

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 (ENVIRONMENTAL SCIENCE)**

**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 Environmental Science**

| Sr. No. | Name                     | Designation              |
|---------|--------------------------|--------------------------|
| 1.      | Dr. Satish D.Kulkarni    | Chairman                 |
| 2.      | Prof.Dr. N.R.Bandella    | Academic Council Nominee |
| 3.      | Dr. Nilesh Wagh          | Academic Council Nominee |
| 4.      | Dr, Deepali Nimbalkar    | Vice-Chancellor Nominee  |
| 5.      | Dr. D. D.Ahire           | Member                   |
| 6.      | Dr. A.P.Pandit           | Member                   |
| 7.      | Prof.Dr. D.C. Meshram    | Member (co-opt)          |
| 8.      | Dr. Ashish V.Mane        | Member (co-opt)          |
| 9.      | Mr. Kaliprasad Ningurkar | Alumni                   |
| 10.     | Dr. Prakash Mundhe       | Industry Expert          |

**1. Prologue/ Introduction of the programme:**

The course curriculum for undergraduate studies under New Education policy for B.Sc. in Environmental Science. The course curriculum outlined here is designed in an inclusive and interdisciplinary manner and draws content from various allied disciplines. Ideally, an undergraduate programme in environmental science should focus equally on theory and practice so that students are able to pick up necessary skills enabling them to find gainful employment at the job market. Therefore, a number of skill-based courses have been identified and made a part of the curriculum. Attention was also paid to structuring various core courses so as to make them appealing from a practitioner's point of view. It is hoped that a student with a B.Sc. Environmental Science degree, after having read the courses outlined here, should feel adequately equipped to meet the challenges of career development. At the same time, there is sufficient content for those who wish to continue academic life at the university beyond undergraduate level. That said, due care has been taken to maintain necessary academic rigor and depth in the course content so that the learning outcomes from these courses will lead to intellectual growth of a student.

During the first year of the programme, the students are trained on basic concepts of Environmental science. From second year students are allowed to concentrate on specific areas of the subject, on which they complete their practical and field survey reports. After completing the course, the students will be amply prepared for professional careers in M.Sc. in Environmental Science

This is a job oriented programme and relevant to the current needs of our society. The extent (scope, depth and outcomes) of B.Sc. Environment Sciences programme has taken into account the extent of the knowledge provided at school level in 10th, 11th and 12th standard according to syllabi of NCERT and state boards. It has been designed to bridge the gap between the school level and M.Sc. programmes on environment. This is essential because of the interdisciplinary nature of the subject. More so, there is a current trend to look at the environment through a transdisciplinary approach which is relevant by the nature of the subject and the socio-economic fabric of India

## **2. Programme Outcomes (POs)**

1. Provide students with the scope to develop knowledge base covering all attributes of the environment and enable them to attain scientific/technological capabilities to find answers to the fundamental questions before the society with regards to human action and environmental effects with due diligence.

2. Enhance the ability to apply this knowledge and proficiency to find solutions relating to environmental concerns of varied dimensions of present times

3. Provide with a direction and technical capability to carry on lifelong learning and show teamwork and collaborative endeavor and decision making

4. Improve the employability of the graduates including the enhancement of self-employment potential and entrepreneurial aptitude, and fill the technical resource gap especially in the Indian context

5. Help graduates appreciate requirement of framing environmental policy guidelines.

6. Motivate graduates to appreciate that they are an integral stakeholder in the environmental management of India irrespective of their future jobs or working environments in accordance of the provisions vide Article 48A (Directive Principles of State Policy) and Article 51A(g) (Fundamental Duties) of the Constitution of India.

