2024

B.Sc BIOTECHNOLOGY

Course Structure and Syllabus

(For the candidates admitted from the academic year 2024-2025 onwards)

Choice Based Credit System (CBCS)
&
Learning Outcomes-Based Curriculum Framework (LOCF)

THANTHAI HANS ROEVER COLLEGE (AUTONOMOUS)

(Approved by NAAC, Affiliated to Bharathidasan University)

ELAMBALUR, PERAMBALUR – 621 220

BIOTECHNOLOGY

VISION

- To impart theoretical and practical understanding of contemporary Biology and Biotechnology so that they can pursue research in agriculture, industry, healthcare and restoration of environment providing sustainable competitive edge to societal benefits.

MISSION

- To ensure students to acquire knowledge in biotechnology for human welfare.
- To encourage students in converting knowledge into skill through effective practices, exposure to research institutions, Industries, etc.
- To create platform for students to interact with eminent scientist, researchers and industries of Biotechnology towards their personality development.
- To inculcate research attitude among students in biotechnological aspects for future sustainable development.
- To evolve entrepreneurial skills among the students in evolving biotechnology based industry.

Undergraduate Programme

B.Sc., Biotechnology

Programme Outcomes (POs)

Upon completion of the programme, the undergraduate will be able to

1. Acquire knowledge, understand concepts and apply new ideas which enable them to be employable or self employed
2. Demonstrate motivation in advancing to higher learning programmes
3. Engage in socially responsible behaviour and have value-added education
4. Have exposure to technical proficiency, analytical capability, soft skills and life skills development
5. Develop broad understanding in the basic concepts of Languages/Commerce/Management Studies/ Physical Sciences Computing Sciences Biological Sciences/Life Sciences

Programme Specific Outcomes (PSOs)

1. Acquire knowledge on the fundamentals of biotechnology, Environmental Biotechnology, Nanobiotechnology, animal and plant biotechnology, Industrial Biotechnology, genetic engineering, immunology, bioinformatics for research activities in the department research center or in collaboration with other research institutes
2. Understand the applications of biotechnology in all spheres of agriculture and develop crops with improved productivity thereby increasing farmers' income, better human health and decreased environmental pollution.
3. The objective of the Biotechnology is to equip the students to apply knowledge of molecular mechanisms of cellular processes in living systems including microbes, plants, and higher order organisms to applied aspects.
4. Interdisciplinary approach helps in providing better solutions and new ideas for the sustainable developments, recognition of the need for, and an ability to engage in life-long learning.
5. Recognize the importance of biotechnological applications as to user next generation entrepreneurship

Thanthai Hans Roever College (Autonomous), Elambalur, Perambalur - 621 220

B.Sc. BIOTECHNOLOGY

CHOICE BASED CREDIT SYSTEM–LEARNING OUTCOMES BASED CURRICULUM FRAME WORK (CBCS- LOCF)

(For the candidates admitted from the academic year 2023 - 2024 onwards)

Semester	Part	Course Code	Title of the Course	Ins. Hours/ Weeks	Credits	Exam Hours	CIA (Max)	ESE (Max)	Total (Max)
1	I	23UT1/H1	Language	6	3	3	25	75	100
1	II	23UE1	English-I	6	3	3	25	75	100
1	III	23UBT1CC1	Cell and Molecular Biology & Developmental Biology	6	6	3	25	75	100
1	III	23UBT1CC2P	Cell and Molecular Biology & Developmental Biology(P)	3	3	3	40	60	100
1	III	23UBT1AC1	Biological Chemistry	5	4	3	25	75	100
1	III	23UBT2AP1	Biological Chemistry & Fundamentals of Microbiology (P)	2	--	--	--	--	--
1	IV	23UBT1SE1	NME – 1	2	2	3	25	75	100
			Value Added Course		2*	2	50	50	100*
			Total	**30**	**21**	**-**	**-**	**-**	**600**
2	I	23UT2/H2	Language	6	3	3	25	75	100
2	II	23UE2	English-II	6	3	3	25	75	100
2	III	23UBT2CC3	Genetics	5	5	3	25	75	100
2	III	23UBT2CC4P	Genetics (P)	3	3	3	40	60	100
2	III	23UBT2AC2	Fundamentals of Microbiology	4	3	3	25	75	100
2	III	23UBT2AP1	Biological Chemistry & Fundamentals of Microbiology (P)	2	2	3	40	60	100
2	IV	23UBT2SE2	NME- 2	2	2	3	25	75	100
2	IV	23UBT2SE3	Enzymology	2	2	3	25	75	100
			Value Added Course		2*	2	50	50	100*
			Total	**30**	**23**	**-**	**-**	**-**	**800**
3	I	23UT3/H3	Language	6	3	3	25	75	100
3	II	23UE3	English-III	6	3	3	25	75	100
3	III	23UBT3CC5	Immunology and Immunotechnology	4	5	3	25	75	100
3	III	23UBT3CC6P	Immunology and Immunotechnology (P)	3	3	3	40	60	100
3	III	23UBT3AC3	Bioinstrumentation	4	3	3	25	75	100

