

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce, and Science College
Ahmednagar (Autonomous)
(Affiliated to Savitribai Phule Pune University, Pune)



National Education Policy (NEP)
Choice Based Credit System (CBCS)

Programme Framework
B. Sc. - I (Botany)

Implemented from
Academic Year 2024-25

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar
(Autonomous)
Board of Studies in Botany

Sr. No.	Name	Designation
1.	Dr. D. D. Ahire	Chairman
2.	Dr. Y. R. Gahile	Member
3.	Mrs. L. K. Dhumal	Member
4.	Dr. B. A. Karle	Member
5.	Dr. S. B. Palve	Member
6.	Miss. T. M. Pagare	Member
7.	Miss. M. N. Jagtap	Member
8.	Mr. A. S. Wani	Member (co-opt)
9.	Dr. A. A. Kulkarni	Member (co-opt)
10.	Dr. B. N. Sonawane	Subject Expert
11.	Dr. P. P. Sharma	Academic Council Nominee
12.	Dr. M. L. Ahire	Academic Council Nominee
13.	Dr. S. G. Auti	Vice-Chancellor Nominee
14.	Mr. D. K. Jadhav	Alumni
15.	Dr. S. A. Puneekar	Industry Expert

1. Prologue/ Introduction of the programme:

The new curriculum of B.Sc. in Science (Botany) offers essential knowledge and technical skills to study plants in a holistic manner. Students would be trained in all areas of plant biology using a unique combination of core, elective and vocational papers with significant inter-disciplinary components. B.Sc. Botany Programme covers academic activities within the classroom sessions along with practical concepts at laboratory sessions. Infield, outstation activities and projects would also be organized for real-life experience and learning. Candidates who have curiosity in plants kingdom, ecosystem,

love exploring exotic places and wish to work as researchers or professions like Botanist, Conservationist, Ecologist, etc. can choose B.Sc. Botany course.

1. To provide thorough knowledge about various plant groups from primitive to highly evolved.
2. Accurately interpretation of collected information and use taxonomical information to evaluate and formulate a position of plant in taxonomy.
3. Critically evaluation of ideas and arguments by collection relevant information about the plants, so as recognize the position of plant in the broad classification and phylogenetic level.
4. Identify problems and independently propose solutions using creative approaches, acquired through interdisciplinary experiences, and a depth and breadth of knowledge/expertise in the field of Plant Identification.
5. Students will be able to identify the major groups of organisms with an emphasis on plants and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics of plants, algae, and fungi that differentiate them from each other and from other forms of life.
6. Students will be able to use the evidence of comparative biology to explain how the theory of evolution offers the only scientific explanation for the unity and diversity of life on earth. They will be able to use specific examples to explicate how descent with modification has shaped plant morphology, physiology, and life history.
7. Students will be able to explain how plants function at the level of the gene, genome, cell, tissue, Flower development. Drawing upon this knowledge, they will be able to give specific examples of the physiological adaptations, development, reproduction and mode of life cycle followed by different forms of plants.
8. Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for their area of specialization within botany.
9. To make the students aware of applications of different plants in various industries.
10. To highlight the potential of these studies to become an entrepreneur.
11. To equip the students with skills related to laboratory as well as industries based studies
12. To equip the students with skills related to laboratory as well as field based studies.
13. To make the students aware about conservation and sustainable use of plants.
14. To create foundation for further studies in Botany.
15. To address the socio-economical challenges related to plant sciences.
16. To facilitate students for taking up and shaping a successful career in Botany.

2. Programme Outcomes (POs)

Students enrolled in the programme complete a curriculum that exposes and trains in the full range of essential skills and abilities. Transformed curriculum shall develop educated outcome-oriented candidature, fostered with discovery- learning, equipped with practice & skills to deal practical problems and versed with recent pedagogical trends in education including e-learning, flipped class and hybrid learning to develop into responsible citizen for nation-building and transforming the country towards the future with their knowledge gained in the field of plant science.

Students will have the opportunity to master the following objectives.

