

CURRICULUM & SYLLABUS



CHOICE BASED CREDIT SYSTEM (CBCS)

FOR

BACHELOR OF SCIENCE (B.Sc.)

(4 Year Undergraduate Degree Programme)

IN

BIOTECHNOLOGY

(In Alignment with National Education Policy, 2020)

[w.e.f. 2026-27]

FACULTY OF SCIENCE AND HUMANITIES

SRM UNIVERSITY DELHI-NCR, SONEPAT

SRM UNIVERSITY DELHI-NCR, SONEPAT (HARYANA)

VISION

SRM University Haryana aims to emerge as a leading World Class Institution that creates and disseminates knowledge upholding the highest standards of instruction in Engineering & Technology, Science & Humanities, Commerce, Management, Hotel Management & Medicine & Health Science. Along with academic excellence, our curriculum imparts integrity and social sensitivity so that our graduates may best serve the Nation and the World.

MISSION

- To create a diverse community campus that inspires freedom and innovation.
- Strengthen Excellence in educational & skill development processes
- Continue to build productive international alliances
- Explore optimal development opportunities available to students and faculty
- Cultivate an exciting and rigorous research environment

GRADUATE EMPLOYMENT ATTRIBUTES

EA-1: Graduates have a thorough knowledge and understanding of their subject area, as well as the capacity to apply what they've learned in the classroom, even in multidisciplinary courses.

EA-2: Effective problems-solvers, able to apply critical, creative and evidence-based thinking to conceive innovative responses to future challenges.

EA-3: Successfully communicate ideas and information to all the audiences in a collaborative way in order to achieve common goals.

EA-4: Graduates have the capacity to be entrepreneurial and take leadership roles in their chosen industries or careers, as well as in their communities.

PROGRAM EDUCATIONAL OBJECTIVES

PEO-1: To inculcate the students with recent in the areas of genome, genomics, genetic engineering, proteomics, bioinformatics, stem cell, cell culture, the discovery of new drugs and Pharmacogenomics.

PEO-2: Students will learn to develop specialized skills in the different areas of biotechnology.

PEO-3: Students will learn about the use of biotechnology empirically and creatively to address local and worldwide questions.

PEO-4: Students will be able to apply the scientific knowledge to develop entrepreneurship abilities.

PROGRAM LEARNING OUTCOMES

PLO-1: Students will be capable of doing collaborative and multidisciplinary studies.

PLO-2 Aptitude to carry out research in specialized areas of biotechnology.

PLO-3 Students will be able to work both independently or in groups on complex projects that require collaboration across disciplines.

PLO-4 Students will be capable of designing an experiment with step-by-step instructions to address a research problem.

PLO-5 Capable to present the results/findings in the scientific meetings/conferences/symposia.

MAPPING MATRIX BETWEEN PEOs & PLOs:

PEO \ PLO	PLO-1	PLO02	PLO03	PLO04	PLO05
PEO-1	✓	✓			
PEO-2			✓		✓
PEO-3				✓	
PEO-4					✓

**Four Year B.Sc. Biotechnology Programme Structure in alignment with
NEP-2020 (UGC guidelines) in the Department of Biotechnology, SRMUH
w.e.f. Academic Year 2026-27**

S. No.	Broad Category of Courses	No. of Courses	Credits	%
1	Major Course (Discipline Specific Course DSC)	22	$(18 \times 4) + (4 \times 3) = 84$	46.67
2	Minor Stream Course (MSC)	17	$(14 \times 2) + (2 \times 3) + (1 \times 1) = 35$	19.44
3	Multi-Disciplinary Course (MDC)	3	$3 \times 3 = 9$	5.00
4	Ability Enhancement course (AEC)	4	$4 \times 2 = 8$	4.44
5	Skill Enhancement Course (SEC)	10	$10 \times 1 = 10$	5.56
6	Value Added Course (VAC)	3	$3 \times 2 = 6$	3.33
7	Project / Dissertation	3	$(2 \times 6) + (1 \times 4) = 16$	8.89
8	Live Projects/Vocational Courses/Summer Internship	3	$3 \times 4 = 12$	6.67
Total		56	180	100

Four Year B.Sc. Biotechnology Programme Credit Structure Semester-wise in alignment with NEP-2020 (UGC guidelines) in the Department of Biotechnology, SRMUH w.e.f. Academic Year 2026-27

