School of Biological Sciences

BIOL303: Biotechnology: Applied Cell and Molecular Biology

Subject Outline
Autumn, 2015
On-Campus
Wollongong

Subject Information
Credit Points: 8
Pre-requisite(s): BIOL215
Co-requisite(s): Nil
Restrictions: Nil
Contact Hours: 2 hrs Lectures, 4 hrs Tutorials /Practicals

Subject Contacts
Subject Coordinator/Lecturer

<table>
<thead>
<tr>
<th>Name</th>
<th>Dr Andrew Aquilina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>Building 32, Room 308</td>
</tr>
<tr>
<td>Telephone</td>
<td>61 2 4221 3340</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:andrew_aquilina@uow.edu.au">andrew_aquilina@uow.edu.au</a></td>
</tr>
<tr>
<td>Consultation mode and times</td>
<td>Email for appointment</td>
</tr>
</tbody>
</table>

Student Support and Advice
For general enquiries please contact the Student Centre:

Location: 41.152
Telephone: 61 2 4221 3492
Email: smah-students@uow.edu.au
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Section A: General Information

Subject Learning Outcomes

<table>
<thead>
<tr>
<th>On completion of this subject, students should be able to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Understand the basic theoretical aspects of gene technology</td>
</tr>
<tr>
<td>b) Understand the application and processes of biotechnology</td>
</tr>
<tr>
<td>c) Competently perform basic molecular biological techniques</td>
</tr>
<tr>
<td>d) Discuss the regulatory and ethical issues of biotechnology</td>
</tr>
</tbody>
</table>

Subject Description

Recombinant DNA technology and genetic engineering of micro-organisms, plant cells and animal cells. Expression, production and purification of recombinant proteins, cytokines and hormones. Protein expression technology and industrial scale-up. Applications of Biotechnology to the fields of human therapeutics, agriculture, environment protection and forensics diagnostics. Gene silencing, Bioinformatics, ethical and patent issues of Biotechnology.

Graduate Qualities

The University of Wollongong has developed five graduate qualities (http://www.uow.edu.au/student/qualities/index.html), which it considers express valuable qualities that are essential for UOW graduates in gaining employment and making an important contribution to society and their chosen field. Student development of the following graduate qualities will be enhanced by their participation in this subject:

1. Informed: Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.
2. Independent learners: Engage with new ideas and ways of thinking and critically analyse issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.
4. Effective communicators: Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognise how culture can shape communication.
5. Responsible: Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.

eLearning Space

This subject has materials and activities available via eLearning. To access eLearning you must have a UOW user account name and password, and be enrolled in the subject. eLearning is accessed via SOLS (student online services). Log on to SOLS and then click on the eLearning link in the menu column. For information regarding the eLearning spaces please use the following link: http://uowblogs.com/moodlelab/files/2013/05/Moodle_StudentGuide-1petpo7.pdf

Lecture, Tutorial, Laboratory Times

All timetable information is subject to variation. Check the latest information on the university web timetable via the Timetable link under Study Resources on the Current Students webpage or log into SOLS to view your personal timetable prior to attending classes.
Readings, References and Materials

Textbooks
The following text(s) will need to be purchased by students enrolled in this class.

Nil

Prescribed Readings (includes eReadings)
The following texts are prescribed for this subject, but students are not expected to purchase these. They are available to students through the library on the subject's eLearning site.


AND


Materials
Nil

Recommended Readings
The following references complement the prescribed readings and textbooks:

Brown, T.A. Gene Cloning and DNA Analysis (6th Ed) This is available as an eBook on the UoW Library website.


Metzenberg S. Working with DNA. Taylor & Francis Group, New York. 2007

Recommended readings are not intended as an exhaustive list, students should use the Library catalogue and databases to locate additional resources.

Recent Changes to this Subject
i. Nil
List of Topics Covered
The following are examples of the topics to be covered in this course. This is not an exhaustive list and will be subject to change.

Lecture Topics
- The polymerase chain reaction
- Gene analysis and detection
- Transgenic plants
- Environmental biotechnology
- Recombinant protein production
- Forensic DNA analysis
- Genome projects and functional genomics
- Analysis and manipulation of gene regulation
- RNA interference
- Gene knock-out
- Transgenic animals & animal cloning
- Viruses and gene technology
- Human gene therapy
- Recombinant vaccines
- Patents in biotechnology
- Ethics and regulation of biotechnology
### Section B: Assessment

#### Assessment Summary

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Form of Assessment</th>
<th>Due Date</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment 1</td>
<td>Project Report 1</td>
<td>21/04/2015</td>
<td>20%</td>
</tr>
<tr>
<td>Assessment 2</td>
<td>Oral Presentation of Tutorial Topic</td>
<td>Assigned in Week 1</td>
<td>10%</td>
</tr>
<tr>
<td>Assessment 3</td>
<td>Project Report 2</td>
<td>26/05/2015</td>
<td>20%</td>
</tr>
<tr>
<td>Assessment 4</td>
<td>Theory Exam</td>
<td>During Exam Period</td>
<td>50%</td>
</tr>
</tbody>
</table>

Total Marks 100%

#### Details of Assessment Tasks

Assessment tasks will be marked using explicit criteria that will be provided to students prior to submission.

