B.Sc. II year Environmental Science
Semester III

Gondwana University, Gadchiroli
Semester Pattern Syllabus for
B. Sc. II year, Semester III
Environmental Science
General Instructions

- The examination of Semester III shall comprise of two theory papers of 3 hours duration of 50 marks each. Ten marks will be allotted for internal assessment for each theory paper.
- The examination of Semester IV shall comprise of two theory papers of 3 hours duration of 50 marks each. Ten marks will be allotted for internal assessment for each theory paper.
- Practical examination will be of 5 hours duration and separately for each semester having 30 marks each.
- Students should pass separately in Theory and Practical Examination.
- The syllabus is based on 6 theory periods and 6 practical periods per week.

<table>
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<tr>
<th>Distribution of Practical Marks (Semester III and IV)</th>
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<tbody>
<tr>
<td>1 Two experiments</td>
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<tr>
<td>2 Certified practical record book</td>
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<tr>
<td>3 Certified tour report/field diary</td>
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<td>4 Viva-voce</td>
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<td><strong>Total</strong></td>
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GONDWANA UNIVERSITY, GADCHIROLI

Faculty of Science

B. Sc. II year
Semester III and IV
Environmental Science

<table>
<thead>
<tr>
<th>Year</th>
<th>Semester</th>
<th>Paper</th>
<th>Paper title</th>
<th>Marks</th>
<th>Total Marks</th>
<th>Total Marks</th>
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<tbody>
<tr>
<td>B.Sc. II Year</td>
<td>III</td>
<td>I</td>
<td>Pollution Science</td>
<td>Theory</td>
<td>50</td>
<td>10</td>
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<td></td>
<td></td>
<td>II</td>
<td>Natural Resources and GIS</td>
<td>Theory</td>
<td>50</td>
<td>10</td>
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<td>Practical</td>
<td></td>
<td>30</td>
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<tr>
<td></td>
<td>IV</td>
<td>I</td>
<td>Pollution Control Technologies</td>
<td>Theory</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>II</td>
<td>Forest &amp; Wildlife</td>
<td>Theory</td>
<td>50</td>
<td>10</td>
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<td></td>
<td>Practical</td>
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<td>30</td>
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Note: The Syllabus is based on 6 theory periods per week and 6 practical periods per week per batch.
Semester III
Paper I
Pollution Science

Unit I: Air Pollution


Industrial air pollution: Principle causes of industrial pollution. Point and non point sources of air pollution. Air pollution problems of some industries: thermal power plant, pulp and paper industry, mining industry and cement industry.

Case Study: Bhopal Gas Tragedy.

Unit II: Water Pollution


Oil pollution: Definition, sources, effects on marine life, birds and man. Ballast water.


Case study: Effects of thermal power plant on environment and on a river water quality.

Unit III: Noise and Radiation Pollution


3. **Occupational health hazards**: Types of hazards. Hazards in mining activities, pulp and paper industry and cement industry. Difficulties due to poor illumination, ventilation, working at elevated places, overhead equipments handling, vibration causes of accidents.

**Case Study:** Atom bomb disaster in Hiroshima and Nagasaki; Chernobyl–world’s worst nuclear disaster.

**UNIT IV: Soil and Pesticide Pollution**

1. **Soil Pollution**: Definition, causes and sources. Agricultural practices. Chemical and metallic pollutants. Mining and soil sediment.

**Case study:** Comparative study of organic and artificial farming soil for soil and pesticide pollution.
Semester III
Paper II
Natural Resources and GIS

Unit I: Energy Resources and Conservation


**Case study**: In the map of your district mark various types of natural resources.

Unit II: Earth’s Water and Land Resource


2. **Rainwater Harvesting**: Aims and objectives. Roof top rainwater harvesting: conservation, details of pit, selection of sand media, quality of pit outlet, construction of pit in agriculture land for water storage


**Case study**: Construct a rain water harvesting system for college/home.

Unit III: Natural Catastrophes and Disaster Management

1. **Natural Catastrophes**: Definition. Types: tsunami, drought, cloud bursting, hurricanes, cyclones, avalanche. Description of phenomenon and their effects.


**Unit IV: Remote Sensing and GIS**


3. **RS & GIS and Environmental Management**: Definition. Components of GIS. GIS process system. Role in pollution monitoring, forest cover, earthquake, landslide, nuclear, chemical and measuring wetland loss.

**Books for Reference:**

15. A Textbook of Environment- Agrawal, Mcmillion publication, Mumbai
19. Air Pollution- A.C. Stern
27. Industrial Safety and Environment- Anupama Prasar. S. K. Kataria & Sons, Delhi
Semester III
Practical

Section A: Pollution Science

1. Analysis of settleable particulate matter by Dust fall jar method.
2. Determination of relative humidity by psychrometer.
3. Determination of wind speed and direction by cup shaped anemometer.
4. Identification of point and non point sources of pollution in the region.
5. Analysis of surface water quality for effective chlorine dosages (free chlorine).
7. Analysis of water supply for potability test with respect to pH, hardness, alkalinity, acidity, free chlorine and disease causing organisms.
8. Effect of thermal pollution study of water body with respect to temperature, dissolved oxygen, viscosity, pH and conductivity.
11. Analysis of rainwater harvesting pit for drinking water quality parameter-pH, acidity, alkalinity, hardness, solids and fluoride.
12. Analysis of fly ash leachate with respect to silica and fluoride.
14. Determination of the noise levels in residential, commercial, industrial and silence zones and its comparison with the National Ambient Air Quality Standards with respect to Noise.
15. Demonstration on occupational hazards in Industry w.r.t temperature, light, vibration and ventilation.
16. Critical study of special economic zone (SEZ) concept with respect to National and International context.
17. Detection of Ni^{2+}, Co^{2+} and Cu^{2+} in a given mixture by paper chromatography.

Section B: Planktonology and Natural Resources

1. Sampling techniques for planktons and their preservation.
2. Identification of phytoplankton’s.
3. Identification of zooplanktons.
5. Quantitative estimation of zooplanktons by Sedgwick Rafter cell method.
7. Soil, rain and agro-climatic zone of Maharashtra.
8. National parks in Maharashtra.
9. Mining resources of Maharashtra.
10. Types of forests in Maharashtra.