Karmaveer Bhaurao Patil University, Satara

(A State Public University)

Faculty of Science and Technology

Department of Biotechnology

Programme and Credit Structure as per NEP 2020

{Ref. Government of Maharashtra letter no. □□□□□.□□□□/□□□.□.□□/□□□□-□□□□□□□□□□□□□□: □□□□□□□□□□□}

The degree shall be titled as 'Bachelor of Science [biotechnology) under the faculty of Science and Technology

B. Sc. Sem. I & II from Academic Year 2024-25

B. Sc. Sem. III & IV from Academic Year 2025-26

B. Sc. Sem. V & VI from Academic Year 2026-27

B. Sc. Sem. VII&VIII from Academic Year 2027-28

Programme Outcomes for B. Sc. (Biotechnology)

PO. No.	**Programme Outcomes** **After completing B.Sc. (Biotechnology) Programme the students will be able to…….**
PO-1	Impart the knowledge of biotechnology is the basic objective of this course.
PO-2	Develop a scientific attitude among the students and to make the students open minded, critical, and curious.
PO-3	Develop skills in practical work, experiments, and laboratory materials.
PO-4	understand scientific terms, concepts, facts, phenomenon, and their relationships.
PO-5	Make the students aware of natural resources and the environment.
PO-6	Enable the students to acquire knowledge of biotechnology and related subjects to understand nature and the environment for the benefit of human beings.
PO-7	Develop the ability for the application of acquired knowledge to improve agriculture and related fields to make themselves self-reliant
PO-8	Impart the knowledge of biotechnology is the basic objective of the course.
PO-9	Understand scientific terms, concepts, facts, phenomenon and their relationships.
PO-10	Develop skill in practical work, experiments and laboratory materials.
PO-11	Develop scientific attitude among the students and to make the students open minded, critical and curious so that they enter research field with a positive approach.
PO-12	Make the students skilled to get employment in the plant-based industries or to start their own plant based entrepreneurial ventures.
PO-13	Make the students aware of environment sustainable goals.
PO-14	Enable the students to acquire knowledge of plants and related subjects so as to apply them for the benefit of human beings.
PSO. NO	**Programme Specific Outcomes** **The student will be able to…**
PSO-1	Discuss and ask questions related to the different aspects of Biotechnology.

PSO-2	Perform experiments and projects related to Biotechnology
PSO-3	Critically analyze the interactions between the living and non- living entities around them.
PSO-4	Apply the knowledge of Biotechnology in finding sustainable solutions for the society as well as industry.
PSO-5	Apply the knowledge of Biotechnology in becoming self- reliant either through entering into a job, establishing a model agricultural set up or initiating a plant based entrepreneurial venture
PSO-6	Explain, describe and discuss the concepts of Biotechnology .
PSO-7	Perform and design experiments related to Biotechnology
PSO-8	Decide and Undertake a project based on Biotechnology
PSO-9	Attain skills needed in the plant based industries through an internship.
PSO-10	Improve the research based skills by entering into a research internship as well as in house project.
PSO-11	Present their research findings in research conglomerations like conferences and in research journals in the form of publications.
PSO-12	Critically analyze their role as an environment sustainability goals oriented citizen

Semester, Credit Framework, NSQF Level and Exit Points

Sr. No.	Semester	Year	Year	Credits	Level	Exit Points &Award
1	Sem. I & II	2024-25	1Year	44	4.5	UG Certificate in Accountancy
2	Sem. III & IV	2025-26	2Year	88	5.0	UG Diploma in Accountancy
3	Sem. V &VI	2026-27	3Year	132	5.5	B. Sc. in Biotechnology (UG Three Year Degree)
4	Sem. VII & VIII	2027-28	4Year	176	6.0	B. Sc. in Biotechnology [Honors/Research] (UG Four Year Degree)

