

**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 Skeleton and Syllabus of
B.Sc. Botany (Major)**

**Implemented from
Academic Year 2023-24**

Credit Distribution: B.Sc. Botany (Major) including Minor and OE and other courses.

	Type of Courses	III Yr	IV Yrs (Honours)	IV Yrs (Research)
Major	Discipline-Specific Courses (DSC)	46	74	66
	Discipline Specific Elective (DSE)	08	16	16
	Skill Enhancement Courses (SEC)	06	06	06
	Vocational Skill Courses (VSC)	08	08	08
	On-Job Training (OJT)	04	08	04
	Field Project (FP)	04	04	04
	Community Engagement and Service (CEP)	02	02	02
	Research project	00	00	12
	Research Methodology	00	04	04
	Indian Knowledge System	02	02	02
	Total (I, II and III Year)	80	124	124
Minor	Minor	20	20	20
Other Courses	Open Elective (OE)/ Multidisciplinary Courses	12	12	12
	Co-Curricular Courses	08	08	08
	Ability Enhancement Courses	08	08	08
	Value Education Courses	04	04	04
	Total	132	176	176

B. Sc. Programme Framework: Credit Distribution

Year	Semester	Level	Major										Minor	OE	CC	AEC	VEC	Total
			DSC		DSE		SEC		VSC		FP/OJT /IN/CEP		IKS					
			T	P	T	P	T	P	T	P	T	P		T/P	-	-	-	-
I	I	4.5	4	2	-	-	-	2	-	-	-	-	2	03	3	2	2	22
I	II	4.5	6	-	-	-	-	2	-	2	-	-		03	3	2	2	22
Exit Option: Award of UG Certificate in Major with 44 credits and an additional 4 credit core NSQF course /Internship or Continue with Major and Minor																		
II	III	5.0	6	2	-	-	-	2	-	-	-	2		03	3	2	2	22
II	IV	5.0	6	2	-	-	-	-	-	2	-	2		03	3	2	2	22
Exit Option: Award of UG Diploma in Major with 88 credits and an additional 4 credit core NSQF course /Internship or Continue with major and minor																		
III	V	5.5	8	2	2	2	-	-	-	2		2		04	-	-	-	22
III	VI	5.5	6	2	2	2	-	-	-	2		4		04	-	-	-	22
Exit Option: Award of UG Degree in Major and Minor with 132 credits or continue with Major for a 4-year Degree																		

IV	VII	6.0	8	6	2	2	RM-4	-	-	-	-	-	-	-	-	-	-	22
IV	VIII	6.0	8	6	2	2	-	-	-	-	-	4	-	-	-	-	-	22
Four Year UG Degree (Honours) with Major and Minor with 176 credits																		
IV	VII	6.0	6	4	2	2	RM-4	-	-	-	4	-	-	-	-	-	-	22
IV	VIII	6.0	6	4	2	2	-	-	0	-	-	8	-	-	-	-	-	22
Four Year UG Degree (Honours with Research) with Major and Minor with 176 credits																		

B. Sc. Programme Framework: Course Distribution

Year	Semester	Level	Major											Minor	OE	CC	AEC	VEC	Total
			DSC		DSE		SEC		VSC		FP/OJT /IN/CEP		IKS						
	-	-	T	P	T	P	T	P	T	P	T	P		T	P	-	-	-	-
I	I	4.5	2	1	-	-	-	1	-	-	-	-	1	1	1	1	1	1	10
I	II	4.5	2	-	-	-	-	1	-	1	-	-	-	1	1	1	1	1	09
Exit Option: Award of UG Certificate in Major with 44 credits and an additional 4 credit core NSQF course /Internship or Continue with major and minor																			
II	III	5.0	2	1	-	-	-	1	-	-	-	1	-	1	1	1	1	-	09
II	IV	5.0	2	1	-	-	-	-	-	1	-	1	-	1	1	1	1	-	09
Exit Option: Award of UG Diploma in Major with 88 credits and an additional 4 credit core NSQF course /Internship or Continue with major and minor																			
III	V	5.5	2	1	1	1	-	-	-	1	-	1	-	1	-	-	-	-	08
III	VI	5.5	2	1	1	1	-	-	-	1	-	1	-	1	-	-	-	-	08
Exit Option: Award of UG Degree in Major and Minor with 132 credits or continue with Major for a 4-year Degree																			
IV	VII	6.0	3	3	1	1	0	1	-	-	-	-	-	-	-	-	-	-	09
IV	VIII	6.0	3	3	1	1	-	-	-	-	-	1	-	-	-	-	-	-	09
Four Year UG Degree(Honours) with Major and Minor with 176 credits																			
IV	VII	6.0	2	2	1	1	0	1	-	-	-	1	-	-	-	-	-	-	08
IV	VIII	6.0	2	2	1	1	-	-	-	-	-	1	-	-	-	-	-	-	07
Four Year UG Degree (Honours with Research) with Major and Minor with 176 credits																			

Programme Framework (Course Distribution): B.Sc. Botany (Major)

