SECTION A TEACHING, LEARNING AND ASSESSMENT

COURSE AIMS

An understanding of bioinformatics is fundamentally important to health practitioners, biological scientists, and medical researchers, who use the study of genes and the regulation of gene products to understand development and phenotype, health and disease. The genomes of many more organisms (in excess of 1,000) have become available, and with it, gigabytes of accompanying information. One consequence of this information flood is the "data rich- insight poor" phenomenon, as the sheer volume of information overwhelms those who can most benefit from it. This course aims to teach students how to access, filter, critically analyse and extract information from the sequence databases.

LEARNING OUTCOMES

This course will provide students with the knowledge of where to go to find relevant information, and the skills to extract and critically evaluate this information from the public sequence datasets. The course is practical orientated and teaches research skills in the field of bioinformatics, The skills acquired will be broadly applicable to other subjects in the biology and biotechnology fields. The course is tailored to biologists, and hence no computer programming will be required.

By the end of this course, students will be able to conduct basic searches to find genes sequences, motifs and perform evolutionary analysis. Students will understand the principles of managing these large datasets, and different approaches to querying the datasets.

Students will apply these skills to a research project, where they will annotate a new gene sequence.

The benefits to the students will be an enrichment of their understanding of many biological questions and development of their interpretive skills. The students will be better resourced for coursework and assignments in other biological subjects, as the content of this course will compliment the current streams in cell biology and genetics.

CONTENT, ORGANISATION AND TEACHING STRATEGIES

Genomes, and their fundamental unit (the gene) contain information - the biological blueprint - that extends far beyond a sequence of A, C, T and G. Students will apply the knowledge gained in molecular genetics, cell biology and molecular biology to annotate a set of newly described genes from a prokaryotic and eucaryotic genome projects.

The course will be taught over 13 weeks with 2 x 3 hrs = 66 lecture hours per week. The lectures will be conducted in computer labs and will consist of theory and computer-based learning. To enhance the the theoretical concepts of bioinformatics, lectures will use web-based resources to allow students exposure to the most recent bioinformatics data ware houses and data mining tools.

Handouts will be provided during the lectures to cover important aspects but please note that these should only be regarded as summaries and not as lecture notes. Students are encourages to read the material covered during lectures from the chapters of the recommended text book. The details of the recommended text book is given under “TEXTS AND SUPPORTING MATERIALS” below

CONTENT SUMMARY

Students can obtain a copy of the course timetable through the learning@griffith site. The course outline, course content and assessment criteria will be discussed in lecture 1. The content has been chosen to represent the essential foundation information available on databases, genomes and the bioinformatics tools and approaches used to analyse and interpret this information. The following table provides the topics and organisation of the modules that will be covered in the course but does not necessarily reflect the order in which the modules will be taught. All communications, including changes to the schedule will be conveyed to the students via email. Consequently, students are advised and encouraged to check their email on a regular basis for advice.

7307BPS Bioinformatics		
Week	**Module**	**Activities**
1 / BP	Evolution & bioinformatics Introduction to databases	An introduction to & logging in to http://trishul.sci.gu.edu.au/wEMBOSS
2 / BP	Sequence file formats & sequence annotation	Students will receive Assignment 1 tasks
3 / JB	Pairwise & multiple sequence Alignments	Students will receive Assignment 2 tasks
4 / JB	Pairwise & multiple sequence Alignments (con'd)	
5 / BP	Hands on use of Bioinformatic tools Phylogenetic Reconstruction	http:/trishul.sci.gu.edu.au/wEMBOSS
6 / JB	No lectures	Quiz will be held, on Tuesday. There will be no lectures on Friday due to a public holiday
EASTER MID-SEMESTER BREAK 10 – 17 April		
7 / BP	Hands on use of Bioinformatic tools Phylogenetic Reconstruction	http:/trishul.sci.gu.edu.au/wEMBOSS Submit Assignment task 1
8 / JB	Sequencing & Assembly of sequences	
9 / JB	Comparative genomics	
10 / BP	Metagenomics & Bioinformatics	
11 / JB / BP	Revision	
12 / JB / BP	Seminar	Submit Assignment task 2
13 J B / BP	Seminar	

Lecturers:

BP = Professor Bharat Patel
JB = Dr Jeremy Brownlie

Lecture schedule, time and venue:

Tuesdays: 8 to 11am in N06_0.01A Pat Thoms Building
Fridays: 9 to 12 in N06_0.01A Pat Thoms Building

ASSESSMENT

Summary of Assessment:

The table below summarises the assessment items for the course.

