MODULE DESCRIPTOR

Module Title

Biotechnology And Synthetic Biology

Reference	AS4921	Version	2
Created	August 2021	SCQF Level	SCQF 10
Approved	February 2018	SCQF Points	30
Amended	August 2021	ECTS Points	15

Aims of Module

To provide the student with the ability to assess the enabling technologies which contribute to biotechnological processes and appreciate the importance of biotechnology to society. To provide the students with the ability to understand synthetic biology and its importance.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1	Discuss the application of biotechnology.
2	Discuss the cellular and molecular aspects of bioproduction technologies.
3	Critically assess the importance of genetic engineering.
4	Understand the concepts of synthetic biology and its applications.
5	Critically assess the importance of biotechnological processes and products for medicine, agriculture and food industry.

Indicative Module Content

Developments in bioprocess technology; consideration of biocatalyst, production environment and downstream processing; fermentation technology; product recovery and purification. Genetic engineering; selection of producer organisms; genetic manipulation of producer; cloning technology for heterologous gene expression; CRISPR/Cas 9, recombinant expression systems; hybridoma technology; antibody engineering; plant biotechnology; transgenic organisms; animal cloning; vaccines; stem cells; gene therapy; ethics; synthetic biology, system level bioengineering, medical, microbial and environmental and food industry applications

Module Delivery

A combined approach utilising formal lectures, directed reading and tutorials.

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Indicative Student Workload	Full Time	Part Time
Contact Hours	60	N/A
Non-Contact Hours	240	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	300	N/A
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Examination	Weighting:	70%	Outcomes Assessed:	2, 3, 4, 5
Description:	Unseen closed book examination				

Component 2

Type:	Coursework	Weighting:	30%	Outcomes Assessed:	1
Description:	Poster				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

The first grade represents Component 1 (EX1) weighted as major and the second, Component 2 (CW1), weighted as minor. A module grade of D is required for a pass, with compensation of grade E in Component 1 or Component 2 permitted. Non-submission of either component will result in an NS grade.

Module Grade	Minimum Requirements to achieve Module Grade:
A	AA, AB
B	AC, AD, AE, BA, BB, BC, CA
C	BD, BE, CB, CC, CD, DA, DB
D	CE, DC, DD, DE, EA, EB, EC
E	AF, BF, CF, DF, ED, EE, EF, FA, FB, FC, FD
F	FE, FF
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	Successful completion of Stage 3 of the course or equivalent.
Corequisites for module	None.
Precluded Modules	None.

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INDICATIVE BIBLIOGRAPHY

1	GLICK, B.R. and PASTERNAK, J.J., *Molecular Biotechnology.* American Society for Microbiology. Current edition
2	ZHAO, H., *Synthetic Biology, Tools and Applications.* Academic Press. Current edition
3	HOUDEBINE, L.M., *Animal Transgenesis and Cloning.* Wiley. Current edition