ODISHA UNIVERSITY OF TECHNOLOGY AND RESEARCH

Techno Campus, Mahalaxmi Vihar, Ghatikia, Bhubaneswar-751029.

Syllabus Structure (Effective from 2023-24)

School/ Department: Department of Biotechnology
Course: M.Tech., Programme: Biotechnology (BT),
Duration: 2 years (Four Semesters)

Abbreviation used:

AC	Audit course	LC	Lab Course	PA	Practical Assessment
PC	Professional Core	PR	Project/ Practical/ Internship	L	Lecture
PE	Professional Elective	SE	Seminar/ Expert Lecture/ Etc.	T	Tutorial
OE	Open Elective	IA*	Internal Assessment	P	Practical
MC	Mandatory/ Common Course	EA	End-Semester Assessment		
*Internal Assessment Mark (30 marks) consists of (i) Mid Semester (20 marks), (ii) Quiz/ Assignment (10 marks)					

Subject Code Format:

A1	A2	B3	C4	C5	C6
School/ Dept. (Offering) **BH:** Basic Sciences and Humanities **CS:** Computer Sciences **EE:** Electrical Sciences **EI:** Electronic Sciences **IP:** Infrastructure and Planning **MS:** Mechanical Sciences **BT:** Biotechnology **TE:** Textile Engineering		**Level** **1:** UG/ Int. Msc. (1st Year) **2:** UG/ Int. Msc. (2nd Year) **3:** UG/ Int. Msc. (3rd Year) **4:** UG/ Int. Msc. (4th Year) **5:** UG/ Int. Msc. (5th Year) **6:** PG (1st Year) **7:** PG (2nd Year) **8:** Ph.D.	**0:** AC **1:** PC **2:** PE **3:** OE **4:** MC **5:** LC **6:** PR **7:** SE **8:** **9:**	**Serial Number (01 to 99)** 01/ 03/…/ 19: Odd Sem. (BT) 21/ 23/…/ 39: Odd Sem. (Prog-2) 41/ 43/…/ 59: Odd Sem. (Prog-3) 61/ 63/…/ 79: Odd Sem. (Prog-4) 81/ 83/…/ 99: Odd Sem. (Prog-5) 02/ 04/…/ 20: Even Sem. (BT) 22/ 24/…/ 40: Even Sem. (Prog-2) 42/ 44/…/ 60: Even Sem. (Prog-3) 62/ 64/…/ 80: Even Sem. (Prog-4) 82/ 84/…/ 98: Even Sem. (Prog-5)	

1st Semester

Sl. No.	Subject Type	Subject Code	Subject Name	Teaching Hours			Credit	Maximum Marks			
				L	T	P		IA	EA	PA	Total
1	PC 1	BT6101	Advanced Bioprocess Engineering	3	0	0	3	30	70	-	100
2	PC 2	BT6103	Bioinstrumentation and Biostatistics	3	0	0	3	30	70	-	100
3	PE 1 (Any One)	BT6201	Cell culture and Metabolic regulations	3	0	0	3	30	70	-	100
		BT6203	Applied Bioinformatics								
4	MC 1	BS6401	Mathematical Methods in Engineering	3	0	0	3	30	70	-	100
5	MC 2	MS6403	Research Methodology and IPR	2	0	0	2	30	70	-	100
6	LC 1	BT6501	Bioprocess Engineering Lab	0	0	4	2	-	-	100	100
7	LC 2	BT6503	Biostatistics & Bioinformatics Lab	0	0	4	2	-	-	100	100
8	AC 1	BH6001	English for Research Paper Writing	2	0	0	0	30	70	-	100
			Total	**16**	**0**	**8**	**18**	**180**	**420**	**200**	**800**

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2nd Semester

Sl. No.	Subject Type	Subject Code	Subject Name	Teaching Hours			Credit	Maximum Marks			
				L	T	P		IA	EA	PA	Total
1	PC 3	BT6102	Gene manipulation & Vector Technology	3	0	0	3	30	70	-	100
2	PC 4	BT6104	Current trends in Translational Biotechnology	3	0	0	3	30	70	-	100
3	PE 2 (Any One)	BT6202	Advanced microbiology and immunology	3	0	0	3	30	70	-	100
		BT6204	Advanced drug delivery systems								
		BT6206	Nano-biotechnology								
4	PE 3 (Any One)	BT6208	Environmental Biotechnology	3	0	0	3	30	70	-	100
		BT6210	Cancer biology								
		BT6212	Chemistry of nucleic acids and proteins								
5	OE 1	Any One from the List of *OE 1 (Appendix-I)		3	0	0	3	30	70	-	100
6	PR 1	BT6602	Project (Specialization Related)	0	0	4	2	-	-	100	100
7	LC 3	BT6502	Genetic Engineering Lab	0	0	4	2	-	-	100	100
8	AC 2	IP6002	Disaster Management	2	0	0	0	30	70	-	100
			Total	**17**	**0**	**8**	**19**	**180**	**420**	**200**	**700**

