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 Botany (Minor)

Implemented from

Academic Year 2023-24

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.	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:

Welcome to the Botany (Minor) program, designed in accordance with the National Education Policy (NEP) and following the principles of the Choice Based Credit System (CBCS). This program aims to provide students with a comprehensive understanding of various aspects of Botany, including Natural Resource Management, Plant Biodiversity and Human Welfare, Bioanalytical Techniques, Medicinal Botany, and Economic Botany and Plant Resource Utilization. Through a combination of theoretical knowledge and practical

applications, students will develop a deep appreciation for the importance of plants in our lives and the sustainable management of our natural resources.

### 2. Programme Outcomes (POs)

- 1. Demonstrate a comprehensive understanding of the principles and concepts in botany and their applications in various fields.
- 2. Apply critical thinking and problem-solving skills to address real-world challenges in natural resource management, plant biodiversity, and human welfare.
- 3. Analyze and evaluate the role of plants in human health and well-being, particularly in medicinal and economic contexts.
- 4. Utilize bioanalytical techniques and instrumentation effectively for plantbased research and analysis.
- 5. Develop an understanding of sustainable plant resource utilization and contribute to the conservation and management of plant diversity.
- 6. Communicate scientific knowledge effectively through oral and written presentations, demonstrating effective scientific writing and communication skills.

### Credit Distribution: B.Sc. Botanyincluding Minor and OE and other courses.

	Type of Courses	III Yr	IV Yrs	IV Yrs
			(Honours)	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	Open Elective (OE)/ Multidisciplinary	12	12	12
Courses	Courses			
	Co-Curricular Courses	08	08	08
	Ability Enhancement Courses	08	08	08
	Value Education Courses	04	04	04
	Total	132	176	176

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

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

Sr.		Semester	Level	Course	Course	Title	Credits
No.	Year			Туре	Code		
1.	Ι	Ι	4.5	MNR-1	BS-	Plant <b>Diversity</b>	03
					BO101		
2.	Ι	II	4.5	MNR-2	BS-	Natural Resource	03
					BO201	Management	
3.	II	III	5.0	MNR-3	BS-	Plant Biodiversity and	03
					BO301	Human Welfare	
4.	II	IV	5.0	MNR-4	BS-	Bioanalytical Techniques	03
					BO401		
5.	III	V	5.5	MNR-5	BS-	Medicinal Botany	04
					BO501		
6.	III	VI	5.5	MNR-6	BS-	Economic Botany and	04
					BO601	Plant Resource Utilization	
							20

## (Autonomous) Syllabus B.Sc. Botany (Minor)

Title of the Course: Plant Diversity								
Year: I			Ser	nester: I				
		Credit Distribution						
Course Type	Course Code	Theory	Practical	Credits	Allotted Hours	Allotted Marks		
		•				CIE	ESE	Total
MNR-1	BS-BO101 T/P	02	01	03	60	30	70	100

#### Learning Objectives:

- 1. Understand plant characteristics, ecology, and distribution.
- 2. Classify plants using established classification systems.
- 3. Recognize the economic importance of plants.
- 4. Learn about plant reproductive processes.
- 5. Understand the ecological significance of plants.
- 6. Appreciate plant biodiversity for human welfare and sustainability.

#### **Course Outcomes (Cos)**

- 1. Classify and identify diverse plant groups based on characteristics and reproduction.
- 2. Understand the ecological roles and distribution of plants in various ecosystems.
- 3. Evaluate the economic importance of plants in agriculture, medicine, and industry.
- 4. Describe the general characteristics and life cycles of different plant groups.
- 5. Recognize notable plant species, including endemics and economically significant ones.
- 6. Analyze human impact on plant diversity and propose conservation strategies.

Detailed	Syllabus:					
Unit I	Algae	6				
	1.1 Introduction, General characteristics; ecology and distribution; Range					
	of thallus organization and reproduction.					
	1.2 Classification of algae (Bold and wynne, 1985).					
	1.3 Blood Rain phenomenon in India and its cause, Endemic and newly					
	discovered algal species of India.					
	1.4 Economic importance of algae.					
Unit II	Fungi	6				
	2.1 Introduction, general characteristics, ecology and distribution, range of					
	thallus organization.					
	2.2 Cell wall composition, mode of nutrition, reproduction					
	2.3 Classification (Ainsworth, 1973). Economic importance.					
	2.4 Symbiotic Associations- a) Lichens: General account and significance;					

	b) Mycorrhiza: ectomycorrhiza, endomycorrhiza and ectoendomycorrhiza	
	their significance.	
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Unit III	<ul> <li>Bryophytes</li> <li>3.1 Introduction, general characters, Transition to land habit, ecology and thallus organization, sporophyte and gametophyte, alternation of generations, reproduction.</li> <li>3.2 Classification (G. M. Smith, 1955), Common mosses of India.</li> <li>3.3 Economic importance of bryophytes.</li> </ul>	5
Unit IV	Pteridophytes	5
	<ul> <li>4.1 Introduction, general characteristics, early land plants, habitat- terrestril, aquatic, xerophytic, distribution of pteridophytes in India.</li> <li>4.1 Classification (Sporne, 1996), reproduction (Developmental details not to be included).</li> <li>4.3 Heterospory and seed habit, stelar evolution. Common ferns of India,</li> <li>4.4 Economical importance of Pteridophytes.</li> </ul>	
Unit V	Gymnosperms	5
	<ul> <li>5.1 Introduction, general characteristics; affinities with pteridophytes and angiosperms, distribution of gymnosperms in India. sporophytic plant body of gymnosperms, reproduction.</li> <li>5.2 Classification (Chamberlein, 1934), (Developmental details not to be included), association of gymnosperms.</li> <li>5.3 Economical importance of pteridophytes.</li> </ul>	
Unit VI	<ul> <li>Angiosperms</li> <li>6.1 Introduction, general characters, dicot, monocot, morphology-root, stem, leaf, reproduction, life cycle pattern in angiosperms.</li> <li>6.2 Economoc importance of angiosperms.</li> </ul>	3