<table>
<thead>
<tr>
<th>Assessment 1</th>
<th>Project Report 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due date</td>
<td>21/04/2015</td>
</tr>
<tr>
<td>Weighting</td>
<td>20%</td>
</tr>
<tr>
<td>Submission</td>
<td>Submit a hardcopy of your assessment to your tutor/demonstrator in class.</td>
</tr>
<tr>
<td>Type of Collaboration</td>
<td>Individual Assessment</td>
</tr>
<tr>
<td>Length</td>
<td>Details provided in class</td>
</tr>
<tr>
<td>Details</td>
<td>See Practical Manual – guidelines for Project Reports</td>
</tr>
<tr>
<td>Style and format</td>
<td>Report</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment 2</th>
<th>Oral Presentation of Tutorial Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due date</td>
<td>Assigned in Week 1</td>
</tr>
<tr>
<td>Weighting</td>
<td>10%</td>
</tr>
<tr>
<td>Submission</td>
<td>Presentation in tutorial time</td>
</tr>
<tr>
<td>Type of Collaboration</td>
<td>Group Project (pairs)</td>
</tr>
<tr>
<td>Length</td>
<td>10 minutes plus 3 minutes question time</td>
</tr>
<tr>
<td>Details</td>
<td>Students in pairs will be required to give a 10 minute tutorial seminar (followed by 3 minutes of questions) on an area relevant to Biotechnology and, in particular, genetic engineering. It should be based on a research-type paper rather than a review paper. Tutorial talks will run from week 2 or 3, to week 12. Students should choose their own tutorial topic from recent (2012-14) publications in scientific journals. Topics must be approved by a lecturer or demonstrator prior to preparing your presentation. Each student pair should register for a presentation time for their tutorial topic with the Technical Officer, by week 3. There will be a maximum of 3 tutorial talks each week. Attendance at each tutorial is compulsory. Failure to attend any one tutorial will result in a 10% penalty on your own tutorial mark.</td>
</tr>
<tr>
<td>Style and format</td>
<td>Presentation</td>
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</table>

<table>
<thead>
<tr>
<th>Assessment 3</th>
<th>Project Report 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due date</td>
<td>26/05/2015</td>
</tr>
<tr>
<td>Weighting</td>
<td>20%</td>
</tr>
<tr>
<td>Submission</td>
<td>Submit a hardcopy of your assessment to your tutor/demonstrator in class.</td>
</tr>
<tr>
<td>Type of Collaboration</td>
<td>Individual Assessment</td>
</tr>
<tr>
<td>Length</td>
<td>Details provided in class</td>
</tr>
<tr>
<td>Details</td>
<td>See of Practical Manual – guidelines for Project Reports</td>
</tr>
<tr>
<td>Style and format</td>
<td>Report</td>
</tr>
</tbody>
</table>
Assessment 4
Theory Exam

Due date
During Exam Period

Weighting
50%

Submission
Exam papers and answers must be submitted at the conclusion of the exam.

Type of Collaboration
Individual Assessment

Length
Three hours

Details
Provided in class

Style and format
Final exam

Minimum Requirements for a Pass in this Subject
To receive a clear pass in this subject a total mark of 50% or more must be achieved. In addition, failure to meet any of the minimum performance requirements is grounds for awarding a Technical Fail (TF) in the subject, even where total marks accumulated are greater than 50%.

The minimum performance requirements for this subject are:
- Obtain a mark of 45% or greater for the final examination

Minimum Student Attendance and Participation
It is expected that students will allocate 16 hours per week to this subject, including any required class attendance, completion of prescribed readings and assessment tasks.

Student attendance at practicals is compulsory and students must attend at least 100% of classes. Absences will require the submission of an application for Academic Consideration via SOLS and the presentation of suitable documentation, for example a Medical Certificate, to Student Central as soon as practical. For further details about applying for academic consideration visit the Student Central webpage: http://www.uow.edu.au/student/central/academicconsideration/index.html

Scaling
Scaling may occur in this subject at the end of session by the Unit Assessment Committee and/or Faculty Assessment Committee (FAC). Marks will only be scaled to ensure fairness/parity of marking across groups of students. Scaling will not affect any individual student’s rank order within their cohort. For more information refer to Assessment Guidelines – Scaling: http://www.uow.edu.au/about/policy/UOW058609.html

Late Submission
Late submission of an assessment task without an approved extension of the deadline is not acceptable. If you are unable to submit an assessment due to extenuating circumstances (e.g. medical grounds or compassionate grounds), you can make an application of academic consideration. Not all circumstances qualify for academic consideration. For further details about applying for academic consideration visit the Student Central webpage: http://www.uow.edu.au/student/central/academicconsideration/index.html

Late Submission Penalty
Late submission of an assessment task without an approved extension of the deadline is not acceptable. Marks will be deducted for late submission at the rate of 10% of the total possible marks for that particular assessment task per day. This means that if a piece of work is marked out of 100, then the late penalty will be 10 marks per day (10% of 100 possible marks per day). The formula for calculating the late penalty is the total possible marks x 0.10 x number of days late. For the purposes of this policy a weekend (Saturday and Sunday) will be regarded as two days.