1. Educate students about plant science.
2. Inculcate strong fundamentals on modern and classical aspects of Botany.
3. Create platform for higher studies in Botany.
4. Facilitate students to take-up successful career in Botany
5. Acquire practical skills to gather information, assess, create and execute new ideas to develop entrepreneurial skills.
6. Learn to respect and conserve nature and the environment.
7. CBCS syllabus with a combination of general and specialized education shall introduce the concepts of breadth and depth in learning.
8. It produces competent plant biologists who can employ and implement their gained knowledge in basic and applied aspects that will profoundly influence the prevailing paradigm of agriculture, industry, healthcare and environment to provide sustainable development.
9. Will increase the ability of critical thinking, development of scientific attitude, handling of problems and generating solutions, improve practical skills, enhance communication skill, social interaction, and increase awareness in judicious use of plant resources by recognizing the ethical value system.
10. The training provided to the students will make them competent enough for doing jobs in Govt. and private sectors of academia, research and industry along with graduate preparation for national as well as international competitive examinations, especially UGC-CSIR NET, UPSC Civil Services Examination, IFS, NSC, FCI, BSI, FRI etc. 2 Botany UG (NEP) KUN
- 11 Certificate and diploma courses are framed to generate self- entrepreneurship and self-employability, if multi exit option is opted.
12. Lifelong learning is achieved by drawing attention to the vast world of knowledge of plants and their domestication.

Programme specific objectives (PSOs):**B.Sc. I Year Certificate Course in Basic Botany**

- This certificate course will provide knowledge on various fields of basic Botany.
- The syllabus is prepared to enable students for competitive exams in frontier areas of plant sciences and start-up floriculture, horticulture or nursery related business.
- Students will be able to know the role of medicinal plants in India from ancient to recent year. Students from other faculty can gain knowledge related plants through Open Elective course

Programme specific outcomes (PSOs):**B.Sc. II Year/ Diploma Course in Botany**

- This programme will provide knowledge of formulation, preparation and applications of Biofertilizers and biopesticides. On the basis of this knowledge students will able to start up a small scale industry of biofertiliozesr and biopesticides.
- Laboratory sessions following theory will provide easy understanding of plant taxonomy, ecology, plant anatomy, embryology, plant biotechnology and plant physiology.
- This course will help students to become a plant Taxonomist.

Programme specific outcomes (PSOs):**B.Sc. III Year/ Bachelor of Science**

- Third year graduation programme will provide an understanding of plant systematic, economic botany, molecular and developmental biology, ecology, plant pathology, physiology, plant genetics and biochemistry.
- It will provide expertise in plant breeding and seed technology.
- After completing this course successfully students will be able to contribute in the field of plant sciences. The research project will help to develop research aptitude for higher education and scientific research.

B. Sc. Programme Framework: Credit Distribution

Level / Difficulty	Sem	Subject-1 (Selected as Major)						Subject-2		Subject-3		(SEC)	GE/OE		IKS	AEC	VEC	CC	Total
		T		P				T	P	P	T	P	T	P					
Certificate 4.5 / 100	I	02		02				02	02	02	02	-	02		02	02	02	02	22
	II	02		02				02	02	02	02	02	-	02	--	02	02	02	22
		Credits Related to Major						Selected as Minor											
		Core		Elective		VSC	FP / OJT / CEP/RP												
		T	P	T	P	P	P	T	P	-	P	T	P	-	-	-	-	-	
Diploma 5.0 / 200	III	04	02	--		02	02	02	02	-	02	02		-	02	-	02	22	
	IV	04	02	--		02	02	02	02	-	02		02	--	02	-	02	22	
Degree 5.5 / 300	V	06	04	02	02	2	2	02	-	-	-	-	-	02	-	-	-	22	
	VI	06	04	02	02	2	4	02	-	-	-	-	-	-	-	-	-	22	
Total		24	16	04	04	08	10	10	08	04	04	06	08	04	08	04	08	132	
6.0/400 Honours	VII	08	06	02	02	-	RM-04											22	
	VIII	08	06	02	02		OJT-04											22	
6.0/400 Honours with Research	VII	06	04	02	02		RM-04 RM-04											22	
	VIII	06	04	02	02		RM-08											22	
Total		40/36	28/24	08	08	08	18/26	10	08	04	04	06	04	04	04	08	04	08	176