7.Help graduates to understand the concerns related to Sustainable Development Goals (SDGs) and the Indian obligation

**Program Objectives:**

1. To develop basic understanding of Fundamentals of Environmental Science as a discipline.
- 2.To bring sensitization towards the environment and also increase student competency & employability.
3. To inculcate a sense of responsibility among students about various principles and laws of environment to develop conscience towards social responsibility, human values and sustainable development through curriculum delivery and extra-curricular activities
5. To develop scientific temperament with strong fundamental knowledge of the subject
6. To develop analytical thinking and problem-solving skills needed for various entrance and competitive examinations and Post Graduate Studies
7. To train students in laboratory skills and handling equipment along with soft skills needed for placement

**Program Outcomes:**

- 1. Provide students with the scope to develop knowledge base covering all attributes of the environment and enable** them to attain scientific/technological capabilities to find answers to the fundamental questions before the society with regards to human action and environmental effects with due diligence.
- 2.Enhance the ability to apply this knowledge and proficiency to find solutions relating to environmental concerns of varied dimensions of present times
- 3.Provide with a direction and technical capability to carry on lifelong learning and show teamwork and collaborative endeavor and decision making
- 4.Improve the employability of the graduates including the enhancement of self-employment potential and entrepreneurial aptitude, and fill the technical resource gap especially in the Indian context
- 5.Help graduates appreciate requirement of framing environmental policy guidelines.

6. Motivate graduates to appreciate that they are an integral stakeholder in the environmental management of India irrespective of their future jobs or working environments in accordance of the provisions vide Article 48A (Directive Principles of State Policy) and Article 51A(g) (Fundamental Duties) of the Constitution of India.

7. Help graduates to understand the concerns related to Sustainable Development Goals (SDGs) and the Indian obligation

8. The students will graduate with holistic development and will be qualified to continue higher studies in their subject.

3) The students will be eligible to appear for various competitive examinations and pursue and apply for the Jobs

**Program Specific Outcomes:**

- After successful completion of B.Sc. Environmental Science Course, student **will** have:
- Fundamental and Advanced knowledge of theory and practical courses in Environmental science.
- Students will understand about how the subject knowledge helps in solving various social, economic and environment related problem
- Knowledge about Environmental (Resource, Energy) Management, Monitoring, introductory aspects of Environmental Biotechnology and Microbiology
- Skills in laboratory techniques and experience in instrument handling

**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<br>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  | -         | P  | T     | P     | -  | -   | -   | -   | -   |       |
|  |      | T                             | P     | T        | P  | P   | P                 | T                 | P  | -         | P  | T     | P     | -  | -   | -   | -   | -   |       |
| Diploma<br>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<br>5.5 / 300                    | V    | 06                            | 04    | 02       | 02 | 2   | 2                 | 02                | -  | -         | -  | -     | -     | 02 | -   | -   | -   | 22  |       |
|  | VI   | 06                            | 04    | 02       | 02 | 2   | 4                 | 02                | -  | -         | -  | -     | -     | -  | -   | -   | -   | 22  |       |
| <b>Total</b>                           |      | 24                            | 16    | 04       | 04 | 08  | 10                | 10                | 08 | 04        | 04 | 06    | 08    | 04 | 08  | 04  | 08  | 132 |       |
| 6.0/400<br>Honours                     | VII  | 08                            | 06    | 02       | 02 | -   | RM-04             |                   |    |           |    |       |       |    |     |     |     | 22  |       |
|  | VIII | 08                            | 06    | 02       | 02 |     | OJT-04            |                   |    |           |    |       |       |    |     |     |     | 22  |       |
| 6.0/400<br>Honours<br>with<br>Research | VII  | 06                            | 04    | 02       | 02 |     | RM-04<br>RM-04    |                   |    |           |    |       |       |    |     |     |     | 22  |       |
|  | VIII | 06                            | 04    | 02       | 02 |     | RM-08             |                   |    |           |    |       |       |    |     |     |     | 22  |       |
| <b>Total</b>                           |      | 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<br>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<br>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<br>5.5 / 300                    | V    | 03                            | 02    | 01       | 01 | 01  | FP-01             | 01                | -  | -         | -  | -     |       | 01 | -   | -   | -   | 11    |       |
|  | VI   | 03                            | 02    | 01       | 01 | 01  | OJT-01            | 01                | -  | -         | -  | -     |       | -  | -   | -   | -   | 10    |       |
| <b>Total</b>                           |      | 12                            | 08    | 02       | 02 | 04  | 04                |                   |    | 02        | 02 | 03    | 04    | 02 | 04  | 02  | 04  | 65    |       |
| 6.0/400<br>Honours                     | VII  | 03                            | 03    | 01       | 01 | -   | RM-01             |                   |    |           |    |       |       |    |     |     |     | 09    |       |
|  | VIII | 03                            | 03    | 01       | 01 |     | OJT-01            |                   |    |           |    |       |       |    |     |     |     | 09    |       |
| 6.0/400<br>Honours<br>with<br>Research | VII  | 02                            | 02    | 01       | 01 |     | RM-01<br>RM-01    |                   |    |           |    |       |       |    |     |     |     | 08    |       |
|  | VIII | 02                            | 02    | 01       | 01 |     | RM-01             |                   |    |           |    |       |       |    |     |     |     | 07    |       |
| <b>Total</b>                           |      | 18/16                         | 14/12 | 04       | 04 | 04  | 06/07             | 06                | 04 | 02        | 02 | 03    | 04    | 02 | 04  | 02  | 04  | 83/80 |       |

