

Genomic Coding & Genetic Engineering

Module Code:	MHT7011-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Biomedical and Electronics Engineering
Subject Area:	Medical and Healthcare Technology
FHEQ Level:	FHEQ Level 7 (Masters)

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	48
Tutorials	24
Directed Study	128

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Semester 1 (Sep - Jan)

Module Aims

To engender specialist knowledge and understanding of the principles of bioinformatics and how information technology can be applied to problems in computational biology and clinical medicine. To develop mathematical skills in relation to bioinformatics and an understanding of the role of information technology in the genomic revolution.

Outline Syllabus

What is bioinformatics?
The role of information technology in biology and medicine.
Elementary information theory.
Elementary coding theory.

Nature of information. Information encoding, storage and transmission.
 Error-correcting codes.
 Elementary statistics.
 Expected distributions.
 Genomic alphabet.
 Proteomic alphabet.
 Genomic information coding.
 Sequence analysis.
 Sequence alignment.
 Pattern matching.
 Pattern discovery.
 Applications to taxonomy and phylogeny.
 Motif discovery.
 Codons, scriptons, cistrons and replicons.
 Regulatory sequences.
 Spectral analysis and the periodogram.
 Automated discovery of ORFs.
 Making a Mammoth (Nature study paper)
 Implications for understanding of evolution.

Module Learning Outcomes

On successful completion of this module, students will be able to...

- 1 Understand the nature of the information contained within genomic code;
 Locate and analyse bioinformatics data published on the internet;
 Describe the principles and techniques underlying the analysis;
 Critically evaluate and analyse genomic data for medical use;
 Critically evaluate the performance of different bioinformatics techniques.
- 2 Use a range of bioinformatics techniques to analyse genomic data; write simple programs in a computer language of their choice to manipulate biological information into different forms for various uses.

Learning, Teaching and Assessment Strategy

The factual basis, concepts and principles of the subject will be introduced through interactive lectures in which routine analysis will be demonstrated. The material is reinforced through whole-group seminars. Tutorial exercises, recommended texts and lecture notes provided enable students to consolidate what they have learned. In the remaining time, students have the opportunity to reflect on, explore and extend their knowledge and understanding and to prepare for the formal written examination that assesses their knowledge and understanding of the subject.

100% Coursework portfolio of experimental modelling work, results and analysis.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
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Summative	Coursework	Coursework portfolio of experimental modelling work, results and analysis	100%	Yes
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Legacy Code (if applicable)

ENG4317D

Reading List

To view Reading List, please go to [rebus:list](#).