

### Program Specific Outcomes: B. Sc. Biotechnology

This definitive document provides the main characteristics and learning outcomes of the said program. If students will engage themselves in the process of effective learning, it will give opportunities to utilize acquired knowledge for the catering the needs of science and technology as well as for the betterment of human mankind. This document reflects the eligibility of student for admission, syllabus, exam pattern and prospects of the program. On the basis of this document, students can develop their personality and do great achievements as outcome of the above cited program.

<b>Programme Information:</b>	
<b>Award</b>	B. Sc.
<b>Society / Trust</b>	Shriram Gramin Sanshodhan Va Vikas Pratishtan, Wadala
<b>Programme Title</b>	Biotechnology
<b>Institution</b>	Lokmangal Science and Entrepreneurship College, Wadala
<b>Awarding Institution</b>	Solapur University, Solapur, Maharashtra State, India
<b>Faculty</b>	Science
<b>Department</b>	Biotechnology
<b>Mode and Period of Study</b>	Three (3) academic years (Six Semesters)
<b>Entry Point</b>	Annually in June-July
<b>Person responsible for the specification</b>	Dr. Bajare Jitendra Shahaji
<b>Reference points</b>	Life Sciences or Biosciences
<b>Description of Programme Contents</b>	<p>The B.Sc. Biotechnology program is a three-year degree. In the first two years, students will tackle core subjects to ensure that they receive a solid grounding in fundamentals. Students will then specialize in the final year, making their choice from a wide range of options and research projects.</p> <p>Our biochemistry and biotechnology courses contain topics covering all aspects of the applied biochemistry and the biotechnology industry, such as intellectual property and patents, commercializing technology etc.</p>
<b>Academic Requirement (Eligibility) for Admission</b>	A Candidate passing 10+2 with biology as one of the subjects and passed from state syllabus / CBSE / equivalent with minimum passing percentage of 45% aggregate for open category and 5% relaxation in the

	<p>aggregate for all reserved categories candidates as per the government rules and regulations. Admission is based on first come first serve basis.</p>
<p><b>Learning &amp; Teaching Strategy</b></p>	<ul style="list-style-type: none"> <li>• Laboratory</li> <li>• Lectures</li> <li>• Tutorials</li> <li>• Seminars</li> <li>• Computer-based work</li> <li>• Group project</li> <li>• Research project/dissertation</li> <li>• Site visits</li> </ul>
<p><b>Assessment Strategy</b></p>	<ul style="list-style-type: none"> <li>• Written Examinations</li> <li>• Coursework</li> <li>• Laboratory write-ups</li> <li>• Essays</li> <li>• Reports</li> <li>• Dissertations</li> <li>• Presentations</li> <li>• Individual research project report</li> <li>• Viva</li> </ul> <p><b>Regulation of Assessment</b></p> <p>The respective B.O.S. may decide the nature of college internal assessment after referring to scheme given below or may be used as it is. As per the norms of the grading system of evaluation, out of 100 marks, the candidate has to appear for college internal assessment of 30 marks and external evaluation (University assessment) of 70 marks.</p> <p><b>Assessment Rules and Degree Classification:</b></p> <p><b>Passing Standard</b></p> <p>The student has to secure a minimum of 4.0 grade points (Grade C) in each paper. A student who get less than 4.0 grade point (39% or less marks, Grade FC/FR) will be considered fail in that paper and</p>

has to reappear for respective paper. FC grade is given to the students who is failed in University Examination (theory) and passed in internal assessment of a same paper. Such student will have to reappear for University Examination only. FR grade is given to the student who fails in Internal Assessment and passed in University examination (theory). Such student will have to reappear for both University examination as well as internal assessment.

In case of Annual pattern/old semester pattern students/candidates from the mark scheme, the candidates has to appear for the same 70 marks of external examination and his performance shall be scaled to 100 marks and candidate passed in all papers except 5 (five) papers combined together of semester I and II of B.Sc. Part-I Biotechnology examination shall be permitted to enter upon the course of Semester III of B.Sc. Part-II Biotechnology.

