**Table of Contents**

1. Information about the Course ................................................................. 2
2. Staff Involved in the Course ............................................................... 2
3. Course Details ...................................................................................... 3
4. Rationale and Strategies Underpinning the Course .......................... 4
5. Course Schedule .................................................................................. 5
6. Assessment Tasks and Feedback ......................................................... 6
   6.1 Literature Review (20%) ................................................................. 6
   6.2 Laboratory Notebook (5%) ............................................................ 6
   6.3 Journal Article (25%) ................................................................. 6
7. Additional Resources and Support ....................................................... 7
8. Required Equipment, Training and Enabling Skills ............................ 7
9. Administration Matters ....................................................................... 7
10. UNSW Academic Honesty and Plagiarism ......................................... 9
11. SPECIAL CONSIDERATION AND FURTHER ASSESSMENT .......... 10
Faculty of Science - Course Outline

1 Information about the Course
NB: Some of this information is available on the UNSW Handbook

<table>
<thead>
<tr>
<th>Year of Delivery</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Code</td>
<td>BABS3061</td>
</tr>
<tr>
<td>Course Name</td>
<td>Medical Biotechnology</td>
</tr>
<tr>
<td>Academic Unit</td>
<td>School of Biotechnology and Biomolecular Sciences (BABS)</td>
</tr>
<tr>
<td>Level of Course</td>
<td>3rd UG</td>
</tr>
<tr>
<td>Units of Credit</td>
<td>6UOC</td>
</tr>
<tr>
<td>Session(s) Offered</td>
<td>S2</td>
</tr>
<tr>
<td>Number of Weeks</td>
<td>12 weeks</td>
</tr>
<tr>
<td>Commencement Date</td>
<td>Tuesday 26 July, 2016</td>
</tr>
</tbody>
</table>

Summary of Course Structure (for details see ‘Course Schedule’)

<table>
<thead>
<tr>
<th>Component</th>
<th>HPW</th>
<th>Time</th>
<th>Day</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>2</td>
<td>9-11 am</td>
<td>Tuesday</td>
<td>Pioneer International Theatre (K-G27-G04)</td>
</tr>
<tr>
<td>Lab</td>
<td>4</td>
<td>10am-2pm</td>
<td>Wednesday</td>
<td>Meet in Samuels 129</td>
</tr>
</tbody>
</table>

Special Details
Any students with special requirements resulting from a disability should consult the Course Convenor by Week 2 of Session 2 so that the appropriate resources can be provided.

The wet-lab practical course may be split into groups depending on laboratory availability. Computer practicals are held in selected weeks in G08 Biological Sciences Building.

2 Staff Involved in the Course

<table>
<thead>
<tr>
<th>Staff</th>
<th>Role</th>
<th>Name</th>
<th>Contact Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Convenors</td>
<td></td>
<td>Dr. Matthew Clemson; Dr. Jeff Welch; Dr. Kyle Thomson</td>
<td><a href="mailto:m.clemson@unsw.edu.au">m.clemson@unsw.edu.au</a>; <a href="mailto:j.welch@unsw.edu.au">j.welch@unsw.edu.au</a>; <a href="mailto:kyle.thomson@unsw.edu.au">kyle.thomson@unsw.edu.au</a></td>
</tr>
<tr>
<td>Additional Teaching Staff</td>
<td>Lecturers</td>
<td>Dr. Matthew Clemson; Dr. Jeff Welch; Dr. Chris Marquis; Dr. Kyle Thomson; Dr. Valerie Wasinger; Dr. Giancarlo Pascali; A/Prof. Cyrille Boyer; A/Prof. Kerrie McDonald; Prof. Garry Graham; Prof. Brett Neilan</td>
<td></td>
</tr>
<tr>
<td>Technical &amp; Laboratory Staff</td>
<td></td>
<td>Ms. Alta Buyanbat</td>
<td><a href="mailto:a.buyanbat@unsw.edu.au">a.buyanbat@unsw.edu.au</a></td>
</tr>
</tbody>
</table>

1 UNSW Online Handbook: http://www.handbook.unsw.edu.au
3 Course Details

Course Description

Biotechnology innovation is in a large part driven by the requirement for improvements in medical diagnosis and therapy for a range of diseases including autoimmune diseases, diseases of inflammation and cancer. Innovations in biomolecular therapies such as recombinant proteins, monoclonal antibodies, vaccines, nucleic acid therapies, stem cells and novel bioinspired materials have and will continue to improve available medical treatments for many conditions. The course is designed to give students a detailed insight into the principles and techniques leading to these innovations. The practical work includes production of a model recombinant biopharmaceutical by cell culture, including downstream processing and characterization using modern techniques of analytical biotechnology including mass spectrometry. On-line bioinformatics tutorials and assignments associated with model biopharmaceuticals and other biotherapeutics are included in the practical program.

