

## Module specification

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**Refer to the module guidance notes for completion of each section of the specification.**

Module code	SCI639
Module title	Bioinformatics
Level	6
Credit value	20
Faculty	FAST
Module Leader	Dr Ian Ratcliffe
HECoS Code	100869
Cost Code	GAFS

### Programmes in which module to be offered

Programme title	Is the module core or option for this programme
BSc (Hons) Biochemistry	Core

### Pre-requisites

*None*

### Breakdown of module hours

Learning and teaching hours	24 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
<b>Total active learning and teaching hours</b>	<b>24 hrs</b>
Placement / work based learning	176 hrs
Guided independent study	0 hrs
<b>Module duration (total hours)</b>	<b>200 hrs</b>

<b>For office use only</b>	
Initial approval date	14/10/2020
With effect from date	01/09/2023
Date and details of revision	
Version number	1

## Module aims

The module aims to introduce students to the field of bioinformatics and showcase its application in biochemistry research and practice. The taught content will focus upon establishing a sound knowledge base in the topic, whilst a critical appreciation of applications will be developed through the means of directed study tasks. A grounding in bioinformatics is essential for many career pathways in the Life Sciences, and can serve as a platform upon which to base specialisation in this field, e.g. by study at Masters level.

## Module Learning Outcomes - at the end of this module, students will be able to:

1	Review the range of databases available to researchers within bioinformatics and their utility in advancing knowledge in biochemistry and the life sciences.
2	Exhibit proficiency in the ability to access data files from selected bioinformatics databases and the use of bioinformatics data mining software.
3	Critically interpret the output from data mining exercises using alignment search tools in the context of its significance to e.g. proteomics and genomics.
4	Explain the significance of phylogenetic trees to the field of genomics.
5	Discuss and critically evaluate new applications of bioinformatics in Life Sciences research and Healthcare as reported in current journal articles.

## Assessment

Indicative Assessment Tasks:

**Assessment One:** Students will write a report based upon the completion of an exercise involving the use of biological databases to access data files and processing of the data using dedicated bioinformatics software. The report will consider both the range and utility of databases available to researchers, and their contribution to the field of genomics. Word count: 2000 words.

**Assessment Two:** Students will compose a themed literature review based upon an appropriate set of contemporary research articles within the field of life sciences research / healthcare. Word count: 2000 words

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1-4	Report	50%
2	5	Literature Review	50%

## Derogations

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N/A

## Learning and Teaching Strategies

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A range of teaching activities will be used to deliver this module. This will comprise formal lectures, workshops (including use of IT labs), 'flipped' classroom sessions and seminars. It will be essential for students to undertake regular independent study of additional resources in order to prepare for each session.

## Indicative Syllabus Outline

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Revision and update: sequencing DNA, RNA and proteins.

Genomics and the Human Genome.

Databases in Bioinformatics, their types and importance. Accessing sequences in proteins, DNA, RNA: GenBank, Swiss-Prot, EMBL

Data mining using dedicated bioinformatics software, BLAST. Sequence alignment and similarity searches.

Proteomics – predicting 3D protein structure.

Systems Biology

Phylogenetic Trees

Application of predictive modelling in drug discovery.

Bioinformatics in Healthcare

Translational Bioinformatics, TBI.

## Indicative Bibliography:

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Please note the essential reads and other indicative reading are subject to annual review and update.

### Essential Reads

Lesk A.M. (2019). *Introduction to Bioinformatics*. 5th ed., Oxford: Oxford University Press.

### Other indicative reading

Baxevanis, A.D., Bader, G.D. and Wishart, D.S.(Eds.) (2020). *Bioinformatics*. 4<sup>th</sup> ed. Hoboken, NJ, USA: John Wiley and Sons, Inc.

Selected Peer-Reviewed Journals e.g. Genomics, Proteomics & Bioinformatics, Journal of Biomedical Informatics, International Journal of Medical Informatics, Computational Biology and Chemistry.

## **Employability skills – the Glyndŵr Graduate**

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Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas. [Click here to read more about the Glyndwr Graduate attributes](#)

### **Core Attributes**

Engaged  
Creative  
Enterprising  
Ethical

### **Key Attitudes**

Commitment  
Curiosity  
Resilience  
Confidence  
Adaptability

### **Practical Skillsets**

Digital Fluency  
Organisation  
Critical Thinking  
Emotional Intelligence  
Communication