**B. Sc. -Environmental Science: 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)       |
| <b>Total</b>       |      | <b>12</b>                | <b>08</b>    | <b>(02)</b> | <b>(02)</b> | <b>04</b> | <b>04</b>              | <b>(01)</b> | <b>33</b>    |
| 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)<br>RP-04(01) |             | 22(08)       |
|                    | VIII | (02)                     | (02)         | (01)        | (01)        |           | RM-08(01)              |             | 22(07)       |
|                    |      | <b>18/16</b>             | <b>14/12</b> | <b>04</b>   | <b>04</b>   | <b>04</b> | <b>06/07</b>           | <b>(01)</b> | <b>51/48</b> |

**Programme Framework (Courses and Credits): B. Sc. Environmental Science**

| Sr. No. | Year | Semester | Level | Course Type | Course Code | Title                                  | Credits |
|---------|------|----------|-------|-------------|-------------|--|---------|
| 1.      | I    | I        | 4.5   | DSC-01      | BS-EN 111T  | Introduction to Environmental Biology  | 02      |
| 2.      | I    | I        | 4.5   | DSC-02      | BS-EN 112P  | Practical based on BS- EN-111          | 02      |
| 3.      | I    | II       | 4.5   | DSC-03      | BS-EN 121T  | Fundamental of Environmental Chemistry | 02      |
| 4.      | I    | II       | 4.5   | DSC-04      | BS-EN 122T  | Practical based on BS- EN112           | 02      |



|     |     |     |     |        |            |   |           |
|-----|-----|-----|-----|--------|------------|---|-----------|
| 5.  | II  | III | 5.0 | DSC-05 | BS-EN 231T | Basics in Geoscience                                | <b>02</b> |
| 6.  | II  | III | 5.0 | DSC-06 | BS-EN 232T | Environmental Pollution                             | <b>02</b> |
| 7.  | II  | III | 5.0 | DSC-07 | BS-EN 233P | Practical based on<br>BS- EN231 & BS-EN 232         | <b>02</b> |
| 8.  | II  | III | 5.0 | VSC-01 | BS-EN 234P | Practical in Ecology and<br>field Visit             | <b>02</b> |
| 9.  | II  | III | 5.0 | FP-01  | BS-EN 235T | Field Project                                       | <b>02</b> |
| 10. | II  | IV  | 5.0 | DSC-08 | BS-EN 241T | Introduction to forestry                            | <b>02</b> |
| 11. | II  | IV  | 5.0 | DSC-09 | BS-EN 242T | Natural Resources<br>Conservation and<br>Management | <b>02</b> |
| 12. | II  | IV  | 5.0 | DSC-10 | BS-EN 243P | Practical based on EN-241<br>and EN242              | <b>02</b> |
| 13. | II  | IV  | 5.0 | VSC-02 | BS-EN 243T | Organic Farming                                     | <b>02</b> |
| 14. | II  | IV  | 5.0 | CEP-01 | BS-EN 245P | Community Engagement<br>Project                     | 02        |
| 15. | III | V   | 5.5 | DSC-11 | BS-EN 351T | Biodiversity and its<br>conservation                | 02        |
| 16. | III | V   | 5.5 | DSC-12 | BS-EN 352T | Environmental Pollution<br>Control Technology       | 02        |
| 17. | III | V   | 5.5 | DSC-13 | BS-EN 353T | Environmental Law, ethics<br>and Policy             | 02        |
| 18. | III | V   | 5.5 | DSC-14 | BS-EN 354P | Practical based on<br>BS- EN-351                    | 02        |
| 19. | III | V   | 5.5 | DSC-15 | BS-EN 355P | Practical based on<br>BS- EN-352                    | 02        |
| 20. | III | V   | 5.5 | DSE-01 | BS-EN 356T | Global issues in<br>Environmental Science           | 02        |
| 21. | III | V   | 5.5 | DSE-02 | BS-EN 357P | Water and waste water<br>Analysis                   | 02        |
| 22. | III | V   | 5.5 | VSC-03 | BS-EN 358P | Rain water Harvesting                               | 02        |
| 23. | III | V   | 5.5 | FP-02  | BS-EN 359P | Taxonomic Studies of<br>indigenous Plants           | 02        |
| 24. | III | V   | 5.5 | IKS-02 | BS-EN 360T | Traditional Water<br>Conservation methods           | 02        |
| 25. | III | VI  | 5.5 | DSC-16 | BS-EN 361T | Restoration Ecology                                 | 02        |
| 26. | III | VI  | 5.5 | DSC-17 | BS-EN 362T | Atmospheric Science                                 | 02        |
| 27. | III | VI  | 5.5 | DSC-18 | BS-EN 363T | Environmental law and<br>Policy                     | 02        |
| 28. | III | VI  | 5.5 | DSC-19 | BS-EN 364P | Practical based on EN-351                           | 02        |
| 29. | III | VI  | 5.5 | DSC-20 | BS-EN 365P | Practical based on EN352                            | 02        |
| 30. | III | VI  | 5.5 | DSE-03 | BS-EN 366T | Solid waste Management                              | 02        |
| 31. | III | VI  | 5.5 | DSE-04 | BS-EN 367P | Wild life Management                                | 02        |
| 32. | III | VI  | 5.5 | VSC-04 | BS-EN 368T | Wetland studies                                     | 02        |
| 33. | III | VI  | 5.5 | OJT-01 | BS-EN 369T | On job Training                                     | 04        |

