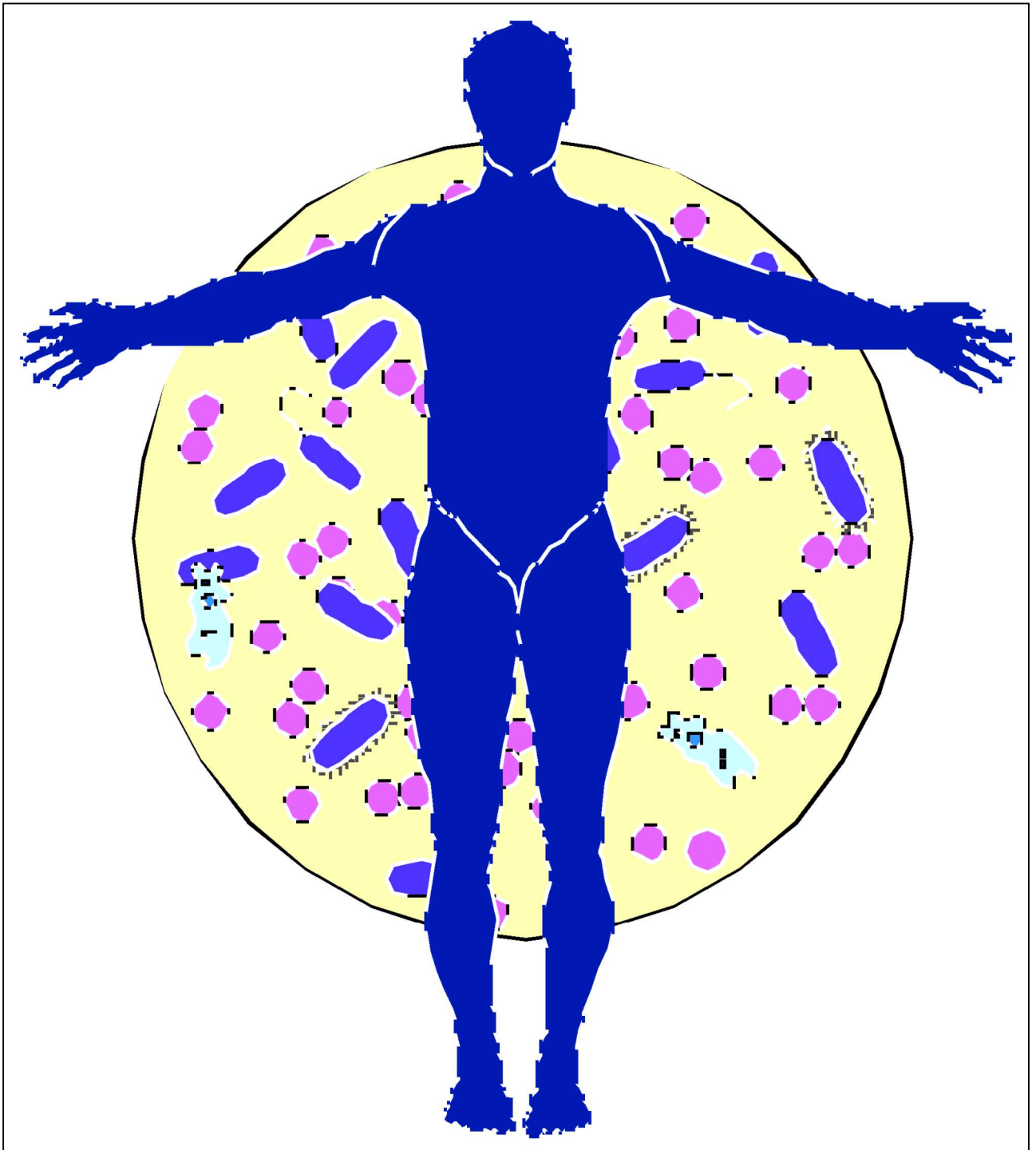


SCHOOL OF BIOTECHNOLOGY AND BIOMOLECULAR SCIENCES  
THE UNIVERSITY OF NEW SOUTH WALES

# BACTERIA AND DISEASE

**BABS 3081**

**2021**





**UNSW**  
A U S T R A L I A

Science

BIOTECHNOLOGY & BIOMOLECULAR SCIENCES

BABS3081

**BACTERIA AND DISEASE**

Term 2, 2021

## Contents

Information about the Course	3
Staff involved in the Course	3
Course Details	4
Rationale and Strategies Underpinning the Course	6
Course Schedule	7
Assessment procedures	9
Additional Resources and Support	10
Required Equipment, Training and Enabling Skills	10
Administration Matters	10
UNSW Academic honesty and plagiarism	14
Risk assessment	15
Systematic Medical Microbiology	19
Kit One	21
Kit Two	29
Diagnosis of bacterial infections	46
Wound swabs	53
Research project	56
Techniques in Medical Microbiology	92
Media in Medical Microbiology	102
Appendix 1: Commercial kits used	110



## 1. Information about the Course

Year of Delivery	2021			
<u>Course Code</u>	BABS3081			
Course Name	Bacteria and Disease			
Academic Unit	Biotechnology & Biomolecular Science			
Level of Course	3 <sup>rd</sup> UG			
Units of Credit	6UOC			
Session(s) Offered	Term 2			
Assumed Knowledge, Prerequisites or Co-requisites	Prerequisite: MICR2011 Highly recommended: BABS3041 or BABS3641			
Hours per Week	7			
Number of Weeks	10			
Commencement Date	31 <sup>st</sup> May 2021			
<b>Summary of Course Structure (for details see 'Course Schedule')</b>				
<b>Component</b>	<b>HPW</b>	<b>Time</b>	<b>Day</b>	<b>Location</b>
<i>e.g. Lectures</i>	3			
Lecture 1		2-3 pm	Monday	Online
Lecture 2		12-1 pm	Tuesday	Online
Lecture 3		12-1 pm	Friday	Online
Laboratory				