Semester	Broad Category of Courses								Total Credits	Remarks
	Major	IDC/ MSC	MDC	AEC	SEC	VAC	RP/Dissertation	Live Projects/Vocational Courses/Summer Internship		
I	8	4	3	2	2	2	-	-	21	Certificate: 46 Credits
II	8	4	3	2	2	2	-	4	25	
III	12	4	3	2	2	-	-	-	23	Diploma: 95 Credits
IV	12	4	-	2	2	2	-	4	26	
V	15	4	-	-	2	-	-	-	21	Degree: 140 Credits
VI	15	5	-	-	-	-	-	4	24	
VII	14	10	-	-	-	-	-	4	28	Degree: 180 Credits
VIII	-	-	-	-	-	-	12	-	12	
3 Years	70	25	9	8	10	6	0	12	140	
%	50.00	17.85	6.42	5.71	7.14	4.28	0.00	8.57	100.00	
4 Years	84	35	9	8	10	6	12	16	180	
%	46.67	19.44	5.00	4.44	5.56	3.33	6.67	8.89	100.00	

SEMESTER – I

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1		Fundamental of Biotechnology	4	0	0	4	Major
2		Microbiology	4	0	0	4	Major
3		Microbiology Lab	0	0	4	2	MSC
4		Basic Biotechnology lab	0	0	4	2	MSC
5		MDC – I	3	0	0	3	MDC
6		Functional English – I	2	0	0	2	AEC
7		Effective Communication Skills	0	0	2	1	SEC (Soft)
8		Digital Literacy & IT Skills	0	0	2	1	SEC (Tech)
9		Indian Constitution & Polity	2	0	0	2	VAC
TOTAL			15	0	12	21	

L – Lectures, T- Tutorial, P- Practical

- **Major – Major Course**
- **MSC - Minor Stream Course**
- **MDC - Multidisciplinary Course**
- **AEC - Ability Enhancement Course**
- **SEC (Soft) - Skill Enhancement Course (Soft Skills)**
- **SEC (Tech) - Skill Enhancement Course (Technical Skills)**
- **VAC – Value Added Course**

SEMESTER – II

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1		Cell Biology	4	0	0	4	Major
2		Biochemistry	4	0	0	4	Major
3		Biochemistry Lab	0	0	4	2	MSC
4		Cell Biology Lab	0	0	4	2	MSC
5		MDC – II	3	0	0	3	MDC
6		Functional English – II	2	0	0	2	AEC
7		Teamwork & Interpersonal Skills	0	0	2	1	SEC (Soft)
8		Advanced Excel Skills	0	0	2	1	SEC (Tech)
9		Environmental Protection & Sustainable Development	2	0	0	2	VAC
10		Live Projects/Vocational Courses/Summer Internship	-	-	-	4	SIP
TOTAL			15	0	12	25	

L – Lectures, T- Tutorial, P- Practical

On Exit, students shall be awarded UG Certificate (Biotechnology) on securing the requisite 46 Credits on completion of II-Semester.

SEMESTER – III

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1		Molecular Biology	4	0	0	4	Major
2		Introduction to Bioinformatics	4	0	0	4	Major
3		Bioinformatics Lab	0	0	4	2	MSC
4		Molecular Biology Lab	0	0	4	2	MSC
5		Fundamental Genetics	4	0	0	4	Major
5		MDC – III	3	0	0	3	MDC
6		Hindi – I / German – I / French – I	2	0	0	2	AEC
7		Presentation Skills	0	0	2	1	SEC (Soft)
8		Statistical Analysis with SPSS	0	0	2	1	SEC (Tech)
TOTAL			17	0	12	23	

L – Lectures, T- Tutorial, P- Practical

SEMESTER – IV

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1		Immunology	4	0	0	4	Major
2		Immunology lab	0	0	4	2	MSC
3		Genetic Engineering	4	0	0	4	Major
4		Genetic Engineering Lab	0	0	4	2	MSC
5		Biostatistics	4	0	0	4	Major
6		Hindi – II / German – II / French – II	2	0	0	2	AEC
7		Professional Skills	0	0	2	1	SEC (Soft)
8		R Language Programming	0	0	2	1	SEC (Tech)
9		Sports, Yoga & Fitness	0	0	4	2	VAC
10	23SEC471	Live Projects/Vocational Courses/Summer Internship	-	-	-	4	SIP
TOTAL			14	0	16	26	

L – Lectures, T- Tutorial, P- Practical, C- credits

On Exit, students shall be awarded UG Diploma (Biotechnology) on securing the requisite 95 Credits on completion of IV-Semester.

SEMESTER – V

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1		Bioinstrumentation & Bioanalytical Tools	4	0	0	4	Major
2		Bio Instrumentation lab	0	0	4	2	MSC
3		Structural Biology	4	0	0	4	Major
4		Animal Biotechnology & Animal Tissue Culture	4	0	0	4	Major
5		Animal Tissue Culture Lab	0	0	4	2	MSC
6		Bioethics, IPR & Biosafety	3	0	0	3	Major
7		Aptitude & Reasoning	0	0	2	1	SEC (Soft)
8		Programming with MATLAB	0	0	2	1	SEC (Tech)
TOTAL			15	0	12	21	

L – Lectures, T- Tutorial, P- Practical

SEMESTER – VI

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1		Bioprocess Technology	4	0	0	4	Major
2		Bioprocess Lab	0	0	4	2	MSC
3		Plant Biotechnology & Plant Tissue Culture	4	0	0	4	Major
4		Plant Tissue Culture Lab	0	0	4	2	MSC
5		Nanobiotechnology	4	0	0	4	Major
6		Seminar	0	0	2	1	MSC
7		Virology	3	0	0	3	Major
8	23SEC671	Live Projects/Vocational Courses/Summer Internship	-	-	-	4	SIP
TOTAL			15	0	10	24	

L – Lectures, T- Tutorial, P- Practical

On Exit, students shall be awarded B.Sc. Degree (Biotechnology) on securing the requisite 140 Credits on completion of VI-Semester.

SEMESTER – VII

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1		Basic Genomics & Proteomics	3	0	0	3	Major
2		Enzyme Technology	3	0	0	3	Major
3		Advanced Biotechnology Lab	0	0	4	2	MSC
4		Pharmaceutical Biotechnology	4	0	0	4	Major
5		Artificial Intelligence and Machine Learning in Biology	3	0	0	3	Major
7		Industrial Biotechnology	3	0	0	3	MSC
8		Environmental Biotechnology	3	0	0	3	MSC
9		Research Methodology	3	0	0	3	MSC
10	23MABS777	Minor Project / Minor Dissertation	-	-	-	4	Research Project/Dissertation
TOTAL			22	0	4	28	

L – Lectures, T- Tutorial, P- Practical

SEMESTER – VIII

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1		Major Project	0	0	12	6	Research Project/Dissertation
2		Major Dissertation Presentation	0	0	12	6	Research Project/Dissertation
TOTAL			0	0	24	12	

L – Lectures, T- Tutorial, P- Practical

On Exit, students shall be awarded B.Sc. degree (Biotechnology) after securing the requisite 180 Credits on completion of VIII – Semester.

**List of Major Courses offered to
Four Year B.Sc. Biotechnology programme in the Department of Biotechnology
w.e.f. Academic Year 2026-27**

S No	Semester	Course Code	Course Title	L	T	P	Credits
1	I	25BTBS101	Fundamentals of Biotechnology	4	0	0	4
2		25BTBS102	Microbiology	4	0	0	4
3	II	25BTBS201	Cell Biology	4	0	0	4
4		25BTBS202	Biochemistry	4	0	0	4
5	III	25BTBS301	Molecular Biology	4	0	0	4
6		25BTBS302	Introduction to Bioinformatics	4	0	0	4
7		25BTBS303	Fundamental Genetics	4	0	0	4
8	IV	25BTBS401	Immunology	4	0	0	4
9		25BTBS402	Genetic Engineering	4	0	0	4
10		25BTBS403	Biostatistics	4	0	0	4
11	V	25BTBS501	Bioinstrumentation & Bioanalytical tools	4	0	0	4
12		25BTBS502	Structural Biology	4	0	0	4
13		25BTBS503	Animal Biotechnology & Animal Tissue Culture	4	0	0	4
14		25BTBS504	Bioethics, IPR & Biosafety	3	0	3	3
15	VI	25BTBS601	Bioprocess Technology	4	0	0	4
16		25BTBS602	Plant biotechnology & Plant tissue Culture	4	0	0	4
		25BTBS603	Nanobiotechnology	4	0	0	4
18		25BTBS604	Virology	3	0	0	3
19	VII	25BTBS701	Basic Genomics & Proteomics	3	0	0	3
		25BTBS702	Enzyme Technology	3	0	0	3
20		23MABS703	Pharmaceutical Biotechnology	4	0	0	4
21		23MABS704	AI & ML in Biology	3	0	0	3

**List of Minor Stream Courses (MSC) offered to
Four Year B.Sc. Biotechnology programme in the Department of Biotechnology
w.e.f. Academic Year 2026-27**

S. No	Course code	Course title	L	T	P	Credits
1	25BTBS101L	Basic Biotechnology Lab	0	0	4	2
2	25BTBS102L	Microbiology Lab	0	0	4	2
3	25BTBS201L	Cell Biology Lab	0	0	4	2
4	25BTBS202L	Biochemistry Lab	0	0	4	2
5	25BTBS301L	Molecular biology Lab	0	0	4	2
6	25BTBS302L	Bioinformatics Lab	0	0	4	2
7	25BTBS401L	Immunology Lab	0	0	4	2
8	25BTBS402L	Genetic Engineering Lab	0	0	4	2
7	25BTBS501L	Bio Instrumentation Lab	0	0	4	2
8	25BTBS502L	Animal Tissue Culture Lab	0	0	4	2
9	25BTBS601L	Bioprocess Lab	0	0	4	2
10	25BTBS602L	Plant Tissue Culture Lab	0	0	4	2
11	25BTBS606	Seminar	0	0	2	1
12	25BTBS701L	Advanced Biotechnology Lab	0	0	4	2
13	25BTBS706	Industrial Biotechnology	3	0	0	3
14	25BTBS707	Environmental biotechnology	3	0	0	3
15	25RMBS710	Research Methodology	3	0	0	3

**List of Multidisciplinary Courses (MDC) offered to
Four Year B.Sc. Biotechnology programme in the Department of Biotechnology
w.e.f. Academic Year 2026-27**

Cat.	Code	Course Name	L	T	P	Credits
MDC I		Renewable Energy Sources	3	0	0	3
		Hybrid Electric Vehicle	3	0	0	3
		IPR in Business	3	0	0	3
		Library Information Sciences & Media Literacy	3	0	0	3
		Management Process & Organizational Behavior	3	0	0	3
		Basic Biology	3	0	0	3
MDC II		Introduction to Bioengineering	3	0	0	3
		Introduction to Robotics	3	0	0	3
		Psychology and Emotional Intelligence	3	0	0	3
		Indian Economy	3	0	0	3
		Creating an Entrepreneurial Mind	3	0	0	3
		Developmental Biology	3	0	0	3
MDC III		Arduino Based Programming	3	0	0	3
		Electoral Literacy in India	3	0	0	3
		Personal Financial Planning	3	0	0	3
		Interior Design	3	0	0	3
		Life Science & Public Health	3	0	0	3

**List of Ability Enhancement Courses (AEC) offered to
Four Year B.Sc. Biotechnology programme in the Department of Biotechnology
w.e.f. Academic Year 2026-27**

S. No.	Code	Course Name	L	T	P	Credits
1		Functional English – I	2	0	0	2
2		Functional English – II	2	0	0	2
3		Hindi – I / German – I / French – I	2	0	0	2
4		Hindi – II / German – II / French – II	2	0	0	2

**List of Value-Added Courses (VAC) offered to
Four Year B.Sc. Biotechnology programme in the Department of Biotechnology
w.e.f. Academic Year 2026-27**

S. No.	Code	Course Name	L	T	P	Credits
1		Indian Constitution & Polity	2	0	0	2
2		Environmental Protection & Sustainable Development	2	0	0	2
3		Sports, Yoga & Fitness	0	0	4	2

**List of Skill Enhancement Courses (SEC) offered to
Four Year B.Sc. Biotechnology programme in the Department of Biotechnology
w.e.f. Academic Year 2026-27**

Courses on Soft Skills

S. No.	Code	Course Name	L	T	P	Credits
1		Effective Communication Skills	0	0	2	1
2		Teamwork & Interpersonal Skills	0	0	2	1
3		Presentation Skills	0	0	2	1
4		Professional Skills	0	0	2	1
5		Aptitude & Reasoning	0	0	2	1

Courses on Technical Skills

S. No.	Code	Course Name	L	T	P	Credits
1		Digital Literacy & IT Skills	0	0	2	1
2		Advanced Excel Skills	0	0	2	1
3		Statistical Analysis with SPSS	0	0	2	1
4		R Language Programming	0	0	2	1
5		Programming with MATLAB	0	0	2	1