B.Sc. Programme Framework: Course Distribution

Level / Difficulty	Sem	Subject-1 (Selected as Major)						Subject-2		Subject-3		(SEC)	GE/OE		IKS	AEC	VEC	CC	Total
		T		P				T	P	P	T	P	T	P					
Certificate 4.5 / 100	I	01		01				01	01	01	01	-	01		01	01	01	01	11
	II	01		01				01	01	01	01	01	-	01	--	01	01	01	11
		Credits Related to Major						Selected as Minor											
		Core		Elective		VSC	FP / OJT / CEP / RP												
		T	P	T	P	P	P	T	P	-	P	T	P	-	-	-	-	-	
Diploma 5.0 / 200	III	02	01	--		01	FP-01	01	01	-	01	01		-	01	-	01	11	
	IV	02	01	--		01	CEP-01	01	01	-	01		01	--	01	-	01	11	
Degree 5.5 / 300	V	03	02	01	01	01	FP-01	01	-	-	-	-		01	-	-	-	11	
	VI	03	02	01	01	01	OJT-01	01	-	-	-	-		-	-	-	-	10	
Total		12	08	02	02	04	04			02	02	03	04	02	04	02	04	65	
6.0/400 Honours	VII	03	03	01	01	-	RM-01											09	
	VIII	03	03	01	01		OJT-01											09	
6.0/400 Honours with Research	VII	02	02	01	01		RM-01 RM-01											08	
	VIII	02	02	01	01		RM-01											07	
Total		18/16	14/12	04	04	04	06/07	06	04	02	02	03	04	02	04	02	04	83/80	

B. Sc. -Botany: Credit and Course Distribution in Brackets

Level / Difficulty	Sem	Subject-1							Total
		T		P					
4.5	I	02 (01)		02 (01)				04(02)	
	II	02 (01)		02 (01)				04(02)	
		Credits Related to Major							
		Core		Elective		VSC	FP / OJT/ CEP	IKS	
		T	P	T	P	P	P	T	
5.0	III	04(02)	02(01)	--		02(01)	FP-02(01)		10(05)
	IV	04(02)	02(01)	--		02(01)	CEP-02(01)		10(05)
5.5	V	06(03)	04(02)	02(01)	02(01)	02(01)	FP-02(01)	02(01)	20 (10)
	VI	06(03)	04(02)	02(01)	02(01)	02(01)	OJT-04(01)		20(09)
Total		12	08	(02)	(02)	04	04	(01)	33
6.0	VII	03	03	(01)	(01)	-	RM-04(01)		22(09)
	VIII	03	03	(01)	(01)		OJT-04(01)		22(09)
6.0	VII	(02)	(02)	(01)	(01)		RM-04(01) RP-04(01)		22(08)
	VIII	(02)	(02)	(01)	(01)		RM-08(01)		22(07)
		18/16	14/12	04	04	04	06/07	(01)	51/48

Programme Framework (Courses and Credits): B. Sc. Botany

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	I	4.5	DSC-01	BS-BO 111T	Principles of Plant Science	02
2.	I	I	4.5	DSC-02	BS-BO 112P	Practicals based on Principles of Plant Science	02
3.	I	II	4.5	DSC-03	BS-BO 121T	Plant Morphology	02
4.	I	II	4.5	DSC-04	BS-BO 122P	Practicals based on	02
5.	II	III	5.0	DSC-05	BS-BO 231T	Taxonomy of Angiosperms and Plant Ecology	02
6.	II	III	5.0	DSC-06	BS-BO 232T	Plant Physiology	02
7.	II	III	5.0	DSC-07	BS-BO 233P	Practicals based on BO 231 & 232	02
8.	II	III	5.0	VSC-01	BS-BO 234P	Floriculture and Horticultural Practices	02
9.	II	III	5.0	FP-01	BS-BO 235T	Field Project	02

