SMIMS SIKKIM MANIPAL UNIVERSITY

SIKKIM MANIPAL INSTITUTE OF MEDICAL SCIENCES

Syllabus For 4 Years B. Sc. (Honours with Research) in Medical Biotechnology

From the Academic Session: 2025-2026

CHOICE BASED CREDIT SYSTEM (CBCS)
Undergraduate Programme

Framed According To The National Education Policy (NEP 2020)

MODEL CURRICULUM

Name of the Degree/ Programme: B.Sc. (Honours with Research)

Discipline: Medical Biotechnology

Total Credits for the Programme: 160

Duration: 4 Years Undergraduate Programme

Eligibility: 3 years CGPA should be 7.5 or above

Programme Objectives:

- The main objective of this degree course is to produce graduates with enhanced skills, knowledge and research aptitude to carry out higher studies, research and development in health, agricultural and industrial sectors.

- To develop proficiency in application of current aspects of biotechnology like biochemistry, molecular biology, medical microbiology, recombinant DNA technology, bioinformatics and computational biology.

- To design, analyze, conduct and interpret the experiments and data for the development of process/product within the realistic constraints.

- To develop proficiency in application of current aspects of biotechnology like biochemistry, molecular biology, medical microbiology, recombinant DNA technology, bioinformatics and computational biology.

Course Outcomes:

- Advanced understanding of biotechnology that can be applied in innovation, and problem solving through gaining knowledge and hands-on research skills.

- The rigorous project work and wet / dry lab training will enable students to independently design and perform experiments.

- Students develop scientific communication skills, critical analysis, bioethics, intellectual property rights etc.

- Students will get opportunity to learn subjects of their interest other than core subjects, which will provide them holistic education.

Course Structure for B. Sc. (Honours with Research) in Medical Biotechnology

YEAR/ SEMESTER	SUBJECTS	NATURE	CODE	MARKS		CREDIT
				IA	UE	
1st Year/ Semester I	Chemistry Paper- I (Th)	Major	BT-1101	30	70	4
	Cell biology Paper- I (Th)	Major	BT-1102	30	70	3
	Genetics (Th)	Major	BT-1103	30	70	3
	Biostatistics (Th)	Minor	BT-1104	30	70	4
	Cell Biology Part I (Pr)	Major	BT-1105	30	70	3
	Communicative English (Th)	AEC	BT-1106	30	70	3
	Total credit in semester I					**20**
1st Year Semester II	Chemistry Paper- II (Th)	Major	BT-1201	30	70	4
	Cell Biology Paper- II (Th)	Major	BT-1202	30	70	2
	Molecular Genetics (Th)	Major	BT-1203	30	70	3
	Biotechnology in Human Welfare (Th)	VAC	BT-1204	30	70	3
	Basic Computer Application (Th)	MTD	BT-1205	30	70	3
	Cell Biology Part- II (Pr)	Major	BT-1206	30	70	3
	Basic Computer Application (Pr)	MTD	BT-1207	30	70	2
	Total credit in semester II					**20**
	Total credit in semester I + II					**40**
Exit option with Undergraduate Certificate on completion of courses equal to a minimum of 40 credits; in addition to this, students must undertake a work-based learning/internship of 4 credits during the summer term for the award of the Undergraduate Certificate						
2nd Year/ Semester III	Basic Lab Technique (Th)	SEC	BT-1301	30	70	2
	Human Anatomy Paper- I (Th)	Minor	BT-1302	30	70	3
	Human Physiology Paper- I (Th)	Minor	BT-1303	30	70	2
	Human Biochemistry Paper- I (Th)	Major	BT-1304	30	70	3
	Biotechnology & Industry (Th)	VAC	BT-1305	30	70	2
	Basic Lab Technique (Pr)	SEC	BT-1306	30	70	2
	Human Anatomy Part I (Pr)	Minor	BT-1307	30	70	2
	Human Physiology Part I (Pr)	Minor	BT-1308	30	70	2
	Human Biochemistry Part I (Pr)	Major	BT-1309	30	70	2
	Total credit in semester III					**20**
	Biophysics (Th)	Minor	BT-1401	30	70	3

