SCHOOL OF BIOTECHNOLOGY AND BIOMOLECULAR SCIENCES

APPLIED BIOMOLECULAR SCIENCES (BABS1202)

SUBJECT GUIDE

2019

CONTENTS

Course Identity	
Course Code	BABS1202
Course Name	Applied Biomolecular Sciences
Academic Unit	School of Biotechnology and Biomolecular Sciences
Level of Course	First-year Undergraduate
Units of Credit	6
Session(s) Offered	Session 2
Assumed Knowledge, Prerequisites or Co-requisites	BABS1201 is NOT a prerequisite, but is highly recommended.
Hours per Week	6 hours per week
Number of Weeks	10 weeks
Commencement Date	Week 1, Session 2, 2019

Staff	
Course Coordinator	John Wilson Student Office, G06 Ground floor, Biological Sciences Building j.e.wilson@unsw.edu.au
Course Administration	BEES/BABS Student office Ground floor Biological Sciences Building BABS1202@unsw.edu.au

Additional Resources and Support	
Text Books	"Biology" by Campbell, Reece & Meyers, 11th Edition
Course Web Site	BABS1202 uses Moodle as an on-line course management software. This website contains background information, links to resources, lecture notes, and discussion forums. All announcements will be made through Moodle. Once you are enrolled in BABS1202, you can access the Moodle site at: **https://moodle.telt.unsw.edu.au/login/index.php** Your username is your student number preceded by a lower-case z
Course Manuals	A course manual is required and may be purchased from the UNSW Bookshop. A PDF versions is available on Moodle
Equipment Required	A lab coat and covered shoes must be worn in all laboratory classes.

Course Outline	
Course Description	This course provides an overview of the application of molecular and cellular biology to the fields of medicine, plant and animal science, and food, marine and environmental sciences. It draws comparisons between contemporary and conventional technologies through the introduction of traditional and recombinant genetics, microbiology, biochemistry molecular engineering techniques.
Student Learning Outcomes	Upon completion of Applied Biomolecular Sciences the student should have: • A good understanding of the fundamental and key principles of modern molecular biology. • Have the ability to pose questions, design experiments and interpret the resultant experimental data with respect to the literature. • The ability to identify inconsistencies in scientific thought and writing through an understanding of the relevant literature and the correct use of references to support arguments and hypotheses. • An understanding of the ethical and professional issues surrounding biotechnology. • An appreciation of the interdisciplinary and rapidly changing nature of biomolecular sciences. • An ability to communicate scientific ideas and discoveries in biomolecular sciences, to the industrial, scientific and the general communities, using the written and spoken word as well as electronic media.
Teaching Strategies	Lectures are used to introduce the concepts of biomolecular sciences and laboratory sessions are used to both complement the lecture material and provide practise in standard biomolecular techniques used in research. Tutorials are additionally designed to further reinforce the concepts presented in lectures and practised in the laboratory, and support students in their research projects. The laboratory research project forms an essential element of the students' scientific training. The research project, as integrated with the other components of the course, have been designed in accordance with the UNSW Guidelines on Learning that Inform Teaching (www.guidelinesonlearning.unsw.edu.au) to: - teach students the process of scientific inquiry through progressive cycles of critical analysis of their research and their own thinking; - facilitate multidisciplinary thinking to reflect current research and professional practice in the sciences; - reinforce deep learning and promote collaborative inquiry; - integrate students' disciplinary understanding and research practice with the development of their communication skills, teamwork, and information literacy skills.

Major Topics (Syllabus Outline)	• Characteristics of biological processes • Basic biochemistry and cell structure of eukaryotes and bacteria • Bacterial growth and cell culture • Understanding DNA, RNA, proteins from a biological perspective • Enzymes with an emphasis on biotechnology • Growth of cells, basic kinetics, concept of quantitation in biotechnology, product yields in biological systems • Conventional genetics • Genetic exchange • Recombinant DNA technology • Principles of cloning • Genomics, proteomics and bioinformatics • Recovery and purification of fermentation products • Application of genetic engineering in medical research • Environmental biotechnology • Bioremediation

