You will need access to OWL during lectures. As such students will require a laptop, tablet or smart phone with internet access during the lectures. If this is an issue, contact Dr. Heit by email to make alternative arrangements.

6) Evaluation
Laboratory Component: (40%)
• Lab write-ups (30%)
• Lab preparation mark, Biosafety quiz, Ethics quiz, TA evaluation of lab skills and general student competency (10%)

Scientific Writing & Analysis Component: (60%)
• Mid-Term report (15%)
• Final report (30%)
• In-class assignments (15%)

Policy on Rounding and Bumping of Grades
Across the Basic Medical Sciences Undergraduate Education programs and within the Department of Microbiology & Immunology we strive to maintain high standards that reflect the effort that both students and faculty put into the teaching and learning experience during this course. All students will be treated equally and evaluated based on their actual achievement. Final grades in this course will be calculated using the gradebook feature in OWL and rounded to the next whole integer, e.g. a 74.50 becomes a 75, and 74.49 becomes a 74. Marks WILL NOT be bumped to the next grade or GPA, e.g. a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark you achieved and the mark assigned; all requests for mark “bumping” will be denied.

7) Course Policies and Expectations
Code of Conduct Document: You must read, sign, and hand in the “CODE OF CONDUCT” document at the first lab.

OWL: <most stuff on owl, etc, access during lecture, more>. Students with OWL issues should contact the Computer Support Centre at 519 661-3800 or at ithelp.uwo.ca

Attendance: You are required to attend all lectures and labs. There is NO MAKE-UP lab for any reason. An absence without penalty will only be given to students with reasons approved by the Dean’s Office (see below). Approval is generally restricted to medical or compassionate reasons. The penalty for an unexcused absence is 5% deducted from the student’s final grade (e.g. 5 points subtracted from a total course mark out of 100) for each lecture missed; missed labs will be assigned a grade of 0.
Lab Coats, Safety Glasses and Lockers: You are required to provide your own lab coat and safety glasses, and these must be brought to every lab. Only the lab manual, notebook, and a pencil/pen are permitted in the lab. Lockers are available outside of the lab for storage of personal belongings, but you must provide your own lock. Locks must be removed after the lab. You may be asked to bring your cell phone into some labs, but in most cases this should be left in your locker.

Lab Notebook: You must provide your own lab notebook, in the form of a bound notebook (e.g. spiral or tape bound). A binder with loose-leaf paper is not acceptable. Your notebook should be an up-to-date, accurate account of everything you do in each lab. Your TA will check your lab notebook at each lab to help you develop record-keeping habits expected of all lab personnel. Your notebook entries should follow this format:

- **Lab Preparation Report** - details below, must be completed **before** the lab
- **Methods** - note any changes in the protocol, clarifications, etc.
- **Results** - show Raw Data, Calculations, etc.
- **Conclusion** - what do your results mean in 1-2 sentences

Lab Preparation Report: For best performance and understanding of the lab objectives and methods learned, it is important to prepare for each lab in advance. This includes reading the lab manual and preparing a “Lab Preparation Report” **before** you enter the lab. Your TA will check it at the start of the lab as evidence of your advanced preparation. Failure to do so will result in a “Lab Preparation” mark of zero for that lab.

The Laboratory Preparation Report is an account of what you are going to do during the lab. Do not copy or re-write the lab manual. It must be **HANDWRITTEN** into your lab notebook. Include:

1. **Lab Objective(s)**: 1-2 sentences (what you will learn), and
2. **Flowchart diagram** of the experimental approach to be used in the lab (show what procedures you will be doing and when)

Lab Reports: Reports must be prepared in a word processor and submitted via the OWL site. The object of these reports is for you to **integrate the information and present it in a clear and thoughtful manner in your own words**. Discussions of data and interpretations are encouraged with your lab mates, teaching assistant and instructor prior to writing your report. However, each student must write her/his lab report independently. **Individual work is mandatory.** Material cited must be referenced. Academic dishonesty will not be tolerated.

In-Lecture Exercises: Many lectures will incorporate a series of in-class exercises focused on the materials covered in the concurrent lecture. These exercises are intended to give you practice with scientific writing and analysis skills **before** having to use these skills for the preparation of the mid-term and final reports. Assessment of these exercises will be performed via OWL, and some exercises will require the instillation of free software. As such a WiFi-connected laptop will be required. If you do not have access to a laptop, contact Dr. Heit as soon as possible to arrange for alternative assessment tools. Note that submitting answers for another student is considered academic misconduct.

