

Liverpool John Moores University

Title: FERMENTATION TECHNOLOGY PRINCIPLES
Status: Definitive
Code: **7005BTBMOL** (101531)
Version Start Date: 01-08-2012

Owning School/Faculty: Pharmacy & Biomolecular Sciences
Teaching School/Faculty: Pharmacy & Biomolecular Sciences

Team	Leader
Glyn Hobbs	Y
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Academic Level: FHEQ7 **Credit Value:** 30.00 **Total Delivered Hours:** 78.00
Total Learning Hours: 300 **Private Study:** 222

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	38.000
Practical	25.000
Workshop	12.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Essay-type	75.0	3.00
Report	AS2	Practical Report	10.0	
Presentation	AS3	Mini Project	15.0	

Aims

To give an insight into Industrial, Microbiology and Biochemistry. This module will show how fundamental principles can be applied to industrial processes and will examine the wide range of microbial processes and products.

Learning Outcomes

After completing the module the student should be able to:

- 1 design a fermentation process from strain selection and improvement to product recovery and purification.
- 2 compare practical fermenters and appreciate the need for instrumentation and control.
- 3 construct and operate small scale and pilot plant fermentation equipment.
- 4 understand the biochemistry of industrially important organisms and their products.
- 5 analyse the efficiency of a process and provide a rational approach for its improvement.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

EXAM	1	2	3	4	5
Report	1	2	3	4	
Presentation	1	2	3	4	

Outline Syllabus

Characteristics of industrial microorganisms: biochemical diversity, overflow metabolism, enzyme production.
Isolation and improvement of organisms: isolation techniques, strain selection, improvement of organisms by rational and random approaches, breeding programmes and protoplast fusion.
Fermentation Processes: media design, inocula development, fermenter or design, fermentation instrumentation and control and scale-up.
Analysis of process efficiency: batch, fed-batch and continuous culture.
Downstream Processing: harvesting, fermentation broth extraction and purification of products.
Microbial products: antibiotics, enzymes, single cell protein etc.

Learning Activities

Lectures, workshops, practicals

References

Course Material	Book
Author	Crueger, W. and Crueger, A
Publishing Year	1990
Title	Biotechnology: A textbook of Industrial Microbiology

Subtitle	
Edition	2nd ed.
Publisher	Sinauer Associates Inc.
ISBN	087893135X

Course Material	Book
Author	Stanbury, P. F., Whitaker, A. and Hall, S. J.
Publishing Year	1995
Title	Principles of Fermentation Technology.
Subtitle	
Edition	2nd ed.
Publisher	Pergamon Press.
ISBN	0080361315

Course Material	Book
Author	Ratledge, C. and Kristiansen, B.
Publishing Year	2006
Title	Basic Biotechnology
Subtitle	
Edition	3rd ed.
Publisher	
ISBN	978-0-521-54958-5

Course Material	Book
Author	El-Mansi, M. and Bryce, C. Eds.
Publishing Year	2007
Title	Fermentation Microbiology and Biotechnology
Subtitle	
Edition	2nd ed.
Publisher	Taylor and Francis
ISBN	0-8493-5334-3

Course Material	Book
Author	Bailey, J.E. and Ollis, D.F.
Publishing Year	1989
Title	Biochemical Engineering Fundamentals
Subtitle	
Edition	2nd ed.
Publisher	McGraw-Hill
ISBN	0070032122

Course Material	Book
Author	McNeil, B and Harvey, L.M.
Publishing Year	2008
Title	Practical Fermentation Technology
Subtitle	
Edition	1st ed.

Publisher	Wiley
ISBN	978-0-470-01434-9

Notes

The module gives an insight into Industrial Microbiology and Biochemistry. Showing how fundamental principles can be applied to industrial processes. A wide range of microbial processes will be examined and used to illustrate how complex products can be made economically from microorganisms.