Credit Distribution

Sr. No.	Course	3 Year Degree Programme			4 Year Honors Degree Programme			4 Year Honors with Research Degree Programme		
		Courses (3 Yr)	Credits (3 Yr)	%	Courses (4 Yr)	Credits (4 Yr)	%	Courses (4 Yr)	Credits (4 Yr)	%
1	Major	26	52	39.39	34	80	45.45	32	72	40.91
2	Elective	04	08	6.06	08	16	9.09	08	16	9.09
3	IKS	02	04	3.03	02	04	2.27	02	04	2.27
4	VSC	04	08	6.06	04	08	4.55	04	08	4.55
5	FP	01	02	1.52	01	02	1.14	01	02	1.14
6	OJT	01	04	3.03	02	08	4.55	01	04	2.27
7	RP	00	00	0.00	00	00	00	02	12	6.82
8	SEC	03	06	4.55	03	06	3.41	03	06	3.41
9	CEP	01	02	1.52	01	02	1.14	01	02	1.14
Total (Major) (A)		**42**	**86**	**65.15**	**55**	**126**	**71.59**	**54**	**126**	**71.59**
1	Minor & RM	12	24	18.18	13	28	15.91	13	28	15.91
Total (Minor) (B)		**12**	**24**	**18.18**	**12**	**28**	**15.91**	**13**	**28**	**15.91**
1	OE	04	08	6.06	04	08	4.55	04	08	4.55
2	AEC	04	08	6.06	04	08	4.55	04	08	4.55

3	VEC	02	04	3.03	02	04	2.27	02	04	2.27
4	CC	01	02	1.52	01	02	1.14	01	02	1.14
Total (C)		**11**	**22**	**16.67**	**11**	**22**	**12.50**	**11**	**22**	**12.50**
Grand Total (A+B+C)		**65**	**132**	**100**	**79**	**176**	**100**	**78**	**176**	**100**

Duration:

- The program shall be a full-time program.
- The duration of program shall be three years for Bachelor of Science and four years for Bachelor of Science with Honors or Bachelor of Science with Research.
- Every year students will have exist option with:
- (1^{st} Year: Certificate, 2^{nd} Year: Diploma, 3^{rd} Year: Degree, 4^{th} Year: Honors / Research)
- These students are allowed to re-enter the degree program within three years and complete the degree program within the stipulated maximum period of Seven Years.

Eligibility: 12^{th} Pass with Science, or equivalent.

Medium of Instruction: The medium of instructions shall be in English.

Scheme of Examination & Standard of Passing (CCE and ESE):

- End Semester Exam (ESE): 30 Marks (Min 12 Marks for Passing)
- Continuous Comprehensive Evaluation (CCE): 20 Marks (Min 08 Marks for Passing)
- Total Marks = 50 Marks
- Minimum 40% Marks Required for Passing and there is separate head of Passing for End Semester Examination (ESE) and Continuous Comprehensive Evaluation (CCE).
- Scheme of Examination & Standard of Passing for ESE and CCE:
- As per the decision of the concern Board of Studies or Competent Authority.
- A candidate who acquire 32 credits or more during semester – I & II shall be admitted to B. Sc. II (appear for semester – III & IV examination).
- However the candidate shall not be admitted to B.Sc. III (Semester - V) unless he/she passed in all the subjects at B.Sc. I (Semester - I & Semester - II) and acquire 32 credits or more during semester – III & IV.
- However the candidate shall not be admitted to B. Sc. IV (Semester - VII) unless he/she passed in all the subjects at B. Sc. III (Semester - V & Semester - VI).
- However under the National Education Policy the rules extended by KBP University, time to time regarding ATKT will be applicable.

Eligibility of the Core Faculty:

- As per rules and regulations of KarmaveerBhauraoPatil University, Satara and Govt. of Maharashtra.
- Eligibility for Professor of Practice or Professional Trainer:

  Any other eligibility as per the guidelines and regulations passed by concern board of studies, academic council of the autonomous college and rules & regulations of KarmaveerBhauraoPatil University, Satara and Government of Maharashtra and UGC norms.