Year	Semester	Level	Major											Total	
			DSC		DSE		SEC		VSC		FP/OJT /IN/CEP/PR		IKS		
			T	P	T	P	T	P	T	P	T	P	T	T	P/PR
I	I	4.5	2	1	-	-	-	1	-	-	-	-	01	03	02
I	II	4.5	2	-	-	-	-	1	-	1	-	-	-	02	02
II	III	5.0	2	1	-	-	-	1	-	-	-	1	-	02	03
II	IV	5.0	2	1	-	-	-	-	-	1	-	1	-	02	03
III	V	5.5	2	1	1	1	-	-	-	1	-	1	-	03	04
III	VI	5.5	2	1	1	1	-	-	-	1	-	1	-	03	04
B.Sc. Honours															
IV	VII	6.0	3	3	1	1	RM-1		-	-	-	-	-	05	04
IV	VIII	6.0	3	3	1	1	-	-	-	-	-	1	-	04	05
B.Sc. Honours with Research															
IV	VII	6.0	2	2	1	1	RM-1		-	-	-	1	-	04	04
IV	VIII	6.0	2	2	1	1	-	-	-	-	-	1	-	03	04

Programme Framework (Credit Distribution): B.Sc. Botany (Major)

Year	Semester	Level	Major											Total
			DSC		DSE		SEC		VSC		FP/OJT /IN/CEP/RP		IKS	
			T	P	T	P	T	P	T	P	T	P	T	
I	I	4.5	4	2	-	-	-	2	-	-	-	-	02	10
I	II	4.5	6	-	-	-	-	2	-	2	-	-	-	10
II	III	5.0	6	2	-	-	-	2	-	-	-	2	-	12
II	IV	5.0	6	2	-	-	-	-	-	2	-	2	-	12
III	V	5.5	8	2	2	2	-	-	-	2	-	2	-	18
III	VI	5.5	6	2	2	2	-	-	-	2	-	4	-	18
IV	VII	6.0	8	6	2	2	RM-4	-	-	-	-	-	-	22
IV	VIII	6.0	8	6	2	2		-	-	-	-	4	-	22
IV	VII	6.0	6	4	2	2	RM-4	-	-	-	-	4	-	22
IV	VIII	6.0	6	4	2	2		-	-	-	-	8	-	22

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

Sr. No.	Year	Sem.	Level	Course Type	Course Code	Title	Credits
1.	I	I	4.5	DSC-1	BS-BO111T	Cryptogams	02
2.	I	I	4.5	DSC-2	BS-BO112T	Phanerogams	02
3.	I	I	4.5	DSC-3	BS-BO113P	Practical based on BO 111T and BO 112 T	02
4.	I	I	4.5	SEC-1	BS-BO114P	Floricultural practices	02
5.	I	I	4.5	IKS-1	BS-BO115T	Plants in Indian Traditional Medicinal System	02
6.	I	II	4.5	DSC-4	BS-BO121T	Plant Morphology	03
7.	I	II	4.5	DSC-5	BS-BO122T	Principles of Plant Sciences	03
8.	I	II	4.5	SEC-2	BS-BO123P	Pomoculture and Horticulture	02
9.	I	II	4.5	VSC-1	BS-BO124P	Nursery Management	02
10.	II	III	5.0	DSC-6	BS-BO231T	Taxonomy of Angiosperms and Plant Ecology	03
11.	II	III	5.0	DSC-7	BS-BO232T	Plant Physiology	03
12.	II	III	5.0	DSC-8	BS-BO233P	Practical based on BO231T and BO 232T	02
13.	II	III	5.0	SEC-3	BS-BO234P	Biofertilizers and Biopesticides	02
14.	II	III	5.0	FP-01	BS-BO235P	Field Project	02
15.	II	IV	5.0	DSC-9	BS-BO241T	Plant Anatomy and Embryology	03
16.	II	IV	5.0	DSC-10	BS-BO242T	Plant Biotechnology	03
17.	II	IV	5.0	DSC-11	BS-BO243P	Practical based on BO241T and BO242T	02
18.	II	IV	5.0	VSC-2	BS-BO244P	Herbal Technology	02
19.	II	IV	5.0	CEP-01	BS-BO245P	Community Engagement and Service	02
20.	III	V	5.5	DSC-12	BS-BO351T	Systematics of Cryptogams	04
21.	III	V	5.5	DSC-13	BS-BO352T	Spermatophytic and Palaeobotany	04
22.	III	V	5.5	DSC-14	BS-BO353P	Practical based on BO351T and BO352T	02
23.	III	V	5.5	DSE-01	BS-BO354T	A. Cell and Molecular Biology B. Bioinformatics	02
24.	III	V	5.5	DSE-02	BS-BO355P	Practical based on BO354T	02
25.	III	V	5.5	VSC-3	BS-BO356P	Plant Pathology	02
26.	III	V	5.5	FP-02	BS-BO357P	Field Project	02
27.	III	VI	5.5	DSC-15	BS-BO361T	Plant Physiology and	03