10.	II	IV	5.0	DSC-08	BS-BO 241T	Plant Anatomy and Embryology	02
11.	II	IV	5.0	DSC-09	BS-BO 242T	Plant Biotechnology	02
12.	II	IV	5.0	DSC-10	BS-BO 243P	Practicals based on BO 241 & 242	02
13.	II	IV	5.0	VSC-02	BS-BO 243P	Nursery & Gardening Management	02
14.	II	IV	5.0	CEP-01	BS-BO 245P	Community Engagement Project	02
15.	III	V	5.5	DSC-11	BS-BO 351T	Algae & Fungi	02
16.	III	V	5.5	DSC-12	BS-BO 352T	Cell & Molecular Biology	02
17.	III	V	5.5	DSC-13	BS-BO 353T	Genetics & Plant Breeding	02
18.	III	V	5.5	DSC-14	BS-BO 354P	Practicals based on BO 351	02
19.	III	V	5.5	DSC-15	BS-BO 355P	Practicals based on BO 352	02
20.	III	V	5.5	DSE-01	BS-BO 356T	Medicinal Botany	02
21.	III	V	5.5	DSE-02	BS-BO 357P	Practicals based on BO 356	02
22.	III	V	5.5	VSC-03	BS-BO 358P	Practicals based on BO 353	02
23.	III	V	5.5	FP-02	BS-BO 359P	Field Project	02
24.	III	V	5.5	IKS-02	BS-BO 360T	Plants in Indian Traditional Medicine Systems	02
25.	III	VI	5.5	DSC-16	BS-BO 361T	Archegoniate	02
26.	III	VI	5.5	DSC-17	BS-BO 362T	Plant Physiology	02
27.	III	VI	5.5	DSC-18	BS-BO 363T	Biochemistry	02
28.	III	VI	5.5	DSC-19	BS-BO 364P	Practicals based on BO 361	02
29.	III	VI	5.5	DSC-20	BS-BO 365P	Practicals based on BO 362 & 363	02
30.	III	VI	5.5	DSE-03	BS-BO 366T	Plant Tissue Culture	02
31.	III	VI	5.5	DSE-04	BS-BO 367P	Practicals based on BO 366	02
32.	III	VI	5.5	VSC-04	BS-BO 368T	Biofertilizers & Biopesticides	02
33.	III	VI	5.5	OJT-01	BS-BO 369T	On Job Training	04

B. Sc. Botany (Honours)

34.	IV	VII	6.0	DSC-21	BS-BO 471T	Algae & Fungi	03
35.	IV	VII	6.0	DSC-22	BS-BO 472T	Cell & Molecular Biology	03
36.	IV	VII	6.0	DSC-23	BS-BO 473T	Genetics & Plant Breeding	02
37.	IV	VII	6.0	DSC-24	BS-BO 474P	Practicals based on BO 471	02
38.	IV	VII	6.0	DSC-25	BS-BO 475P	Practicals based on BO 472	02
39.	IV	VII	6.0	DSC-26	BS-BO 476TP	Tools & Techniques in Botany	02

40.	IV	VII	6.0	DSE-05	BS-BO 477T	Medicinal Botany	02
41.	IV	VII	6.0	DSE-06	BS-BO 478T	Plant Pathology	02
42.	IV	VII	6.0	RM-01	BS-BO 479T	Research Methodology	04
43.	IV	VIII	6.0	DSC-27	BS-BO 481T	Archegoniate	03
44.	IV	VIII	6.0	DSC-28	BS-BO 482T	Plant Physiology	03
45.	IV	VIII	6.0	DSC-29	BS-BO 483T	Biochemistry	02
46.	IV	VIII	6.0	DSC-30	BS-BO 484T	Mycology	02
47.	IV	VIII	6.0	DSC-31	BS-BO 483P	Practicals based on BO 481	02
48.	IV	VIII	6.0	DSC-32	BS-BO 484P	Practicals based on Plant Tissue Culture	02
49.	IV	VIII	6.0	DSE-07	BS-BO 485P	Practicals based on BO 483	02
50.	IV	VIII	6.0	DSE-08	BS-BO 485P	Practicals based on Pomoculture	02
51.	IV	VIII	6.0	OJT-02	BS-BO 486T	On Job Training	04

