

**School of Biochemical Engineering**

**Institute of Technology**

**BANARAS HINDU UNIVERSITY**

**VARANASI – 221005**

# **SYLLABUS**

**Course Structure for Five Year IDD**

**B.Tech & M.Tech Course**

**(B.Tech in Biochemical Engineering & M.Tech in  
Biochemical Engg. And Biotechnology)**

## **COURSE STRUCTURE:**

### **B.Tech Part II, Semester III:**

<b>Sr.No.</b>	<b>Subjects Theory:</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
1.	AM-2101: Mathematical Methods	3	3
2.	EC-2113A: Electronics And Instrumentation	3	3
3.	MS-2101: Introduction To Materials Science	3	3
4.	CH-2102: Fluid Flow Operations	3	3
5.	BC-2101: Introduction To Modern Biology	4	4
6.	BC-2102: Fundamentals Of Biochemistry	3	3
	<b>Practical:</b>		
7.	EC-2313A: Electronics And Instrumentation	3	3
8.	BC-2301: Biochemistry And Molecular Biology Lab	6	4
<b>Total for Semester III</b>		<b>28</b>	<b>25</b>

### **B.Tech Part II, Semester IV:**

<b>Sr.No.</b>	<b>Subjects Theory:</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
1.	AM-2201A: Numerical Analysis	3	3
2.	EE-2213A: Electrical Engineering	3	3
3.	CH-2202: Fluid Particle Mechanics And Mechanical Operations	3	3
4.	BC-2201: Fundamentals Of Micro Biology	4	4
5.	AC-2201A: Chemical Thermodynamics	3	3
6.	BC-2203: Bioprocess Calculations	3	3
	<b>Practical:</b>		
7.	EC-2413A: Electrical Engineering Lab	3	2
8.	CH-2402A: Fluid Flow And Mechanical Operations Lab	3	2
9	BC-2401: Microbiology Lab	3	2
<b>Total for Semester IV</b>		<b>28</b>	<b>25</b>
<b>Total for B.Tech Part II</b>		<b>56</b>	<b>50</b>

**B.Tech Part III, Semester V:**

<b>Sr.No.</b>	<b>Subjects Theory:</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
1.	BC-3101: Microbial Process Principles	4	4
2.	AC-3103: Environmental Chemistry	3	3
3.	BC-3103: Microbiological Engineering	4	4
4.	BC-3104: Bioprocess Technology	3	3
5.	CH-3104: Chemical Reaction Engineering-I	3	3
6.	AC-3102: Analytical Techniques In Chemistry	3	3
	<b>Practical:</b>		
7.	BC-3301: Bioprocess Technology Lab	3	2
8.	CH-3313A: Computer Application Lab	3	2
<b>Total for Semester V</b>		<b>26</b>	<b>24</b>

**B.Tech Part III, Semester VI:**

<b>Sr.No.</b>	<b>Subjects Theory:</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
1.	BC-3201: Enzyme Engineering And Technology	4	4
2.	PH-3202: Pharmaceutical Biotechnology	3	3
3.	BC-3203: Bioprocess Instrumentation And Control	4	4
4.	CH-3202: New Separation Process	3	3
5.	AC-3201: instrumental methods of chemical analysis	3	3
6.	HU: Open Elective*	3	3
	<b>Practical:</b>		
7.	BC-3402: Enzyme And Protein Engineering Lab	6	4
8.	BM-3403: Analytical Techniques In Chemistry	3	2
<b>Total for Semester VI</b>		<b>29</b>	<b>26</b>
<b>Total for B.Tech Part III</b>		<b>55</b>	<b>50</b>

**\*Any one of the following open electives**

- 1. HU 321: History of Science and Technology**
- 2. HU 322: Industrial and Organizational Psychology**
- 3. HU 323: Intellectual Property Rights**
- 4. HU 324: Energy Management**
- 5. HU 325: Industrial Sociology**
- 6. HU 326: Ethics, Philosophy and Values**
- 7. HU 327: Entrepreneurship Development**

**B.Tech Part IV, Semester VII:**

<b>Sr.No.</b>	<b>Subjects Theory:</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
1.	BC-4101: Downstream Processing	3	3
2.	BC-4103: Advanced Fermentation Technology	3	3
3.	BC-4104: Introduction To Bioinformatics	3	3
4.	BC-4105: Food Engineering And Biotechnology	3	3
5.	ME-4113A: Engineering Economics And Management	3	3
	<b>Practical:</b>		
6.	BC-4301: Food Biotechnology Lab	3	2
7.	BC-4302: Seminar And Group Discussion	3	2
8.	BC-4303: Industrial Training (Viva Voce)	-	2
9.	BC-4304: UG Project	6	4
<b>Total for Semester VII</b>		<b>27</b>	<b>25</b>

**B.Tech Part IV, Semester VIII:**

<b>Sr.No.</b>	<b>Subjects Theory:</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
1.	AC-4202: Industrial Waste Management	3	3
2.	BC-4203: Bioreactor Design And Analysis	3	3
3.	BC-4204: Molecular Biology And Genetic Engineering	3	3
4.	BC-4205: Bioprocess Plant Design	3	3
5.	PH-4213A: Quality Assurance	-	2
	<b>Practical:</b>		
6.	BC-4301: Comprehensive Viva Voce	3	3
7.	BC-4302: Project -1 Dissertation	6	4
8.	BC-4303: Waste Water Engineering Lab	3	2
	BC-4304: Bioreaction Engineering Lab	3	2
<b>Total for Semester VIII</b>		<b>27</b>	<b>25</b>
<b>Total for B.Tech Part IV</b>		<b>54</b>	<b>50</b>

**B.Tech Part V, Semester IX:**

<b>Sr.No.</b>	<b>Subjects Theory:</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
1.	BC-5101: Bio-Business Planning And Management	3	3
2.	*Elective 1	3	3
3.	*Elective 2	3	3
4.	PG Open Elective from Other Departments	3	3
	<b>Practical:</b>		
5.	BC-5301: Biochemical Engineering Lab	3	2
6.	BC-5302: Seminar On Dissertation	-	5
7.	BC-5303: Dissertation Interim Evaluation	9	5
<b>Total for Semester IX</b>		<b>24</b>	<b>24</b>

**B.Tech Part V, Semester X:**

<b>Sr.No.</b>	<b>Subjects Theory:</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
1.	BC-5201: Seminar On Dissertation	-	5
2.	BC-5202: Dissertation Evaluation	-	10
3.	BC-5203: Open Defense	2	1
<b>Total for Semester X</b>		<b>2</b>	<b>16</b>
<b>Total for B.Tech Part V</b>		<b>26</b>	<b>40</b>

**Year wise Credits****I Year- 50****II Year- 50****III Year- 50****IV Year- 50****V Year- 40****Total Credits=240**

**\*Elective I, \*Elective II, \*Elective III :- (3 Credits Each):**

**\*Any three of the following**

**BC5102: Environmental biotechnology**

**BC5103: Regulatory Aspects in Biotechnology (IPR)**

**BC5104: Modeling and Simulation of Bioprocesses**

**BC5105: Cell and Tissue Engineering**

**BC5106: Metabolic Engineering**

**BC5107: Protein Engineering**

**BC5108: Animal Cell Biotechnology**

**BC5109: Plant Biotechnology**

**BC5110: Recombinant DNA Technology**

**BC5111: Transport Phenomena in Microbial Systems**

**AC5104: Biosensors**

**BC5112: Structural Biology**

**BC5113: Bioconversion**