Lab – Component 1	4 hrs: Weeks 2 - 9	2-6pm	Thursday	Bioscience South Lab 11 and 12
Online				
Other activities, e.g., field trips				
<b>TOTAL</b>	<b>7</b>			

## 2. Staff Involved in the Course

Staff	Role	Name	Contact Details	Consultation Times
<b>Course Convenor</b> (please see note below)		Professor Ruiting Lan	Rm 3115 E26, Ph 9385 2095 r.lan@unsw.edu.au	By appointment
<b>Additional Teaching Staff</b>	Lecturers & Facilitators	Dr Jai Tree	Rm 3114, Ph 9385 2040 h.mitchell@unsw.edu.au  Rm 3113, Ph 9385 9142. j.tree@unsw.edu.au	By appointment
	Demonstrators	Hiroki Suyama Winton Wu  Emma Harding	<a href="mailto:h.suyama@unsw.edu.au">h.suyama@unsw.edu.au</a> <a href="mailto:z3462135@student.unsw.edu.au">z3462135@student.unsw.edu.au</a> <a href="mailto:e.harding@unsw.edu.au">e.harding@unsw.edu.au</a>	
	Technical Staff	Tim Nguyen Tanjina Haque		

### **3. Course Details**

#### **Course description**

Bacteria and Disease aims to provide students with a high level of understanding of the pathogenic mechanisms used by a diverse array of bacterial pathogens to cause human disease. In addition, the epidemiology and strategies used to control and prevent these infectious diseases will be discussed. The lecture program will include key pathogens infecting different body systems. In conjunction with the lecture program, the laboratory program will provide students with practical experience in contemporary medical microbiology techniques used for the diagnosis of bacterial infections. In addition, students will develop their research skills by conducting a research project on the isolation and characterisation of a common bacterial pathogen using conventional and molecular techniques.

