

**Curriculum for Two-Year M.Sc. Program in Biosciences (4 Sem.) with any of the four specializations
(Common Curriculum for the first two semesters with Specializations in last two semesters)**

Semester : 1		Minimum Semester Credits Required : 18, Cumulative semester Credits Required : 18		
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Cell Biology	3-0-0	3
		Genetics	3-0-0	3
		Macromolecular Structure & Function	3-0-0	3
		Ecology & Evolution	3-0-0	3
		Analytical Tools & Techniques (lab)	0-0-6	6
		Total		18
Semester : 2		Minimum Semester Credits Required : 22, Cumulative semester Credits Required : 40		
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Microbiology (diversity and systematics)	3-1-0	4
		Molecular Biology	3-1-0	4
		Enzymology	3-1-0	4
		Metabolic Pathways	3-1-0	4
		Analytical Tools & Techniques (Lab)	0-0-6	6
		Total		22

L = Lecture; A = Assignments/Seminars; P = Practical
28 (Theory) + 12 (Practical/Lab) = 40 Credits = 1ST and 2nd Sem

Semester : 3		ANIMAL BIOLOGY		
		Minimum Semester Credits Required : 25, Cumulative semester Credits Required : 65		
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Physiology (with emphasis on disease orientation)	3-1-0	4
		Immunology	3-1-0	4
		Reproduction and Developmental Biology (one unit of transgenics will be covered)	3-1-0	4
		Genetic Engineering	3-1-0	4
		Optional - I	2-1-0	3
		Computer Applications in Biology (lab)	0-0-2	2

		Model Organisms (Practical)	0-0-3	3
		Comprehensive Viva	0-0-1	1
		Total		25
Semester : 4	Minimum Semester Credits Required : 21 , Cumulative semester Credits Required : 86			
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Stem Cells & Regenerative medicine	3-1-0	4
		Neurobiology & Neurochemistry	3-1-0	4
		Optional - II	2-1-0	3
		Project (project-laboratory part 8 credits + presentation – 2 credits)	0-0-10	10
		Total		21

46 credits = 3rd and 4th Sem; Total for two years: 86 Credits

Analytical Tools and Techniques – Practical subjects will be taught by Chemistry faculty to Biosciences students
 Optionals: Any two of the optionals, listed at the end, to be taken (one in 3rd and one in 4th semesters).

Semester : 3	Biochemistry Minimum Semester Credits Required : 22 , Cumulative semester Credits Required : 65			
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Physiology (Abiotic and Biotic Stress Biology)	3-1-0	4
		Plant Systematics and Diversity	3-1-0	4
		Plant Tissue Culture and Transgenics	3-1-0	4
		Genetic Engineering	3-1-0	4
		Optional - I	2-1-0	3
		Computer Applications in Biology (lab)	0-0-2	2
		Model Organisms (Practical)	0-0-3	3
		Comprehensive Viva	0-0-1	1
		Total		25
Semester : 4	Minimum Semester Credits Required : 21, Cumulative semester Credits Required : 86			
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Developmental Biology	3-1-0	4
		Natural Products and Metabolic Engineering	3-1-0	4

		Optional II	2-1-0	3
		Project (project-laboratory part 8 credits + presentation – 2 credits)	0-0-10	10
		Total		21

Total 46 credits = 3rd and 4th Sem; Total: 86 credits

Analytical Tools and Techniques – Practical subjects will be taught by Chemistry faculty to Biosciences students

Optionals: Any two of the following be taken (one in 3rd and one in 4th semesters)

Semester : 3		Microbiology Minimum Semester Credits Required : 25, Cumulative semester Credits Required : 65		
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Physiology (Microbial)	3-1-0	4
		Metabolic Diversity and Metabolic Engineering	3-1-0	4
		Immunology	3-1-0	4
		Genetic Engineering	3-1-0	4
		Optional - I	2-1-0	3
		Computer Applications in Biology (lab)	0-0-2	2
		Model Organism (Practical)	0-0-3	3
		Comprehensive Viva	0-0-1	1
		Total		25
Semester : 4		Minimum Semester Credits Required : 21, Cumulative semester Credits Required : 86		
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Virology	3-1-0	4
		Bioprocess & biochemical technology	3-1-0	4
		Optional -II	2-1-0	3
		Project (project-laboratory part 8 credits + presentation – 2 credits)	0-0-10	10
		Total		21

Total 46 credits = 3rd and 4th Sem; Total: 86 credits

Analytical Tools and Techniques – Practical subjects will be taught by Chemistry faculty to Biosciences students

Optionals: Any two of the following be taken (one in 3rd and one in 4th semesters)

Semester : 3		Biotechnology Minimum Semester Credits Required : 25, Cumulative semester Credits Required :		
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65				
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Metabolic Diversity and Metabolic Engineering	3-1-0	4
		Transgenic technology (Plant and animal)	3-1-0	4
		Immunology	3-1-0	4
		Genetic Engineering	3-1-0	4
		Optional-I	2-1-0	3
		Computer Applications in Biology (lab)	0-0-2	2
		Model Organism (Practical)	0-0-3	3
		Comprehensive Viva	0-0-1	1
		Total		25

Semester : 4 **Minimum Semester Credits Required : 21 , Cumulative semester Credits Required : 86**

Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Bioprocess Technology & Biochemical Technology	3-1-0	4
		Stem Cells and Regenerative Medicine	3-1-0	4
		Optional II	2-1-0	3
		Project (project-laboratory part 8 credits + presentation – 2 credits)	0-0-10	10
		Total		21

Total 46 credits = 3rd and 4th Sem; Total: 86 credits

Analytical Tools and Techniques – Practical subjects will be taught by Chemistry faculty to Biosciences students
 Optionals: Any two of the following be taken (one in 3rd and one in 4th semesters)

Semester : 3 **Computational Biology**
Minimum Semester Credits Required : 25 Cumulative semester Credits Required : 65

Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Sequence Analysis (Includes Maths) Genomics/Proteomics/Transcriptomics (Big data analysis)	3-1-0	4
		Protein structure & function	3-1-0	4
		Introduction to Systems Biology	3-1-0	4
		Genetic Engineering	3-1-0	4

		Optional I	2-1-0	3
		Computer Applications in Biology (lab)	0-0-2	2
		Unix, C, C++, R, Perl, Python	0-0-3	3
		Comprehensive Viva	0-0-1	1
		Total		22
Semester : 4	Minimum Semester Credits Required : 21 Cumulative semester Credits Required : 86			
Subject Type	Subject No.	Subject Name	L-A-P	Credits
		Maths & Statistics for computational Biology	3-1-0	4
		Advanced course on drug design & discovery	3-1-0	4
		Optional II	2-1-0	3
		Project, SAS, SCI Lab,	0-0-10	10
		Total		21

Total 46 credits = 3rd and 4th Sem; Total: 86 credits

Analytical Tools and Techniques – Practical subjects will be taught by Chemistry faculty to Biosciences students
Optionals: Any two of the following be taken (one in 3rd and one in 4th semesters)

Optional/Elective 2+1 Credit Courses

1. Food Microbiology
2. Signal Transduction
3. Fermentation technology
4. Synthetic Biology
5. Medical Microbiology
6. Redox Biology in Health and Disease
7. Cancer Biology
8. Host-Pathogen Interactions
9. Aquatic Biology
10. Marine Bioprospecting
11. IPR, Innovation & Entrepreneurship
12. Drug Discovery & Development
11. Any other emerging area depending on expertise of the faculty