						Biochemistry	
28.	III	VI	5.5	DSC-16	BS-BO362T	Plant Ecology and Evolution	03
29.	III	VI	5.5	DSC-17	BS-BO363P	Practical based on BO361T and BO362T	02
30.	III	VI	5.5	DSE-03	BS-BO364T	A.Plant Genetics B. Biostatistics	02
31.	III	VI	5.5	DSE-04	BS-BO365P	Practical based on BO364T	02
32.	III	VI	5.5	VSC-4	BS-BO366P	Plant Breeding and Seed Technology	02
33.	III	VI	5.5	OJT-01	BS-BO367P	On Job Training	04

B.Sc. Botany (Major with Honours)

34.	IV	VII	6.0	DSC-18	BS-BO471T	Botanical Techniques	03
35.	IV	VII	6.0	DSC-19	BS-BO472T	Plant Physiology	03
36.	IV	VII	6.0	DSC-20	BS-BO473T	Cytogenetics and Plant Breeding	02
37.	IV	VII	6.0	DSC-21	BS-BO474P	Practical based on BO471T	02
38.	IV	VII	6.0	DSC-22	BS-BO475P	Practical based on BO472T	02
39.	IV	VII	6.0	DSC-23	BS-BO476P	Practical based on BO473T	02
40.	IV	VII	6.0	DSE-05	BS-BO477T	Forensic Botany	02
41.	IV	VII	6.0	DSE-06	BS-BO478P	Practical based on BO477T	02
42.	IV	VII	6.0	RM-01	BS-BO479T/P	Research Methodology	04
43.	IV	VIII	6.0	DSC-24	BS-BO481T	Computational Botany	03
44.	IV	VIII	6.0	DSC-25	BS-BO482T	Developmental Botany	03
45.	IV	VIII	6.0	DSC-26	BS-BO483T	Biochemistry	02
46.	IV	VIII	6.0	DSC-27	BS-BO484P	Practical based on BO481T	02
47.	IV	VIII	6.0	DSC-28	BS-BO485P	Practical based on BO482T	02
48.	IV	VIII	6.0	DSC-29	BS-BO486P	Practical based on BO483T	02
49.	IV	VIII	6.0	DSE-07	BS-BO487T	Plant Tissue Culture Technology	02
50.	IV	VIII	6.0	DSE-08	BS-BO488P	Practical based on BO487T	02
51.	IV	VIII	6.0	OJT-02	BS-BO489P	On Job Training	04

B.Sc. Botany (Major Honours with Research)

34.	IV	VII	6.0	DSC-20	BS-BO471T	Botanical Techniques	03
35.	IV	VII	6.0	DSC-21	BS-BO472T	Plant Physiology	03
36.	IV	VII	6.0	DSC-22	BS-BO473P	Practical based on BO471T	02
37.	IV	VII	6.0	DSC-23	BS-BO474P	Practical based on BO472T	02
38.	IV	VII	6.0	DSE-05	BS-BO475T	Forensic Botany	02
39.	IV	VII	6.0	DSE-06	BS-BO476P	Practical based on BO475T	02

Department of Botany, New Arts, Commerce and Science College, Ahmednagar

40.	IV	VII	6.0	RM-01	BS-BO477T/P	Research Methodology	04
41.	IV	VII	6.0	RP-01	BS-BO478P	Research Project	04
42.	IV	VIII	6.0	DSC-20	BS-BO481	Computational Botany	03
43.	IV	VIII	6.0	DSC-21	BS-BO482	Developmental Botany	03
44.	IV	VIII	6.0	DSC-22	BS-BO483	Practical Based on BO481T	02
45.	IV	VIII	6.0	DSC-23	BS-BO484	Practical Based on BO482T	02
46.	IV	VIII	6.0	DSE-07	BS-BO485	Plant Tissue Culture Technology	02
47.	IV	VIII	6.0	DSE-08	BS-BO486	Practical Based on BO485T	02
48.	IV	VIII	6.0	RP-02	BS-BO487	Research Project	08

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

Sr. No.	Name	Designation
1.	Dr. D. D. Ahire	Chairman
2.	Dr. Y. R. Gahile	Member
3.	Dr. B. A. Karle	Member
4.	Dr. S. B. Palve	Member
5.	Mrs. L. K. Dhumal	Member
6.	Miss. M. N. Jagtap	Member
7.	Miss. T. M. Pagare	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. Punekar	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.

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

Title of the Course: Cryptogams								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-1	BS-BO111T	02	00	02	30	15	35	50

Learning Objectives:

1. To know the basics of cryptogams and its diversity.
2. To understand the structure and function of Algae, Fungi, Lichens, Bryophytes and Pteridophytes.
3. To give knowledge about economic importance of cryptogams.
4. To give an idea about need of habitat conservation of cryptogams diversity.
5. To impart the basic skills in the conservation diversity of cryptogams.

Course Outcomes (Cos)

The students will be able:

1. To identify, describe and study in detail life cycle of cryptogams.
2. To provide plant description, describe the morphology and reproductive structure of Cryptogams.
3. To get knowledge of comparison between cryptogams and other plant groups.
4. To get scope of the cryptogams diversity.
5. To get knowledge about habitat conservation of cryptogams diversity.
6. To get knowledge about the application of cryptogams.