**B. Sc. Environmental Science (Honours)**

|            |    |      |     |        |             |                                      |           |
|------------|----|------|-----|--------|-------------|--------------------------------------|-----------|
| <b>34.</b> | IV | VII  | 6.0 | DSC-21 | BS-EN 471T  | Soil Health Management               | <b>03</b> |
| <b>35.</b> | IV | VII  | 6.0 | DSC-22 | BS-EN 472T  | Remote Sensing & GIS                 | <b>03</b> |
| <b>36.</b> | IV | VII  | 6.0 | DSC-23 | BS-EN 473T  | Environmental Biotechnology-I        | <b>02</b> |
| <b>37.</b> | IV | VII  | 6.0 | DSC-24 | BS-EN 474P  | Practical based on EN-471            | <b>02</b> |
| <b>38.</b> | IV | VII  | 6.0 | DSC-25 | BS-EN 475P  | Practical based on EN-472            | <b>02</b> |
| <b>39.</b> | IV | VII  | 6.0 | DSC-26 | BS-EN 476TP | Practical based on EN-472            | <b>02</b> |
| <b>40.</b> | IV | VII  | 6.0 | DSE-05 | BS-EN 477T  | Environmental Microbiology           | <b>02</b> |
| <b>41.</b> | IV | VII  | 6.0 | DSE-06 | BS-EN 478T  | Urban Ecosystem Management           | <b>02</b> |
| <b>42.</b> | IV | VII  | 6.0 | RM-01  | BS-EN 479T  | Introduction To Research Methodology | <b>04</b> |
| <b>43.</b> | IV | VIII | 6.0 | DSC-27 | BS-EN 481T  | Environmental Management System      | <b>03</b> |
| <b>44.</b> | IV | VIII | 6.0 | DSC-28 | BS-EN 482T  | Environmental Statistics             | <b>03</b> |
| <b>45.</b> | IV | VIII | 6.0 | DSC-29 | BS-EN 483T  | Environmental Biotechnology-II       | <b>02</b> |
| <b>46.</b> | IV | VIII | 6.0 | DSC-30 | BS-EN 484T  | Environmental Toxicology             | <b>02</b> |
| <b>47.</b> | IV | VIII | 6.0 | DSC-31 | BS-EN 483T  | Remote Sensing and GIS               | <b>02</b> |
| <b>48.</b> | IV | VIII | 6.0 | DSC-32 | BS-EN 484T  | Basics in Industrial Safety          | <b>02</b> |
| <b>49.</b> | IV | VIII | 6.0 | DSE-07 | BS-EN 485T  | Watershed Management                 | <b>02</b> |
| <b>50.</b> | IV | VIII | 6.0 | DSE-08 | BS-EN 485T  | Basics in Industrial Safety          | <b>02</b> |
| <b>51.</b> | IV | VIII | 6.0 | OJT-02 | BS-EN 486T  | Field Experience and Report          | <b>04</b> |