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B.Sc. Biotechnology Part I

Semester I				
Sr. No.	Course	Course Code	Name of the Paper	Credits
1	Course 1	BBTT 111	Fundamental of Biotechnology (P-I)	2
		BBTT 112	Biomolecules (P-II)	2
		BBTP 113	Practical based on theory paper BBTT111 and BBTT 112	2
2	Course 2	BBTT 114	Microbiology I (P-III)	2
		BBTT 115	Plant Science (P-IV)	2
		BBTP 116	Practical based on theory paper BBTT114 and BBTT 115	2
3	Course 3	BBTT 117	Basics in computers (P-V)	2
		BBTT 118	Basics in Bioinformatics (P-VI)	2
		BBTP 119	Practical based on theory paper BBTT117 and BBTT 118	2
4	OE	BBTTOE 1	Instrumentation studies	2
5	IKS	BBTTIKS 1	Introduction to Indian Knowledge System I	2
			Total	22
Semester II				
Sr. No.	Course	Name of the course	Name of the Paper	Credits
1	Course 1	BBTT 121	Environmental of Biotechnology (P-VII)	2
		BBTT 122	Proteins and Enzymes (P-VIII)	2
		BBTP 123	Practical based on theory paper BBTT121 and BBTT 122	2
2	Course 2	BBTT 124	Microbiology II (P-IX)	2
		BBTT 125	Animal science (P-X)	2
		BBTP 126	Practical based on theory paper BBTT124 and BBTT 125	2

3	Course 3	BBTT 127	Biostatistics (P-XI)	2
		BBTT 128	Cell biology I (P-XII)	2
		BBTP 129	Practical based on theory paper BBTT127 and BBTT 128	2
4	OE	BBTTOE 2	Instrumentation studies	2
5	VEC	BBTTVEC 1	Democracy, Election and Indian Constitution	2
			Total	**22**

B.Sc. Biotechnology Part II				
Semester III				
Sr.No	Course	Course Code	Course Name	Credits
1.	Course 1	BBTT231	Molecular Biology	2
		BBTT232	Metabolic Pathways	2
		BBTP233	Practical based on theory paper BBTT231 and BBTT 232	2
2.	Course 2	BBTT234	Developmental Biology	2
		BBTT235	Cell Biology II	2
		BBTP236	Practical based on theory paper BBTT234 and BBTT 235	2
3	OE	BBTTOE 3	Agricultural Economics	2
4	VSC	BBTTVSC 1	Practical in Basics of Biotechnology in Nursery Management	2
5	SEC	BBTTSEC 1	Advances in Hydroponics	2
6.	AEC	BBTTAEC 1	English for communication I and II	2
7.	IKS	BBTTIKS 2	Indian Health Sciences IKS II	2
			Total	22
Semester IV				
Sr.No	Course	Course Code	Course	Credits
1.	Course 1	BBTT241	Plant Tissue Culture	2
		BBTT242	Plant Physiology and Biochemistry	2
		BBTP243	Practical based on theory paper BBTT241 and BBTT 242	2
2.	Course 2	BBTT244	Genetics	2
		BBTT245	Imunnology	2
		BBTP246	Practical based on theory paper BBTT244 and BBTT 245	2
3.	OE	BBTTOE 4	Agricultural Economics and Development	2
4	VSC	BBTTVSC 2	Practical based in Tools and Techniques of Biotechnology in nursery management	2
5	SEC	BBTTSEC 2	Applications in Hydroponics	2

6.	AEC	BBTTAEC 2	English for communication III and IV	2
7	VEC	BBTT VEC 2	Environmental Awareness for biotechnologist	2
			Total	22

