



Transport Phenomena in Living Systems

COURSE SYLLABUS

Course Code	Course Name	Credits	Contact Hours
0404584	Transport Phenomena in Living Systems	3	48

INSTRUCTOR/COORDINATOR

Name
Email@mutah.edu.jo
Website	

TEXTBOOK

TextBook:

- : Michael L.Shuler, Fikret Kargi ,”Bioprocess Engineering Basic Concepts”, PHPTR, 2nd Edition

References:

- James M. Lee,”Biochemical Engineering”.Version 2.1, 2002.
- Rajiv Dutta, “Fundamental of Biochemical Engineering “, Ane books India,1st edition,2008

SPECIFIC COURSE INFORMATION

A. Brief Description of the Content of the Course (Catalog Description)

Introduction to Biotechnology. Elementary Biochemistry and Microbiology. Major metabolic pathways. Introduction to genetic engineering. Kinetics and mechanism of enzymatic reactions, enzyme inhibition, and enzyme immobilization. Kinetics of microbial growth, substrate utilization and product formation. Methods of cell cultivation (batch, continuous and fed batch). Transport phenomena in bioprocesses. Design, analysis and scale- up of biochemical reactors.

B. Pre-requisites (P) or Co-requisites (C)

(P): 0404437 Mass Transfer

C. Course Type (Required or Elective)

Selected Elective

SPECIFIC GOALS

A. Specific Outcomes of Instruction

Upon the successful completion of the course, the student will be able to:

- Appreciate the role of biochemical engineers in industry and comment on the debate over biotechnology (SLO-4)
- Explain the major steps involved in cell fractionation (SLO-1).
- Explain the major steps involved in cell fractionation (SLO-1)
- Define enzymes and differentiate between enzymes and synthetic catalysts (SLO-1).
- Explain the mechanism of enzyme action according to different models (SLO-1).
- Explain differences between the different types of bioreactors (SLO-1).
- Perform material balance on batch fermenters (SLO-1).
- Design a bioreactor (SLO-2).

B. Student Learning Outcomes (SLOs) Addressed by the Course

1	2	3	4	5	6	7				
✓	✓		✓							

BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
• Introduction, Elementary Biochemistry & Microbiology	1-2	3 hr/week
• Enzymes Kinetics, Inhibition, and Immobilization	3-6	3 hr/week
• Metabolic Pathways	6-9	3 hr/week
Mid Term Exam	1	
• Bioreactors and Microbial Growth	10-11	3 hr/week
• Bioreactor Design and Analysis	12-14	3 hr/week
• Case Studies and Projects Presentations	14-15	3 hr/week
Final Exam	16	

METHODS OF ASSESSMENT

No.	Method of assessment	Week and Date	%
1	Midterm Examination	9th week	30
2	Homeworks and Activities	All over the Semester	20
3	Final examination	End of Semester	50
Total			100