

	production, Factors affecting biohydrogen production, Detection and Quantification of biohydrogen.	
5.	<b>Microbial Fuel Cells:</b> Introduction and biochemical basis, History of microbial fuel cell development, Microbes used in microbial fuel cells Design of microbial fuel cells; MFC components, Two and Single MFC systems,Performances of microbial fuel cells.	8
	TOTAL	42

### Books: -

S. No.	Name of Books/ Author/Publisher
1	Caye M. Drapcho, N.P. Nhuan and T. H. Walker, Biofuels Engineering Process Technology, Mc Graw Hill Publishers, New York,
2	Jonathan R.M, Biofuels – Methods and Protocols (Methods in Molecular Biology Series), Humana Press, New York,
3	Lisbeth Olsson (Ed.), Biofuels (Advances in Biochemical Engineering/Biotechnology Series, Springer-Verlag Publishers, Berlin.,

### **Enzymology and Enzyme Technology**

### Details of course: -

Course Title	Course Structure			Pre-Requisite
	L	T	P	
<b>Enzymology and Enzyme Technology (BT318)</b>	3	0	2	NIL

#### **Course Objective:**

To integrate the practical aspects of enzymology with the kinetic theories and provide a mechanistic overview of enzyme activity.

**Course Outcome:**

1. Understand the concept of Enzyme, its application.
2. Illustrate the kinetics and mechanism of Enzyme
3. Compare and contrast the types of Enzyme Immobilization.
4. Identify the Enzyme Reactor for Batch/ continuous enzymatic processing.
5. Analyze the Bioprocess Design and Physical parameters.

S. No.	Content	Contact Hours
1.	Enzyme: Introduction and scope, Nomenclature, Application of enzyme, Enzyme catalysis in organic media.	8
2.	Enzyme Kinetics: Kinetics of enzymatic reaction, Single and multiple substrate systems, Inhibition - substrate, product and inhibitors, Mechanism of enzyme action.	8
3.	Immobilization of Enzyme: Methods of immobilization External and diffusional mass transfer limitation, Effectiveness factor.	9
4.	Enzyme Reactor: Reactors for Batch/ continuous enzymatic processing, choice of reactor type.	9
5.	Bioprocess Design: Physical parameters, immobilized cells.	8
TOTAL		42

**Books: -**

S. No.	Name of Books/ Author/Publisher
1	Fundamentals of Enzymology by Price and Stevens. Publisher: Oxford University Press.
2	Introduction to Biocatalysis using Enzymes and Microorganisms by S.M. Roberts, N.J. Turner and A. J. Willetts. Publisher: Cambridge University Press
3	Enzyme Kinetics: Behavior and Analysis of Rapid Equilibrium and Steady - State Enzyme Systems by I.H. Segel. Publisher: Wiley-Interscience.
4	Enzyme Technology by M.F. Chaplin and C. Bucke. Publisher: Cambridge University Press
5	Enzymes: A Practical Introduction to Structure, Mechanism, and Data Analysis by R.A. Copeland .Publisher: John Wiley and Sons Inc

**Protein Engineering****Details of course: -**