**Academic Feedback Policy**

Coursework feedback is provided by a feedback form attached to items of coursework. Feedback is also provided via Blackboard on automatically-assessed pieces of coursework and on formative MCQ quizzes. Personal tutors hold timetabled tutorials at the start of the academic year to give feedback on examination performance and can be approached by their tutees at any point in the year for further guidance. The undergraduate teaching office repeatedly informs individual staff via email when coursework is due back at the appropriate time. The Head of Undergraduate Studies routinely monitors the quality and quantity of feedback provided on marked coursework. In some instances, generic class feedback is returned to all students via email or a blackboard announcement once coursework is marked.

Course	Sem	Subject	Credits		CA	UA	TA
			TH	PR			
B.Sc. I	I	English paper I (communication skill)	4	0	70	30	100
PSOs	Students get knowledge about the basic English grammar, communication skills, basic language skills & use of language in creative writings.						
B.Sc. I	I	Paper I: Ecology	2.5	0	70	30	100

PSOs	Students can understand the importance of components of environments & its betterment.						
B.Sc. I	I	Paper II: Microbiology	2.5	0	70	30	100
PSOs	Students know about the contribution of microbiology scientist, types of microbes, and branches of microbiology & anatomy of microbes.						
B.Sc. I	I	Paper I: Animal Sciences	2.5	0	70	30	100
PSOs	Students can understand the concepts of breeding, physiology, nutrition, herd-health & profitable animal production.						
B.Sc. I	I	Paper II: Plant Sciences	2.5	0	70	30	100
PSOs	Students can understand the basic principles, processes & functions of plant growth reproduction & photosynthesis for biotechnological approach.						
B.Sc. I	I	Paper I: Chemical Sciences	2.5	0	70	30	100
PSOs	Students can understand the natural sciences dealing with the composition of substance & their properties.						
B.Sc. I	I	Paper II: Biophysics	2.5	0	70	30	100
PSOs	Students develops an ability to comprehend the core concepts of biophysics and concepts of classical & modern physics.						
B.Sc. I	I	Paper I: Cell Biology	2.5	0	70	30	100
PSOs	Students get the information about cell & its importance in biology.						
		Paper II: Biostatistics					
PSOs	Students get the knowledge about basic statistical aspects, measures of central tendencies, measures of dispersion and probability.						
B.Sc. I	II	English Paper II (Communication skill)	2.5	0	70	30	100
PSOs	Students get knowledge about the basic English grammar, communication skills, basic language skills & use of language in creative writings.						
B.Sc. I	II	BT 105: Paper I: Environmental pollution	2.5	0	70	30	100
PSOs	Students can understand the anthropogenic activities in environment, its sources, impact & controlling measures to attend sustainable development.						
B.Sc. I	II	BT105: Paper II: Microbial techniques	2.5	0	70	30	100
PSOs	Students take the methodological review of cultivation of microbes, pure culture, staining,						

	sterilization & disinfection.						
B.Sc. I	II	BT106: Paper I : Taxonomy	2.5	0	70	30	100
PSOs	Students can identify, classify & nomenclature the micro-organisms ( bacteria, fungi, alagai), animals and plants.						
B.Sc. I	II	BT106 ; Paper II : Tissue Culture	2.5	0	70	30	100
PSOs	Students can understand the basic principles & process of plant and animal tissue culture.						
B.Sc. I	II	BT107 Paper I: Biochemistry	2.5	0	70	30	100
PSOs	Students get the knowledge about chemical process within & relating to living organisms.						
B.Sc. I	II	BT107: Paper II :Paper II: Cell Physiology	2.5	0	70	30	100
PSOs	Students can understand the basic principles & application of plant and animal physiology.						
B.Sc. I	II	BT108: Paper I: Biometry	2.5	0	70	30	100
PSOs	Students get the knowledge about how to solve the linear system of equation, to calculate percentage, derivative and integration.						
B.Sc. I	II	BT108: Paper II: Computer Science	2.5	0	70	30	100
PSOs	Students get the information about computer literacy & awareness of technology used in daily life.						
B.Sc. I	Annual	Laboratory Course I : Based on BT 101 and BT 105	0	4	70	30	100
PSOs	A student does staining, growth & pure culture of microbes related practical & obey the lab rules. Students acquire an ability to analyze environmental factors like soil, water etc. and for its improvement.						
B.Sc. I	Annual	Laboratory Course II : Based on BT 102 and BT 106	0	4	70	30	100
PSOs	Students develop the ability of collection, preservation & presentation of insects, its types, life cycle and detailed characteristics as well as different types of plants, life cycle, their mode, pattern of development to tissue culture.						
B.Sc. I	Annual	Laboratory Course III : Based on BT 103 and BT 107	0	4	70	30	100
PSOs	Student does qualitative & quantitative analysis of protein, carbohydrates and amino acid as well as Osmotic pressure on RBCs, BT & C.T. of blood cells. It also helps to understand cell physiology of human being.						
B.Sc. I	Annual	Laboratory Course IV : Based on BT 104 and BT	0	4	70	30	100

