



FACULTY OF HEALTH SCIENCES AND SPORTS
BACHELOR OF SCIENCE IN BIOMEDICAL TECHNOLOGY
(PHARMACY TECHNOLOGY)

LEARNING MODULE OUTLINE

Academic Year	2023-2024	Semester	1
Module Code	BSBP3101		
Learning Module	Biopharmaceutics(生物藥劑學)		
Pre-requisite(s)	Nil		
Medium of Instruction	Chinese & English		
Credits	2	Contact Hours	30
Instructor	Lang Bin (Subject Teacher)	Email	blang@mpu.edu.mo
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MODULE DESCRIPTION

This 30-hour course is one of the foundation courses of the pharmacy program.

Biopharmaceuticals are complex medicines made from living cells or organisms, often produced using cutting-edge biotechnological methods. Introduce the basic concepts of producing biopharmaceuticals using techniques of biotechnology. Discussions on genetic engineering/recombinant DNA technology, monoclonal antibodies, industrial microbiology, enzyme technology, cloning technology, protein engineering, tissue culture technology, biochip, bioinformatics and etc.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

On completion of this learning module, students will be able to:

M1.	Master the basic concepts of biopharmaceuticals.
M2.	Master the theories and knowledge related to the production and uses of biopharmaceuticals.
M3.	Master the biotechnology medicines include recombinant proteins, monoclonal antibodies, vaccines and antibiotics.
M4.	Understand the knowledge and concepts of pharmacogenomics, GM foods, pharming and gene therapy.
M5.	Apply the knowledges in pharmacy technology.



These ILOs aims to enable students to attain the following Programme Intended Learning Outcomes (PILOs):

PILOs	M1	M2	M3	M4	M5
P1. To demonstrate understanding of a range of subjects, fields, principles and approaches relevant to pharmacy technology	✓	✓	✓	✓	✓
P2. To demonstrate understanding of theories, analytical approaches and practices that underpin pharmacy operations and management	✓	✓	✓	✓	✓
P3. To demonstrate understanding of major trends and issues related to pharmacy technology	✓	✓	✓	✓	✓
P4. To apply professional knowledge and skills to analyse, interpret and solve problems, challenges and risks in pharmacy practice	✓	✓	✓	✓	✓
P5. To critically appraise and interpret scientific and clinical literature and apply evidence-based practice	✓	✓	✓	✓	✓
P6. To acquire and apply research skills in pharmacy technology	✓	✓	✓	✓	✓
P7. To demonstrate effective communication and teamwork skills	✓	✓	✓	✓	✓
P8. To maintain professional and ethical standards in pharmacy practice and research	✓	✓	✓	✓	✓

MODULE SCHEDULE, COVERAGE AND STUDY LOAD

Week	Content Coverage	Contact Hours
1	Introduction to Biopharmaceuticals <ul style="list-style-type: none">• Introduction to pharmaceutical products• Definition of biopharmaceuticals• The age of biopharmaceuticals• Biopharmacy technology	2
2-4	Genetic Engineering of Pharmaceuticals <ul style="list-style-type: none">• Development of genetic engineering pharmacy• Basic process of genetic engineering for pharmaceutical• Instance of genetic engineering for pharmaceutical:<ul style="list-style-type: none">• Insulin• Erythropoietin (EPO)• Interferons (IFN)	8
5-6	Cell Engineering of Pharmaceuticals <ul style="list-style-type: none">• Introduction to cell engineering• Cell culture technology used in the pharmaceutical• Hybridoma technology and monoclonal antibodies• Stem cell research: application and challenge	6
7-8	Introduction to Pharmaceutical Products <ul style="list-style-type: none">• Antibodies:<ul style="list-style-type: none">• Monoclonal antibodies• Polyclonal antibodies• Vaccines<ul style="list-style-type: none">• Traditional vaccine preparations	4



	<ul style="list-style-type: none"> • The impact of genetic engineering on vaccine technology • Development of an AIDS vaccines • Cancer vaccines • Cytokines • Blood products 	
9	Enzymes Engineering and Microbial Fermentation for Pharmaceuticals Genetically Modified Foods <ul style="list-style-type: none"> • Transgenic plant • Transgenic animal 	2
10	Gene Therapy <ul style="list-style-type: none"> • Basic approach to gene therapy • Gene therapy and genetic disease • Some additional questions in gene therapy 	2
11-12	Individual Assignment and Presentation	4
13	Examination	2

TEACHING AND LEARNING ACTIVITIES

In this learning module, students will work towards attaining the ILOs through the following teaching and learning activities:

Teaching and Learning Activities	M1	M2	M3	M4	M5
T1. Lectures and videos	✓	✓	✓	✓	
T2. Case study		✓		✓	✓
T3. Group discussion					✓
T4. Writing assignment				✓	✓
T5. Oral Presentation					✓

ATTENDANCE

Attendance requirements are governed by the Academic Regulations Governing Bachelor's Degree Programmes of the Macao Polytechnic University. Students who do not meet the attendance requirements for the learning module shall be awarded an 'F' grade.

ASSESSMENT

In this learning module, students are required to complete the following assessment activities:

Assessment Activities	Weighting (%)	ILOs to be Assessed
A1. Group assignment	40	M5
A2. Final Examination	60	M1, M2, M3, M4



The assessment will be conducted following the University's Assessment Strategy (see www.mpu.edu.mo/teaching_learning/en/assessment_strategy.php). Passing this learning module indicates that students will have attained the ILOs of this learning module and thus acquired its credits.

This learning module is graded on a 100-point scale, with 100 being the highest possible score and 50 being the passing score. Any student scoring less than 35% of the total mark in the final examination will be given an "F" grade for the course even if the overall grade is 50% or higher.

MARKING SCHEME

High grades will be awarded to work that demonstrates exceptional understanding and mastery of the subject matter and consistently exceeding expectations. The followings are the general assessment criteria for the assessment activities.

Assessment Activities	Assessment Criteria	Mark Ranges				
		88-100	73-87	58-72	50-57	<50
A1. Group assignment	Describe clearly the background of the assignment; Rational analysis and explanation; Deep reflection; Complete and clear data;	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels
A2. Final Examination	Demonstrate the ability to identify and apply appropriate concepts, methods, and techniques	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels

Please refer to the 'Essay Rubric.pdf' and 'Group Presentation Evaluation Form.pdf' for the grading criteria of the writing assignment and oral presentation.

REQUIRED READINGS

There is no required textbook for this course.

REFERENCES

1. Gary Walsh, 2013, Biopharmaceuticals: Biochemistry and Biotechnology, 2nd Edition, Wiley-Blackwell Publishing.
2. Chandrakant Kokate, 2011, Textbook of Pharmaceutical Biotechnology, 1st Edition, Elsevier.
3. 王鳳山, 2011, 生物技術制藥, 第二版, 人民衛生出版社.

STUDENT FEEDBACK

At the end of every semester, students are invited to provide feedback on the learning module and the teaching arrangement through questionnaires. Your feedback is valuable for instructors to enhance the module and its delivery for future students. The instructor and programme coordinators will consider all feedback and respond with actions formally in the annual programme review.



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ACADEMIC INTEGRITY

The Macao Polytechnic University requires students to have full commitment to academic integrity when engaging in research and academic activities. Violations of academic integrity, which include but are not limited to plagiarism, collusion, fabrication or falsification, repeated use of assignments and cheating in examinations, are considered as serious academic offenses and may lead to disciplinary actions. Students should read the relevant regulations and guidelines in the Student Handbook which is distributed upon the admission into the University, a copy of which can also be found at www.mpu.edu.mo/student_handbook/.