



B.Sc. Honours/ Honours with Research in Botany Semester-I
(NCrF Level- 4.5 First Year – Certificate in Botany)

Semester-I

Multi-Disciplinary Course -1 (MDC -1): Botany: Introduction to Biology-I Theory	
Course Category	Multi-Disciplinary Course -1 (MDC -1)
Title of the Course	Botany: Introduction to Biology-I Theory
Course Credit	03
Teaching Hours per Semester (15 week / 90 working days)	45
Total Marks	50

Theory Course Outcomes

On the completion of course, students are able to know:

1. Studying the contributions of the scientists in biology not only imparts knowledge about specific discoveries to students but also teaches them critical thinking, scientific methodology and the collaborative nature of scientific progress.
2. Students will be able to explain the progression of plant classification systems over time, including the Five Kingdom Plant Classification proposed by Whittaker and its limitations.
3. Students will be able to apply their understanding of the cell theory to explain biological phenomena, such as the structure and function of organs and tissues.
4. Students will be able to distinguish the key characteristics and structure of eukaryotic cells and prokaryotic cells.
5. They will understand the world of microbes, fungi and lichens.
6. Studying bacterial morphology can help students recognize and understand the differences between harmless and harmful bacteria and they also gain a comprehensive understanding of the diverse world of bacteria and their significance in various aspects of life, health and the environment.
7. Student will be able to understand molecular biology, genetics, and cellular processes of virus. Studying the structure of the Tobacco Mosaic Virus can provide students with insights into basic virology concepts, genetic material, self-assembly, host-pathogen interactions, disease mechanisms and the broader implications of virus research in various fields.
8. Students will gain a solid understanding of the fundamental aspects of yeast cell structure, including the major organelles and their functions.
9. They will be able to understand the pattern of inheritance in various life forms through genetics.
10. They develop strong fundamentals basics for further molecular studies.
11. Students will be able to understand the various basic physiological processes in plants which is useful to give the idea for the plants and plant cells in relation to water.
12. Student will gain knowledge about soil water which is useful for agricultural Productivity, Water Resource Management, Soil Conservation and Environmental Impact.



1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?				Yes	
2	Value added Courses Imparting Transferable and Life Skillsના ગુણો ધરાવે છે?				No	
3	Major	No	Minor		No	
	Skill Enhancement Courses	No	Ability Enhancement Courses		No	
	Value Added Courses	No	Exit/ Vocational Courses		No	
4	Holistic Education	No	Multidisciplinary	Yes	Interdisciplinary	No
5	દિવ્યાંગ માટે વિષય અંતર્ગત આનુસાંગિક જોગવાઈ કરાયેલ છે ?				No	
6	New India Literacy Programme (NILP) મુજબનો વિષય છે?				No	
7	Swayam પ્લેટફોર્મ પરના MOOC વિષય પર આધારિત આ વિષય છે ?				No	
8	ઇન્ડીયન નોલેજ સીસ્ટમ (IKS) પર આધારિત વિષય છે ?				No	

Theory Course content: Unit No., Topics, Hours and Marks			
Unit No.	Topics	Hours	Marks
1	Fundamental biology 1.1. Contributions of Aristotle in biology. 1.2. Works of Louis Pasteur and Robert Koch, Robert Hooke and Antonie van Leeuwenhoek 1.3. Principles of systematics: Linnaean classification and taxonomic hierarchy. 1.4. Five kingdom classification of R. H. Whittaker. 1.5. Eichler's classification of plants.	9	10
2	The Cell 2.1. Cell theory and cell as the basic unit of life. 2.2. Difference between prokaryotic and eukaryotic cell. 2.3. Plant cell and animal cell. 2.4. Functions of cells.	9	10
3	Microbiology 3.1. Introduction to akryotes, virus, archea & bacteria, cyanobacteria. 3.2. Types of bacteria. 3.3. Introduction of virus: Structure of Tobacco Mosaic Virus. 3.4. Ultra-Structure of Cyanobacteria. 3.5. Ultra-Structure of Yeast cell.	9	10
4	Genetics 4.1. Basic Concept of Gene. 4.2. Mendelian laws of hereditary: Mono hybrid cross, Di	9	10