3	III	23UBT4AP2	Bioinstrumentation & Bioinformatics and Biostatistics(P)	3	--	--	--	--	--
3	IV	23UBT3SE4	Bioentrepreneurship	2	2	3	25	75	100
3	IV	25UHW	Health & Wealth	1	1	-	-	-	100
3	IV	23UGS	General Studies	1	1	3	25	75	100
			Value Added Course*		2*	2	50	50	100*
			Total	**30**	**21**	**-**	**-**	**-**	**800**
4	I	23UT4/H4	Language	6	3	3	25	75	100
4	II	23UE4	English-IV	6	3	3	25	75	100
4	III	23UBT4CC7	Genetic Engineering and rDNA Technology	5	5	3	25	75	100
4	III	23UBT4CC8P	Genetic Engineering and rDNA Technology (P)	3	3	3	40	60	100
4	III	23UBT4AC4	Bioinformatics and Biostatistics	4	4	3	25	75	100
4	III	23UBT4AP2	Bioinstrumentation & Bioinformatics and Biostatistics (P)	2	2	3	40	60	100
4	IV	23UBT4SE6	Soft Skill Development	2	2	3	25	75	100
4	IV	23UES	Environmental Studies	2	2	3	25	75	100
			Value Added Course*		2*	2	50	50	100*
			Total	**30**	**24**	**-**	**-**	**-**	**800**
5	III	23UBT5CC9	Plant Biotechnology	5	5	3	25	75	100
5	III	23UBT5CC10	Animal Biotechnology	5	5	3	25	75	100
5	III	23UBT5CC11P	Plant Biotechnology and Animal Biotechnology (P)	5	4	3	40	60	100
5	III	23UBT5DE11 23UBT5DE12	Nano Biotechnology/ Good Laboratory Practices	4	4	3	25	75	100
5	IV	23UBT5DE21 23UBT5DE22	IPR, Bioethics and Biosafety/ Biotechnology For Human Welfare	4	4	3	25	75	100
5	IV	23UVE	Value Education	2	2	3	25	75	100
5	IV		Summer Internship/ Industrial visit/ Field visit	-	2*	-	-	-	-
5			Value Added Course*		2*	2	50	50	100*
			Total	**30**	**24**	**-**	**-**	**-**	**700**
6	III	23UBT6CC13	Environmental and Industrial Biotechnology	6	5	3	25	75	100

6	III	23UBT6CC14	Pharmaceutical Biotechnology	6	5	3	25	75	100
6	III	23UBT6CC15P	Environmental and Industrial Biotechnology (P)	6	4	3	40	60	100
6	III	**23UBT5CC12PW**	Project with viva- voce	5	4	-	Evaluation 80	Viva Voce 20	100
6	III	23UBT6DE31 23UBT6DE32	Medical Biotechnology/ Marine Biotechnology	6	4	3	25	75	100
6	III	23UBT6DE41 23UBT6DE42	Cancer Biology/ Stem Cell Biology	6	4	3	25	75	100
6	IV								
6	V		Extension activity	-	1	-	-	-	-
6			Value Added Course*		2*	2	50	50	100*
			Total	**30**	**27**	**-**	**-**	**-**	**500**
			Grand Total	**180**	**140**				**4200**