#### **Course Learning Outcomes**

At the end of this course, students will be competent to:

1. Explain the pathogenic mechanisms used by common bacteria to cause disease and identify common pathogenic mechanisms used by these bacteria
2. Identify approaches that can be used to control the spread of disease as well as strategies that can be taken to prevent disease
3. Undertake the steps required to isolate, identify and report bacterial pathogens in a routine microbiology laboratory
4. Conduct research experiments, collect and analyse data and write a research report

<b>Course Learning Outcome (CLO)</b>	<b>LO Statement</b>	<b>Related Tasks &amp; Assessment</b>
CLO 1	Able to explain the pathogenic mechanisms used by common bacteria to cause disease and identify common pathogenic mechanisms used by these bacteria	Lectures and mid session and final exams
CLO 2	Able identify approaches that can be used to control the spread of disease as well as strategies that can be taken to prevent disease	Lectures and mid session and final exams
CLO 3	Able to undertake the steps required to isolate, identify and report bacterial pathogens in a routine microbiology laboratory	Prac program, lab tests, diagnostic reports
CLO 4	Able to conduct research experiments, collect and analyse data and write a research report	Research project and report

**Major Topics  
(Syllabus Outline)**

**Lecture Program**

For the organisms listed below students should be able to:

1. List major diseases caused.
2. Explain in detail the mechanisms of pathogenesis in the diseases you have listed above.
3. Understand the limitations of our knowledge and identify unsolved problems in our understanding of how bacteria cause disease.
4. Identify approaches that can be used to control the spread of disease as well as strategies that can be taken to prevent disease.

**Bacteria covered:**

*Staphylococcus aureus*

*Staphylococcus saprophyticus*

*Streptococcus pneumoniae*

*Mycobacterium tuberculosis*

*Corynebacterium diphtheriae*

*Vibrio cholerae*

*Clostridium botulinum*

*Clostridium perfringens*

*Bordetella pertussis*

*Neisseria meningitidis*

*Salmonella enterica*

*Staphylococcus epidermidis*

*Streptococcus pyogenes*

Viridans group of streptococci

*Mycobacterium avian-intracellulare complex*

*Escherichia coli*

*Pseudomonas aeruginosa*

*Clostridium tetani*

*Helicobacter pylori*

*Campylobacter concisus*

*Neisseria gonorrhoeae*

**Practical Program**

1. For the specimens listed below

- Wound swabs

Students should be able to:

- a. Name the major pathogens that could be isolated from the specimen
  - b. Name normal flora commonly found in that specimen
  - c. Describe a protocol for culture and identification that would result in diagnosis of the most common bacterial infections.
  - d. Set up and examine
    - i. microscopic preparations
    - ii. bacterial culture plates
    - iii. tests for the identification of microorganisms and interpret the findings.
2. Describe the major distinguishing features of the bacteria demonstrated in kits 1-2.
  3. Given appropriate plates and tests, identify organisms in Kits 1-2.
  4. Isolation and characterisation of pathogenic *E. coli* from dog faecal samples

#### 4. Rationale and Strategies Underpinning the Course

##### Teaching Strategies

*The focus of this course is to understand the mechanisms by which bacteria colonise a host and subsequently cause disease. In constructing the themes of this course, the bacteria covered were specifically chosen to provide good examples of the range of pathogenic mechanisms used by bacteria to cause disease. For example, toxin production is an important and common mechanism by which bacteria cause disease, however the structure of the toxins involved, the mechanism by which they act and their site of action varies considerably among bacteria. The bacterial examples chosen for inclusion clearly demonstrate such differences but in addition demonstrate that in relation to toxin related disease, some bacteria have very similar mechanisms despite the fact they cause very different diseases. To encourage interactions between students and staff, questions are often posed in lectures. This approach not only reinforces understanding of the concepts being taught but also encourages discussion of the similarities/differences in the mechanisms used by bacteria discussed in previous lectures. To stimulate debate, discussion and to demonstrate that science is an evolving field areas of controversy in bacterial pathogenesis are introduced*

*The practical component of this course is designed to foster independent learning, research skill development, the development of critical thought and to stimulate both written and verbal communication. To facilitate this outcome each student is provided with simulated patient specimens and is required to identify the causative agent. This approach to practical teaching is challenging to students as they are required to conduct appropriate tests, interpret the results, diagnose their patients, infections and write a microbiological laboratory report. Students are also required to conduct a research project on the isolation and characterisation of a common bacterial pathogen using conventional and molecular techniques from animal faecal samples. Through this real life min-research project, student will develop research skills scientific report writing skills, data analysis skills and a deeper understanding of human pathogens in the context of our environment.*



