**20MC2201 – ENVIRONMENTAL SCIENCE**

(Common to ECE, EEE, CE & ME)

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| **Course Category:** | Mandatory course | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture-Tutorial-Practical:** | 3-0-0 |
| **Pre-requisite:** | Basic idea on environment, Environmental pollution causes, effects and control measures. | **Sessional Evaluation:**  **External Evaluation:**  **Total Marks:** | 40  60  100 |

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| **Course**  **Objectives** | Students undergoing this course are expected to: | |
| 1. To know the importance of Environmental Sciences and understand the various components of environment. 2. To know the value of natural resources and need to protect them. 3. To know the value of biodiversity and it`s conservation methods. 4. To describe advanced methods to solve problems related to environmental pollution. 5. To understand the social issues and provide plans to minimize the problems. 6. To articulate various environmental acts in order to protect the environment. | |
| **Course Outcomes** | Upon successful completion of the course, the students will be able to: | |
| CO1 | Know the importance of Environmental sciences and understand the various components of environment. |
| CO2 | Understand the value of natural resources |
| CO3 | Summarize the function of ecosystem, values of biodiversity and conservation. |
| CO4 | Identify how the environment is polluted and suggest the mitigation measures. |
| CO5 | Understand the environmental problems in India and way to minimize the effects. |
| CO6 | Categorize the environmental protection laws in our country and role of information technology in environment protection. |
| **Course**  **Content**  **Course**  **Content** | **UNIT-I**  **MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL SCIENCES:** Introduction,Definition, Scope and Importance of environmental sciences - Various components of environment – Atmosphere, lithosphere, hydrosphere and biosphere – Multidisciplinary nature of environmental sciences.  **UNIT-II**  **NATURAL RESOURCES:**  **LAND RESOURCES:** Importance, Land degradation, Soil erosion and desertification, Effects of modern agriculture (fertilizer and pesticide problems).  **FOREST RESOURCES**: Use and over-exploitation-Mining and Dams-their effects on forest and tribal people.  **WATER RESOURCES:** Use and over-utilization of surface and ground water Floods and droughts.  **ENERGY RESOURCES:** Renewable and non-renewable energy, need to use of alternate energy sources, Impact of energy use on environment.  **UNIT-III**  **ECOSYSTEM**: Definition, types, structure (biotic and abiotic components) and functions of an Ecosystem – Energy flow, Food chain, food web, ecological pyramids and Ecological succession.  **BIO-DIVERSITY AND ITS CONSERVATION:** Definition - genetic, species and ecosystem diversity- value of biodiversity - hotspots of biodiversity in India - threats to biodiversity – in situ and ex situ conservation of biodiversity.  **UNIT-IV**  **ENVIRONMENTAL POLLUTION:** Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution and Nuclear hazards. **SOLID WASTE MANAGEMENT**: causes, effects and control measures of urban and industrial waste. **DISASTER MANAGEMENT:** Floods, earthquake and cyclones.  **UNIT-V**  **SOCIAL ISSUES AND ENVIRONMENT:** From unsustainable to sustainable development, urban problems related to energy, water conservation, rainwater harvesting and water shed management.  **CASE STUDIES:** Silent valley project, Madhura Refinery and TajMahal, Tehri Dam, Kolleru Lake Aquaculture and Fluorosis in Andhra Pradesh.  **CLIMATE CHANGE-** Global warming, Acid rain and Ozone depletion.  **UNIT-VI**  **HUMAN POPULATION AND ENVIRONMENT:** Population growth, variation among nations and population explosion- Role of information technology in environment and human health.  **ENVIRONMENTAL ACTS:** Water (Prevention and control of pollution) Act-Air (Prevention and control of pollution) Act – Wildlife protection Act and Forest conservation Act.  **FIELD WORK:** Visit to Local Area having river/Forest/grass land/hill/mountain to document environmental assets. | |
| **Text Books and Reference Books** | **TEXT BOOKS:**   1. “Environmental science and Engineering” by Anubha Kaushik and C.P.Kaushik, New Age International publishers. Sixth Edition 2018. 2. “Environmental science and Engineering” by [N. Arumugam](https://www.amazon.in/s/ref=dp_byline_sr_book_1?ie=UTF8&field-author=N+Arumugam&search-alias=stripbooks),[V Kumaresan](https://www.amazon.in/s/ref=dp_byline_sr_book_2?ie=UTF8&field-author=V+Kumaresan&search-alias=stripbooks), Saras Publication; 2 edition (2014)   **REFERENCE BOOKS:**   1. “Introduction to Environmental science” by Y.Anjaneyulu, B.S Publications.2004. 2. Perspectives in Environmental Studies, Anubha Kaushik and C.P.Kaushik, New Age International publishers, Third Edition 2019. 3. “Environmental science” by M. Chandrasekhar, Hi-Tech Publications. 2009. | |
| **E-Resources** | 1. <https://nptel.ac.in/courses> 2. <https://freevideolectures.com/university/iitm> | |

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| Contribution of Course Outcomes towards achievement of Program Outcomes (3-High, 2-Medium, 1-Low) | | | | | | | | | | | | |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | - | - | - | 3 | - |
| CO2 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | - | - | - | 2 | - |
| CO3 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | - | - | - | 2 | - |
| CO4 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | - | - | - | 3 | - |
| CO5 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | - | - | - | 2 | - |
| CO6 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | - | - | - | 2 | - |