Detailed Syllabus:		
Unit I	1.1 Introduction: General outline of plant kingdom. 1.2 Introduction to lower cryptogams and higher cryptogams.	2
Unit II	2.1 Algae-Introduction, habitat, thallus diversity, pigments, reserve food, Types of reproduction in algae. 2.2 G.M Smith system of Classification. 2.3 Life cycle of <i>Spirogyra</i> . 2.4 Economic importance of algae-Role of algae in environment,	6

	agriculture, biotechnology and industry.	
Unit III	3.1 Fungi-Introduction, general characters, thallus structure, mode of nutrition and types of Reproduction. 3.2 Ainsworth system of classification. 3.3 Life cycle of <i>Agaricus</i> . 3.4 Economic importance of fungi-Role of fungi in environment, agriculture, biotechnology industry and pathogenic importance.	5
Unit IV	4.1 General characters, types of Lichens on the basis of thallus morphology. 4.2 Economic importance of Lichens.	2
Unit V	5.1 Bryophytes-Introduction, general characters, distribution in India, Adaptation to land habit, Range of thallus organization. 5.2 G.M Smith System of classification. 5.3 Life cycle of <i>Riccia</i> . 5.4 Ecological and economic importance of bryophytes.	8
Unit VI	6.1 Pteridophytes-Introduction, general characters, distribution in India, heterospory and seed habit. Differences between bryophytes and pteridophytes. 6.2 K.R. Sporne system of classification. 6.3 Life cycle of <i>Nephrolepis</i> . 6.4 Ecological and economic importance of Pteridophytes.	7

Suggested Readings/Material:

1. Ainsworth, Sussman and Sparrow (1973). The fungi. Vol IV A & IV B. Academic Press.
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3. Chopra R.N. and Kumar P.K. (1988). Biology of Bryophytes. John Wiley & Sons, New York, NY.
4. Das Dutta and Gangulee. College Botany Vol I, Central Book Depot.
5. Desikachary T.V. (1959). Cyanophyta. ICAR, New Delhi.
6. Gangulee and Kar (2006): College Botany. New Central Book Agency.
7. Kashyap S.R. (1929). Liverworts of the Western Himalayas and the Punjab Plain. Part 1, Chronica Botanica, New Delhi.
8. Kashyap S.R. (1932). Liverworts of the Western Himalayas and the Punjab Plain (illustrated): Part 2. Chronica Botanica, New Delhi.
9. Krishnamurthy V. (2000). Algae of India and neighboring countries I. Chlorophycota, Oxford & IBH, New Delhi.

10. Lee R.E. (2008). Phycology. Cambridge University Press, pp.547.
11. Mehrotra R.S. and Aneja K.R. (1990). An introduction to mycology. New Age Publishers, ISBN 8122400892.
12. Misra J.N. (1996). Phaeophyceae in India. ICAR, New Delhi.
13. Parihar N.S. (1980). Bryophytes: An Introduction to Embryophyta. Vol I. Central Book Depot, Allahabad.
14. Prem Puri(1981). Bryophytes: Morphology, Growth and Differentiation. AtmaRam and Sons, New Delhi.
15. Rashid A. (1999): An Introduction to Pteridophyta. Vikas Publishing House Pvt. Ltd. New Delhi.
16. Sharma O.P. Algae
17. Smith G. M. (1955): Cryptogamic Botany Vol II. McGraw Hill.
18. Smith G.M. (1950). The fresh water algae of the United States, Mc-graw Hill New York.
19. Sporne K. R. (1986): The morphology of Pteridophytes. Hutchinson University Library, London.
20. Vashista B. R., Sinha A. K., Kumar A. (2008): Botany for degree students - - Bryophyta, S. Chand Publication.
21. Vashista B. R., Sinha A. K., Kumar A. (2008): Botany for degree students Pteridophyta, S. Chand Publication.
22. Vashista B.R, Sinha A.K and Singh V.P. (2005). Botany for degree students –Algae, S. Chand's Publication.
23. Vashista B.R., Sinha A.K., Kumar A. (2008). Botany for degree students – Bryophyta, S. Chands Publication.

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

Title of the Course: Phanerogams								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-2	BS-BO112T	02	00	02	30	15	35	50

Learning Objectives:

1. To know the basics of phanerogams and its diversity.
2. To understand the scope and importance of gymnosperms and angiosperms.
3. To give an idea about need of habitat conservation of phanerogams diversity.
4. To impart the basic skills in the conservation diversity of phanerogams.

Course Outcomes (Cos)

The students will be able to:

1. Identify, describe and study in detail life cycle of phanerogams.
2. Understand plant description; describe the morphology and reproductive structure of phanerogams.
1. Acquire knowledge of comparison between phanerogams and other plant groups.
2. Know scope of the phanerogams diversity.
3. Understand habitat conservation of phanerogams diversity.
4. Acquire knowledge about the application of phanerogams.