B. Sc. Botany (Honours with Research)

34.	IV	VII	6.0	DSC-21	BS-BO 471T	Algae & Fungi	03
35.	IV	VII	6.0	DSC-22	BS-BO 472T	Cell & Molecular Biology	03
36.	IV	VII	6.0	DSC-23	BS-BO 473P	Practicals based on BO 471	02
37.	IV	VII	6.0	DSC-24	BS-BO 474P	Practicals based on BO 472	02
38.	IV	VII	6.0	DSE-05	BS-BO 473T	Medicinal Botany	02
39.	IV	VII	6.0	DSE-06	BS-BO 474P	Practicals based on BO 473	02
40.	IV	VII	6.0	RM-01	BS-BO 476T	Research Methodology	04
41.	IV	VII	6.0	RP-01	BS-BO 477T	Research Project	04
42.	IV	VIII	6.0	DSC-19	BS-BO 481T	Archegoniate	03
43.	IV	VIII	6.0	DSC-20	BS-BO 482T	Plant Physiology	03
44.	IV	VIII	6.0	DSC-21	BS-BO 483T	Biochemistry	02
45.	IV	VIII	6.0	DSE-04	BS-BO 485T	Mycology	02
46.	IV	VIII	6.0	DSE-07	BS-BO 473T	Plant Pathology	02
47.	IV	VIII	6.0	DSE-08	BS-BO 474P	Practicals based on BO 481	02
48.	IV	VIII	6.0	PR-02	BS-BO 486T	Project	08

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar
(Autonomous)
Syllabus
B. Sc. -I (Botany)

Title of the Course: Principles of Plant Science								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-01	BS-BO 111T	02	00	02	30	15	35	50

Learning Objectives:

1. Understand the importance of plant physiology in the study of plant function and adaptation.
2. Define plant physiology and its scope in relation to other branches of biology.
3. Understand the concept of plant growth and its significance in plant development.
4. Differentiate between prokaryotic and eukaryotic cells, focusing on structural and functional differences.
5. Analyze the relationship between the structure and function of organelles within plant cells.

Course Outcomes (Cos)

On completion of this course, the students will be able to:

1. Know about basic processes and functions at physiological, cellular and molecular level.
2. Know the structure of cells in relation to the functional aspects.
3. Understand the difference between prokaryotic and eukaryotic cells.
4. Understand the properties of nucleic acids (DNA & RNA).
5. Acquire knowledge about basic genetics.

Detailed Syllabus:		
Unit I	1.1 Introduction and definition of plant physiology. 1.2 Application of plant physiology with examples.	02
Unit II	2.1 Diffusion – definition, concept, importance of diffusion in plants 2.2 Imbibition : definition, concept, importance of Imbibition in plants. 2.3 Osmosis – definition, concept, types of solutions (hypotonic, isotonic, hypertonic), endosmosis, exo-osmosis, osmotic pressure, turgor pressure, wall pressure, importance of osmosis in plants. 2.4 Difference between exosmosis and Endo-osmosis, difference between Diffusion and Osmosis 2.5 Plasmolysis-definition, mechanism, importance of plasmolysis.	09