**B. Sc. Environmental Science (Honours with Research)**

|            |    |      |     |        |            |                                      |           |
|------------|----|------|-----|--------|------------|--------------------------------------|-----------|
| <b>34.</b> | IV | VII  | 6.0 | DSC-21 | BS-EN 471T | Soil Health Management               | <b>03</b> |
| <b>35.</b> | IV | VII  | 6.0 | DSC-22 | BS-EN 472T | Remote Sensing & GIS                 | <b>03</b> |
| <b>36.</b> | IV | VII  | 6.0 | DSC-23 | BS-EN 473P | Environmental Biotechnology-I        | <b>02</b> |
| <b>37.</b> | IV | VII  | 6.0 | DSC-24 | BS-EN 474P | Practical based on EN-471            | <b>02</b> |
| <b>38.</b> | IV | VII  | 6.0 | DSE-05 | BS-EN 473T | Environmental Microbiology           | <b>02</b> |
| <b>39.</b> | IV | VII  | 6.0 | DSE-06 | BS-EN 474P | Urban Ecosystem Management           | <b>02</b> |
| <b>40.</b> | IV | VII  | 6.0 | RM-01  | BS-EN 476T | Introduction To Research Methodology | <b>04</b> |
| <b>41.</b> | IV | VII  | 6.0 | RP-01  | BS-EN 477T | Topic, review , Methodology          | <b>04</b> |
| <b>42.</b> | IV | VIII | 6.0 | DSC-25 | BS-EN 481T | EIA and Environmental Audit          | <b>03</b> |
| <b>43.</b> | IV | VIII | 6.0 | DSC-26 | BS-EN 482T | Renewable Energy                     | <b>03</b> |

|            |    |      |     |        |            |  |           |
|------------|----|------|-----|--------|------------|--|-----------|
|            |    |      |     |        |            | Management   |           |
| <b>44.</b> | IV | VIII | 6.0 | DSC-27 | BS-EN 483T | Environmental Management System  | <b>02</b> |
| <b>45.</b> | IV | VIII | 6.0 | DSE-04 | BS-EN 485T | Wild life Management   | <b>02</b> |
| <b>46.</b> | IV | VIII | 6.0 | DSE-07 | BS-EN 473T | Watershed Management   | <b>02</b> |
| <b>47.</b> | IV | VIII | 6.0 | DSE-08 | BS-EN 474P | Basics in Industrial Safety  | <b>02</b> |
| <b>48.</b> | IV | VIII | 6.0 | PR-02  | BS-EN 486T | Data Collection ,<br>Interpretation , Scientific<br>Report Preparation | <b>08</b> |

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

| Title of the Course: Introduction to Environmental Biology |             |                     |           |             |                |                |     |       |
|--|-------------|---------------------|-----------|-------------|----------------|----------------|-----|-------|
| Year: I  |             |                     |           | Semester: I |                |                |     |       |
| Course Type  | Course Code | Credit Distribution |           | Credits     | Allotted Hours | Allotted Marks |     |       |
|  |             | Theory              | Practical |             |                | CIE            | ESE | Total |
| DSC-01   | BS-EN 111T  | 02                  | 00        | 02          | 30             | 15             | 35  | 50    |

**Learning Objectives:**

1. To learn the theories and fundamental concepts of environmental biology.
2. To know the origin of life on planet earth and related theories.
3. To Gain knowledge about distribution of life on earth

**Course Outcomes (Cos): -**

1. To Understand the theories and fundamental concepts of plant and animal taxonomy.
2. Students Acquire knowledge about Bio-resources availability, its distribution and importance.
3. Students Develop the skills of identification of native plants and animals