B.Sc. Biotechnology Part III

Semester V				
Sr. No.	**Course**	**Course Code**	**Course Name**	**Credits**
1	Major	BBTT351	Basics in Genetic Engineering	02
2	Major	BBTT352	Industrial Biotechnology	02
3	Major	BBTT353	Application of Biotechnology in Agriculture	02
4	Electives	BBTT354 E1	Research Methodology	02
		BBTT354 E2	Bio-Nanotechnology	
5	Major Lab	BBTP355	Practical based on theory paper BBTT351and BBTT 352	02
6	Elective Lab	BBTP356	Practical based on theory paper BBTT 353 and BBTT 354	02
7	VSC	BBTTVSC 3	Basic Numerical Skills in Biotechnology	02
8	AEC	BBTTAEC 3	English P-III	02
9	OJT	BBTT357	On Job Training in Biotechnology I	04
10	CEP	BBTTCEP 1	Community Engagement Programme in Biotechnology	02
			Total	**22**
Semester VI				
Sr.	**Components**		**Course**	**Credits**
1	Major	BBTT361	Advances in Genetic Engineering	02
2	Major	BBTT362	Food and Microbial Biotechnology	02
3	Major	BBTT363	Application of Biotechnology in Health	02
4	Electives	BBTT364 E 1	Computational Biology	02
		BBTT364 E 2	IPR, Bioethics and Quality Management	
5	Major Lab	BBTP365	Practical based on theory paper BBTT 361 and BBTT 362	02
6	Elective Lab	BBTP366	Practical based on theory paper BBTT 363 and BBTT 364	02
7	VSC	BBTTVSC 4	Bio - entrepreneurship	02
8	SEC	BBTTSEC 3	Application in hydroponics	02
9	FP	BBTP367	Field Project in Biotechnology	02
10	CC	BBTTCC1	Community Engagement Programme in Biotechnology	02
11	AEC	BBTTAEC4	English P-IV	02
			Total	**22**
EXIT OPTION: Award of UG Degree in Major with 132 credits OR Continue with Major & Minor.				

B.Sc. Biotechnology Part IV Honors

Semester VII				
Sr.No	**Course**	**Course Code**	**Course Name**	**Credits**
1.	Major	BBTT 471	Advances in Cell Biology	4
2.	Major	BBTT 472	Advances in Molecular Biology	4
3.	Major	BBTT 473	Advances in Biological Chemistry	4
4.	Elective	BBTT 474 E1	Advances in Microbiology	2
		BBTT 474 E2	Clinical Research & Data management	
5.	Minor	BBTT 475	Research Methodology	2
6.	Major Lab	BBTP 476	Practical based on theory paper BBTT 471 and BBTT 472	2
7.	Elective lab	BBTP 477	Practical based on theory paper BBTT 473 and BBTT 474	2
Total				**22**
Semester VIII				
Sr.No	**Course**	**Course Code**	**Course Name**	**Credits**
1.	Major	BBTT 481	Advances in Genetics	4
2.	Major	BBTT 482	Advances in Immunology and Virology	4
3.	Major	BBTT 483	Plant Biotechnology	4
4.	Elective	BBTT 484 E1	Advances in Food Biotechnology	
5.		BBTT 484 E2	Animal Tissue Culture	2
6.	Major Lab	BBTP 485	Practical based on theory paper BBTT 481 and BBTT 482	2
7.	Elective lab	BBTP 486	Practical based on theory paper BBTT 483 and BBTT 484	2
8.	OJT	BBTT 487	On job training in Biotechnology II	4
			Total	**22**

B.Sc. Biotechnology Part IV Honors with Research Degree

Semester VII				
Sr.No	**Components**		**Course**	**Credits**
1.	Major	BBTT 471	Advances in Cell Biology	4
2.	Major	BBTT 472	Advances in Molecular Biology	4
3.	Elective	BBTT 474 E1	Advances in Microbiology	
4.		BBTT 474 E2	Clinical Research & Data management	4
5.	Major Lab	BBTP 476	Practical based on theory paper BBTT 471 and BBTT 472	2
6.	Minor	BBTT 475	Research Methodology	4
7.	RP	BBTP 478	Research Project in Biotechnology I	4
Total				**22**
Semester VIII				
Sr.No	**Components**		**Course**	**Credits**
1.	Major	BBTT 481	Advances in Genetics	4
2.	Major	BBTT 482	Advances in Immunology and Virology	4
3.	Elective	BBTT 484 E1	Advances in Food Biotechnology	
4.		BBTT 484 E2	Plant Biotechnology	4

5.	Major Lab	BBTP 485	Practical based on theory paper BBTT 481 and BBTT 482	2
6.	Elective lab	BBTP 486	Practical based on theory paper BBTT 483	2
7.	RP	BBTP 488	Research Project in Biotechnology II	8
			Total	**22**

Chairman
BOS in Biotechnology

Secretary
Academic Council

Chairman
Academic Council