Copyright notice: all course material produced by the faculty is copyright, and to reproduce this material for any purpose other than your own educational use contravenes Canadian Copyright law. This includes all lecture slides, notes, pre-lab talks and the lab manual.

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. Student 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 labs 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, Medical Sciences Building (MSB) 384
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 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 24). Students must also sign a code of conduct at the beginning of the first lab. Students who fail to complete the biosafety test and code-of-conduct on-time will not be allowed in the lab, and make-up labs will not be provided.

2) Pre, Co- and Anti-Requisites
- **Prerequisites:** Biology 2581B; Microbiology and Immunology 2500A/B.
- **Pre- or Co-requisites:** Biochemistry 3381A; Microbiology and Immunology 3100A.
- **Antirequisites:** 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>
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<tr>
<td>Teaching Assistants</td>
<td>TBA</td>
<td>TBA</td>
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<tr>
<td>Lydia Dafoe (Lab Manager)</td>
<td>MSB 120</td>
<td>N/A</td>
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</tbody>
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Administrative issues (e.g. missed labs) should be directed to Dr. Bryan Heit using the email address shown above. Students with OWL issues should contact the Computer Support Centre at 519 661-3800 or fill out the WebCT webform: itshelp.uwo.ca

4) Lecture & Lab Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture</th>
<th>Lab</th>
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<tbody>
<tr>
<td>September 10</td>
<td>Introduction to 3610, Scientific Writing &amp; Biosafety.</td>
<td>No Lab</td>
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<tr>
<td>September 17</td>
<td>The Big Picture, Introductions and Principals of Scientific Enquiry</td>
<td>Basic Methods</td>
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<tr>
<td>September 24</td>
<td>Materials &amp; Methods and Analysis of Image-Based Data</td>
<td>Microscopy &amp; Bacterial Stains</td>
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<tr>
<td>October 1</td>
<td>Results and Analysis of 16S rRNA Genetic Data</td>
<td>Bacterial Identification Lab I</td>
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<tr>
<td>October 8</td>
<td>Reading Week – No Lectures or Labs</td>
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<tr>
<td>October 15</td>
<td>Figures and Presentation of Numerical Data</td>
<td>Bacterial Identification Lab II</td>
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<tr>
<td>October 22</td>
<td>Discussions and Statistical Analysis</td>
<td>Environmental &amp; Clinical Sampling</td>
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<tr>
<td>October 29</td>
<td>Abstracts and Assessing Data Quality I</td>
<td>Bacterial Conjugation &amp; Plasmids</td>
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<tr>
<td>November 5</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 12</td>
<td>Referencing &amp; Fun with Data Analysis I</td>
<td>Cloning Lab B</td>
</tr>
<tr>
<td>November 19</td>
<td>Finding &amp; Assessing the Scientific Literature &amp; Fun with Data Analysis II</td>
<td>Cloning Lab C</td>
</tr>
<tr>
<td>November 26</td>
<td>Probiotics &amp; Fun with Data Analysis III</td>
<td>Lactic acid bacteria &amp; probiotics</td>
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<tr>
<td>December 3</td>
<td>Introduction to Bioinformatics</td>
<td>Bioinformatics</td>
</tr>
</tbody>
</table>

Final report due on December 11 (Tuesday lab) or December 12 (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 only on their actual achievement. Final grades on this course will be calculated to one decimal place and rounded up to the next whole integer, e.g. a 74.5 becomes a 75. 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.

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.

**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
1) Absence for medical illness
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

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. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Academic Counselling Office immediately.

A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found at:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

2) Absence for non-medical reasons
Petitions for permission to waive a laboratory assignment will be entertained only if they are submitted on compassionate grounds with supporting documentation.

- **Religious Holiday.** Students must familiarize themselves with the Policy on Accommodation for Religious Holidays.
- **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.

Ask the academic counsellor to contact Dr. Heit directly and notify him of the receipt and approval of your document by the Office of the Dean. This has to be done immediately upon your return to Western. Details of how missed labs and assignments will be dealt with can be found in sub-section 3, below.
3) **Missed labs and assignments due to an approved absence**
   - **Labs:** There will be no makeup for missed labs. If required for future labs or assignments, TAs will provide the student with replacement data for data acquired during the student’s absence. Lab write-up and competency marks will be re-weighted to account for the missing labs.
   - **On-line Assignments:** Students will be given additional time to complete any missed on-line assignments, equal to the duration of their approved absence, starting on the date the student receives his/her Dean’s office approval of their absence. In the event multiple assignments are missed, the extension time for those assignments will run concurrently.
   - **In-Lecture Assignments:** There will be not make-up for missed in-lecture assignments. In-Lecture assignment marks will be re-weighted to account for the missing lecture.
   - **Mid-Term and Final Reports:** In the event a student misses the mid-term or final report deadline they will be given an extension of the same duration as their approved absence, starting on the date of the deadline.

4) **No electronic devices of any kind may be used in the laboratory**
   Such devices must be turned off and stored in the lockers located outside of the lab. **This is for your safety.**

5) **Scholastic offences are taken seriously**
   Students will have to complete an on-line ethics education module and quiz, and are directed to read the appropriate university policy – specifically, the definition of what constitutes a Scholastic Offence, at the following website:

6) **All written assignments are subject to submission for similarity review**
   All written assignments are subject to submission for similarity review using the commercial 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](http://www.turnitin.com)).

10) **Support Services**
    Registrarial Services: [http://registrar.uwo.ca](http://registrar.uwo.ca)
    Academic Counselling: [http://www.uwo.ca/sci/counselling](http://www.uwo.ca/sci/counselling)
    USC Student Support Services: [http://westernusc.ca/services/](http://westernusc.ca/services/)
    Student Development Services: [http://sds.uwo.ca](http://sds.uwo.ca)
    Student Health Services: [http://www.health.uwo.ca/](http://www.health.uwo.ca/)

    Students who are in emotional/mental distress should refer to Mental Health@Western [https://www.uwo.ca/health/mental_wellbeing/self/student.html](https://www.uwo.ca/health/mental_wellbeing/self/student.html) for a complete list of options about how to obtain help.