BCMB30010 Advanced Techniques in Molecular Science

Credit Points:	12.5
Level:	3 (Undergraduate)
Dates & Locations:	2015, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus. Semester 2, Parkville - Taught on campus. An enrolment quota of 90 students (30 students per practical class) per semester applies to this subject. For detailed information on the quota subject application process, refer to the Quota Subject link on the MDHS Student Centre website: http://sc.mdhs.unimelb.edu.au/quota-subjects
Time Commitment:	Contact Hours: one x 1 hour lecture, one x 1 hour tutorial and one x 5 hour practical class per week. Total Time Commitment: 84 contact hours with an estimated total time commitment of 170 hours.
Prerequisites:	**BSc students** Note: Both a Biochemistry and Molecular Biology lecture subject and practical subject are required Before 2009: **Biochemistry & Molecular Biology Part A (521-211)** **Biochemistry & Molecular Biology Part B (521-212)** **Techniques in Molecular Science (521-220)** OR **Techniques in Protein and Gene Technology (521-220)** 2009 and subsequently:

Subject	Study Period Commencement:	Credit Points:
BCMB20002 Biochemistry and Molecular Biology	Semester 1, Semester 2	12.50
BCMB20005 Techniques in Molecular Science	Semester 1, Semester 2	12.50

Note that the pre-2009 subject “Biochemistry & Molecular Biology Part A” and the 2009 subject “BCMB20002 Biochemistry & Molecular Biology” are not identical despite sharing a similar subject title.

Only the subject

Subject	Study Period Commencement:	Credit Points:
BCMB20002 Biochemistry and Molecular Biology	Semester 1, Semester 2	12.50

offered in 2009 and beyond acts as a prerequisite for the lecture subject (replacing both the pre-2009 Biochemistry and Molecular Biology Part A and Biochemistry and Molecular Biology Part B).

BBiomedicine students

Subject	Study Period Commencement:	Credit Points:
BIOM20001 Molecular and Cellular Biomedicine	Semester 1	25
BCMB20005 Techniques in Molecular Science	Semester 1, Semester 2	12.50

All Students: Other combinations of subjects that provide a similar background may be considered by the coordinator.

Corequisites:	None
Recommended Background Knowledge:	BSc students BCMB20003 Biochemical Regulation of Cell Function is recommended. BBiomedicine Students BCMB20003 Biochemical Regulation of Cell Function is strongly recommended.

Subject	Study Period Commencement:	Credit Points:
BCMB20003 Biochemical Regulation of Cell Function	Semester 2	12.50

Non Allowed Subjects:	Students cannot enrol in and gain credit for this subject if credit was obtained for pre-2009 subjects **Gene Technology & Protein Expression (521-321)** or **Protein Biochemistry & Proteomics (521-322)**.
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Dr Leon Helfenbaum
Contact:	Subject Coordinator Dr Leon Helfenbaum **leonh@unimelb.edu.au (mailto:leonh@unimelb.edu.au)** Administrative Coordinator Mrs Irene Koumanelis **i.koumanelis@unimelb.edu.au (mailto:i.koumanelis@unimelb.edu.au)**
Subject Overview:	To participate in the rapidly expanding fields of genome research and protein structure-function analysis it is necessary to have an understanding of the techniques used in these areas. This subject provides practical training in the technologies of molecular biology and protein expression and in the analysis of data derived from these techniques. Areas covered include the use of recombinant DNA for the investigation of gene function and the use of bacterial expression systems for the production and analysis of recombinant proteins. Specific experiments will deal with DNA cloning and sequencing, bioinformatics, *in vitro* mutagenesis to generate mutations in genes expressing an enzyme, expression of these variants to analyse the effects of these mutations on enzyme activity and identification of proteins using mass spectrometry. Students will learn how to maintain a laboratory notebook to record their experiments and how to compose a scientific report. In addition, students will develop an appreciation for the current scientific literature and collaborate in student presentations. The experimental work is supported by a lecture series providing an overview of technologies used in class and in research.
Learning Outcomes:	# to provide practical experience in a variety of techniques used in biochemistry and molecular biology.

	# to give instruction in the correct methods for keeping scientific records and writing scientific reports. # to provide experience in simple experimental design and problem solving. # to extend students' knowledge of the use of bioinformatics in the analysis of DNA and protein sequence data and in data derived by mass spectrometry. # to assist students in the evaluation of scientific literature and to develop skills in the presentation of scientific data in oral and written formats.
Assessment:	Ongoing assessment of laboratory skills throughout the semester (45%) divided between: practical management of the experimental program, maintenance of a laboratory notebook including short summaries and reports of practical results and 2 Database Tutorials A written research report submitted mid-semester (15%) Group presentation of a scientific paper including preparation of a short critical summary towards the end of semester (15%) 2-hour written examination in the examination period at the end of semester (25%) Attendance is compulsory. Students who miss more than 20% of the practical classes will not be eligible for final assessment.
Prescribed Texts:	None
Recommended Texts:	Keith Wilson and John Walker, Principles and Techniques of Biochemistry and Molecular Biology (2010, 7th Ed) Cambridge University Press
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	On completion of this subject, students should have developed the following generic skills: # Hands-on experience in a variety of techniques, generating results for analysis. # Design and execution of simple experiments. # Analysis of experimental data using spreadsheets and bioinformatics resources. # The ability to keep complete and accurate records of experimental results and to use these records to prepare a scientific report. # Evaluation and presentation of scientific literature to an audience. # The ability to interpret scientific literature and interpret data from electronic databases. # The capacity to integrate knowledge across disciplines. # The ability to comprehend a question, evaluate the relevant information and communicate an answer.
Notes:	This subject is available for science credit to students enrolled in the BSc and in BBiomed. Students must enrol for one of the available laboratory days via the student portal before the start of the semester. Be aware that each day may have limited places and in general allocations to practical classes will be made on a first come-first served basis. Students undertaking this subject will be expected to have regular access to an internet-enabled computer.
Related Majors/Minors/ Specialisations:	Biochemistry and Molecular Biology Biomedical Biotechnology (specialisation of Biotechnology major) Biotechnology (pre-2008 Bachelor of Science) Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED