



SARDAR PATEL UNIVERSITY

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

Vallabh Vidyanagar

Gujarat

Academic Program Structure

&

Curriculum

(Aligned with NEP-2020)

Master of Science in Biotechnology

NHEQF Level: 6.0 / 6.5

Entry NHEQF Level	:	5.5 / 6.0
Duration	:	Two Years
Total Courses	:	24
Total Learning Hours	:	2640
Total Credits	:	88
Total Marks	:	2200

Graduate Attributes (GAs):

Upon successful completion of the programme, Biotechnology Graduates are expected to attain the following Graduate Attributes:

GA1: Demonstrate Disciplinary Knowledge

Demonstrate a comprehensive understanding of core and advanced concepts in biotechnology and related interdisciplinary fields.

GA2: Analyse and Solve Problems

Evaluate complex biological issues through critical thinking and scientific reasoning to develop effective solutions.

GA3: Design and Conduct Research

Design and perform experiments, analyse data, and interpret results using suitable biotechnological and statistical tools.

GA4: Technical and Computational Proficiency

Use advanced technical skills to apply modern laboratory methods, instrumentation, and computational tools in biotechnology practice.

GA5: Communicate Effectively

Demonstrate strong communication skills in conveying scientific information through written, oral, and digital formats.

GA6: Multidisciplinary / Interdisciplinary Knowledge

Foster interdisciplinary understanding by applying insights from biology, chemistry, mathematics, and computational sciences to solve biotechnological problems.

GA7: Ethics and Responsibility

Examine ethical concerns and show social responsibility, biosafety, and professional integrity in scientific work.

GA8: Design Innovative Solutions

Design innovative and entrepreneurial solutions for biotechnology-based problems and industry applications.

GA9: Evaluate Societal and Environmental Impact

Evaluate the impact of biotechnological solutions on environmental sustainability and societal well-being.

GA10: Engage in Lifelong Learning

Demonstrate commitment to continuous learning and adapt to emerging trends and technologies in biotechnology.

GA11: Teamwork and Leadership

Apply teamwork and leadership skills to work effectively in multidisciplinary environments.

GA12: Digital and Information Literacy

Apply digital tools, bioinformatics resources, and data management systems in biotechnology research and applications.

These attributes enable the M.Sc. Biotechnology program students to deliver advanced interdisciplinary expertise and technical skills to drive innovation and solve real-world problems. By blending research excellence with ethical leadership and sustainability, it prepares graduates to make significant impacts across global healthcare, industry, and environmental sectors.

Programme Educational Objectives (PEOs): Within 2 - 3 years of completing the Programme, graduates will be able to

PEO1: Graduates will apply advanced knowledge of biotechnology, including molecular biology, genetics, microbiology, and bioinformatics, to solve real-world problems.

PEO 2: Graduates will engage in research, develop experimental designs, analyze data, and contribute to innovations in areas like healthcare, agriculture, and environmental sustainability.

PEO 3: Graduates will work effectively in biotech industries, research labs, pharmaceutical companies, or academic institutions with technical and managerial skills.

PEO 4: Graduates will practice biotechnology responsibly, considering ethical issues, biosafety, and environmental impact.

PEO 5: Graduates will pursue continuous learning through higher studies (PhD), certifications, or professional development in emerging biotech fields.

PEO 6: Graduates will demonstrate effective communication, teamwork, and leadership in multidisciplinary environments.

Program Learning Outcomes (PLOs): Upon successful completion of the programme, learners will be able to:

PLO1: Demonstrate comprehensive knowledge of fundamental and advanced concepts in biotechnology.

PLO2: Apply interdisciplinary approaches by integrating knowledge across biotechnology domains.

PLO3: Analyze problems using independent and critical thinking skills.

PLO4: Demonstrate effective communication skills in scientific and professional contexts.

PLO5: Apply laboratory techniques and modern tools in biotechnology practices.

PLO6: Analyze the impact of biotechnological solutions in global, environmental, and societal contexts.

PLO7: Demonstrate professional ethics and social responsibility in scientific practice.

PLO8: Design and conduct experiments, and analyse and interpret scientific data.

PLO9: Evaluate contemporary issues using biotechnology knowledge and skills.

PLO10: Demonstrate commitment to lifelong learning and professional development.

PLO11: Demonstrate the ability to collaborate effectively in teams to address societal challenges.

PLO12: Design innovative solutions and develop entrepreneurial skills through scientific inquiry.



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NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

Master of Science in Biotechnology (Semester : 1)

Course Type	Course Code	Course Title	Teaching-Learning Scheme		Credits	Assessment Scheme & Marks				
			L-P-T	Total Notional Hours		Internal Assessment			External Assessment	Total Marks
						FA	SA	Total		
DSC	P2S01NCBIT01	Molecular Biology	4-0-1	120	4	30	20	50	50	100
DSC	P2S01NCBIT02	Biochemistry and Metabolism	4-0-1	120	4	30	20	50	50	100
DSC	P2S01NCBIT03	Molecular Cell Biology	4-0-1	120	4	30	20	50	50	100
DSC	P2S01NCBIT04	Bioanalytical Laboratory	0-8-0	120	4	30	20	50	50	100
DSC	P2S01NCBIT05	Cell and Molecular Biology Laboratory	0-8-0	120	4	30	20	50	50	100
DSE (Any One)	P2S01NEBIT01	Bioethics & Biosafety	2-0-0	60	2	15	10	25	25	50
	P2S01NEBIT02	Entrepreneurship Fundamentals	2-0-0							
	P2S01NEBIT03	Principles of Ecology	2-0-0							
	P2S01NEBIT04	Pharmaceutical Microbiology	1-2-0							
	P2S01NEBIT05	Mathematics Essentials for Biologists	2-0-0							
				660	22			275	275	550

DSC: Discipline Specific Core, DSE: Discipline Specific Elective, L: Lecture, P: Practical, T: Tutorial, FA: Formative Assessment, SA: Summative Assessment



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Master of Science in Biotechnology (Semester : 2)

Course Type	Course Code	Course Title	Teaching-Learning Scheme		Credits	Assessment Scheme & Marks				
			L-P-T	Total Notional Hours		Internal Assessment			External Assessment	Total Marks
						FA	SA	Total		
DSC	P2S02NCBIT01	Microbial Genetics	4-0-0	120	4	30	20	50	50	100
DSC	P2S02NCBIT02	Enzyme Technology	4-0-0	120	4	30	20	50	50	100
DSC	P2S02NCBIT03	Cellular and Molecular Immunology	4-0-0	120	4	30	20	50	50	100
DSC	P2S02NCBIT04	Microbial Genetics and Immunology Laboratory	0-8-0	120	4	30	20	50	50	100
DSC	P2S02NCBIT05	Enzyme Technology Laboratory	0-8-0	120	4	30	20	50	50	100
DSE (Any One)	P2S02NEBIT01	Biostatistics Using R	0-4-0	60	2	15	10	25	25	50
	P2S02NEBIT02	Microtechniques	1-2-0							
	P2S02NEBIT03	Developmental Biology	2-0-0							
	P2S02NEBIT04	Molecular Endocrinology	2-0-0							
				660	22			275	275	550

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DSE: Discipline Specific Elective

L: Lecture

P: Practical

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FA: Formative Assessment

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