3rd Semester

Sl. No.	Subject Type	Subject Code	Subject Name	Teaching Hours			Credit	Maximum Marks			
				L	T	P		IA	EA	PA	Total
1	PE 4* (Any One)	BT7201	Advanced Plant Biotechnology	3	0	0	3	30	70	-	100
		BT7203	Molecular modelling and drug designing								
		BT7205	Animal Biotechnology								
2	PR 2	BT7601	Dissertation (Phase-I)	0	0	24	12	-	-	100	100
			Total	**3**	**0**	**24**	**15**	**30**	**70**	**100**	**200**

* Virtual/Online Course either offered by OUTR or available in MOOCs platform (No physical class)

4th Semester

Sl. No.	Subject Type	Subject Code	Subject Name	Teaching Hours			Credit	Maximum Marks			
				L	T	P		IA	EA	PA	Total
1	PR 3	BT7602	Dissertation (Phase-II)	0	0	32	16	-	-	100	100
			Total	**0**	**0**	**32**	**16**	**-**	**-**	**100**	**100**

Credits and Maximum Marks

Sl. No.	Semester	Credits	Maximum Marks
1	1st	18	800
2	2nd	19	800
3	3rd	15	200
4	4th	16	100
	Total	68	1900

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(APPENDIX-I)

LIST OF (MC/ *OE/ AC) SUBJECTS OFFERED BY SCHOOLS/ DEPARTMENTS

School/ Department (Offering)	Subject Type	Subject Code	Subject Name
Basic Science and Humanities	MC 1	BS6401	Mathematical Methods in Engineering
	*OE 1	BH6302	Spectroscopic Techniques for Organic Compounds
		BH6304	Chemical Biology
		BH6306	Nanoscience and Technology
		BH6308	Statistical Methods
		BH6310	Operations Research
		BH6312	Advanced Numerical Methods
	AC 1	BH6001	English for Research Paper Writing
		BH6003	Sanskrit for Technical Knowledge
		BH6005	Value Education
		BH6007	Constitution of India
	AC 2	BH6002	Pedagogy Studies
		BH6004	Stress Management by Yoga
		BH6006	Personality Development through Life Enlightenment Skills
Computer Sciences	*OE 1	CS6302	Pattern Recognition
		CS6304	Distributed Systems
		CS6306	Microfluidic Biochip
		CS6308	Programming in C
		CS6310	Data Structure
		CS6312	Computer Vision
Electrical Sciences	*OE 1	EE6302	Quantitative Methods for Energy Management and Planning
		EE6304	Soft Computing application to Engineering
		EE6306	Illumination Engineering
		EE6308	AI and ML for Biomedical Sciences
Electronic Sciences	*OE 1	EI6302	Machine Learning and Artificial Intelligence
		EI6304	IoT and its Applications
		EI6306	Parallel Processing
		EI6308	Signal Processing in Mechatronics Systems
		EI6310	Micro Electro Mechanical Systems
Infrastructure and Planning	*OE 1	IP6302	Universally Accessible Built Environments
		IP6304	Environment Impact Analysis
		IP6306	Geotechnics for Waste Materials
		IP6308	Project Planning and Management
	AC 2	IP6002	Disaster Management
Mechanical Sciences	MC 2	MS6403	Research Methodology and IPR
	*OE 1	MS6302	Production Planning and Control
		MS6304	Design of Experiment
		MS6306	Total Quality Management and Six Sigma
		MS6308	Financial Institutions, Instruments and Markets
		MS6310	Renewable Energy Systems
		MS6312	Design of Thermal Systems
		MS6314	Sensors and Actuators in Industry
		MS6316	Robot Mechanics and Control
Biotechnology	*OE 1	BT6302	Nanobiotechnology
Textile Engineering	*OE 1	TE6302	Polymer Composite

***N.B.:**

The Open Elective Subjects (*OE 1) are specifically open for all programs of Schools/ Departments, other than the School/ Department offering the same subject.