**Detailed Syllabus: Example**

| Unit No. | Name of the Unit        | Course contents   | No of lectures |
|----------|-------------------------|---|----------------|
| 1        | Introduction To Biology | <ul style="list-style-type: none"> <li>• Introduction to Biology, Branches, Scope and Importance in today's context from environmental point of view.</li> <li>• Biological diversity of India – Major genera, species, sub-species of flora and fauna.</li> <li>• Major ecological types of India</li> </ul> | 6              |
| 2        | Biogeography            | <ul style="list-style-type: none"> <li>• Biogeography – The meaning; Importance</li> <li>• Biographical profile of the world; and India</li> <li>• Classification of Biogeographic Region (Realms)</li> <li>• Biogeographic zone in India</li> <li>• Biodiversity Hotspot and its importance</li> </ul>       | 8              |

|   |   |  |          |
|---|---|--|----------|
| 3 | Taxonomy                                  | <ul style="list-style-type: none"> <li>• Taxonomic Principles - aim, objectives, hierarchy, kingdoms.</li> <li>• History; Linnaeus system of classification; Bentham &amp; Hooker system of classification.</li> <li>• Components of systematic - characterization, classification, identification &amp; nomenclature.</li> <li>• The concept of species- morphological, biological, phylogenetic, ecological etc.</li> </ul>  | 8        |
| 4 | Ecological Adaptations and Bio- resources | <ul style="list-style-type: none"> <li>• Ecological Adaptations under various environmental conditions – i) In plants - hydrophytes, mesophytes, epiphytes, xerophytes &amp; halophytes ii) In animals - mimicry, vestigiality etc.</li> <li>• Bio-resources- <ul style="list-style-type: none"> <li>i) Forests- major types of the world &amp; India</li> <li>ii) Agricultural crops - major food plants of the world &amp; India</li> <li>iii) Livestock- major varieties of the world &amp; India</li> <li>iv) Fisheries resources - saline &amp; fresh water</li> </ul> </li> <li>• Significances and use of the Bioresources; Extraction of Bioresources by traditional &amp; modern methods; Threat to local bioresources - overexploitation, habitat loss, invasive species etc.</li> </ul> | 8        |
|   |   |  | Total 30 |

**Suggested Readings/Material:**

- 1) ‘A Textbook of Plant Ecology’ Ambashta R.S. & Ambashta N.K (1999) CBS Publ. & Distributers, New Delhi
- 2) ‘Ecology: Principles and Applications’ Chapman J.L. & Reiss M.J. (1995) Cambridge University Press
- 3) ‘Environmental Science: A Global Concern’ Cunningham W.P. & Saigo S.W. (1997) WCB, McGraw Hill
- 4) ‘Elements of Ecology’ Sharma P.D. Rastogi Publication
- 5) ‘Environmental Science’ Tyler M.G. Jr. (1997) Wadsworth Publ. Co.
- 6) ‘Environmental Studies’ Benny Joseph (2005) Tata McGraw Hill Publ. Co. Ltd.
- 7) ‘Patterns in the Living World’ – Biology-an Environmental approach, John Murray, London
- 8) ‘Diversity Among Living Things’ Biology-an Environmental approach, John Murray, London
- 9) ‘Paleobotany and the Evolution of Plants’ Wilson N. Stewart (1983) Cambridge University Press
- 10) Biological science, D. J. Taylor, N.P.O. Green & G.W Stout, Cambridge Low Price Edition, 3rd Edtn.

**New Arts, Commerce and Science College, Ahmednagar  
(Autonomous)  
Syllabus  
B. Sc. -I (ENVIRONMENTAL SCIENCE)**

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

**Learning Objectives:**

- 1 Collection and preservation of plant and animal sample
- 2 Preparation of Biodiversity register with taxonomic classification
- 3 Study of Plant Adaptations under various environmental condition.

**Course Outcomes (Cos)**

- 1.To understand the preparation of chemicals, normality, molarity etc.
- 2.Understand native plants for plantation with respect to Geography and Climate
- 3.Acquire knowledge about working of PUC Machine-Gas Analyzer.

