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COURSE STAFF

Prof Rick Cavicchioli (Course Coordinator):
Location: Room 309, Biol Sci    Phone: 9385 3516    Email: r.cavicchioli@unsw.edu.au

Dr Michelle Allen
Location: Room 323, Biol Sci    Phone: 9385 2092    Email: m.allen@unsw.edu.au

Dr Mark Brown:
Location: Room G05B, Biol Sci    Phone: 9385 1255    Email: markbrown@unsw.edu.au

Dr Brendan Burns:
Location: Room 354, Biol Sci    Phone: 9385 3659    Email: brendan.burns@unsw.edu.au

Dr Suhelen Egan:
Location: Room 303, Biol Sci    Phone: 9385 8569    Email: s.egan@unsw.edu.au

Assoc Prof Torsten Thomas:
Location: Room 350, Biol Sci    Phone: 9385 3467    Email: t.thomas@unsw.edu.au

Dr Jai Tree:
Location: Room S110, Samuels    Phone: 9385 9142    Email: j.tree@unsw.edu.au

Dr Tim Williams:
Location: Room G14A, Samuels    Phone: 9385 8704    Email: t.williams@unsw.edu.au

Ms Kim Nguyen (Laboratory Technical Officer):
Location: Room 130, Biol Sci    Phone: 9385 2094    Email: kim.nguyen@unsw.edu.au

Ms Violet Heuston (BABS Student Advisor):
Location: Room G27, Biol Sci    Phone: 9385 8047    Email: v.hueston@unsw.edu.au
COURSE INFORMATION

Microbial Genetics is a course worth 6 units of credit consisting of lectures, tutorials, and practical investigations. The following pages contain a summary of the lecture material and a detailed description of the practical investigations and written assignments. Aims and objectives which each student will be expected to achieve during this course have been specified.

The course embraces a number of areas of microbial genetics; many of which are new, whereas others carry on as strands from 2nd level microbiology, genetics and molecular biology courses. The course is intended for students interested in microbiology, molecular biology and genetics. The course covers fundamentally important and well established concepts in microbial genetics, while emphasizing the latest discoveries that have emerged from contemporary research efforts in the field (presented by senior researchers in the School). Topics may include genetics of bacteriophages, bacteria, archaea and yeast, mutation and evolution, mechanisms of gene transfer, gene regulation and adaptive responses, and genomics and functional genomics of individual microorganisms and whole microbial communities. The practical component includes contemporary wet-lab microbial genetics experiments that complement lecture material. The practical also emphasizes interaction between demonstrators and students, facilitated through a rich variety of concept tutorials that cover diverse topics including experiments and outcomes involving bacteria or archaea involving transposon mutagenesis, gene library construction, gene complementation using recombinant plasmids, gene expression and regulation studies, UV mutagenesis and DNA repair, restriction/modification systems, promoter rescue experiments, and a variety of gene exchange techniques. The socioeconomic impact of microbial genetics is also discussed.

Lectures are held Monday 9-10am CLB 1 and Thursday 12noon-1pm CLB4. Session exams are held at the beginning of the laboratory class (Tues starting at 9am sharp). Laboratory classes are held Tues 9am-1pm in Lab BioSci 110. Tutorial rooms will be allocated during the laboratory class.

OBJECTIVES OF MICROBIAL GENETICS

At the conclusion of this course students will be expected:

1. To have acquired knowledge of the facts, concepts, principles and procedures presented during the course.
2. To be capable of integrating knowledge from different sources, e.g. lab sessions, lectures, assignments, other units such as microbiology, biotechnology and biochemistry.
3. To have used the information retrieval systems in the library effectively and efficiently as a supplement to lectures, tutorials and practical classes.
4. To be capable of carrying out experiments, employing a personally responsible, scientifically honest and systematic approach. This includes competently organizing work in the laboratory, making accurate and complete observations and records, developing skill and confidence in the use of laboratory equipment and performing techniques with safety and reliability.
5. To have developed the ability to interpret data, analyze results and discuss these with respect to the aims of the experiment. This involves understanding both the principles and methodology of the experiments.

It is expected that students who perform to a satisfactory level in this course will develop the following attributes which are particularly relevant to Science graduates:

- Research, inquiry and analytical thinking abilities
- Capability and motivation for intellectual development
- Ethical, social and professional understanding
- Communication
- Teamwork, collaborative and management skills
- Information literacy
5

OPPORTUNITIES FOR ACHIEVING OBJECTIVES

(a) It is the responsibility of the convenor and demonstrators to provide opportunities for student learning directed towards the attainment of each of the above objectives.