		108					
PSOs	Students get knowledge of calculation of derivative, integration and measures of central tendencies, measures of dispersion, drawing some diagram using computer sheet and to become computer literate and handle it efficiently.						
B.Sc. II	Sem III	Paper I:Inheritance Biology	3	0	70	30	100
PSOs	Students become able to study the genes (DNA) and its inheritance at molecular level.						
B.Sc. II	Sem III	Paper II: Basics of Molecular Biology	3	0	70	30	100
PSOs	Students get the knowledge of living things at the level of molecules which control them & make them up.						
B.Sc. II	Sem III	Paper I :Biophysical Instruments	3	0	70	30	100
PSOs	Students get the information about analytical instruments in life sciences and research activities regarding academics.						
B.Sc. II	Sem III	Paper II :Animal Tissue Culture	3	0	70	30	100
PSOs	Students get the information about history of animal tissue culture, media preparation, sterilization, culture techniques, and establishments of cell lines, genetic engineering & application of animal cell culture.						
B.Sc. II	Sem III	Paper I: Bioenergetics and Enzymology	3	0	70	30	100
PSOs	Students realize the fact that the knowledge and techniques learnt in this course has direct implication for the betterment of society and its sustainability						
B.Sc. II	Sem III	Paper II :Fundamentals of Immunology	3	0	70	30	100
PSOs	Learning of cells and organs of immunity, innate immunity, antigen, antibody, applications of a antigen-antibody interaction, MHC & cytokines.						
B.Sc. II	Sem IV	Paper I:Cytogenetics and Population Genetics	3	0	70	30	100
PSOs	Students get the information of chromosomes and their functions in genetics.						
B.Sc. II	Sem IV	Paper II: Mechanisms in Molecular Biology	3	0	70	30	100
PSOs	It gives deep theoretical knowledge to the students about biological and medicinal process through the investigation of the underlying molecular mechanisms.						
B.Sc. II	Sem IV	Paper I: Analytical Techniques	3	0	70	30	100

PSOs	Students get information about the techniques which can be helpful in future projects, aware of research and development in life sciences and biotechnology.						
B.Sc. II	Sem IV	Paper II: Plant Tissue Culture	3	0	70	30	100
PSOs	Students can understand in detail the principles, process & applications of plant tissue culture.						
B.Sc. II	Sem IV	Paper I: Metabolism	3	0	70	30	100
PSOs	Student recognizes the amino acid structure, describe the physical & chemical properties and predict how their ionic charges change with pH.						
B.Sc. II	Sem IV	Paper II: Mechanisms in Immunology	3	0	70	30	100
PSOs	Students can know the Humoral and cell mediated immunity, monoclonal antibodies, hyper sensitivity, auto immunity, Vaccines & hematology.						
B.Sc. II	Annual	Lab. Course V	0	8	140	60	200
PSOs	Student can understand and articulate the nature of science and its development through the scientific method as well as to identify the characteristics and basic needs of living organisms and ecosystems.						
B.Sc. II	Annual	Lab. Course VI	0	8	140	60	200
PSOs	It helps to develop biomedical techniques, devices, and systems that require substantive expertise in biology and in addition, it gives information about important techniques of animal tissue culture such as sterilization, media preparation, cell viability etc. and to learn different life cycles of plants, their mode & pattern of development.						
B.Sc. II	Annual	Lab. Course VII	0	8	140	60	200
PSOs	The students can determine the clotting time, hemoglobin, RBC, WBC, DLC, Latex, Coombs, Widal, VDRL etc. tests & immune-electrophoresis.						
B.Sc. III	Sem V	Compulsory English	3	0	70	30	100
PSOs	Students get the knowledge of English grammar, communicative skills, to define, classify, and understand the methods of communication, to improve their LSRW skills, to enable						