**5. Course Schedule****LECTURE TIMETABLE****Lecture Times and Locations:****Monday:** 2 pm - 3 pm – Online**Tuesday:** 12 pm – 1 pm – Online**Wednesday:** 12 pm – 1 pm – Online

Week	Date	Time	Lecture	Lecturer
1	31/5/2021	2-3 pm	Course introduction	RL
	1/6/2021	12-1 pm	Bacterial Pathogenesis: overview	RL
	4/6/2021	12-1 pm	Streptococcal infection	RL
2	7/6/2021	2-3 pm	<i>Staph aureus</i> infection	RL
	8/6/2021	12-1 pm	Urinary pathogenic <i>Escherichia coli</i>	JT
	11/6/2021	12-1 pm	<i>E. coli</i> and gastrointestinal infection 1	JT
3	14/6/2021	2-3 pm	Public holiday	
	15/6/2021	12-1 pm	<i>E. coli</i> and gastrointestinal infection 2	JT
	18/6/2021	12-1 pm	<i>Shigella</i> and gastrointestinal infection	RL
4	21/6/2021	2-3 pm	Mid-session exam advice	RL
	22/6/2021	12-1 pm	<i>Salmonella</i> infections	RL
	25/6/2021	12-1 pm	<i>Campylobacter</i> and gastrointestinal infections	LZ
5	28/6/2021	2-3 pm	<i>Vibrio cholerae</i>	RL
	29/6/2021	12-1 pm	Anaerobic infections	JT
	2/7/2021	12-1 pm	<i>Neisseria meningitidis</i>	RL
6	5/7/2021	2-3 pm	Flexi week	
	6/7/2021	12-1 pm	Flexi week	
	9/7/2021	12-1 pm	Flexi week	
7	12/7/2021	2-3 pm	<i>Neisseria gonorrhoeae</i> and Chlamydia	RL
	13/7/2021	12-1 pm	<i>Pseudomonas aeruginosa</i> infections	RL
	16/7/2021	12-1 pm	Mycobacterial infection	RL
8	19/7/2021	2-3 pm	<i>Helicobacter pylori</i> infection	LZ
	20/7/2021	12-1 pm	Pneumonia caused by Gram-positive cocci	RL
	23/7/2021	12-1 pm	Current research – EHEC virulence	JT
9	26/7/2021	2-3 pm	Current research - IBD	LZ
	27/7/2021	12-1 pm	Current research - <i>Bordetella pertussis</i>	RL
	30/7/2021	12-1 pm	Revision and Final exam advice	RL

RL: Prof Ruiting Lan

JT: Dr Jai Tree

LZ: Dr Li Zhang

## LABORATORY PROGRAM

All lab classes will be held in BioScience South E26 Lab 11 & 12 on Thursday from 2 to 6 pm

Week	Date	Lab activity	Research project
1	3/06/2020	Kit 1 (Gram positive pathogens)	Project planning
2	10/06/2021	Kit 2 (Gram negative pathogens)	Sample collection
3	17/06/2021	Wound infection	Isolation of pure culture
4	24/06/2021	Wound infection (ID tests except RAPID SS/U)	Identification (Gram stain)
5	1/07/2021	mid session exam/Wound infection (Rapid SS/U)	Identification (Rapid SS/U)
6	8/07/2021	Flexi week	
7	15/07/2021	Wound infection (sens testing)	DNA isolation, Phylogrouping and UPEC PCR
8	22/07/2021	Wound infection (sens results)	Gel run/inPEC PCR/ sens testing
9	29/07/2021	Wound infection (report)	Gel run/Data analysis/sens results
10	5/08/2021	No lab	Project report

## ASSESSMENT PROCEDURES

The assessment is divided into three components as listed below.