(b) It is the responsibility of the student to make use of the learning opportunities provided, using the statement of goals and objectives as guides.

(c) The choice of learning activities will be influenced by the nature of the course matter, the interest and expertise of staff and students, as well as by the availability of materials and other resources.

(d) Students are encouraged to consult with the course authority if in doubt as to their progress or how certain objectives may best be achieved in the course.

(e) Lectures, as well as providing facts, will attempt to provide an understanding of processes by which scientific enquiries and discoveries are made. By referring to examples, lecture material should illustrate how scientific theories can be developed from experimental results. The possibilities for alternative interpretations yielding controversy in theories especially in certain fields of current interest will be presented. Following such examples, students are encouraged to undertake similar enquiry themselves, depending on their interests.

(f) Students will also be encouraged to think about processes of experimental enquiry, especially as it applies to the laboratory investigations.
### BABS3021/MICR3621: MICROBIAL GENETICS

**SCHOOL OF BIOTECHNOLOGY AND BIOMOLECULAR SCIENCES**
**SESSION 1 2016 LECTURE & SESSION EXAM SCHEDULE**

<table>
<thead>
<tr>
<th>Week No.</th>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29/2</td>
<td>9-10</td>
<td>Bacterial conjugation</td>
<td>RC</td>
</tr>
<tr>
<td></td>
<td>3/3</td>
<td>12-1</td>
<td>Bacteriophage genetics – λ phage</td>
<td>RC</td>
</tr>
<tr>
<td>2</td>
<td>7/3</td>
<td>9-10</td>
<td>Bacteriophage genetics - λ phage</td>
<td>RC</td>
</tr>
<tr>
<td></td>
<td>10/3</td>
<td>12-1</td>
<td>Bacteriophage genetics - λ phage</td>
<td>RC</td>
</tr>
<tr>
<td>3</td>
<td>14/3</td>
<td>9-10</td>
<td>Bacteriophage genetics - λ phage</td>
<td>RC</td>
</tr>
<tr>
<td></td>
<td>17/3</td>
<td>12-1</td>
<td>Archaeal genetics</td>
<td>RC</td>
</tr>
<tr>
<td>4</td>
<td>21/3</td>
<td>9-10</td>
<td>Lateral gene transfer and evolution</td>
<td>TT</td>
</tr>
<tr>
<td></td>
<td>24/3</td>
<td>12-1</td>
<td>Genomics and DNA sequencing</td>
<td>TT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Recess 25/3 – 3/4</strong></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4/4</td>
<td>9-10</td>
<td>Microbial signalling and interactions</td>
<td>SE</td>
</tr>
<tr>
<td></td>
<td>7/4</td>
<td>12-1</td>
<td>Microbial signalling and interactions</td>
<td>SE</td>
</tr>
<tr>
<td>6</td>
<td>11/4</td>
<td>9-10</td>
<td>Bacterial &amp; archaeal diversity</td>
<td>MB</td>
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<tr>
<td></td>
<td><strong>12/4</strong></td>
<td><strong>9</strong></td>
<td><strong>Session exam 1 (covering weeks 1-5)</strong></td>
<td></td>
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<tr>
<td></td>
<td>14/4</td>
<td>12-1</td>
<td>Bacterial &amp; archaeal diversity</td>
<td>MB</td>
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<tr>
<td>7</td>
<td>18/4</td>
<td>9-10</td>
<td>Microbial adaptation – lab-based omic studies</td>
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<td>21/4</td>
<td>12-1</td>
<td>Microbial adaptation – lab-based omic studies</td>
<td>RC</td>
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<tr>
<td>8</td>
<td>25/4</td>
<td></td>
<td><em>Anzac Day holiday</em></td>
<td></td>
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<tr>
<td></td>
<td>28/4</td>
<td>12-1</td>
<td>Cyanobacterial genetics</td>
<td>BB</td>
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<tr>
<td>9</td>
<td>2/5</td>
<td>9-10</td>
<td>Microbial adaptation – field-based omic studies</td>
<td>RC</td>
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<tr>
<td></td>
<td>5/5</td>
<td>12-1</td>
<td>Microbial adaptation – field-based omic studies</td>
<td>RC</td>
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<tr>
<td>10</td>
<td>9/5</td>
<td>9-10</td>
<td>Microbial adaptation – field-based omic studies</td>
<td>RC</td>
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<td></td>
<td>12/5</td>
<td>12-1</td>
<td>Archaeal pathogens</td>
<td>RC</td>
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<tr>
<td>11</td>
<td>16/5</td>
<td>9-10</td>
<td>Metaproteomics of marine microbes</td>
<td>TW</td>
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<td></td>
<td><strong>17/5</strong></td>
<td><strong>9</strong></td>
<td><strong>Session exam 2 (covering weeks 6-10)</strong></td>
<td></td>
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<tr>
<td></td>
<td>19/5</td>
<td>12-1</td>
<td>Pyrotag led discoveries of microbial communities</td>
<td>MA</td>
</tr>
<tr>
<td>12</td>
<td>23/5</td>
<td>9-10</td>
<td>Transcriptional regulation in bacteria</td>
<td>JT</td>
</tr>
<tr>
<td></td>
<td>26/5</td>
<td>12-1</td>
<td>Post-transcriptional regulation in bacteria</td>
<td>JT</td>
</tr>
</tbody>
</table>