Detailed Syllabus:		
Unit I	1.1 Introduction to phanerogams, Distinguishing characters of gymnosperms and angiosperms 1.2 Raizada and Sahni system of classification of gymnosperms, distribution in India, 1.3 Affinities with pteridophytes and angiosperms, ecological and economic importance, seed development.	9
Unit II	2.1. Fossil gymnosperms- Order-Pteridospermales-e.g. <i>Glossopteris</i> Order-Cycadeoidales-e.g. <i>Cycadeoidea</i> Order-Pentoxylales-e.g. <i>Pentoxylon</i> 2.2 Life cycle of <i>Cycas</i> .	6

Unit III	3.1 Angiosperms-Introduction, general characters, Bentham and Hookers system of classification. 3.2 Evolutionary history, taxonomic hierarchy. Plant nomenclature. 3.3 Origin of angiosperms. 3.4 Primitive and advanced characters in angiosperms.	8
Unit IV	4.1 Difference between dicotyledons and monocotyledons. 4.2 Study of sunflower (dicotyledons) root, stem and leaf anatomy and Study of maize (monocotyledons) root, stem and leaf anatomy	7

Suggested Readings/Material:

1. Agashe, S. N. (1995). Paleobotany, Oxford and IBH Publ. Co.Pvt. Ltd., New Delhi.
2. Arnold, A. C. (2005 Repr.) An Introduction to Paleobotany, Agrobios (India), Jodhpur.
3. Bhatnagar, S. P. and Motia A. (1996). Gymnosperms. New Age International, New Delhi.
4. Biswas C. and Johri B. M. (1997). Gymnosperms. Narso. Pub., New Delhi.
5. Crawford D. J. (2003). Plant Molecular Systematics. Cambridge University Press, Cambridge, UK.
6. Cronquist, A. (1988). The Evolution and Classification of Flowering Plants (2nd ed.) Allen Press, U.S.A.
7. Davis, P. H. and V. H. Heywood 1991.Principles of Angiosperm Taxonomy.Today and Tomorrow Publications, New Delhi.
8. Johari M, Snehlata and KavitaTyagi (2012). A textbook of Gymnosperm. Dominant Publishers and Distributors, New Delhi.
9. Nair, P.K.K. (1966). Pollen morphology of Angiosperms.Periodical Expert Book Agency, New Delhi.
10. Sharma A.K. and A. Sharma. (1980). Chromosome Technique: Theory and Practices (3rded.) Butterworths, London.
11. Simpson, M.G. (2010). Plant Systematics. Elsevier, Amsterdam.
12. Singh, Gurcharan. 2010. Plant Systematics: An Integrated approach.3rd edition. Science Publishers Inc., New Hampshire, USA.
13. Singh, Gurcharan. 2012. Plant Systematics: Theory and Practice. Completely revised and enlarged 3rd edition. Oxford & IBH, New Delhi.
14. Singh, V. P. (2006). Gymnosperms (Naked seed plants): Structure and development, Sarup and sons, New Delhi.
15. Stuessy, Tod F. 2009. Plant Taxonomy: The Systematic Evaluation of Comparative Data, second edition.Columbia University Press.
16. Christenhusz, M. et. al. (2010). A new classification and linear sequence of extant gymnosperms. Phytotaxa, 19(1), 55-70.
17. Website: <http://www.mobot.org/MOBOT/research/APweb/>.
18. Website: <https://doi.org/10.12705/Code.2018>

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

Title of the Course: Practical based on BO 111 T and BO 112 T								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-3	BS-BO113P	00	02	02	60	15	35	50

Learning Objectives:

1. To give knowledge about handling of microscope.
2. To give the practical knowledge about morphological and anatomical variations in cryptogams and phanerogams.
3. To understand the phanerogams diversity.
4. To understand the habit and habitat diversity of angiosperms.

Course Outcomes (Cos)

The students will be able to:

1. Handle the microscopes.
2. Identify, describe and study in detail life cycle of cryptogams and phanerogams.
3. Provide plant description; describe the morphology and reproductive structure of phanerogams.
4. Understand scope of the phanerogams diversity.
5. Know about habitat conservation of cryptogams and phanerogams diversity.
6. Know about the application of phanerogams.

Sr. No.	Practicals	60 H
1.	Study of Vegetative and reproductive characters of <i>Spirogyra</i> .	1P
2.	Study of Vegetative and reproductive characters of <i>Agaricus</i> .	1P
3.	Study of types and morphology of Lichen.	1P
4.	Study of Vegetative and reproductive characters of <i>Riccia</i> .	1P
5.	Study of Vegetative and reproductive characters of <i>Neprolepis</i> .	1P
6.	Study of Fossil gymnosperms.	1P

7.	Study of Vegetative and reproductive characters of <i>Cycas</i> .	1P
8.	Study of habit diversity in angiosperms with suitable examples.	1P
9.	Study of morphology of dicot plant with reference to vegetative and reproductive structures.	1P
10.	Study of morphology of monocot plant with reference to vegetative and reproductive structures.	1P
11.	Study of anatomy of Dicot –Sunflower Root, Stem and Leaf.	1P
12.	Study of anatomy of Monocot- Maize Root, Stem and Leaf.	1P

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

Title of the Course: Floricultural Practices								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
SEC-1	BS-BO114P	00	02	02	60	15	35	50

Learning Objectives:

1. Identify and name various tools and equipment used in plant propagation techniques, seed sowing, seed germination and viability tests.
2. Demonstrate proper usage and handling of tools and equipment for effective plant propagation.
3. Explain the concept of a protected structure and its significance in flower crop cultivation.
4. Identify symptoms of nutrient deficiencies and excesses in cut flowers.
5. Demonstrate proper techniques for taking cuttings from ornamental plants.