	hybrid cross. 4.3. Structure of DNA. 4.4. Types of RNA.		
5	Osmotic relation of plant cell. 5.1. Basic concept of Osmosis and its significance in plants. 5.2. Basic concept of Diffusion and its significance in plants 5.3. Basic concept of Imbibition and its significance in plants 5.4. Difference between Plasmolysis and Deplasmolysis. 5.5. Permeability of membrane and its factor affecting. 5.6. Types of Soil water.	9	10
	Total	45	50

Reference Books:

1. A text book of Botany by Singh, V. C, Pandey. P.C. and Jain. D. K. Rastogi Publication, Meerut.
2. An Introduction to Embryophyta 5th Edition by N.S., Parihar (1965). Central Book Deport, Allahabad, India
3. Cell and Molecular Biology by Gupta, P.K. (2003). Rastogi Publications, Meerut.
4. Cell Biology, Genetics, Molecular Biology, Evaluation and Ecology by Verma, P.S. and Agarwal, V.K. (2006). S. Chand and Company Pvt. Ltd., New Delhi.
5. Microbiology by Pelezar Michael, J., Chan, E.C.S. and Krieg Noel, R., Tata Mcgraw Hill Publishing Company, Ltd.
6. Modern Genetics Anaysis: Integrating Genes and Genomes, by Griffith, J.F., Gelbart, M., Lewontin, C and Miller, W.H. Freeman and Company, New York, USA.
7. Plant Physiology & Development by Taiz et.al. (2015), 6th Edition, Sinauer Associates Inc. USA.
8. Plant Physiology and Biochemistry by H.S. Srivastava (2008), Rastogi Publication, Meerut.
9. Plant Physiology by Pandey, S.N. and Sinha, B.K. (2009). Vikas Publishing House, Pvt. Ltd. New Delhi
10. Principles of Genetics, Snustad and Simmons, John Wiley & Sons, USA
11. Text book of microbiology. Trivedi, P.C., Pandey, S. and Bhadauria, S., 2010.



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Semester- I

Multi -Disciplinary Course -1 (MDC-1): Botany-1P: Introduction to Biology Practical-I	
Course Category	Multi -Disciplinary Course -1 (MDC-1)
Title of the Course	Botany-1P: Introduction to Biology Practical-I
Course Credit	01
Teaching Hours per Semester (15 Week/ 90 Working days)	30
Total Marks	25

Practical Course Outcomes - COs

On completion of the course, students are able to know:

1. Students will develop the ability to identify and describe the morphological characteristics of various algae, such as Sargassum, Mucor, Funaria, Nephrolepis, Cycus, Hibiscus
2. Through the study of onion leaf peels, students will gain insights into the various functions performed by different cell components.
3. Students will develop the ability to observe and interpret the structures and behaviors of blue-green algae cells using permanent slides.
4. Student can get understanding the structure, function, and significance of prokaryotic cells in various biological contexts, including health, ecology, industry, and research.
5. Morphology refers to the size, shape, arrangement, and structure of bacterial cells, and studying these changes can provide valuable insights into the behavior and outcome of bacterial infections.
6. Students can learn several important concepts from experiments that explore Imbibition, osmosis, diffusion and plasmolysis process.
7. Students will gain hands-on experience with laboratory techniques, including using solutions of different concentrations.

1	Employability/Entrepreneurship/Skill Development પર કેન્દ્રિત થયેલ છે કે નહિ?			Yes		
2	Value added Courses Imparting Transferable and Life Skillsનું ગુણો ધરાવે છે?			No		
3	Major	No	Minor	No		
	Skill Enhancement Courses	No	Ability Enhancement Courses	No		
	Value Added Courses	No	Exit/ Vocational Courses	No		
4	Holistic Education	No	Multidisciplinary	Yes	Interdisciplinary	No