Unit III	3.1 Plant growth - introduction, phases of growth 3.2 Factors affecting growth.	2
Unit IV	4.1 Cell: Evolution of cell, Types of cells- prokaryotic and eukaryotic cell, salient features of plant cell, Structure of plant cell, Plant cell wall – components of cell wall, structure and functions. Plasma membrane – structure and function. 4.2 Nucleus: Structure-nuclear envelope, nuclear lamina, nucleolus. 4.3 Chloroplast, mitochondria: Ultrastructure, Function. Endosymbiont theory; Endomembrane system: Endoplasmic Reticulum – Structure and function of RER and SER, Golgi Apparatus – Organization and function ; Lysosomes introduction, importance and types. 4.4. Cell cycle - importance of cell cycle in plants, divisional stages of mitosis and meiosis.	09
Unit V	5.1 Introduction and scope of molecular biology. 5.2 Contribution of Rosalind Franklin and Chargoff in the discovery of DNA Structure. 5.3 Nucleoside and nucleotide: purines and pyrimidins and pentose sugar. 5.4 Watson and Crick double helical structure of DNA, properties and forms of DNA. 5.5 RNA: structure, types of RNA and its function. 5.6 Chromosomes structure and its types; Gene: definition and concept, eukaryotic gene structure.	08
Unit VI	6.1 Genetics: Definition, introduction and scope, 6.2 Genetics terminology 6.3 Mendel's laws of inheritance, monohybrid and dihybrid cross, Punnett square and forkline method, test cross, back cross.	04

Suggested Readings:

1. Buchanan, B.B, Gruissem, W. and Jones, R.L (2000). Biochemistry and Molecular Biology of Plants. American Society of Plant Physiologists Maryland, USA.
2. Cooper, G.M. and Hausman, R.E. (2007). The Cell: Molecular Approach 4th Edition, Sinauer Associates, USA.
3. David, Nelson and Cox, Michael (2007). Lehninger Principles of Biochemistry. W.H. Freeman and Company. New York.
4. Devlin, R.M. (1983). Fundamentals of Plant Physiology. Mc. Millan, New York.
5. Dutta, A.C. (2000). A Class Book of Botany. Oxford University Press, UK.
6. Hopkins, William G. (1995). Introduction to Plant Physiology. Publ. John Wiley and Sons, Inc.
7. Lewin, Benjamin (2011). Genes. X Jones and Bartlett.

8. Lincoln, Taiz and Eduardo, Zeiger (2010). Plant Physiology. 5th Edition. Sinauer Associates, Inc. Publishers. Sunderland, USA.
9. Opik, Helgi, Rolfe, Stephen A. and Willis, Arthur J. (2005). The Physiology of Flowering Plants. Cambridge University Press, UK.
10. Pal, J.K. and Ghaskadbi, Saroj (2009). Fundamentals of Molecular Biology. Oxford University Press. India.
11. Pandey, S.N. and Sinha, B.K. (2014). Plant Physiology. Vikas Publishing House Pvt. Ltd., India.
12. Salisbury, F.B. and Ross, C.B. (2005). Plant Physiology. 5th Edition. Wadsworth Publishing Co. Belmont California, USA.
13. Watson, James D., Baker, Tania; Bell, Stephen P.; Alexander Gann; Levine, Michael and Lodwick, Richard (2008). Molecular Biology of the Gene. 6th Edition, Pearson Education, Inc. and Dorling Kindersley Publishing, Inc. USA.
14. Weaver, R. (2011). Molecular Biology. 5th Edition, Publisher- McGraw Hill Science. USA.

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Syllabus
B. Sc. -I (Botany)

Title of the Course: Practical based on BO 111 T								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-02	BS-BO 112P	00	02	02	60	15	35	50

Learning Objectives:

1. Differentiate between prokaryotic and eukaryotic plant cells by identifying characteristic features.
2. Prepare and observe mitotic and meiotic stages using onion root tips and suitable materials, respectively.
3. Estimate chlorophyll-a and chlorophyll-b levels in plants to understand photosynthetic pigments.
4. Demonstrate osmotic processes such as endosmosis, exosmosis, and plasmolysis using Rhoeo leaf peeling.
5. Apply genetic principles through solving problems on test cross, back cross, monohybrid, and dihybrid crosses, and prepare solutions of varying tonicity.