Course Aims

This course aims to present students with the background to medical problems and the technologies currently used to address them. Students will gain an insight into the scientific development and application of these new technologies as well as their limitations. The course present students with opportunities for further investigation and tests their innovative thought processes.

Student Learning Outcomes

Some of the skills the course will aid in developing include:
- The ability to critically evaluate scientific literature.
- The capacity for innovative and original thinking.
- Creative problem-solving
- Self-learning techniques, including independent and reflective learning
- Working in a group dynamic, refining communication skills, team management

Graduate Attributes Developed in this Course

<table>
<thead>
<tr>
<th>Science Graduate Attributes</th>
<th>Select the level of FOCUS</th>
<th>Activities / Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research, inquiry and analytical thinking abilities</td>
<td>3</td>
<td>Literature review; Laboratory report; participation in research laboratory activities</td>
</tr>
<tr>
<td>Capability and motivation for intellectual development</td>
<td>2</td>
<td>Computer and wet laboratory practicals; written reports</td>
</tr>
<tr>
<td>Ethical, social and professional understanding</td>
<td>2</td>
<td>The application of biotechnology to medical conditions encompasses a range of ethical and social issues, many of which will be discussed during the lectures.</td>
</tr>
<tr>
<td>Communication</td>
<td>3</td>
<td>Working in team during laboratory activities; written reports; presentation of selected laboratory project topic</td>
</tr>
<tr>
<td>Teamwork, collaborative and management skills</td>
<td>3</td>
<td>Working in a team during laboratory activities;</td>
</tr>
<tr>
<td>Information literacy</td>
<td>3</td>
<td>Information search for literature review; development of skills in using web-based analytical tools for processing and interpretation of large biological data sets.</td>
</tr>
</tbody>
</table>

---

3 Learning and Teaching Unit: Course Outlines
4 Learning and Teaching Unit: Learning Outcomes
Major Topics (Syllabus Outline)  
1) Principles of Pharmacology  
2) Biopharmaceuticals and the biopharmaceutical industry.  
3) Nuclear medicine and radiopharmaceuticals.  
4) Nanomedicine  
5) Wound healing and biomaterials.  
6) Proteomics for the pharmaceutical industry.  
7) Cancer  
8) Tissue engineering and regenerative medicine  
9) Bioprospecting and traditional medicines  
10) Bionics

Relationship to Other Courses within the Program  
This undergraduate 3rd year course reasonably assumes a prior knowledge of biological and chemical skills as well as a degree of information literacy gained from two years of academic study.

4 Rationale and Strategies Underpinning the Course

Teaching Strategies  
The underpinning concept of this course is to...

Rationale for learning and teaching in this course  
Medical biotechnology is a 3rd year undergraduate course with participants having a reasonable and requisite background in technical, investigative and literacy skills. Biotechnology is an applied science and in this course, the focus is on the application of multidisciplinary techniques to the medical field. Consequently, the course provides an overview of key areas delivered by experts in the field.