Mid-Term and Final Reports: A large portion of your mark is derived from the mid-term and final reports. These will be formatted similar to scientific papers. **Extensive guidelines will be provided for these reports.** To receive full marks, it is **absolutely essential** that you follow these guidelines.
8) Late Assignments & Reports
If a student lacks a valid medical or compassionate reason for late assignments, approved by the Deans Office, the following penalties will be incurred for late assignments & reports:

- On-line assignments not completed in their allotted time will be automatically assigned a grade of 0%.
- Late lab reports will be penalized 25% the first day they are overdue and 50% the second day per day they are overdue. Lab reports more than 2 days late will receive a grade of 0%.
- Late mid-term and final reports will be penalized 25% the first day they are overdue and 50% the second day per day they are overdue. Reports more than 2 days late will receive a grade of 0%.

9) Additional Information/Statements
The website for the Office of the Registrar is http://www.registrar.uwo.ca

Statement on Official Email Addresses
In accordance with policy, http://www.uwo.ca/its/identity/activatenonstudent.html
the centrally administered e-mail account provided to students will be considered the individual’s official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Statement on Academic Offences
Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following website: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

All required written papers will be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com http://www.turnitin.com

Academic Consideration for Student Absences
If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a self-reporting of absence or via the Academic Counselling Office of the Faculty of Science located in NCB 280, and can be contacted at scibmsac@uwo.ca.

For further information, please consult the university’s policy on academic consideration for student absences as there are updates to the academic consideration procedures.
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf

The policy on Accommodation for Religious Holidays can be found here:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf
A. Absence for medical reasons:
Students must familiarize themselves with the Policy on Accommodation for Medical Illness for Undergraduate Students, located at:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

A Western Student Medical Certificate (SMC) is required when a student is seeking academic accommodation. This documentation should be obtained at the time of the initial consultation with the physician/nurse practitioner or walk-in clinic.
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Medical/Compassionate Relief Program Policy
It is current policy that students who are unable to write a test or examination or other form of course evaluation are required to obtain a medical certificate that is taken to the Academic Counseling Office, NCB 280 (for Science and Basic Medical Science students) or to your appropriate Home Faculty Counseling Office. In the case of an unexpected absence on compassionate grounds, documentation is also requested. **Such documentation must be submitted by the student directly to the Academic Counseling office and not to the instructor.** An academic counselor in that office will review and either approve or deny the accommodation request. It will be the Academic Counseling office that will determine if accommodation is warranted. This policy applies to all forms of assessment, including evaluations that are less than 10%.

B. Absence for non-medical reasons:
- **Bereavement or Compassionate Reasons.** Documentation must be submitted by the student directly to the Dean’s Office and **not to the instructor.** It will subsequently be the Dean’s Office that will determine if accommodation is warranted.
- **Religious Holiday.** Students must familiarize themselves with the Policy on Accommodation for Religious Holidays.

Statement from the Academic Counselling Office, Faculty of Science (for Science and BMSc students)
If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Academic Counselling Office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved by the Academic Counselling Office and the instructor has been informed.

*A clear indication of how approved medical and non-medical absences from the midterms and final exam in this course is provided in the Evaluations section of this document.*

C. Special Examinations
http://www.uwo.ca/univsec/pdf/academic_policies/exam/definitions.pdf

A Special Examination is any examination other than the regular final examination, and it may be offered only with the permission of the Dean/Academic Counselling Office of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. You may also be eligible to write the Special Examination if you are in a “Multiple Exam Situation”. See: http://www.registrar.uwo.ca/examinations/exam_schedule.html
A Special Examination must be written at the University or an Affiliated University College no later than 30 days after the end of the examination period involved. To accommodate unusual circumstances, a date later than this may be arranged at the time permission is first given by the Dean/Academic Counselling Office of the Faculty. The Dean/Academic Counselling Office will consult with the instructor and Department Chair and, if a later date is arranged, will communicate this to the Office of the Registrar.

If a student fails to write a scheduled Special Examination, permission to write another Special Examination will be granted only with the permission of the Dean/Academic Counselling Office in exceptional circumstances and with appropriate supporting documents. In such a case, the date of this Special Examination normally will be the scheduled date for the final exam the next time the course is offered.

When a grade of Special (SPC) or Incomplete (INC) appears on a student's record, the notations will be removed and replaced by a substantive grade as soon as the grade is available.

10) Support Services:

Academic Counselling (Science and Basic Medical Sciences): http://www.uwo.ca/sci/counselling

Accessibility: Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation. The policy on Accommodation for Students with Disabilities can be found here: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf

Student Development Centre (SDC): Learning-skills counsellors at SDC are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling. http://www.sdc.uwo.ca

Mental Health: Students who are in emotional/mental distress should refer to Mental Health@Western for a complete list of options about how to obtain help. http://www.health.uwo.ca/mental_health

Student Health Services: https://www.uwo.ca/health/shs/index.html
Additional student-run support services are offered by the USC, http://westernusc.ca/services