- **EXAMINATIONS**

**Mid-session examination (1 hour)**

Four short answer questions covering any part of the lecture program from week 1 up to and including week 3. **20%**

**End of session examination (2 hours)**

This will consist of eight short answer questions covering the material covered in lectures from weeks 4-9. **40%**

- **PRACTICAL ASSESSMENT\*** **40%**

The practical assessment is comprised of the following three components:

Part 1	Three lab tests (online open book)	<b>16%</b>
Part 2	Diagnostic report	<b>4%</b>
Part 3	Project report	<b>20%</b>

\*Students who fail the practical assessment will fail the subject outright.

## 7. Additional Resources and Support

<b>Text Books</b>	Engleberg, N.C; V. DiRita and T.S. Dermody. Schaechter's Mechanisms of Microbial Disease, 5 <sup>th</sup> Edition Lippincott Williams & Wilkins, 2012 Availability: UNSW Bookshop, UNSW Library Open Reserve
<b>Course Manual</b>	<i>Available on-line (please print your own hardcopy)</i>
<b>Required Readings</b>	<i>More advanced reading on the topics covered in the lecture series can be obtained through pubmed. In addition specific journal articles will be recommended by individual lecturers.</i>
<b>Recommended Internet Sites</b>	<a href="http://www.cdc.gov/">http://www.cdc.gov/</a> <a href="http://www.asm.org/index.asp">http://www.asm.org/index.asp</a>
<b>Societies</b>	<i>Australian Society for Microbiology</i>
<b>Computer Laboratories or Study Spaces</b>	NA

## 8. Required Equipment, Training and Enabling Skills

<b>Equipment Required</b>	<i>Personal protection equipment (PPE) such as safety glasses, lab coat.</i>  <i>Please see following pages for full details of Risk assessments and laboratory rules and procedures.</i>
<b>Enabling Skills Training Required to Complete this Course</b>	<i>HS, ELISE, LILT</i>

## 9. Administration Matters

<b>Expectations of Students</b>	<b>MINIMUM REQUIREMENTS TO ACHIEVE A PASS IN BABS3081</b>  All students are required to achieve a satisfactory performance in all components of the subject.  Students who have achieved an aggregate mark of 50% or more overall, but only obtain a mark of 45% or less in the final theory examination or have an unsatisfactory performance in other components of the subject, may fail outright or be required to undertake further assessment.
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	<p>Where further assessment is required, unless there are special circumstances that need to be taken into consideration, the student will be awarded either a Pass or a Fail.</p> <p>Should further assessment be required it is the responsibility of the student to be available at the time and place notified. The supplementary examinations will be held in the dates as specified below. The time and place of the exams will be given via UNSW email by BSB student office.</p>
<p><b>Health and Safety</b></p>	<p><i>Information on relevant Health and Safety policies and expectations both at UNSW: <a href="https://safety.unsw.edu.au">https://safety.unsw.edu.au</a></i></p> <p><i>In addition please see details of risk assessments and laboratory procedures on pages 15-18.</i></p>
<p><b>Assessment Procedures</b></p>	<p><b>Students have been known to suffer a major crisis such as death or illness in the family or a major personal trauma during session. Please let your subject convenor or tutor know of any such events that may affect your performance in the subject as soon as possible, so that appropriate assistance can be rendered. If you are colour blind or have a specific disability, please advise the subject convenor at the beginning of session.</b></p>
<p><b>Special Consideration and Further Assessment</b></p>	<p>Students who believe that their performance, either during the session or in the end of session exams, may have been affected by illness or other circumstances may apply for special consideration. Applications can be made for compulsory class absences such as (laboratories and tutorials), in-session assessments tasks, and final examinations.</p> <p><b>Students must make a formal application for Special Consideration</b> for the course/s affected as soon as practicable after the problem occurs and <b>within three working days of the assessment to which it refers.</b></p> <p>Students should consult the “Special Consideration” section of Moodle for specific instructions related to each BABS course they are studying. Further general information on special consideration can also be found at <a href="https://student.unsw.edu.au/special-consideration">https://student.unsw.edu.au/special-consideration</a>.</p> <p><b>HOW TO APPLY FOR SPECIAL CONSIDERATION</b></p> <p>Applications must be made via Online Services in myUNSW. <b>You must obtain and attach Third Party documentation before submitting the application. Failure to do so will result in the application being rejected.</b> Log into myUNSW and go to <b>My Student Profile tab &gt; My Student Services channel &gt; Online Services &gt; Special Consideration.</b> After applying online, students must also verify supporting their documentation by submitting to <a href="#">UNSW Student Central</a>:</p> <ul style="list-style-type: none"> <li>• Originals or certified copies of your <a href="#">supporting documentation</a> (Student Central can certify your original documents), and</li> <li>• A completed <a href="#">Professional Authority form (pdf - download here)</a>.</li> </ul> <p>The supporting documentation must be submitted to Student Central for verification <b>within three working days</b> of the assessment or the period covered by the supporting documentation. Applications which are not verified will be rejected.</p> <p><b>Students will be contacted via the online special consideration system as to the outcome of their application. Students will be notified via their official university email once an outcome has been recorded.</b></p> <p><b>SUPPLEMENTARY EXAMINATIONS:</b></p> <p>The University does not give deferred examinations. However, further assessment exams may be given to those students who were absent from the final exams through illness or misadventure. Special</p>