Course Outcomes (Cos)

1. Gain comprehensive understanding of cell structure differences (prokaryotic vs. eukaryotic).
2. Develop proficiency in cytological techniques through slide preparation and analysis of mitotic and meiotic stages.
3. Acquire skills in estimating chlorophyll levels, enhancing comprehension of photosynthetic processes.
4. Understand osmotic processes and cellular responses to environmental conditions.
5. Apply genetic principles through problem-solving exercises on inheritance patterns.

Sr. No.	Practicals	60 H
1.	Preparation of solution hypertonic, isotonic and hypotonic.	1P
2.	Study of DPD by using suitable plant sample.	1P
3.	Demonstration- Osmosis, curling experiment, imbibition.	1P
4.	Plasmolysis- endosmosis, exosmosis, incipient plasmolysis using <i>Rhoeo</i> leaf peeling.	1P
5.	To observe characteristic features of prokaryotic and eukaryotic plant cell.	1P
6.	Study of meiosis- preparation of slides using <i>any suitable material</i> to observe divisional stages.	1P
7.	Study of mitosis preparation of slides using onion root tips to observe divisional stages.	1P
8.	Demonstration: DNA and RNA model.	1P
9.	Problems on monohybrid cross.	1P
10.	Problems on dihybrid cross by using punnet square method.	1P
11.	Problems on dihybrid cross by using forkline method.	1P
12.	Problems on test cross and back cross.	1P

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Syllabus
B. Sc. -I (Botany)

Title of the Course: Plant Morphology								
Year: I				Semester: II				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
IKS-01	BS-BO121T	02	00	02	30	15	35	50

Learning Objectives:

1. Define descriptive and interpretative morphology.
2. Explain root, stem, and leaf morphology and functions.
3. Identify types of inflorescences.
4. Describe parts and variations of a typical flower.
5. Classify different types of fruits.

Course Outcomes (Cos)

On completion of the course, students will be able to:

1. Understanding of plant morphology terminologies and identifying morphological Peculiarities.
2. Recognize members of the major angiosperm families by identifying their diagnostic Features with the help of morphology.
3. The students will gain ability to apply the acquired knowledge and skills in the field of plant morphology.
4. Provide lab based training in writing short species description and illustration.
5. The students will learn about the basic concepts in Morphology.

Detailed Syllabus:		
Unit I	1.1: Introduction, definition, descriptive and interpretative orphology. 1.2: Importance in identification, nomenclature, classification, hylogeny and Plant breeding.	2
Unit II	Morphology of Vegetative Parts: Root, Stem And Leaf: 2.1 Introduction 2.2 Morphology of Root: Modification ,Types and Function 2.2 Morphology of Stem: Modification Types and Function 2.3 Morphology of Leaf: Modification Types and Function	11
Unit III	Morphology Of Reproductive Parts: INFLORESCENCE: 3.1 Introduction and definition	5

	<p>3.2 Types:</p> <p>a) Racemose -Raceme, Spike, Spadix, Corymb, Umbel, Catkin and Capitulum.</p> <p>b) Cymose -Solitary, Monochasial- Helicoid and scorpioid; Dichasial and Polychasial.</p> <p>c) Special types -Verticillaster, Cyathium and Hypanthodium.</p> <p>3.3 Significance</p>	
Unit IV	<p>FLOWER</p> <p>4.1 Introduction and definition</p> <p>4.2 Parts of a typical flower: Bract, Pedicel, Thalamus- forms, Perianth-Calyx and Corolla, Androecium and Gynoecium.</p> <p>4.3 Symmetry: Actinomorphic and zygomorphic, Sexuality- Unisexual and bisexual, Insertion of floral whorls on thalamus- Hypogyny, Epigyny and perigyny, Merous condition-Trimerous, tetramerous and pentamerous.</p> <p>4.4 Floral whorls:</p> <p>a) Calyx: Nature- Polysepalous, Gamosepalous; Aestivation- types, Modifications of Calyx- Pappus, Petaloid and Spurred.</p> <p>b) Corolla: Forms of Corollai) Polypetalous- Cruciform and Papilionaceous.</p> <p>ii) Gamopetalous- Infundibuliform, Bilabiate, Tubular and Campanulate.</p> <p>iii) Aestivation- types and significance.</p> <p>c) Perianth: Nature- Polytepalous, Gamotepalous.</p> <p>d) Androecium: Structure of typical stamen, Variations- cohesion and adhesion.</p> <p>e) Gynoecium: Structure of typical carpel, number, position, cohesion and adhesion; placentation- types and significance.</p>	08
Unit V	<p>FRUITS</p> <p>5.3.1 Introduction and definition</p> <p>5.3.2 Types of fruits:</p> <p>a) Simple: Indehiscent - Achene, Cypsela, Nut and Caryopsis. Dehiscent - Legume, Follicle and Capsule,</p> <p>b) Fleshy: Drupe, Berry, Hesperidium and Pepo.</p> <p>c) Aggregate: Etaerio of Berries and Etaerio of Follicles.</p> <p>d) Multiple fruits: Syconus and Sorosis.</p>	06