Item	Assessment Task	Length	Weight	Total Marks	Relevant Learning Outcomes	Due Day and Time
1	Bioinformatics Assignment 1	Maximum 1 page summary plus supporting evidence folio	25	100	To test critical analysis & written communication skills	Week 7, 24th April
2	Bioinformatics Assignment 2	Maximum 1 page summary plus supporting evidence folio	25	100	To test critical analysis & written communication skills	Week 12, 29th May
3	Mid semester Quiz	1 hr	20	100	To test concepts	
4	Seminar on special topics	20 min plus 10 min question & discussion	20	100	To test communication skills	Week 13, 2nd and 5th June

5	Class attendance and participation during lectures and seminars	Throughout the semester	10	100	Evidence of professional conduct	

Assessment Details :

1. All assessment items for the course are compulsory and a pass in each of the assessment is required to pass the course.
2. Failure to submit the assignment as specified in the "Summary of Assessment" above will result in zero marks unless there is documentary evidence of medical or other extenuating circumstance. Without prior authorised extension, late submission of assignments will result in a loss of 10% of marks per day. Where satisfactory documentary evidence is provided an alternative date for the submission of the assignment will be offered.
3. Quiz attendance is compulsory; failure to attend or complete the quiz at the specified time will result in a zero mark for the quiz unless there is documentary evidence of medical or other extenuating circumstance. Where satisfactory document is provided an alternative sitting of the quiz will be offered.
4. Class attendance and participation in class discussion is compulsory.

Presentation of Bioinformatics Assignments for Assessment :
The first page of the assignment should include your name, student ID, the course code and the name of the course. The assignment should be based your own independent research of the topic and summarised in your own words. Avoid regurgitating information taken directly from books, journals or websites. Also remember that non-peer reviewed websites and databases unless carefully curated may contain incorrect or unproven information. I strongly suggest that you seek assistance from the library in using EndNote database referencing software if you are unfamiliar with it. EndNote reference manager allows you to search NCBI PuBMed and download references and abstracts from these searches onto your computer. The references can be inserted into your assignments while you are writing (cite while you write). After completing your written work, you are able to format your referenced bibliography into any citation style of your choosing.

Rationale for Assessement :

1. The bioinformatics assignments will be used to assess the student's ability to research, analyse and retrieve information from web-based resources. The assignment will assist students in undertaking hands on exercises in modem biology and expose them to the use of bioinformatics resources including molecular biology databases and online / off line data mining and analysis tools.
2. The quizzes will test the understanding of the course matter in the specific modules and will be in the form of multiple choice questions. They will cover material in the preceding lectures and the exact content covered for the quiz will be conveyed to the class prior to the quiz being conducted.
3. Seminar presentation will allow assessment of information retrieval skills, communication skills and the student's ability to form a logical discussion and argument.
4. Students will be encouraged to attend and to participate in discussions during lectures and seminars allowing them to develop confidence and social skills.

GRADUATE SKILLS

The Griffith Graduate Statement states the characteristics that the University seeks to engender in its graduates through its degree program

Graduate skills	Taught	Practised	Assessed
1. Effective communication (written)			X
2. Effective communication (oral)	X	X	X
3. Effective communication (interpersonal)		X	X
4. Information literacy	X	X	X
5. Problem solving	X	X	X
6. Critical evaluation	X	X	X

7. Work autonomously	X	X	X
8. Work in teams	X	X	X
9. Creativity and innovation	X	X	X
10. Ethical behaviour in social / professional / work environments	X		
11. Responsible, effective citizenship		X	

TEACHING TEAM

Course Convenor

Convenor Details	Nathan
Campus Convenor	Professor Bharat Patel
Email	b.patel@griffith.edu.au
Office Location	N34 2.27
Phone	37357641
Fax	3735 7773
Consultation times	by appointment

Additional teaching team members

Dr Jeremy Brownlie (J.brownlie@griffith.edu.au. P: 3735 7740) – Consultation by appointment

COURSE COMMUNICATIONS

Information about this course will be communicated to students through their Griffith University email accounts and during lectures. Students are encouraged to make use of the discussion board to post feedback, questions or material of interest.

Students will have access to http://trishul.sci.gu.edu.au/pg_courses/7307BPS and will be given password access to logon to http://trishul.sci.gu.edu.au/wEMBOSS

TEXTS AND SUPPORTING MATERIALS

1. The recommended text book for the course is:

Xiong, Jin. Essential Bioinformatics. 1st edition, 2006, Cambridge University Press, UK.

2. Students are encouraged to
(a) download a copy of endnote from the library website and install it on their home computers for use with their assignments.
(b) download a copy of the software listed at the URL http://trishul.sci.gu.edu.au/7307BPS

SECTION B – ADDITIONAL COURSE INFORMATION

Students must conduct their studies in a manner that is ethical and honest. It is expected that all students will adhere to the academic code of practise, which can be found here:

Policy on academic misconduct:

Specifically it is academic misconduct for a student to:

- present copied, falsified or improperly obtained data as if it were the result of laboratory work, field trips or other investigatory work;

include in the student's individual work material which is the result of significant assistance from another person if that assistance was unacceptable according to the instructions or guidelines for that work;

assist another student in the presentation of that student's individual work in a way that is unacceptable according to the instructions or guidelines for that work;

cheat; (Cheating is dishonest conduct in assessment);

plagiarise (Plagiarism is knowingly presenting the work or property of another person as if it were one's own.)