521-302 Functional Genomics and Bioinformatics

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 1, - Taught on campus.
Time Commitment:	Contact Hours: three x 1 hour lecture and one x 1 hour tutorial per week Total Time Commitment: 48 contact hours with an estimated total time commitment of 120 hours
Prerequisites:	**BSc students** Biochemistry & Molecular Biology Part A Biochemistry & Molecular Biology Part B Other combinations that provide similar background will be considered by the coordinator. **BBiomedSc students** Bachelor of Biomedical Science students are not permitted to enrol in this subject.
Corequisites:	None
Recommended Background Knowledge:	A Biochemistry and Molecular Biology major will normally entail completing Advanced Techniques in Molecular Science AND at least one of Functional Genomics and Bioinformatics, Protein Structure and Function
Non Allowed Subjects:	Students cannot enrol in and gain credit for this subject if previously obtained credit for pre-2009 subject 521-302 Functional Genomics
Core Participation Requirements:	It is University policy to take all reasonable steps to minimise the impact of disability upon academic study and reasonable steps will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact upon their active and safe participation in a subject are encouraged to discuss this with the relevant subject coordinator and the Disability Liaison Unit.
Coordinator:	Assoc Prof Ian Van Driel
Subject Overview:	The knowledge of genome structures from various organisms and rapid development of technologies that exploit this information are driving revolutions in biology, medicine and biotechnology. This subject describes the structure and expression of genomes in higher organisms and provides an understanding of technologies to analyse and manipulate genes. We demonstrate how the modification of genes in cells and whole organisms can be used to discover gene function or to modify phenotype. The structure of eukaryotic chromosomes is presented to demonstrate how genetic material is replicated and how transcription of RNA is controlled. We illustrate how regulatory pathways at the RNA and protein levels are integrated to control cell metabolism and cell fate. Bioinformatic techniques that are key to understanding genomic information will be explained with examples of how these tools are applied. Functional genomic approaches to investigate cancer and will be used to exemplify how molecular biology can be applied to the study of human biology and health. This subject is required for completion of a major in Biochemistry and Molecular Biology.
Objectives:	By the end of the subject, the student should understand: # current concepts concerning the molecular bases of genome structure and the regulation of gene expression in eukaryotic organisms (yeast, animals and plants); # the role of gene regulatory networks in regulating metabolic and developmental pathways; # theoretical background to recombinant DNA technology and an appreciation of its biomedical and biotechnological applications; # the significance and applications of human and related genome sequencing programs; # bioinformatic techniques and applications;

	# how gene function can be investigated by recombinant DNA techniques and genetic manipulation of cell lines and whole organisms (transgenesis and targeted mutation); # how functional genomic approaches can be applied to study human diseases such as cancer
Assessment:	3 hour written exam held in examination period (70%), two 1 hour written examinations held during semester (7.5% x 2 = 15%), 1,000 word essay assessment due mid-semester (15%)
Prescribed Texts:	Alberts et al, Molecular Biology of the Cell, 5th editionLodish et al, Molecular Cell Biology, 4th edition
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: # 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:	Students enrolled in the BSc (pre-2008 BSc), BASc or a combined BSc course will receive science credit for the completion of this subject. Students undertaking this subject will be expected to regularly access an internet-enabled computer
Related Course(s):	Graduate Diploma in Biotechnology
Related Majors/Minors/ Specialisations:	Biochemistry and Molecular Biology Biotechnology