Course Outcomes (Cos)

After completing this course, the learner will be able to;

1. Develop conceptual understanding of gardening from historical perspective
2. Analyze various nursery management practices with routine garden operations.
3. Distinguish among the various Ornamental Plants and their cultivation.
4. Evaluate garden designs of different countries.
5. Appraise the landscaping of public and commercial places for floriculture.
6. Diagnoses the various diseases and uses of pests for ornamental plants.
7. Students can start small scale floriculture business unit.

Sr. No.	Practicals	60Hrs
1.	Tools and equipments used in plant propagation techniques, seed sowing, seed germination and viability tests.	1P
2.	Study of special cultural practices for flower crops under protected structure.	2P
3.	Study of response of micronutrients and macronutrients on growth of cut flowers.	2P

4.	Preparation of project on Cut flower production including diseases and Pests management.	2P
5.	Hands on cutting techniques of ornamental plants.	1P
6.	Practices on vegetative propagation through layering, budding and grafting of ornamental plants.	2P
7.	Propagation of succulents.	1P
8.	Hardening- case studies.	1P
9.	Use of plant bioregulators in propagation.	1P
10.	Visit to tissue culture labs and commercial nurseries.	2P

Suggested Readings/Material:

1. Randhawa, G.S. and Mukhopadhyay, A. (1986). Floriculture in India. Allied Publishers.
2. Adams, C., M. Early and J. Brrok (2011). Principles of Horticulture. Routledge, U.K.
3. Bose TK, Maiti RG, Dhua RS & Das P. 1999. Floriculture and Landscaping. NayaProkash
4. Lauria A & Ries VH. 2001. Floriculture – Fundamentals and Practices. Agrobios.
5. Prasad S & Kumar U. 2003. Commercial Floriculture. Agrobios

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

Title of the Course: Traditional Systems of Medicine in India								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
IKS-1	BS-BO115P	02	00	02	30	15	35	50

Learning Objectives:

1. Understand the historical background and evolution of traditional systems of medicine.
2. Explain the scope and importance of medicinal plants in traditional medicine systems.
3. Define and explain the concept, scope, and objectives of ethnobotany.
4. Understand the role and importance of fieldwork in collecting ethnobotanical data.
5. Recognize the significance of medico-ethnobotanical sources in India for modern medicine.

Course Outcomes (Cos)

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

1. To know about the basic medicinal plants.
2. Learn Traditional Medicine systems.
3. Apply techniques of conservation and propagation
4. Conceptualize ethnobotany as an interdisciplinary science
5. Restate the established methodology of ethnobotany studies.
6. Categories various indigenous ethnic groups and their environmental practices.

Detailed Syllabus:		
Unit I	1.1 History and Traditional Systems of Medicine, History, Scope and Importance of Medicinal Plants; 1.2 Traditional systems of medicine; Definition and Scope-Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridosha concepts, Rasayana, plants used in ayurvedic treatments. Spread of ayurveda knowledge in different parts of the world. 1.3 Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine.	8

	1.4 Unani: History, concept: Umoor-e-tabiya, tumors treatments/therapy, polyherbal formulations. 1.5 Amchi/Sowa-Rigpa History, Concept and present scenario in India.	
Unit II	2.1 Ethnobotany: Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science. The relevance of ethnobotany in the present context; 2.2 Major and minor ethnic groups or Tribals of India, and their life styles. Plants used by the tribals: a) Food plants b) intoxicants and beverages c) Resins and oils and miscellaneous uses.	7
Unit III	Methodology of Ethnobotanical Studies: a) Field work b) Herbarium c) Ancient Literature d) Archaeological findings e) temples and sacred places.	5
Unit IV	4.1 Role of Ethnobotany in Modern Medicine 4.2 Medico-ethnobotanical sources in India; Significance of the following plants in ethnobotanical practices (along with their habitat and morphology) a) <i>Azadiractha indica</i> b) <i>Ocimum sanctum</i> c) <i>Vitex negundo</i> d) <i>Gloriosa superba</i> e) <i>Tribulus terrestris</i> f) <i>Pongamia pinnata</i> g) <i>Cassia auriculata</i> h) <i>Indigofera tinctoria</i> . 4.3 Role of ethnobotany in modern medicine with special example <i>Rauvolfia serpentina</i> , <i>Trichopus zeylanicus</i> , <i>Artemisia anua</i> , <i>Withania</i> . 4.4 Role of ethnic groups in conservation of plant genetic resources. Endangered taxa and forest management (participatory forest management).	10