Lectures are held Monday 9-10am CLB1 and Thursday 12noon-1pm CLB4.
Laboratory classes are held Tuesday 9-1pm in Lab BioSci 110.
Session exams are held at the beginning of the laboratory class (Tuesday starting at 9am sharp).

RC, Prof Rick Cavicchioli; TT, Assoc Prof Torsten Thomas; MB, Dr Mark Brown; SE, Dr Suhelen Egan; BB, Dr Brendan Burns; TW, Dr Tim Williams; MA, Dr Michelle Allen; JT, Dr Jai Tree.

Public holidays Session 1: March 25, 27 and 28, April 25 and June 13.
## PRACTICAL and SESSION EXAM SCHEDULE

<table>
<thead>
<tr>
<th>Week No.</th>
<th>2/3</th>
<th>3/4</th>
<th>4/5</th>
<th>5/6</th>
<th>7/8</th>
<th>9/10</th>
<th>11/12</th>
<th>13/14</th>
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<tr>
<td>Prac dates</td>
<td>8/3</td>
<td>15/3</td>
<td>22/3</td>
<td>5/4</td>
<td>12/4</td>
<td>19/4</td>
<td>26/4</td>
<td>3/5</td>
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### PRAC
- Investigation 1
  - X
  - X
  - X
- Concept tutorial 1 (MICR3621)
  - X
- Concept tutorial 2
  - X
- Investigation 2
  - X
  - X
  - X
  - X
  - X
  - X
  - X
- Concept tutorial 3 (MICR3621)
  - X
- Concept tutorial 4
  - X
- Concept tutorial 5
  - X
  - X
  - X
  - X
- Concept tutorial 6
  - X

### ASSESSMENT
- Quiz
  - X
- Concept tutorial 1 (MICR3621)
  - X
- Investigation 1
  - X
- Concept tutorial 2
  - X
- Concept tutorial 3 (MICR3621)
  - X
- Session exam 1
  - X
- Concept tutorial 4
  - X
- Session exam 2
  - X
- Concept tutorial 5
  - X
- Concept tutorial 6
  - X
- Investigation 2
  - X

Practicals and session exams are in Lab BioSci 110 on Tuesday from 9 am – 1 pm.
Public holidays Session 1: March 25, 27 and 28, April 25 and June 13.

### TITLES of PRACTICALS and CONCEPT TUTORIALS

- **Investigation 1**: Genetic transfer of antibiotic resistance from *Pseudomonas aeruginosa* to *Escherichia coli* K12
- **Concept tutorial 1**: Transfer of genes by F-prime donor strains of *Escherichia coli* K12 (MICR3621)
- **Concept tutorial 2**: DNA repair mechanisms in bacteria
- **Concept tutorial 3**: Restriction and modification of DNA (MICR3621)
- **Investigation 2**: Transposon mutagenesis and isolation of auxotrophic mutants
- **Concept tutorial 4**: Detection of promoter sequences of *Lactococci*
- **Concept tutorial 5**: Plasmid transfer, genetic stability and nisin resistance in *Lactococci*
- **Concept tutorial 6**: Microbial genetics and society
ASSESSMENT

