University of Jordan
School of Engineering
Chemical Engineering Department

1. **Course code and name:** (0905424) Biochemical Engineering (2024 study plan)
2. **Class schedule:** 3 Credits Hours
3. **Instructor:** Dr. Linda Al-Hmoud
   a. Office: CHE 305
   b. Email address: l.alhmoud@ju.edu.jo, linda.ju14@gmail.com
4. **Text book:** Michael L.Shuler, Fikret Kargi ,"Bioprocess Engineering Basic Concepts", PHPTR,2nd Edition
5. **References:** James M.Lee,"Biochemical Engineering".Version 2.1,2002.
   Book: Rajiv Dutta, "Fundamental of Biochemical Engineering ",Ane books India,1st edition,2008
   Journals:
   - Chemical Engineering Journal: http://www.journals.elsevier.com/chemical-engineering-journal/
   - Chemical Engineering Science: http://www.journals.elsevier.com/chemical-engineering-science
6. **Website:** http://eacademic.ju.edu.jo/l.alhmoud
   Your **e-learning** account (https://elearning.ju.edu.jo/)
7. **Course information:**
   a. **Catalog description**: Introduction to Biotechnology. Elementary Biochemistry and Microbiolory. 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. **Prerequisite:** (0935441, 0905421) Mass Transfer Operation, Chemical Reaction Engineering (1).
   c. **Course classification**: Elective course in the B.Sc. program.
8. **Specific goals of the course:** This course is devoted primarily to basic principles of biochemical engineering. 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
   - Explain the major steps involved in cell fractionation.
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   - Define enzymes and differentiate between enzymes and synthetic catalysts.
   - Explain the mechanism of enzyme action according to different models.
   - Explain differences between the different types of bioreactors.
   - Perform material balance on batch fermenters.
   - Design a bioreactor.

9. **Course topics:** Course topics will be covered through 42 (50 minutes) classes according to the following distribution:

Topic	# of classes
Introduction, Elementary Biochemistry & Microbiology	9
Enzymes Kinetics, Inhibition, and Immobilization	9
Metabolic Pathways	6
Bioreactors and Microbial Growth	6
Bioreactor Design and Analysis	9
Projects Presentation	3

10. **Policies and procedures:**
    - Students are expected to **attend each class session** and they are responsible for all material, announcements, and schedule changes discussed in class. The university policy regarding the attendance will be strictly adhered.
    - All cases of academic dishonesty will be handled in accordance with university policies and regulations.
    - You are encouraged to use **computer softwares** such as EXCEL, MATLAB, or POLYMATH to perform the required computations and to represent your findings in graphs or tables.

11. **Instructional methods:**
    Lectures, class discussions, and in-class problem solving

12. **Assessment & Grading:**
    A weighted average grade will be calculated as follows:

Quizzes	:	12%
Group Project & Participation	:	8%
Midterm examinations	:	30%
Final examination	:	50%
Total	**:**	**100%**

13. **Relationship to Program Outcomes:**

1	2	3	4	5	6	7
✓	✓	✓		✓		✓

Prepared by: Dr. Linda Al-Hmoud
Last modified: Sep.22th , 2025