**Detailed Syllabus:**

| Unit. No. | Course contents   | Number of Practical |
|-----------|---|---------------------|
| 1.        | Laboratory safety rules and introduction to laboratory equipment's                                    | 1                   |
| 2.        | Collection and preparation of Herbarium Sheet   | 1                   |
| 3.        | Preparation of biodiversity register of selected area   | 1                   |
| 4.        | Estimation of productivity of water body  | 1                   |
| 5.        | Identification and significance of water algae from contaminated and non-contaminated water bodies    | 1                   |
| 6.        | Estimation of dust deposition rate on roadside plants   | 1                   |
| 7.        | Identification and taxonomic classification of plants from college area                               | 1                   |
| 8.        | Visit to in situ and ex situ conservation methods of biodiversity ( National Park, Garden, sanctuary) | 1                   |
| 9.        | Identifying native plants for plantation with respect to Geography and Climate                        | 1                   |
| 10.       | Collection and identification of local medicinal plants   | 1                   |

|     |   |   |
|-----|---|---|
| 11. | Study of Plant / Animal Fossil Forms from different geological periods/visit to Paleo-botanical museum                          | 1 |
| 12. | Study of Plant Adaptations under various environmental conditions (Hydrophytes,mesophytes, epiphytes, halophytes & xerophytes). | 1 |
| 13. | Visit to study different Fishery resources in the local market  | 1 |
| 14. | Visit to local forestry department  | 1 |

**D1New Arts, Commerce and Science College, Ahmednagar  
(Autonomous)  
Syllabus  
B. Sc. -I (ENVIRONMENTAL SCIENCE)**

| Title of the Course: Fundamental of Environmental Chemistry |             |                     |           |             |                |                |     |       |
|---|-------------|---------------------|-----------|-------------|----------------|----------------|-----|-------|
| Year: I   |             |                     |           | Semester: I |                |                |     |       |
| Course Type   | Course Code | Credit Distribution |           | Credits     | Allotted Hours | Allotted Marks |     |       |
|   |             | Theory              | Practical |             |                | CIE            | ESE | Total |
| DSC-03  | BS-EN 121T  | 00                  | 02        | 02          | 60             | 15             | 35  | 50    |

**Learning Objectives:**

1. To Know the Concept of Environmental Chemistry.
2. Motivating the knowledge about the analysis techniques of various parameters.
3. Importance of various interactive reactions in atmosphere.

**Course Outcomes (Cos): -**

1. Understand the concept of green chemistry
2. Understand the concept of Environmental Chemistry, (solution, normality, molarity & types of chemical reactions)
3. Understand the structure and composition of atmosphere
4. Effect and impact of Soap, detergent and chemical food adulteration in nature

**Detailed Syllabus: Example**

| Unit No. | Name of the Unit                              | Course contents   | Number of lectures |
|----------|---|---|--------------------|
| 1        | <b>Introduction</b>                           | Scope of Environmental Chemistry, Segments of Environment and various interactive reactions occurring between these segments. Bio-geo-chemical cycles (C,N, H <sub>2</sub> O,,S)  | 6                  |
| 2        | <b>Fundamental Of Environmental Chemistry</b> | Solution concentration (Normality, Molarity, Molality, ppm, Equivalent weight etc.), Types of chemical reactions: acid-base and salts, solubility products; solutes and solvents; Redox reactions, concepts of pH and pE, | 6                  |
| 3        | <b>Chemical Composition of Atmosphere</b>     | Characteristic of the Chemical Reactions involved in atmosphere. Pollutants in Atmosphere<br>Chemistry of Some Atmospheric Gases<br>Oxides of Nitrogen, Oxides of Sulphur, Oxides of Carbon, ozone hydrocarbon etc        | 6                  |



|   |  |   |   |
|---|--|---|---|
| 4 | <b>Chemistry of Surfactants and Food additives</b> | <ul style="list-style-type: none"> <li>• Classification, Characteristic and Composition,</li> <li>• Environmental Impacts and Toxicity of Soaps and Detergents</li> <li>• Food Additives and Contaminants (Preservatives, Flavoring and coloring agents)</li> <li>• Adulterants – Properties and their effects</li> </ul>                     | 6 |
| 5 | <b>Environmental Analysis</b>                      | <ul style="list-style-type: none"> <li>• Titrimetric, colorimetric and spectrophotometric methods.</li> </ul> <p><b>Basic Principle and working of:</b></p> <ul style="list-style-type: none"> <li>• pH meter,</li> <li>• conductivity meter,</li> <li>• Turbidity meter,</li> <li>• colorimetry and</li> <li>• Spectro-photometer</li> </ul> | 6 |