	<p>Consideration applications for final examinations and in-session tests will only be considered after the final examination period when lists of students sitting supplementary exams/tests for each course are determined at School Assessment Review Group Meetings. Students will be notified via the online special consideration system as to the outcome of their application. <b>It is the responsibility of all students to regularly consult their official student email accounts and myUNSW in order to ascertain whether or not they have been granted further assessment.</b></p> <p style="text-align: center;"><b>Supplementary exam period for T2 2021: 6 Sep 2019 – 10 Sep 2021</b></p> <p><b>Further assessment exams will be offered on this day ONLY and failure to sit for the appropriate exam may result in an overall failure for the course. Further assessment will NOT be offered on any alternative dates.</b></p>
<p><b>DIVERSITY AND INCLUSION</b></p>	<p>In an ideal world, science would be objective. However, the reality is much of science is subjective and is historically built on a small subset of voices. In BABS we will make an effort to expose students to literature from a diverse group of scientists, despite limits still existing on this diversity. We acknowledge that it is possible that there may be some biases in the material due to the lens with which it was written, and the School welcomes feedback to improve the diversity of the course materials.</p> <p>There are challenges inherent in communicating between people from other cultures, but BABS staff will strive to ensure their passion for science is appreciated through different eyes. We have a genuine desire to experience new cultures, expand our own horizons, and transcend any barriers that interacting with diverse groups could impose. The School is acutely aware of the importance of diversity and inclusion in all aspects of life and BABS academics strive to uphold these values as educators.</p> <p>The School of BABS is dedicated to creating a positive, inclusive educational environment that embraces diversity in all forms and rejects any form of hostile workplace, discrimination, or bullying. We have a clear statement of behavioural expectations (as well as definitions of discrimination, (sexual) harassment and bullying, which can be found here: <a href="https://student.unsw.edu.au/harassment">https://student.unsw.edu.au/harassment</a>. On this website, students can also find resources and contacts for reporting issues. In addition, the Science Equity, Diversity and Inclusion Working Group of the Faculty of Science have recently launched a set of Classroom Inclusivity Guidelines that all staff and students are striving to work under. They can be found here: <a href="https://www.science.unsw.edu.au/our-faculty/classroom-inclusivity-guidelines">https://www.science.unsw.edu.au/our-faculty/classroom-inclusivity-guidelines</a></p> <p>Beyond the University protocols, it is our goal in BABS to create a learning environment for our students that supports a diversity of thoughts, perspectives and experiences, and honors student identities (including race, gender, class, sexuality, religion, ability). To help accomplish this:</p> <ul style="list-style-type: none"> <li>- If you choose, please let convenors and the class know your chosen name and pronouns.</li> <li>- Your classmates and demonstrators (like many people) are still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please let the School know.</li> <li>- As a participant in course discussions, you should also strive to honor the diversity of your classmates (e.g. make sure all voices are being heard).</li> </ul>