Sr no.	Practicals	
1.	Study of thallus diversity in algae.	1 <b>P</b>
2.	Study of thallus diversity in fungi.	1P
3.	Study of sporophytic and gametophytic structures in bryophytes.	1P
4.	Vegetative and reproductive study of pteridophytes.	1P
5.	Study of vegetative and reproductive parts of Cycas and Pinus	1 <b>P</b>
6.	Study of morphology of dicot and monocot plant.	1P

## Suggested Readings

- 1. Kumar, H.D. (1999). Introductory Phycology. Affiliated East-West. Press Pvt. Ltd., Delhi.
- 2. Tortora, G.J., Funke, B.R., Case, C.L. (2010). Microbiology: An Introduction, Pearson Benjamin Cummings, U.S.A.
- 3. Sethi, I.K. and Walia, S.K. (2011). Text book of Fungi & Their Allies, MacMillan,
- 4. Publishers Pvt. Ltd., Delhi.
- 5. Alexopoulos, C.J., Mims, C.W., Blackwell, M. (1996). Introductory Mycology, JohnWiley and Sons (Asia), Singapore.
- 2. Raven, P.H., Johnson, G.B., Losos, J.B., Singer, S.R., (2005). Biology. Tata McGrawHill, Delhi, India.
- 3. Vashishta, P.C., Sinha, A.K., Kumar, A., (2010). Pteridophyta, S. Chand. Delhi, India.
- 4. Bhatnagar, S.P. and Moitra, A. (1996). Gymnosperms. New Age International (P) LtdPublishers, New Delhi, India.
- 5. Parihar, N.S. (1991). An introduction to Embryophyta. Vol. I. Bryophyta. CentralBook Depot, Allahabad.

#### Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

# New Arts, Commerce and Science College, Ahmednagar (Autonomous) Syllabus B.Sc. Botany (Minor)

Title of the Course: Natural Resource Management								
Year: I			Sen	nester: II				
Course Type	Course Code	Credit Distribution						
		Theory	heory Practical		Allotted Hours	Allotted Marks		
		•				CIE	ESE	Total
MNR-2	BS-BO201 T/P	02	01	03	60	30	70	100

#### Learning Objectives:

- 1. Understand sustainable utilization of natural resources.
- 2. Identify and classify different types of natural resources and their significance.
- 3. Analyze threats to land, water, and biological resources, and develop management strategies.
- 4. Recognize the importance of biodiversity and explore conservation strategies.
- 5. Evaluate the relationship between forests, energy, and resource management.
- 6. Understand contemporary practices in resource management and conservation efforts.

#### **Course outcomes:**

At the end of the course the students will be able to,

- 1. Understand the concept of different natural resources and their utilization.
- 2. Critically analyze the sustainable utilization land, water, forest and energy resources.
- 3. Evaluate the management strategies of different natural resources.
- 4. Reflect upon the different national and international efforts in resource management
- 5. and their conservation

Detailed Syllabus:				
Credit-I		15H		
UnitI	Natural Resources and Sustainable Utilization	7H		
	Definition and types, concept, approaches (economic, ecological and			
	socio-cultural) for			
	sustainable utilization.			
UnitII	Land, Water and Biological Resources	8H		
	Utilization (agricultural, pastoral, horticultural, silvicultural); Soil			
	degradation and			
	management. Fresh water (rivers, lakes, groundwater, aquifers,			
	watershed); Marine;			
	Estuarine; Wetlands; Threats and management strategies. Biodiversity-			
	definition and types;			

	Significance; Threats; Management strategies; Bio- prospecting; IPR;					
	CBD; National					
	Biodiversity Action Plan).					
Credit-II		15H				
Unit-I	Forests and Energy	8H				
	Definition, Cover and its significance (with special reference to India);					
	Major and					
	minor forest products; Depletion; Management. Renewable and non-					
	renewable sources of					
	energy					
Unit-II	Contemporary Practices in Resource Management	<b>7H</b>				
	EIA, GIS, Participatory Resource Appraisal, Ecological Footprint with					
	emphasis on carbon					
	footprint, Resource Accounting; Waste management. National and					
	international efforts in					
	resource management and conservation					

Sr no.	Practical	
1.	Estimation of solid waste generated by a domestic system (biodegradable and	1P
	nonbiodegradable) and its impact on land degradation.	
2.	Collection of data on forest cover of specific area.	1P
3.	Measurement of dominance of woody species by DBH (diameter at breast	1 <b>P</b>
	height)method.	
4.	Calculation and analysis of ecological footprint.	1 <b>P</b>
5.	Ecological modeling.	1 <b>P</b>
6.	More Practical may be added depending on the local habitats and available	1 <b>P</b>
	facilities	

#### **Suggested Readings**

1. Vasudevan, N. (2006). Essentials of Environmental Science. Narosa Publishing House, New Delhi.

2. Singh, J. S., Singh, S.P. and Gupta, S. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications, New Delhi.

3. Rogers, P.P., Jalal, K.F. and Boyd, J.A. (2008). An Introduction to Sustainable Development. Prentice Hall of India Private Limited, New Delhi.

4. United States Government Accountability Office (2008) Natural Resource Management. Nova Science Publishers Inc, 10th Edition

5. Stacy Keach (2016) Natural Resources Management. Syrawood Publishing House

6. Rathor, V.S. and Rathor B. S. (2013) Management of Natural Resource for Sustainable Development. Daya Publishing House, New Delhi