No marks will be awarded for work submitted after the assessment has been returned to the students.
Supplementary Assessments
Supplementary assessment may be offered to students whose performance in this subject is close to that required to pass the subject, and are otherwise identified as meriting an offer of a supplementary assessment. The precise form of supplementary assessment will be determined at the time the offer of a supplementary assessment is made.

Students can log on to SOLS and click on the link titled “Supplementary Assessment” to view any applicable offers. Additional information on supplementary assessments is available at: http://www.uow.edu.au/student/exams/suppassess/index.html

System of Referencing Used for Written Work
The Author-Date (Harvard) referencing system should, unless otherwise specified for a particular assessment (check Details of Assessment Tasks), be utilised. A summary of the Harvard system can be accessed on the Library website at: http://public01.library.uow.edu.au/refcite/style-guides/html/

Use of Internet Sources
Students are able to use the Internet to access the most current information on relevant topics and information. Internet sources should only be used after careful critical analysis of the currency of the information, the role and standing of the sponsoring institution, reputation and credentials of the author, the clarity of the information and the extent to which the information can be supported or ratified by other authoritative sources.

Plagiarism
The full policy on Academic Integrity and Plagiarism is found in the Policy Directory on the UOW website.

"The University's Academic Integrity and Plagiarism Policy, Faculty Handbooks and subject guides clearly set out the University's expectation that students submit only their own original work for assessment and avoid plagiarising the work of others or cheating. Re-using any of your own work (either in part or in full) which you have submitted previously for assessment is not permitted without appropriate acknowledgement. Plagiarism can be detected and has led to students being expelled from the University.

The use by students of any website that provides access to essays or other assessment items (sometimes marketed as ‘resources’), is extremely unwise. Students who provide an assessment item (or provide access to an assessment item) to others, either directly or indirectly (for example by uploading an assessment item to a website) are considered by the university to be intentionally or recklessly helping other students to cheat. This is considered academic misconduct and students place themselves at risk of being expelled from the University."

Submission of Assessments
Refer to the submission requirements under the details of the individual assessments. Students should ensure that they receive a receipt/evidence acknowledging assessment submission. Students will be required to produce this in the event that an assessment task is considered to be lost. Students are also expected to keep a copy of all their submitted assignments in the event that re-submission is required.

Assessment Return
Students will be notified when they are able to view their marked assessment. In accordance with University Policy marked assignments will usually only be held for 21 days after the declaration of marks for that assignment.
Section C: General Advice

Students should refer to the Faculty of Science, Medicine and Health website for information on policies, learning and support services and other general advice.

University Policies

Students should be familiar with the following University policies:

a. Code of Practice – Teaching and Assessment

b. Code of Practice – Research, where relevant

c. Code of Practice – Honours, where relevant

d. Student Charter

e. Code of Practice – Student Professional Experience, where relevant

f. Academic Integrity and Plagiarism Policy

g. Student Academic Consideration Policy

h. Course Progress Policy

i. Graduate Qualities Policy

j. Academic Grievance Policy (Coursework and Honours Students)

k. Policy and Guidelines on Non-Discriminatory Language Practice and Presentation

l. Workplace Health and Safety, where relevant

m. Intellectual Property Policy

n. IP Student Assessment of Intellectual Property Policy, where relevant

o. Policy on Ethical Objection by Students to the Use of Animal and Animal Products in Coursework Subjects, where relevant

p. Human Research Ethics Guidelines, where relevant

q. Animal Research Guidelines, where relevant
r. Student Conduct Rules and accompanying Procedures or Research Misconduct Policy for research students  

Student Support Services and Facilities
Students can access information on student support services and facilities at the following link. This includes information on “Academic Support”, “Starting at University”, “Help at University” as well as information and support on “Career’s and Jobs”. http://www.uow.edu.au/student/services/index.html

Student Etiquette
Guidelines on the use of email to contact teaching staff, mobile phone use in class and information on the university guide to eLearning ‘Netiquette’ can be found at http://www.uow.edu.au/student/elearning/netiquette/index.html

Version Control Table

<table>
<thead>
<tr>
<th>Version Control</th>
<th>Release Date</th>
<th>Author/Reviewer</th>
<th>Approved By</th>
<th>Amendment</th>
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<tr>
<td>1</td>
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<td>Dr Andrew Aquilina</td>
<td>Ashleigh Rae</td>
<td>Final BIOL303 Autumn 2015 outline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Subject Coordinator</td>
<td>ADE Nominee</td>
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