	<p>- If you feel like your performance in the class is being impacted by your experiences outside of class, please let your course convenor know.</p> <p>In addition those students who have a disability that requires some adjustment in their teaching or learning environment (e.g. access requirements, assessment arrangements) are encouraged to discuss their study needs with the course Convenor and with the Equitable Learning Service <a href="https://student.unsw.edu.au/els">https://student.unsw.edu.au/els</a>).</p> <p>Finally, the School recognises the added challenges faced by students during the coronavirus outbreak, in particular those related to teaching and learning remotely while public health is managed. Specific details on how this course will be managed are given throughout this manual and will be highlighted further in the first lecture, but please be assured the School of BABS will strive to minimise stress to students while still endeavoring to deliver a high-quality teaching experience.</p>		
<p><a href="#">Grievance Policy</a><sup>2</sup></p>	<p><b>School Contact</b></p>	<p><b>University Contact</b></p>	
	<p>Online at <a href="https://nucleus.unsw.edu.au/en">https://nucleus.unsw.edu.au/en</a> or visit the Student Hub at the UNSW Main Library</p>	<p><a href="https://student.unsw.edu.au/wellbeing">https://student.unsw.edu.au/wellbeing</a></p>	

<sup>2</sup> <https://student.unsw.edu.au/complaint>

## 10. UNSW Academic Honesty and Plagiarism

### What is Plagiarism?

Plagiarism is the presentation of the thoughts or work of another as one's own.

\*Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;
- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

[www.lc.unsw.edu.au/plagiarism](http://www.lc.unsw.edu.au/plagiarism)

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

\* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle

† Adapted with kind permission from the University of Melbourne.



## **11. Risk Management**

**Working in a laboratory is inevitably associated with certain risks. Good laboratory practice means working in such a way as to eliminate, or at least minimise, these hazards. In order to perform your work safely and to comply with government legislation, a risk assessment has been conducted on all of work that will be performed in this subject in the laboratory and the following potential risks have been identified:**

**Biological hazards:** All microorganisms are potentially harmful if ingested or exposed to body surfaces. Some organisms used in this class may be opportunistic human pathogens, however none are considered to pose a significant risk if handled appropriately (see procedures below).

**Chemical hazards:** Most of the chemicals used in this subject (e.g., in solid and liquid media and most buffers) are not hazardous at the concentrations that are being used, however all chemicals should be considered potentially harmful. Some practical classes employ hazardous chemicals. In these cases the hazard is described in the class directions for that specific exercise. The concentrations of antibiotics in media are generally not harmful, however contact with skin should be avoided.

**Note:** Material Safety Data Sheets (MSDS) are available for all of the hazardous chemicals from your tutor. You should be familiar with the relevant MSDSs prior to commencing your practical work.

**Physical hazards:** Bunsen burners and heat from other sources such as water baths, breakable glassware, sharp objects such as plastic tips and needles.

**Hazards involving work environments:** The combination of large numbers of students performing laboratory work (e.g., with bunsen burners alight) and the necessity to wear protective clothing (see below), especially in summer weather, may cause discomfort to some students.

### **PROCEDURES FOR DEALING WITH RISKS**

In addition to the general risks that have been identified with laboratory work for this subject (see above), any additional risks associated with specific practicals are written in this manual at the beginning of each practical description. At the commencement of each new practical your tutor will review the risks with you. At the commencement of each class the procedures may be reviewed. You may be examined on your understanding.

It is imperative that you be present at the beginning of each class to ensure that you are available to review safety procedures. If you are not present you may be excluded from the class.

**Following are some simple rules that you must follow which will ensure good laboratory practice and minimise the consequences of risks:**

- a. Wear adequate protective clothing. This will protect you from contamination by cultures and chemicals as well as protecting the cultures and chemicals from contamination by you. A laboratory coat must always be worn while in the lab, and removed on leaving. Where necessary protective clothing also includes footwear. Fully enclosed shoes must be worn and thongs and other open, loose footwear are not permitted. Safety glasses may also be required. You should protect yourself from the possibility of falling equipment (glass) and

spilling chemicals. Also there may be broken glass, spilled liquids, etc. in the floor. Students who do not comply with these stipulations will be asked to leave the laboratory.