---

6 Reflecting on your teaching
## Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Lecture date</th>
<th>Lecture topic</th>
<th>Practical topic</th>
<th>Assignment and Submission dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>26 July</td>
<td>Medical Biotechnology Course Introduction &amp; Outline – MC JW</td>
<td>No practical.</td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td>2 Aug</td>
<td>Monoclonal Antibodies &amp; Hybridomas - CPM</td>
<td>10am-12pm Samuels 129. Go through literature review essay and provide background information.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 3</td>
<td>9 Aug</td>
<td>Biomaterials for Medical Devices - KT</td>
<td>G08: 10am-12pm Introduction to lab safety: H&amp;S, OGTR online course.</td>
<td></td>
</tr>
<tr>
<td>Week 4</td>
<td>16 Aug</td>
<td>Tissue Engineering &amp; Regenerative Medicine - KT</td>
<td>Background to practical program and experimental design and planning</td>
<td></td>
</tr>
<tr>
<td>Week 5</td>
<td>23 Aug</td>
<td>Proteomics - VW</td>
<td>No practical.</td>
<td></td>
</tr>
<tr>
<td>Week 6</td>
<td>30 Aug</td>
<td>Proteomics in the Pharmaceutical Industry - VW (Computer lab G08)</td>
<td>Resuscitation of hybridoma cell lines. Start cell cultures.</td>
<td>Literature review (20%): Monoclonal antibody approaches to cancer therapy.</td>
</tr>
<tr>
<td>Week 7</td>
<td>6 Sept</td>
<td>Radiopharmaceuticals from bench to bedside - GP</td>
<td>Cell counting and harvesting hybridoma culture supernatant.</td>
<td></td>
</tr>
<tr>
<td>Week 8</td>
<td>13 Sept</td>
<td>Polymeric nanoparticles and nanomedicine – A new generation of drugs - CB</td>
<td>Affinity purification of monoclonal antibody from culture supernatant</td>
<td></td>
</tr>
<tr>
<td>Week 9</td>
<td>20 Sept</td>
<td>Bionics – TBC</td>
<td>Immobilisation of monoclonal antibody and immunoprecipitation of HLA class I antigen.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mid-session break</td>
</tr>
<tr>
<td>Week 10</td>
<td>4 Oct</td>
<td>Principals of Pharmacology - GG</td>
<td>Preparation of samples for tandem mass spectrometry</td>
<td></td>
</tr>
<tr>
<td>Week 11</td>
<td>11 Oct</td>
<td>Cancer - KM</td>
<td>Mass spectrometry results tutorial.</td>
<td></td>
</tr>
<tr>
<td>Week 12</td>
<td>18 Oct</td>
<td>Bioprospecting and Traditional Medicines - BN</td>
<td>Course round up – JW MC</td>
<td>Laboratory notebook (5%): Detailed notes of all experiments and results. Journal article (25%): Use of monoclonal antibodies to identify targets for cancer therapy.</td>
</tr>
<tr>
<td>Week 13</td>
<td>25 Oct</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lecturers: MC – Matthew Clemson; JW – Jeff Welch; CPM – Chris Marquis; KT – Kyle Thomson; VW – Valerie Wasinger; GP – Giancarlo Pascali; CB – Cyrille Boyer; KM – Kerrie McDonald; GS – G Suaning; GG – Garry Graham; BN – Brett Neilan; TBC – To be confirmed.
6 Assessment Tasks and Feedback

<table>
<thead>
<tr>
<th>Task</th>
<th>When and Where</th>
<th>Brief Description</th>
<th>% of total mark</th>
<th>Date of Submission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literature review: Monoclonal antibody approaches to cancer therapy.</td>
<td>Weeks 2-5</td>
<td>A 2,500 word review on recent approaches to cancer immunotherapy using monoclonal antibodies and their fragments.</td>
<td>20%</td>
<td>Week 6</td>
</tr>
<tr>
<td>Laboratory notebook</td>
<td>Weeks 6-11</td>
<td>A detailed record of all experimental procedures, observations and results.</td>
<td>5%</td>
<td>Week 13</td>
</tr>
<tr>
<td>Journal article</td>
<td>Weeks 6-11</td>
<td>A final practical laboratory report will outline all of the experimental aims, methods, results and conclusions of the practical component of the course. This will be written in the form of a journal article suitable for submission to the Journal of Immunology.</td>
<td>25%</td>
<td>Week 13</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Exam Period (held in S2 exam period)</td>
<td>The final exam will cover the lecture component of the course. The exam format will most likely consist of four essay style questions to be completed within 2 hours.</td>
<td>50%</td>
<td>-</td>
</tr>
</tbody>
</table>

6.1 Literature Review (20%)

The literature review will focus on monoclonal antibodies and cancer immunotherapy.

1. Abstract: 150 words maximum.
2. Give a brief introduction to cancer immunotherapy. Describe how this approach to cancer treatment differs from traditional approaches such as chemotherapy and radiotherapy.
3. Provide a brief introduction to monoclonal antibodies.
4. Describe the different strategies for using monoclonal antibodies and their fragments in cancer therapy.
5. Select 2 recent approaches which employ monoclonal antibodies for cancer therapy and describe the mechanism and rationale for each approach.
6. For each approach, provide a critical evaluation. What are the benefits of this technology over existing therapeutic strategies?
7. Do you see any disadvantages for the new approach?
8. Provide references throughout to justify your reasoning.

6.2 Laboratory Notebook (5%)

Keeping accurate and sufficiently detailed notes in the laboratory is an essential skill in research. These notes are the primary source of information that will be used to publish a scientific paper. As such, you will be required to keep notes of all aspects of the practical throughout session.