Suggested Readings/Material:

1. Gangulee, Das and Dutta (2002). College Botany. Vol. I. New Central Book Agency, Kolkata.

2. Lawrence, G.H.M. (2012). Taxonomy of vascular Plants. Scientific Publishers (India) Jodhpur.
3. Naik, V.N. (1994). Taxonomy of Angiosperms. Tata McGraw Hill Publishing Comp., New Delhi.
4. Dutta, A.C. (2003). Botany for Degree students. Oxford University Press, New
5. Gangulee, Das and Dutta (2002). College Botany. Vol. I. New Central Book Agency, Kolkata.
6. Lawrence, G.H.M. (2012). Taxonomy of vascular Plants. Scientific Publishers (India) Jodhpur. (5)
7. Naik, V.N. (1994). Taxonomy of Angiosperms. Tata McGraw Hill Publishing Comp., New Delhi.
8. Pandey, B.P. (2009). A Text Book of Botany- Angiosperms. S. Chand and Co. Ltd.
9. George Usher. A Dictionary of plants used by man- CBS Publishers and Distributors.
10. Prof. H.D Sane. A Text Book of Botany- Narendra Prakashan.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar
(Autonomous)
Syllabus
B. Sc. -I (Botany)

Title of the Course: practicals								
Year: I				Semester: II				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-03	BS-BO 122P	00	02	02	60	15	35	50

Learning Objectives:

1. To understand the structural features and functions of roots, stems, and leaves.
2. To classify and differentiate various types of inflorescences, including racemose and cymose, and recognize specific examples within each type.
3. To analyze the anatomy of flowers, focusing on the components of the calyx, corolla, perianth, and reproductive structures (androecium and gynoecium).
4. To classify fruits based on their structures and development, including simple (dry and fleshy), aggregate, and multiple fruits, and provide suitable examples for each category.
5. To apply theoretical knowledge through practical observation during field trips, such as excursions to study algae, fungi, bryophytes, and lichens in their natural habitats.

Course Outcomes (Cos)

1. Understand plant morphology thoroughly.
2. Classify inflorescences, flowers, and fruits effectively.
3. Analyze the functional roles of plant structures.
4. Apply knowledge in practical contexts.
5. Enhance observational and analytical skills.

Sr. No.	Practicals	60 H
1.	Study of Morphology of Root, Stem and Leaf	3P
2.	Study of Inflorescence: a. Racemose: Raceme, Spike, Spadix, Catkin, Corymb, Umbel and Capitulum b. Cymose: Solitary cyme, Uniparous cyme: helicoid and scorpiod, Biparous cyme and Multiparous cyme. c. Special type: Verticillaster, Hypanthodium and Cyathium.	3P
3.	Study of flower with respect to Calyx, Corolla and Perianth, Androecium and Gynoecium.	3P
4.	Study of fruits with suitable examples. a) Simple fruit: Dry: Achene, Cypsella and Legume; Fleshy: Berry and Drupe. b) Aggregate fruit: Etaerio of follicles and Etaerio of Berries. c) Multiple fruit: Syconus and Sorosis.	3P

Note: One day excursion tour to study higher and lower plants .