

INVERTIS UNIVERSITY, BAREILLY
ENVIRONMENTAL SCIENCES
SYLLABUS FOR COURSE WORK

DRM-101 RESEARCH METHODOLOGY for Engineering Stream

UNIT I

Research Topic: selection of problems, stages in the execution of research, preparation of manuscript and report writing. Search engines: google, pubmed, google scholar, EMBL, etc. Publication of Report in Journals: Standard of research journals, impact factor, citation index, H index, and more. Proof reading, reading journals and review.

UNIT II

Introduction of computer science- Database management systems, presentation graphics, management of data by office applications: MS-office, MS-Word, MS-Excel, and MS-PowerPoint. Generation and analysis of data, basics of softwares: Matlab and Labview.

LaTeX overview – document classes, Packages, document environment, Block structure, and special pages.

UNIT III

Measures of dispersion: sampling methods: random sampling - types of variables: qualitative and quantitative variables - continuous and discontinuous variables - scaling method – mean - standard deviation- standard error - coefficient of variation. Comparison of means: chi square test, student's t test and ANOVA.

UNIT IV

Spectrophotometer: principle and applications, Ultra violet, Infra Red, ¹H, Nuclear magnetic resonance (NMR), fundamental and procedure of chromatography. Principle and application of electron microscopy, scanning electron microscopy, transmission electron microscopy, X-ray diffraction.

REFERENCE BOOKS

- Statistical methods, Snedecor, G, W. and W.G. Cochran, 1978. Oxford and IBH publishing CO Pvt. Ltd.
- Biometry, Sokal, R.R. and F.J.Rohlf, 1981. W.H. Freeman, NewYork.
- Authoring a PhD, thesis: how to plan, draft, write and finish a doctoral dissertation, Duncary, P. 2003. Macmillan, pp 256.
- Biostatistical analysis, Zar, J.H., 1996. Prentice Hall, Uppar Saddle River, newjersy, USA.
- Scientific courses and presentations, Martha Davis, 2005. Academic press, Tokyo.pp.356

PHD182 - ENVIRONMENTAL STUDIES

Unit 1: Introduction

Definition, Different factors of Environment, Weather and climate, Global environment and its segments – atmosphere, hydrosphere, lithosphere and biosphere, Multidisciplinary nature, scope and importance. Toxicology-definition.

Unit 2: Ecological Concepts

Structure and function of an ecosystem – producers, consumers and decomposers; Energy flow in the system; Food chain, food webs and ecological pyramids; Introduction, types, characteristic features, structure and function of the following ecosystems – (a) forest ecosystem, (b) grassland ecosystem, (c) aquatic ecosystem (ponds, lakes, rivers). Biogeochemical cycles- carbon cycle, nitrogen cycle and sulphur cycle.

Unit 3: Biodiversity and its conservation

Introduction – Value of biodiversity – productive use, social, ethical and option values; Biodiversity at global, national and local level; India as a mega-diversity nation; Threat to biodiversity – habitat loss, man-wildlife conflicts; Endangered, vulnerable and extinct species of India; Conservation of biodiversity.

Unit 4: Natural Resources - I

Harnessing of natural resources and associated problems, Conservation of natural resources– Role of individual in conservation of natural resources; Equitable use of resources for sustainable lifestyle. (a) Forest resources:-Type and functions of forests, Use and over-exploitation, deforestation, their causes and effects, effects of deforestation on tribal people, chipko movement. (b) Water Resources: Different sources of water; Rivers, Lakes and Wetlands; Over-exploitation of surface and ground water, floods, drought, conflicts over water, dams – benefits and problems. Hydrological cycle.

Unit 5: Natural Resources - II

(a) Mineral Resources: Use and exploitation, environmental effects of extracting and using mineral resources. (b) Energy Resources: Renewable and non-renewable energy sources- use of alternate energy sources-solar, hydro, wind, ocean thermal, biogas, biomass, hydrogen and fossil fuel and their advantages and disadvantages. (c) Land Resources: Land as a resource, land degradation, man-induced landslides, soil erosion and conservation. (d) Food Resources: World food problems, malnutrition, undernourishment, nutrients, balanced diet, fertilizers-pesticides.

PHD183 - ENVIRONMENTAL STUDIES II

Unit 1: Environmental Pollution

Definition; Causes, effects and control measures of – (a) air and (b) Water pollution, Acid rain – causes and effects; Role of individuals in prevention of pollution.

Unit 2: Environmental Pollution – II

(a) Definition; Causes, effects and control measures of – (a) Noise, (b) Soil and (c) Nuclear pollution; Problems of Solid wastes and their management; (b) Disasters caused due to Floods, earthquake, cyclone and landslides, and their management.

Unit 3: Social issues and the Environment

Sustainable development; public health aspects, rainwater harvesting, Global environmental issues - Global warming and climate change; ozone layer depletion, Environmental protection Acts – Air (prevention and control of pollution) act, Water (prevention and control of pollution) act, Wildlife protection act, Forest conservation act, EIA.

Unit 4: Human population and the Environment

Population growth -zero potential growth,exponential growth, natality, mortality, pressure on environment, Population explosion – family welfare programme; Environment and human health; value education; women and child welfare.

Unit 5: Field work

A Field Work Report should be submitted by each student to their concern teacher. The report may be based on the visit to a local area to document environmental assets – river/ forest/ grassland/ hill/ mountain; Visit to a local polluted site – urban/ rural/ industrial/ agricultural; study of common plants, insects, birds; Study of simple ecosystem, ponds, river, hill slopes etc. Survey of national parks- collection of data related to fauna and flora.

Reference Books

- 1- Ecology- E.P.Odum, 1983, Holt-Saunders International Edition.
- 2- Ecology & Environment, P.D.Sharma, Ashish Publication, 1984.
- 3- Text Book of Environmental Science and Technology, Anji Reddy, BS Publications, 2010.