Suggested Readings/Material:

1. Jain, S.K. (1995). Manual of Ethnobotany, Scientific Publishers, Jodhpur.
2. Jain, S.K. (1981). Glimpses of Indian. Ethnobotany, Oxford and I B H, New Delhi.
3. Jain, S.K. (1989). Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
4. Jain, S.K. (1990). Contributions of Indian ethnobotny. Scientific publishers, Jodhpur.
5. Colton, C.M. (1997). Ethnobotany – Principles and applications. John Wiley and sons.
6. Rama, R, N and Henry, A.N. (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India. Howrah.
7. Sinha, R. K. (1996). Ethnobotany; The Renaissance of Traditional Herbal Medicine – INA –SHREE Publishers, Jaipur.
8. Faulks, P.J. (1958). An introduction to Ethnobotany, Moredale pub. Ltd.

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

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
DSC-4	BS-BO121T	03	00	03	45	30	70	100

Learning Objectives:

1. To understand concept of "plant morphology".
2. To know habit, habitat and life span of plants.
3. To know external morphological structure and functions of root, stem and leaf.
4. Acquire Knowledge about types of Inflorescence.
5. To understand external morphological structure and function of flowers
6. To understand structure of the fruit and seed.

Course Outcomes (Cos)

On completion of this course, the 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.
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.

Detailed Syllabus:		
Unit I	1.1 Introduction, definition, descriptive and interpretative morphology. 1.2 Importance in identification, nomenclature, classification, phylogeny and Plant breeding. 1.3 Habit: Herb, Shrub, Tree, Climber, Twinner, Runner, Lianes 1.4 Habitat: Hydrophytic, xerophytes, mesophytes, Halophytes. 1.5 Duration: Annual, biannual, ephemerals. 1.6 Mode of nutrition: Epiphytic, Paracytic, Saprophytic,	11
Unit II	2.1 Root: Types of roots, Modifications of roots: Epiphytic, Respiratory	7

	<p>(Pneumatophores), Parasitic and Storage roots (conical, fusiform and napiform) with examples; functions of root.</p> <p>2.2 Stem: Modifications of Stem: Phylloclade, Runner, Stolon, Suckers, Offsets, Rhizome, Corm, Tuber and Bulb with examples. Functions of stem.</p> <p>2.3 Leaf: Parts of typical leaf: petiole, lamina; leaf margins and apices. Types of leaves: simple, compound, venation, phyllotaxy. Modifications: tendrils, spines, scale leaves, phyllode, reproductive and trap leaves (mechanism of trapping in Nepenthes only) with examples. Functions of leaf.</p>	
Unit III	<p>3.1 Inflorescence-Introduction and definition</p> <p>3.2 Types: a) Racemose -Raceme, Spike, Spadix, Corymb, Umbel, Catkin and Capitulum. b) Cymose -Solitary, Monochasial- Helicoid and scorpioid; Dichasial and Polychasial. c) Special types - Verticillaster, Cyathium and Hypanthodium.</p>	5
Unit IV	<p>4.1 Flower-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>	5
Unit V	<p>5.1 Accessory whorls of flower: a) Calyx: Nature- Polysepalous, Gamosepalous; Aestivation- types, Modifications of Calyx- Pappus, Petaloid and Spurred. b) Corolla: Forms of Corolla i) Polypetalous- Cruciform and Papilionaceous. ii) Gamopetalous- Infundibuliform, Bilabiate, Tubular and Campanulate. iii) Aestivation- types and significance. c) Perianth: Nature- Polytepalous, Gamotepalous.</p> <p>5.2 Reproductive whorls of flower: a) Androecium: Structure of typical stamen, Variations- cohesion and adhesion. b) Gynoecium: Structure of typical carpel, number, position, cohesion and adhesion; placentation- types and significance.</p>	8
Unit VI	<p>6.1 Fruit-Introduction and definition</p> <p>6.2 Types of fruits: a) Simple: Indehiscent - Achene, Cypsela, Nut and Caryopsis. Dehiscent - Legume, Follicle and Capsule, b) Fleshy: Drupe, Berry, Hesperidium and Pepo. c) Aggregate: Etaerio of Berries and Etaerio of Follicles. d) Multiple fruits: Syconus and Sorosis.</p> <p>6.3 Seed-Introduction and definition.</p> <p>3.1 6.4 Structure of seed.</p>	9

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. Pandey, B.P. (2007). Plant Anatomy. S. Chand and Co. Ltd. New Delhi.
5. Pandey, B.P. (2009). A Text Book of Botany- Angiosperms. S. Chand and Co. Ltd. New Delhi.