- b. You must not eat, drink, smoke, apply make-up etc. in the lab. Neither should you bring food, drink etc. into the lab. Habits such as chewing the ends of pens and pencils, nail biting etc. are often difficult to avoid, but you should make a conscious effort not to do them. Do not sit on laboratory benches.
- c. Do not invite anyone into the lab. They may not be aware of the hazards and may themselves create additional hazards.
- d. Practice good aseptic techniques when handling microorganisms. If you do not know what this involves you must ask. It is essential to wear gloves at all times when handling potentially pathogenic agents.
- e. Never pipette by mouth. Use plugged, sterile pipettes and mechanical pipetting devices to transfer cultures and solutions. This will prevent contamination in both directions. Take care to avoid breaking glass pipettes when inserting them into mechanical pipettors.
- f. Keep everything covered. Do not leave the plugs off flasks or caps off tubes and bottles. As well as minimising spillages this will prevent contamination of cultures and solutions.
- g. If there is an accident with a microbial culture, or hazardous chemical, ask a fellow student to call someone in authority immediately. Do not move and risk the spread of contamination. If there is a fire, remove yourself immediate danger and call someone in authority immediately.
- h. Place PIPETTES (ONLY) in the labelled containers of disinfectant. Pasteur pipettes should be disposed of in the pasteur pipette discard container. Place all other glassware in the containers provided as soon as possible after use. Broken glass, and only broken glass, should be placed in the "glass only" bins located at the front of the class. All other waste (infected or not), including used Petri dishes, should be placed in the plastic, autoclaved bags. These will be autoclaved before disposal. Never place any infectious material in the sinks, to
- i. Avoid blockages, never drop anything solid into the sinks. Special discard bottles will be provided for particular chemicals.
- j. All materials for incubation or refrigeration should be adequately labelled and placed in the relevant containers provided.
- k. Equipment such as centrifuges, baths, etc. should be operated carefully and correctly. If any doubt exists regarding the correct method of operation of any equipment, then consult a demonstrator before proceedings.
- l. Before leaving the laboratory tidy your bench, clean your bench area using disinfectant provided and wash your hands with Bioprep hand wash and water.
- m. If you feel discomfort from your work (e.g. heat exhaustion or back pain), consult your tutor or the subject authority.
- n. If you feel you may have allergic reactions or be sensitive to any of the biological or chemical components (e.g., antibiotics) used in the practicals, consult your tutor or the subject authority.
- o. If you get any biological or chemical substance (e.g., sodium hydroxide) in your eye, ensure that you immediately go to a tap and wash your eye.
- p. While washing your eye, alert someone to your situation so that they can assist you and gain the attention of someone in authority. Continue to wash your eye until someone in authority

indicates for you to do otherwise. It is imperative that you take this seriously as you may risk permanent eye damage if it is a harmful chemical. Note: you should always wear safety glasses when handling hazardous substances.

### **Health and Safety Precautions for Electronic devices including laptop computers and mobile phones.**

Mobile phones: For your own safety when using your mobile phone in class please ensure it is placed in a plastic zip lock bag. Every student will be provided with a zip lock bag in their first practical class which they should continue to use during the session (keep it with your lab book). If you misplace or loose this bag you will be expected to provide your own zip lock bag.

Computers and tablets: this applies to either your own device or those supplied by the school. Please cut a section of benchcoat (this will be provided in the lab class) and place your device on this on the lab bench to separate it from your other laboratory work. DO NOT wear gloves when using these devices. If the lab is being used as a dedicated DRY LAB (please check signage on the door) you will not be required to do this as the benches will be cleaned and decontaminated before your class.

**STUDENTS MUST NOT GO INTO THE PREPARATION ROOM AREA UNLESS DIRECTED TO DO SO BY THEIR TUTOR.**