6.3 Journal Article (25%)

Abstract (2%)
Introduction (4%)
Materials and methods (1%)
Results (8%)
Discussion (8%)
References (2%)

The journal article should be written following the instructions for authors such that it would be suitable for submission directly to the Journal of Immunology. The instructions to authors can be accessed via the following website:

http://jimmunol.org/site/misc/authorinstructions.xhtml

You should follow the instructions very carefully. Marks will be deducted where appropriate for failing to adhere to the guidelines for font, spacing, references format and all other aspects.
### 7 Additional Resources and Support

| Text Books | Due to the broad range of topics covered in Medical Biotechnology, there is no single textbook that encompasses everything. Additional materials or links to scientific literature will be provided by individual lecturers. The following is a good source of background information to accompany the lectures. It is available for purchase from the UNSW Bookstore: 
*Medical Biotechnology*
*Authors: Bernard R. Glick, Terry L. Delovitch, Cheryl L. Patten* |
| Course Manual | A soft copy will be posted on Moodle. |
| Recommended Internet Sites | PubMed is a very useful way to access peer-reviewed scientific literature: [http://www.ncbi.nlm.nih.gov/pubmed](http://www.ncbi.nlm.nih.gov/pubmed) |
| Computer Laboratories or Study Spaces | A computer lab (Room G08) is available for the use of the students. The BiBS space (Room 107) has some limited computing facilities, is a WiFi hotspot and has some textbooks and other reference materials available. |

### 8 Required Equipment, Training and Enabling Skills

| Equipment Required | Personal protection equipment (PPE) such as enclosed shoes, safety glasses and lab coat will be required for the practical sessions. This will be discussed in the introduction to laboratory safety in week 2. |
| Enabling Skills Training Required to Complete this Course | It is expected that all students will have had a basic Health & Safety training prior to the practical sessions. Training within the course will provide students with the necessary qualifications and knowledge to work within a certified OGTR PC2 accredited laboratory. |

### 9 Administration Matters

| Expectations of Students | The minimum attendance for lectures is 80%; however, we strongly encourage students to attend all lectures as they cover examinable theoretical material, as well as providing background knowledge to be applied in the practical sessions. Attendance is compulsory for computer practicals and the laboratory practicals. |
| Assignment Submissions | All written work must be lodged in the assignment drop box outside the BSB Student Office (Room G27 Biological Sciences Building) by 4:30 pm on the due date. The cover sheet should be securely attached to the front of the assessment and be filled out completely.  

If your work is submitted after a specified submission deadline, the work may not be marked or a penalty will be given. If medical grounds preclude submission of a report by the due date, contact should be made with the course authority as soon as possible. A medical certificate will be required for late submission on medical grounds. |
### Occupational Health and Safety

Biochemical laboratories contain apparatus and chemicals that are potentially dangerous when misused or handled carelessly. Consequently, safe experimental procedures and responsible conduct in the laboratory are essential at all times. The regulations governing conduct in the laboratory have been set down by the NSW Occupational Health & Safety (Hazardous Substances) Regulation 1996, NSW Draft OHS Regulation 2000, and the NSW Workcover Publications and Worksafe National Codes of Practice and Guidance Notes. These policies apply to all university staff and students.

Students are responsible for:
- Complying with the requirements of this policy, legislation and Australian Standards.
- Following directions given to them by the person supervising their work.
- Co-operating in the performance of risk assessments.
- Participating in induction and training programs.

**ALL ACCIDENTS WITH CHEMICALS OR INJURIES MUST BE REPORTED IMMEDIATELY TO YOUR DEMONSTRATOR OR TO A MEMBER OF THE PREPARATION ROOM STAFF.**

### Assessment Procedures

**UNSW Assessment Policy**

Please refer to the specific assessment outline in section 6.

### 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 Convenor prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or [http://www.studentequity.unsw.edu.au/](http://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.

### Student Complaint Procedure

**School Contact**

Dr Louise Lutze-Mann  
Director of Teaching  
[lutze-mann@unsw.edu.au](mailto:lutze-mann@unsw.edu.au)

**Faculty Contact**

Dr Chris Tisdell  
Associate Dean (Education)  
cct@unsw.edu.au  
Tel: 9385 6792

**University Contact**

Student Conduct and Appeals Officer (SCAO)  
Telephone 02 9385 8515,  
email [studentcomplaints@unsw.edu.au](mailto:studentcomplaints@unsw.edu.au)  
University Counselling and Psychological Services’  
Tel: 9385 5418

---

12 UNSW OHS Home page  
13 UNSW Assessment Policy  
14 Student Complaint Procedure  
15 University Counselling and Psychological Services
## 10  UNSW Academic Honesty and Plagiarism

<table>
<thead>
<tr>
<th>What is Plagiarism?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plagiarism is the presentation of the thoughts or work of another as one’s own.</td>
</tr>
</tbody>
</table>

*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

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 SPECIAL CONSIDERATION AND FURTHER ASSESSMENT

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 A-Z section of the “Student Guide 2013”, particularly the section on “Special Consideration”, for further information about general rules covering examinations, assessment, special consideration and other related matters. This is information is published free in your UNSW Student Diary and is also available on the web 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/or
- 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.

The BABS3061 supplementary exams will be scheduled on:

- **Tuesday 6th of December 2016**

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.