

BS934-20 The Fundamentals of Biotechnology & Genetic Engineering

23/24

Department

Life Sciences

Level

Taught Postgraduate Level

Module leader

Katrine Wallis

Credit value

20

Module duration

4 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module is an introduction to the molecular biology and genetic engineering principles essential to an understanding of the science underpinning biotechnology.

[Module web page](#)

Module aims

The module provides a fundamental understanding of biotechnological, molecular biology and genetic engineering to give students a clear understanding of the scientific principles and how these have been used to advance biotechnology and industrial bioprocesses. It lays the foundation for further in-depth studies of biological systems being, or with potential for, commercial exploitation.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module begins with a brief review of cell structure and function before considering the biochemistry of the cell, particularly protein structure and function, biomembranes and cell architecture.

Industrial microbiology – metabolic and process diversity. Production of cell biomass and primary cellular metabolites. Secondary metabolites and antibiotic production. High value metabolites – vitamins, hormones, extremozymes and microbial enzymes.

This is followed by the molecular structure of genes and chromosomes leading to the introduction of molecular genetic techniques and genomics.

The module is then focused on gene cloning and DNA analysis:

- the basic principles of gene cloning and DNA analysis;
- the applications of gene cloning and DNA analysis in research;
- the applications of gene cloning and DNA analysis in biotechnology.

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate a broad knowledge and understanding of the fundamental principles of biotechnology and the importance of microorganisms in the development, exploitation and commercialisation of biological processes.
- Recognise and analyse the problems associated with the development and use of biological systems in a commercial process.
- Discuss the underlying principles associated with the transition of processes from the laboratory to the industrial scale.
- Undertake literature/database searches to research the biotechnology related discipline.
- Demonstrate an understanding of ethical issues pertinent to biotechnology.
- Discuss the underlying principles associated with the transition of processes from the laboratory to the industrial scale.
- Work in multi-disciplinary and multi-skilled teams to solve biotechnological problems.

Indicative reading list

“Molecular Cell Biology” Lodish et al. 5th ed (2004) Publ. Freeman ISBN 0-7167-4366-3

“Gene Cloning and DNA Analysis” Brown 5th ed (2006) Publ. Blackwell ISBN 13-978-14051-1121-8

“Biology and Biotechnology” Kreuzer and Massey (2005). Publ. ASM Press. ISBN 1-55581-304-6

“DNA Technology and Biotechnology” (2003) CD-ROM Insight Media

“DNA Biotechnology” (1996) CD ROM Insight Media

Biology and biotechnology: science, applications, and issues / Helen Kreuzer, Adrienne Massey
ASM Press | c2005.

Microbial biotechnology : fundamentals of applied microbiology / Alexander N. Glazer, Hiroshi Nikaido
Cambridge University Press | 2007

Molecular cell biology / Harvey Lodish [and others] W.H. Freeman and Company | 2013

Gene cloning and DNA analysis : an introduction / T.A. Brown Wiley-Blackwell | c2016

Bioprocess engineering principles / Pauline M. Doran Academic Press | c2013

Brock biology of microorganisms Pearson | 2015

[View reading list on Talis Aspire](#)

Subject specific skills

Demonstrate a broad knowledge and understanding of the fundamental principles of biotechnology and the importance of microorganisms in the development, exploitation and commercialisation of biological processes.

Recognise and analyse the problems associated with the development and use of biological systems in a commercial process.

Discuss the underlying principles associated with the transition of processes from the laboratory to the industrial scale.

Transferable skills

Undertake literature/database searches.

Work in multi-disciplinary and multi-skilled teams to solve problems.

Demonstrate an understanding of ethical issues pertinent to biotechnology.

Study

Study time

Type	Required
Lectures	10 sessions of 1 hour (5%)
Seminars	30 sessions of 1 hour (15%)
Supervised practical classes	(0%)
Online learning (independent)	2 sessions of 1 hour (1%)
Other activity	58 hours (29%)
Private study	100 hours (50%)
Total	200 hours

Private study description

Self-directed Study.

Other activity description

Assessment Preparation.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A5

	Weighting	Study time
Essay 1500 word essay plus a 300 word abstract	60%	
Group Presentation	40%	

Feedback on assessment

Verbal feedback on formative and summative group presentation; written group feedback on summative presentation; written feedback on essay.

Availability

Courses

This module is Core for:

- Year 1 of TLFS-J7N2 Postgraduate Medical Biotechnology and Business Management
- Year 1 of TBSS-C5N2 Postgraduate Taught Biotechnology, Bioprocessing and Business Management