

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

Title of the Course: <b>Plant Biodiversity and Human Welfare</b>								
Year: II				Semester: III				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
MNR-3	BS-BO301T	02	00	02	30	15	35	50

**Learning outcomes:**

1. After the completion of this course, the learner will be able to:
2. Develop understanding of the concept and scope of plant biodiversity
3. Identify the causes and implications of loss of biodiversity
4. Apply skills to manage plant biodiversity
5. Utilize various strategies for the conservation of biodiversity
6. Conceptualize the role of plants in human welfare with special reference to India

**Course Outcomes (Cos)**

On completion of the course, students are able to:

1. Know about plant diversity and its scope in day to day life.
2. Learn about loss of biodiversity.
3. Know about management of biodiversity.
4. Learn about Conservation of biodiversity.
5. Know about importance of biodiversity in human life.

<b>Detailed Syllabus:</b>		
Unit I	<b>Plant Diversity and its Scope</b> 1.1 Levels of biodiversity: Genetic, Species and Ecosystem 1.2 Agrobiodiversity and cultivated plant taxa and related wild taxa. 1.3 Values and uses of Biodiversity 1.4 Methodologies for valuation 1.5 Ethical and aesthetic values 1.6 Uses of plants.	<b>6</b>
Unit II	<b>Loss of Biodiversity</b> 2.1 Loss of biodiversity- causes and implication	<b>7</b>

	2.2 Hot spots of biodiversity 2.3 Extinction of species 2.4 Projected scenario for biodiversity loss	
Unit III	<b>Management of Plant Biodiversity</b> 3.1 Organizations associated with biodiversity management: IUCN, UNEP, WWF, UNESCO, NBPGR 3.2 Methodology for execution 3.3 Biodiversity legislation 3.4 Information management and communication.	<b>7</b>
Unit IV	<b>Conservation of Biodiversity, Role of Plants in Relation to Human Welfare</b> 4.1 Conservation of genetic, species and ecosystem diversity 4.2 In situ and ex situ conservation strategies, 4.3 India's biodiversity and its conservation 4.4 Social approaches to conservation, 4.5 Biodiversity awareness programmes, 4.6 Importance of forestry, their utilization and commercial aspects 4.7 Avenue trees 4.8 Ornamental plants of India 4.9 Alcoholic beverages and plants 4.10 Fruits and nuts; 4.11 Wood and its uses.	<b>10</b>

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Title of the Course: Practicals based on Plant Biodiversity and Human Welfare								
Year: II				Semester: III				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
MNR-3	BS-BO301T/P	00	01	01	30	15	35	50

**Learning Objectives:**

1. To explain vegetation and its types.
2. To tach Red data book categories of plants
3. Commercial applications of biodiversity.
4. Explain day to day uses of plant diversity in human life.

**Course Outcomes (Cos)**

On completion of the course, students are able to:

1. Know about vegetation and its types.
2. Learn about ornamental and avenue plants.
3. Economical important wild plants.
4. Plants used in alcoholic beverages production.
5. Know about cultivable and wild fruits.
6. Learn commercial products of forests.

**Practicals:**

1. Visit any unattended area with natural vegetation. 1P
2. Study of vegetation by quadrat method. 1P
3. Study of any six ornamental plants. 1P
4. Study of any six economically important wild plants. 1P
5. Study of Red data book categories of plants with atleast three examples of each 1P
6. Study of commercial products of forests. 1P
7. Study of plants used in preparation of alcoholic beverages. 1P
8. Study of any four wild edible fruits. 1P
9. Wild vegetables

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Title of the Course: <b>Bioanalytical Techniques</b>								
Year: <b>II</b>				Semester: <b>III</b>				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
MNR-4	BS-BO401T	02	00	02	30	15	35	50

**Learning objectives:**

1. This course is introduced to bridge the gap between academics, research and industry. This course begins with a review of basic bio analytical technique and an introduction to general terminologies.
2. This course contains bio analytical techniques along with their theory, working principal, common instrumentation and possible applications. This course will be equally beneficial to various scientific areas.
3. Students will be exposed to various biological techniques and their applications in identification, isolation of different biological molecules.

**Course Outcomes:**

On completion of the course, students are able to:

1. Students will know the principle and application of various instruments.
2. Students will be able to make a strategy on molecular techniques for the improvement in any trait or its well being based on the techniques learned during this course.
3. This course can use the knowledge for designing a project for research and execute it.

<b>Detailed Syllabus:</b>		
Unit I	<b>Introduction:</b> 1.1 Lab safety 1.2 Scientific notation and Units, errors and accuracy in experimentation 1.3 Biochemical calculations- Buffer solutions, Measurement of pH 1.4 Calibration of pipettes & balance	<b>4</b>
Unit II	<b>Spectroscopy</b>	<b>6</b>

	<p>2.1 The electromagnetic spectrum</p> <p>2.2 Concept and measurement of transmittance and absorbance</p> <p>2.3 Beers Lamberts law, molar extinction coefficient, limitations of Beers Lamberts law</p> <p>2.4 Types of spectrophotometers- UV and visible; Principles, Instrumentation and applications</p>	
Unit III	<p><b>Centrifugation Techniques</b></p> <p>3.1 General principle- sedimentation velocity, sedimentation equilibrium, types of rotor</p> <p>3.2 Types of centrifuges – differential, density gradient, ultracentrifuge</p> <p>3.3 Applications</p>	<b>6</b>
Unit IV	<p><b>Chromatographic techniques</b></p> <p>4.1 Introduction to chromatography, general principles</p> <p>4.2 Partition chromatography- thin layer chromatography, paper chromatography</p> <p>4.3 Column chromatography- columns, stationary phases, packing of columns, application of samples, column development, fraction collection and analysis</p> <p>4.4 Types of column chromatography- Adsorption chromatography, ion exchange chromatography, size exclusion chromatography</p>	<b>8</b>
Unit V	<p><b>Electrophoresis Techniques</b></p> <p>5.1 General principle, factors affecting electrophoresis, voltage, current, resistance, buffer composition, concentration, pH</p> <p>5.2 Electrophoresis –SDS- PAGE and Native PAGE and staining techniques</p> <p>5.4 Applications</p>	<b>6</b>

**Suggested Readings:**

1. Wilson K and Goulding K.H., A biologist's guide to Principles and Techniques of Practical Biochemistry.
2. Willard and Merrit, Instrumental Methods and Analysis
3. Ewing GW, Instrumental Methods of Chemical analysis.
4. Vogel's, Text Book of Quantitative Chemical Analysis, 6th Edition, 2004.
5. Raymond P. W. Scott, Techniques and Practice of Chromatography –Vol. 70.
6. Sethi P.D, DilipCharegaonkar, Chromatography –2nd Edition. Hanes, Gel Electrophoresis of Proteins- A Practical Approach,
7. Biophysical chemistry by Upadhyay, Upadhyay and Nath, Himalaya publication house

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3. This course can use the knowledge for designing a project for research and execute it.

**Practicals:**

1. Scientific notation & units, errors & accuracy in experimentation, Calibration of pipettes, pH meter and balance 1P
2. The separation of amino acids by paper chromatography. 1P

3. The separation of amino acids by ion exchange chromatography. 1P
4. SDS-polyacrylamide gel electrophoresis of proteins. 1P
5. Native gel electrophoresis of proteins. 1P
6. To obtain pH titration curve for amino acid and to determine its pKa value. 1P