## Suggested readings:

- 1) Environmental Chemistry, A. K. De, New Age International Publishers, 7th Edtn.
- 2) Elements of Environmental Chemistry, H. V. Jadhav, Stosius Incorporated/Advent Books Division, 1992
- 3) Environmental Chemistry, H. Kaur, APragatiEdtn., 2nd Edtn. (2007)
- 4) Environmental Chemistry, S. K. Banerjee, PHI Learning Pvt. Ltd., 2nd Edtn.
- 5) Air Pollution- M. N. Rao & H. V. N. Rao; Tata McGraw Hill, New Delhi, 1989.
- 6) "Environment Pollution Control and Environmental Engg." C. S. Rao, Tata McGraw Hill, New Delhi, 1994.
- 7) Soil pollution & Soil Organism - P.V. Mishra
- 8) Water Pollution—A.K. Tripathy & S.N. Pandey; A. P. H. Publishing Corporation
- 9) Environmental Air pollution & its control—G.R. Chatwal; Anmol Publications, New Delhi, 1989
- 10) Environmental Chemistry; A. K. De; New Age International Publishers; 6th Edtn.
- 11) Understanding Environment; Edt by Kiran B. Chhokar, Mamata Pandya, Meena Raghunathan; Centre for Environment Education; Sage Publication.
- 12) Perspective in Environmental Studies; Kaushik & Kaushik; New Age International Pvt. Ltd Publishers
- 13) Environmental Science; S. C. Santra; New Central Book Agency (P) Ltd.; 2nd Edtn.

**New Arts, Commerce and Science College, Ahmednagar  
(Autonomous)  
Syllabus**

**B. Sc. -I (ENVIRONMENTAL SCIENCE)**

| Title of the Course: Practical Based on BS-EN-111& BS -EN112 |               |                     |           |             |                |                |     |       |
|--|---------------|---------------------|-----------|-------------|----------------|----------------|-----|-------|
| Year: I  |               |                     |           | Semester: I |                |                |     |       |
| Course Type  | Course Code   | Credit Distribution |           | Credits     | Allotted Hours | Allotted Marks |     |       |
|  |               | Theory              | Practical |             |                | CIE            | ESE | Total |
| DSC-4  | BS-EN122<br>P | 00                  | 02        | 02          | 30             | 15             | 35  | 50    |

**Learning Objectives:**

- 1 Collection and preservation of plant and animal sample
- 2 Preparation of Biodiversity register with taxonomic classification
- 3 Study of Plant Adaptations under various environmental condition.

**Course Outcomes (Cos)**

- 1.To understand the preparation of chemicals, normality, molarity etc.
- 2.Understand native plants for plantation with respect to Geography and Climate
- 3.Acquire knowledge about working of PUC Machine-Gas Analyzer.

| Unit.No. | Course contents  | Number of Practical |
|----------|--|---------------------|
| 1.       | Preparation of solution and solvents of acid and base chemicals                | 1                   |
| 2.       | Collection and preservation of water and soil samples (Field Practical)        | 1                   |
| 3.       | Calibration and demonstration of PH Conductivity meter, Spectrophotometer      |                     |
| 4.       | Determination of pH and Electrical Conductivity of Water samples/ Soil samples | 1                   |
| 5.       | Determination of Alkalinity from water sample                                  | 1                   |
| 6.       | Determination of Total Hardness (Ca& Mg) from water                            | 1                   |
| 7.       | Determination of Chlorides from water  | 1                   |
| 8.       | Identification of Food adulterants in various food samples                     | 1                   |
| 9.       | Estimation of soil texture and characteristics                                 | 1                   |
| 10.      | Estimation of dust deposition rate on plants                                   | 1                   |
| 11.      | Study of the working of PUC machine-Gas Analyzer (Demonstration).              | 1                   |
| 12.      | Estimation of saponification value of provided samples                         | 1                   |
| 13.      | Determination of Organic Content from soil.                                    | 1                   |
| 14.      | Toxicity of heavy metals on seed germination                                   | 1                   |