

TEMPLATE FOR COURSE SPECIFICATION

HIGHER EDUCATION PERFORMANCE REVIEW: PROGRAMME REVIEW

COURSE SPECIFICATION

This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

1. Teaching Institution	University of Technology
2. University Department/Centre	Chemical Engineering Department
3. Course title/code	Biochemical Engineering CE346
4. Programme(s) to which it contributes	
5. Modes of Attendance offered	Fall
6. Semester/Year	1 semester/year
7. Number of hours tuition (total)	3
8. Date of production/revision of this Specification	
9. Aims of the Course	
1. To introduce and understanding of microorganisms.	
2. To introduce the types of biochemical reactors and fermenters.	
3. To introduce biochemical wastewater treatment .	
4. To introduce biochemical industries.	

10• Learning Outcomes, Teaching ,Learning and Assessment Method
A- Knowledge and Understanding A1. Understanding of the prencipls of biochcematical engineering. A2.Understanding the relation between the chemical and biochemical engineering.
B. Subject-specific skills B1. Apply the prencipls of biochemical engineering in wastewater treatment B2.Apply the principls of biochemical engineering in industries. .
Teaching and Learning Methods
Lectures, Tutorials , Example Classes , homework problems
Assessment methods
Midterm exams , Final exam , Quizzes, homework,
C. Thinking Skills .
Teaching and Learning Methods
Lectures, Tutorials , Example Classes
Assessment methods
Midterm exams , Final exam , Quizzes,homework,

D. General and Transferable Skills (other skills relevant to employability and personal development).

11. Course Structure

Week	Hours	ILOs	Unit/Module or Topic	Teaching Method	Assessment Method
1st semester					
1	3	Principles definitions to know the principles of bioscience	Definitions	Lectures,	Partial test
2	3	Types of enzymes and the role in bio reactors	Classification of enzymes	Lectures	Partial test
3	3	Know how to calculate the reaction rate	Michaelis model	Lectures	Partial test
4	3	Know how to calculate the reaction rate	Briggs model	Lectures	Partial test
5	3	How calculate the parameters of this models	Calculate the parameters	Lectures	Homework and test
6	3	Understand the types of bioreactors	Mods of bioreactors	Lectures	test
7	3	Know how to calculate the reaction time	Batch reactor	Lectures	Homework and test
8	3	Know how to calculate the volume of reactor	Continuous reactor	Lectures	Homework and test

9	3	Know the advantages and disadvantages	Immobilized of enzymes	Lectures	test
10	3	General explanation	Fermenters	Lectures	test
11	3	Know the types and choose the best depending the process	-Types of fermenters	Lectures	test
12	3	Know how to calculate the division rate	The division rate	Lectures	test
13	3	Know the basic principles of heat transfer in bioreactor	Heat transfer in bioreactors	Lectures	test
14	3	Know the main biological wastewater treatment	Wastewater treatment	Lectures	test
15	3	Explain some biological processes	Biological industries	Lectures	test

12. Infrastructure

Required reading:

- CORE TEXTS
- COURSE MATERIALS
- OTHER

1-Rajiv Dutta, " Fundamentals of Biochemical Engineering", Any Books, India, 2007.
 2-Nukesh Doble , " Biochemical Engineering" , by prentice-Hall of India private limited ,New Delhi, 2007.
 3- James E.Bailey , David F. Oils, "Biochemical Engineering Fundamentals",2nd ,1986.
 4 -Ronald W. Missen; Charles A. Mims ; Bradley A.saville (1999),INTRODUCTION TO CHEMICAL REACTION ENGINEERING AND KINETICS,1st edition ,John Wiley and Sons Inc.,USA.

Special requirements (include for example workshops, periodicals, IT software, websites)	
Community-based facilities (include for example, guest Lectures , internship , field studies)	

13. Admissions	
Pre-requisites	Before undertaking this module the student should have undertaken the following: Basic Principles of chemical engineering ,bio chemistry , mathematics reactor design
Minimum number of students	Central Admission
Maximum number of students	Central Admission