2nd Year/ Semester IV	Human Anatomy Paper- II (Th)	Minor	BT-1402	30	70	2
	Human Physiology Paper- II (Th)	Minor	BT-1403	30	70	2
	Human Biochemistry Paper- II (Th)	Major	BT-1404	30	70	2
	Environmental Biotechnology (Th)	SBC	BT-1405	30	70	3
	Human Anatomy Part II (Pr)	Minor	BT-1406	30	70	2
	Human Physiology Part II (Pr)	Minor	BT-1407	30	70	2
	Human Biochemistry Part II (Pr)	Major	BT-1408	30	70	2
	Environmental Biotechnology (Pr)	SBC	BT-1409	30	70	2
	Total credit in semester IV					**20**
	Total credit in semester III+ IV					**40**
Exit option with Undergraduate Diploma on completion of courses equal to a minimum of 80 credits						
3rd Year/ Semester V	Enzymology (Th)	Minor	BT-1501	30	70	3
	Molecular Biology Paper- I (Th)	Major	BT-1502	30	70	3
	Microbiology & Basic Immunology (Th)	Major	BT-1503	30	70	3
	Enzymology (Pr)	Minor	BT-1504	30	70	2
	Molecular Biology Part I (Pr)	Major	BT-1505	30	70	3
	Microbiology & Basic Immunology (Pr)	Major	BT-1506	30	70	2
	Summer internship	SEC	BT-1507	--	--	4
	Total credit in semester V					**20**
3rd Year/ Semester VI	Introduction to Bioinformatics & Genetic Engineering (Th)	Major	BT-1601	30	70	2
	Molecular Biology Paper- II (Th)	Major	BT-1602	30	70	4
	General Pathology (Th)	Major	BT-1603	30	70	3
	Ethics in Biotechnology (Th)	Minor	BT-1604	30	70	2
	Molecular Biology Part II (Pr)	Major	BT-1605	30	70	3
	General Pathology (Pr)	Major	BT-1606	30	70	2
	Seminar	AEC	BT-1607	50	50	4
	Total credit in semester VI					**20**
	Total credit in semester V+VI					**40**
Exit option with Bachelor's Degree on completion of courses equal to a minimum of 120 credits						
	Animal Tissue Culture (Th)	Major	BT-1701	30	70	3

4th Year/ Semester VII	Bioinformatics & Computational Biology (Th)	Major	BT-1702	30	70	3
	Immunology (Th)	Major	BT-1703	30	70	3
	Seminar/MOOCs course from SWAYAM	AEC	BT-1704	30	70	2
	Animal Tissue Culture (Pr)	Major	BT-1705	30	70	3
	Bioinformatics & Computational Biology (Pr)	Major	BT-1706	30	70	3
	Immunotechnology (Pr)	Major	BT-1707	30	70	3
	Total credit in semester VII					**20**
4th Year/ Semester VIII	Research Methodology (Th)	AEC	BT-1801	30	70	4
	Stem Cell & Regenerative Medicine (Th)	Major	BT-1802	30	70	3
	Stem Cell & Regenerative Medicine (Pr)	Major	BT-1803	30	70	3
	Dissertation	--	BT-1804	50	50	10
	Total credit in semester VIII					**20**
	Total credit in semester VII+VIII					**40**
Award of Bachelor's Degree Honours with Research on completion of courses equal to a minimum of 160 credits						

IA- Internal Assessment/Preparative, UE- University Examination/ Summative, Th- Theory, Pr- Practical, AEC- Ability Enhancement Course, VAC- Value Added Course, MTD- Multidisciplinary Course, SBC- Skill- Based Course, SEC- Skill Enhancement Courses