* **Extra Credit Courses which will not be included in the total CGPA**

- Summer Internship after 4th semester during summer vacation -30 Hours

-Value added course (Outside Instruction hours: 30 hours)

CREDIT DISTRIBUTION FOR UG BIOTECHNOLOGY

S.No	Part	Course Details	Credit
1	III	Core(15)	65
2		Allied Course (6) Elective Generic/Discipline Specific Elective(4)	34
3	I& II	Language & English (Language: 4x3=12 and English: 4x3=12)	24
4	IV	Skill Enhancement Course NME (2x2)	4
5		Skill Enhancement Course [4 Courses]	7
6		EVS (1x2)	2
7		Value Education(1x2)	2
8		Extension Activity(1x1)	1
9		Gender studies	1
		Total	**140**

LIST OF CORE COURSES OFFERED

Core Course I: Cell and Molecular Biology & Developmental Biology
Core Course II: Cell and Molecular Biology & Developmental Biology (P)
Core Course III: Genetics
Core Course IV: Genetics (P)
Core Course V: Immunology and Immunotechnology
Core Course VI: Immunology and Immunotechnology (P)
Core Course VII: Genetic Engineering and rDNA Technology
Core Course VIII: Genetic Engineering and rDNA Technology (P)
Core Course IX: Plant Biotechnology

Core Course X: Animal Biotechnology
Core course XI: Plant Biotechnology and Animal Biotechnology (P)
Core Course XII: Project
Core Course XIII: Environmental and Industrial Biotechnology
Core Course XIV: Pharmaceutical Biotechnology
Core Course XV: Environmental and Industrial Biotechnology (P)

LIST OF ALLIED COURSES OFFERED

Allied Course-I: Biological Chemistry
Allied Course-II: Fundamentals of Microbiology
Allied Course-III: Bioinstrumentation
Allied Course-IV: Bioinformatics and Biostatistics
Allied Practical-I: Biological Chemistry & Fundamentals of Microbiology (P)
Allied Practical-II: Bioinstrumentation & Bioinformatics and Biostatistics (P)

LIST OF SKILL ENHANCEMENT COURSES OFFERED

Skill enhancement Course SEC-1 (NME): Public Health and Hygiene
Skill Enhancement Course SEC-2 (NME): Organic Farming and Health Management
Skill Enhancement Course SEC-3: Enzymology
Skill Enhancement Course SEC-4 (Entrepreneurial Skill): Bioentrepreneurship
Skill Enhancement Course SEC-5: Health & Wealth
Skill Enhancement Course SEC-6: Soft Skill Development

LIST OF ELECTIVE COURSES OFFERED

Discipline Specific Elective- I: Nano Biotechnology/ Good Laboratory Practices
Discipline Specific Elective II: IPR, Bioethics and Biosafety/ Biotechnology for Human Welfare
Discipline Specific Elective III: Medical Biotechnology/Marine Biotechnology
Discipline Specific Elective IV: Cancer Biology/Stem Cell Biology

Note:

	Internal Marks	External Marks
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is prescribed for Internal and External marks

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]
The passing minimum for Semester Examinations shall be 40% out of 75 marks [i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]
The passing minimum for Semester Examinations shall be 40% out of 60 marks [i.e. 24 marks]

Project : 100 Marks (The Project will be evaluated by an Internal and an External Examiner)
Dissertation - 80 Marks
Viva Voce - 20 Marks

Question Paper Pattern

UG Programme		
Maximum Marks : 75		**Duration: 3 Hours**
Section - A	**i) a-** (5 Questions for Multiple Choice) One question from each unit	5 x 1 = 5 Marks
	b- (5 Questions for Fill in the Blanks) One question from each unit	5 x 1 = 5 Marks
	ii) (5 short answer questions) One question from each unit	5 x 2 = 10 Marks
Section - B	**5 Questions** (Internal Choice: Either or) One set of questions from each unit	5 x 5 = 25 Marks
Section - C	**3 Questions**(Answer any 3 out of 5 Questions) One question from each unit	3 x10 = 30 Marks