<table>
<thead>
<tr>
<th>Week</th>
<th>Assessment</th>
<th>BABS3021 (%)</th>
<th>MICR3621 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Quiz</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Concept tutorial 1 test</td>
<td>-</td>
<td>5*</td>
</tr>
<tr>
<td>4</td>
<td>Investigation 1 test</td>
<td>5</td>
<td>5*</td>
</tr>
<tr>
<td>5</td>
<td>Concept tutorial 2 report</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Concept tutorial 3 test</td>
<td>-</td>
<td>5*</td>
</tr>
<tr>
<td>6</td>
<td>Session exam 1 (covering wks 1-5)</td>
<td>12</td>
<td>15</td>
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<tr>
<td>8</td>
<td>Concept tutorial 4 test</td>
<td>5</td>
<td>5*</td>
</tr>
<tr>
<td>11</td>
<td>Session exam 2 (covering wks 6-10)</td>
<td>12</td>
<td>15</td>
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<tr>
<td>12</td>
<td>Concept tutorial 5 test</td>
<td>8</td>
<td>5*</td>
</tr>
<tr>
<td>13</td>
<td>Investigation 2 report</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>13</td>
<td>Concept tutorial 6 report</td>
<td>5</td>
<td>5*</td>
</tr>
<tr>
<td></td>
<td>End of Session Exam</td>
<td>35</td>
<td>27</td>
</tr>
</tbody>
</table>

Assessment in Microbial Genetics is in two sections: **A**: Assessment based primarily on lecture material; **B**: Assessment based primarily on laboratory material. **Students may be required to pass both sections of the course.**

* **MICR3621 students**: Students in MICR3621 can elect to not be assessed for 1 of the 5% assessment tasks, or be assessed for all and choose the top 5 grades. All the lab work and concept tutorials must be attended and performed, even if a student chooses not to be assessed. If a student misses a 5% test (e.g. because of sickness), this becomes the assessment task not undertaken.

**Academic Honesty and 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 work, or knowingly permitting it to be copied. This includes 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.†

Submitting an assessment item that has already been submitted for academic credit elsewhere may also be considered plagiarism.

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

Students are reminded of their Rights and Responsibilities in respect of plagiarism, as set out in the University Undergraduate and Postgraduate Handbooks, and are encouraged to seek advice from academic staff whenever necessary to ensure they avoid plagiarism in all its forms.

The Learning Centre website is the central University online resource for staff and student information on plagiarism and academic honesty. It can be located at:

[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.

**ADMINISTRATIVE MATTERS**

**BSB Student Office:** The BSB Student Office is located at G27, Biological Sciences Building. Violet Hueston (v.hueston@unsw.edu.au) is the BABS Student Advisor. The opening hours for student enquiries are: 9:00am – 4:30pm

**SPECIAL CONSIDERATION AND FURTHER ASSESSMENT SEMESTER 1 2016**

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. Students must make a formal application for Special Consideration for the course/s affected as soon as practicable after the problem occurs and within three working days of the assessment to which it refers.

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 https://student.unsw.edu.au/special-consideration.

**HOW TO APPLY FOR SPECIAL CONSIDERATION**

Applications must be made via Online Services in myUNSW. You must obtain and attach Third Party documentation before submitting the application. Failure to do so will result in the application being rejected. Log into myUNSW and go to My Student Profile tab > My Student Services channel > Online Services > Special Consideration. After applying online, students must also verify supporting their documentation by submitting to UNSW Student Central:

* Originals or certified copies of your supporting documentation (Student Central can certify your original documents), and
* A completed Professional Authority form (pdf - download here).

The supporting documentation must be submitted to Student Central for verification within three working days of the assessment or the period covered by the supporting documentation. Applications which are not verified will be rejected.
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.

SUPPLEMENTARY EXAMINATIONS:

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 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. 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.

For Semester 1 2016, BABS Supplementary Exams will be scheduled on:

- All BABS coded courses (except BABS1201): Tuesday 12th of July
- All BIOC coded courses: Wednesday 13th of July
- BABS1201 and MICR-coded courses: Thursday 14th of July

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.

Continual Course Improvement
Periodically student evaluative feedback on the course is gathered, using among other means, NSW's Course and Teaching Evaluation and Improvement (CATEI) Process. Student feedback is taken seriously, and continual improvements are made to the course based in part on such feedback. Significant changes to the course will be communicated to subsequent cohorts of students taking the course.

Equity and Diversity
Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or www.studentequity.unsw.edu.au/). Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.