	them to practice those skills in their daily life & use of language in creative writings.						
B.Sc. III	Sem V	Plant Development	3	0	70	30	100
PSOs	To study & learn about the different growth stages and patterns of plants and life cycle.						
B.Sc. III	Sem V	Animal Development	3	0	70	30	100
PSOs	Students get the knowledge of historical account of embryology, study of gametogenesis, sterilization, cleavage, blastula, gastrula ion, development in model organism- concepts help in future biotechnology study.						
B.Sc. III	Sem V	Bioinformatics and Nanotechnology	3	0	70	30	100
PSOs	Students get the knowledge and aware of the basic principles and concepts of biology, computer science and mathematics and the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries & to Understand the fundamental principles of nanotechnology and their application to biomedical engineering.						
B.Sc. III	Sem V	Recent Trends in Biotechnology	3	0	70	30	100
PSOs	Students can study the enzyme immobilization, enzyme & metabolic engineering, environmental remedies, toxicology & bioethics.						
B.Sc. III	Sem VI	Compulsory English	3	0	70	30	100
PSOs	Students get the knowledge of English grammar, communicative skills, to define, classify, and understand the methods of communication, to improve their LSRW skills, to enable them to practice those skills in their daily life & use of language in creative writings.						
B.Sc. III	Sem VI	Tools and Techniques	3	0	70	30	100
PSOs	Student gets the knowledge of genetic engineering, enzyme in cloning, DNA transfer techniques, cloning in prokaryote & eukaryotes, methods of DNA sequencing – the concepts helps in future biotechnology study.						
B.Sc. III	Sem VI	Applications	3	0	70	30	100
SPOs	Students can know the applications in genetic engineering like xenobiotic degradation, utilization of sugar, polymer synthesis, vaccine production, characteristics modification in plants, animals & industrial microbes.						
B.Sc. III	Sem VI	Fermentation technology	3	0	70	30	100
PSOs	The study provides education and training in food chemistry, food safety, food processing, food packaging, sensory evaluation, flavor chemistry and fermentation science and						



	fundamental and applied research across dairy, seafood, wine, beer, fruit, and vegetable categories to provide value-added solutions to current and future problems encountered by Oregon's food and beverage processing industry.						
B.Sc. III	Sem VI	Food and Dairy technology	3	0	70	30	100
PSOs	Students get the information of beneficial micro-organisms & spoilage of food and dairy products.						
B.Sc. III	Annual	Techniques in Developmental Biology	0	3	70	30	100
PSOs	Students can study practically- sperms, eggs, cleavage, blastula, Gastrula, development of frog-chick, as well as different types of cancer, oxygen consumption in animals, Embryonic and morphologic aspects of plant life.						
B.Sc. III	Annual	Techniques in Genetic Engineering & Modern Biotechnology	0	3	70	30	100
PSOs	Students practically can know the isolation & quantification of Genomic, plasmid DNA from microorganism, ligation, use of restriction enzyme, molecular weight of nucleic acid, PCR this practical of genetic engineering helps to under to modern biotechnology.						
B.Sc. III	Annual	Techniques in Microbial Biotechnology	0	3	70	30	100
PSOs	Students enable for screening of antibiotic producer, vitamin, antibiotic assay, citric acid, amylase, sauerkraut, Bioinsecticide, wine etc. production, determination of milk' s-SPC, MBRT, Phosphates, sugar, Calcium, Magnesium, isolation of lipolytic & lactic acid producer, MIC.						
B.Sc. III	Annual	Project Work	0	3	70	30	100