Graduate Attributes Developed in this Course		
Science Graduate Attributes	Select the level of FOCUS *0 = NO FOCUS* *1 = MINIMAL* *2 = MINOR* *3 = MAJOR*	Activities / Assessment
Research, inquiry and analytical thinking abilities	3	Guided laboratory practicals, independent and collaborative lab research, assessment of open-ended investigations.
Capability and motivation for intellectual development	3	Tutorial modules on critical thinking and the scientific method; Theoretical exams to review procedural and applied thinking.
Ethical, social and professional understanding	2	Lectures address ethical and social issues relevant to the field of biotechnology; lectures and discussions on current research in biotechnology.
Communication	3	Individual and group presentations in tutorials; scaffolded guidance in the development of scientific writing skills.
Teamwork, collaborative and management skills	3	Collaborative lab research projects; facilitation of group discussions; guided peer review of written research reports.
Information literacy	3	Guided research writing workshops and critical literacy assessments; scientific literacy tutorials.

Lecture and Laboratory Schedule

Week	Lectures		Laboratories	
	Day	Topic	Day	Topic
1	Mon	Lecture 1: Course Introduction	Tue Wed	No lab
	Thu	Lecture 2: Biofuels		
	Thu	Lecture 3: Thinking like a biotechnologist		
2	Mon	Public holiday	Tue Wed	Lab 1: Laboratory program & laboratory safety Laboratory project overview
	Thu	Lecture 4: Industrial enzymes		
	Thu	Lecture 5: Bacterial cell structure		
3	Mon	Lecture 6: Microbial growth & bioenergetics	Tue Wed	Lab 2: An introduction to microbiological techniques Laboratory project commences
	Thu	Lecture 7: Microbial diversity & novel methods of cell culture		
	Thu	Large Group Tutorial 1: Literature reviews		
4	Mon	Lecture 8: Bioprocesses: Growing cells on an industrial scale	Tue Wed	Lab 3: Characterisation of bacteria Laboratory project: Purification of isolates
	Thu	Lecture 9: Revision		
	Thu	Session Test A		
5	Mon	Lecture 10: Brewing and fermented beverages	Tue Wed	Lab 4: Spectrophotometry Laboratory project: Sub-culturing for single colonies
	Thu	Large Group Tutorial 2: Experimental design		
	Thu	Lecture 11: Genetics revision - DNA, RNA & Proteins		
6	Mon	Lecture 12: Genetic modification	Tue Wed	Lab 5: Quantification of enzyme production and activity Molecular ID of bacteria by gene sequencing
	Thu	Lecture 13: Conventional genetics & recombinant DNA technology		
	Thu	Lecture 14: Cloning and expression of heterologous proteins		
7	Mon	Lecture 15: Global impact	Tue Wed	Lab 6: Gel electrophoresis of PCR products Ethanol production
	Thu	Lecture 16: Commercialisation of scientific discoveries		
	Thu	Lecture 17: Bioinformatics & microbial genomes		
8	Mon	Session Test B	Tue Wed	Lab 7: Quantification of secreted enzyme production & activity
	Thu	Lecture 18: Bioremediation		
	Thu	Lecture 19: Astrobiology		
9	Mon	Lecture 20: Clinical genomics	Tue Wed	Lab 8: Project analysis and discussion of results Genetic manipulation of microorganisms
	Thu	Lecture 21: Post graduate research		
	Thu	Lecture 22: Course summation		
10	Mon	No lecture	Tue Wed	Lab 9: Genetic manipulation continued Molecular bioinformatics
	Thu	No lecture		
	Thu	No lecture		

Assessment Requirements for BABS1202			
Assessable component	Weight	Description	Due date
Lab project	8%	Online pre-lab questions	Weekly
	8%	Pre-lab discussion	Weekly
	5%	Experimental design (team)	Week 6
	14%	Literature review	Week 7
Session theory test A	10%	Theory exam of practical, tutorial and lecture material of weeks 1- 3	Week 4
Session theory test B	10%	Theory exam of practical, tutorial and lecture material of weeks 1 - 7	Week 8
Final theory examination	45%	Examination will cover all lectures and practical/tutorial classes.	TBA

Special Consideration	
Explanation	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. For BABS1201, applications can be made for in-session assessments tasks and the final examination. 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 "Student Guide", for further information about general rules covering examinations, assessment, special consideration and other related matters. This is information is available on the web at: my.unsw.edu.au/student/atoz/SpecialConsideration.html.
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. After applying online, students must also verify their supporting documentation by submitting to UNSW Student Central: • Originals or certified copies of your supporting documentation (Student Central can certify your original documents), and 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.

Further Assessment	
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 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. 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.

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.
- 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.

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

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.