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

Title of the Course: Principles of Plant Sciences								
Year: I				Semester: II				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-5	BS-BO122T	03	00	03	45	30	70	100

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 1.2 Definition and scope of plant physiology.	2
Unit II	2.1 Diffusion – definition, importance of diffusion in plants, 2.2 Imbibition : imbibition as a special type of diffusion. 2.3 Osmosis – definition, 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	11

	2.5 Plasmolysis-definition, mechanism and significance.	
Unit III	3.1 Plant growth - introduction, phases of growth 3.2 Factors affecting growth.	2
Unit IV	4.1 Cell: Differences between prokaryotic and eukaryotic 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 pore complex, nuclear lamina, nucleolus. 4.3 Cytoskeleton:role and structure of microtubules, microfilaments and intermediary filament. 4.4 Chloroplast, mitochondria and peroxisomes: Structural organization; Function, Endomembrane system: Endoplasmic Reticulum – Structure and function of RER and SER, Golgi Apparatus – Organization and function ; Lysosomes	11
Unit V	5.1 Cell cycle - importance of cell cycle in plants, divisional stages of mitosis and meiosis. 5.2 Gene, prokaryotic gene structure, Eukaryotic gene structure, Central dogma of molecular biology, Structure and types of RNA. 5.3 Genetics: Definition, introduction and scope, Mendels laws of inheritance, genetics terminology, test cross, back cross.	11
Unit VI	6.1 Introduction and scope of molecular biology, 6.2 Chromosomes structure and its types, Packaging of chromosome, Structure of DNA, nucleoside and nucleotide, Properties of double helical structure of DNA and its characteristic features, types of DNA (A, B and Z DNA). 6.3 Contribution of Watson Crick, Rosalind Franklin, Morris Willkins and Chargoff in the discovery of DNA Structure.	8

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.

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

Title of the Course: Pomoculture and Horticulture								
Year: I				Semester: II				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
SEC-2	BS-BO123P	00	02	02	60	15	35	50

Learning Objectives:

1. Understand the growth stages and development of a specific fruit crop.
2. Learn and apply different pruning techniques for fruit plants, such as heading back, thinning, and renewal pruning.
3. Understand the role of growth regulators in fruit ripening processes.
4. Learn and apply proper techniques for harvesting different fruit crops.
5. Learn the basic principles and techniques of fruit preservation through jam, jelly, and marmalade preparation.

Course Outcomes (Cos)

On completion of the course, students are able to:

1. Learn Scope and Importance of Fruit crops.
2. Gain the knowledge of Present status of fruit growing.
3. Knowledge of Planning and Lay out of orchards.
4. Learn the concept of Growth & Fruiting Habits and Methods of Propagation.
5. Learn the methods of Harvesting and Preservation of Fruits.
6. Study the Processing of Fruits and Marketing of Fruits.
7. This course will helpful to start up food processing unit.

Sr. No.	Pomoculture Practicals	
1.	Study of Growth and Fruiting habit in any one locally cultivated fruit crop.	1
2.	Study of methods of Pruning and Training of fruit plants.	1
3.	Study of effect of Growth regulators in fruit ripening in Banana/Grapes/Mango.	1
4.	Study of methods of Propagation of fruit trees.	1
5.	Study Maturity in dices and estimation of Maturity in locally grown Fruit plant.	1
6.	Study of Methods of Harvesting.	1

7.	Preparation of Jam, Jelly & Marmalade from Locally available fruits.	1
8.	Preparation of Squash, Candy.	1
9.	Demonstration of any one by-product of wastes of fruits.	1
10.	Visit to Fruit Processing Industry and preparation of Cases tudy report on any one.	1
11.	Visit to fruit market and prepare report.	1
12.	Visit to Vineyard preparation of case study report on Wine Industry.	1

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

Title of the Course: Nursery Management								
Year: I				Semester: II				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
VSC-1	BS-BO124P	00	02	02	60	15	35	50

Learning Objectives:

After completing this course the learner will be able to;

1. Develop conceptual understanding of gardening from historical perspective
2. Understand the process of sowing seeds in nursery
3. List the various resources required for the development of nursery
4. Distinguish among the different forms of sowing and growing plants
5. Learn the process of vegetative propagation
6. Appreciate the diversity of plants and selection of gardening
7. Examine the cultivation of different vegetables and growth of plants in nursery.

Course Outcomes (Cos)

1. Develop an understanding of nursery business management (financial, marketing, personnel).
2. Develop skills necessary to manage a wholesale nursery.
3. Acquire knowledge regarding theory and practice of cultural and production techniques and methods.

Sr. No.	Practical (Any12)	
1.	Designing nursery layout.	1P
2.	Nursery development business planning.	1P
3.	Media composition for propagation of plants in nursery beds and pot.	2P
4.	Use of different types of nursery tools and implements for general nursery.	1P
5.	Preparation of nursery beds and sowing of seeds. Maintenance of nursery records.	2P
6.	Seed treatments for breaking dormancy.	1P
7.	Preparation of media for potting mixture.	1P

8.	Hardening plants in the nursery.	2P
9.	Practicing different types of cuttings, layering, graftings and buddings.	1P
10.	Preparation of plant growth regulators for seed germination and vegetative propagation.	1P
11.	Cost of establishment of a mist chamber, greenhouse, glasshouse, polyhouse and their uses.	1P
12.	Preparation and raising of rootstock.	1P
13.	Visit to nursery.	2P