M.Sc., Environmental Sciences, 2019-20

Semester IV

(CORE COURSE- XI)

M4 ENV01-CT 11   **CREDITS : 04**

ENVIRONMENTAL AND OCCUPATIONAL HEALTH

Unit I

Basic principle of environmental health; Environmental factors and human health; Physiological responses of man to relevant stresses in the environment; Disease causing infectious organisms (Virus, bacteria, and parasites); teratogens and mutagens; Detailed account of AIDS and sexually transmitted diseases (STD); Environmental health management.

Unit II

Air pollution and human health; causes of air pollution and air borne diseases, Soil pollution- Sources and effect on human health; Water pollution- sources and effects on human health; water borne diseases; Risk assessment and preventive measures; Toxicogenomics- interaction of pollutants with biological systems at different levels-organism,organ and organelles.

Unit III

Environmental health management in India; Occupational health safety and health administration; Environmental health in indigenous tribal communities- problems and remedies; Environmental health protection - Issues and problems;Industrial safety management techniques and standards.

Unit IV

Definition of occupational health, Occupational hazards and associated diseases- silicosis, anthrax and other lung diseases; WHO standards of working conditions; factors affecting occupational health (physical,chemical and biological); prevention of occupational diseases; Various international organizations (WHO, ILO, UNICEF) on human health, Lead poisoning, occupational cancers, Dermatitis.

Unit V

Nuclear pollution and human health- case studies; Agriculture chemicals and human health; Hazardous wastes- human health and management; Noise pollution and human health hazards; Human health education and awareness. Hazard evaluation in polluted environment with specific emphasis on radiological health;Causes and consequences of hazardous wastes in soil,water and air with respect to human health; Industrial hygiene application and statistical methods through medical records, in study of health problems of human population in green environment

M.Sc., Environmental Sciences, 2019-20

Semester IV

(CORE COURSE- XII)

M4 ENV02-CT 12   **CREDITS : 04**

ENVIRONMENTAL PLANNING AND BIOSTATISTICS

Unit I

Basic concepts of Environmental planning;Environmental priorities in India; Urban planning; Environmental problems of urban planning;Rural environmental planning;National and State Environmental policies.

Unit II

Land use and degradation;Land use planning;Waste land and their reclamation;Water logging; Salinization of lands;Strategies for sustainable land management.

Unit III

Watershed management and planning in India; Structure and functioning of MOEF, CPCB, SPCB; Wetlands planning and management; Eco friendly technologies for natural resources.

Unit IV

Fundamentals of Biostatistics -basic concept & introduction to sampling methodology; measures of central tendency and graphical representation of data: Mean (arithmetic, harmonic and geometric), Median and Mode; Measures of central tendency & dispersion;Skewness and Kurtosis,Poisson and binomial distribution; Standard deviation; Standard error of mean.

Unit V

Null hypothesis, t test and pair T test; Chi square test, Coefficient of association (measure of association); Analysis of variance; Probability –definition, addition and multiplication laws; concept of random variable;Correlation coefficient- testing of significance of correlation coefficient; Regression coefficient and the line of best fit; relationship between correlation and regression.Introduction to multivariate methods for environmental sciences–ANOVA (one way & two way), PCA, factor analysis and cluster analysis.

M.Sc., Environmental Sciences, 2019-20

Semester IV (DISCIPLINE SPECIFIC COURSE- III)

M4 ENV03-DT O3   **CREDITS : 04**

ENVIROMENTAL IMPACT ASSESSMENT

Unit-I

Introduction to environmental impact assessment; origin and development of environmental impact assessment; relationship of environmental impact assessment to sustainable development; basic concepts, objectives and its significance of EIA; EIA guidelines -1994 and modified in 2006; Generalized approach to impact analysis.

Unit II

Environmental Impact statement process; environmental impact assessment methodologies-Adhoc method; Check list methodologies-Matrix method, LCA method

Unit III

Introduction to environmental planning,Baseline Information and predictions- land, water, atmosphere, energy and socio-economic status and demographic profile; environmental audit-guidelines concept and process;concept of public participation- public hearing; ISO 9000,14000&18001.

Unit IV

Prediction and assessment of impact on water, air,Noise,soil and biological systems; cost benefit analysis.

Unit V

R & R plan(Act).2007; Green belt development; National environmental policies and guidelines in India; condition and approach for EIS review; Case–studies-River valley projects, Thermal power plants, Mining projects, Dams and reservoirs, Oil refineries, Petro chemicals, national Highway Projects; Identification and prediction of Impact mitigation measures.

M.Sc., Environmental Sciences, 2019-20

Semester IV

(DISCIPLINE SPECIFIC COURSE- IV)

M4 ENV04-DT O4   **CREDITS: 08**

Environmental Scientific Training Programme / Dissertation

08 credits (30 hrs/week each) of workload such as Independent / Group work, Field work, Project work / dissertation related to environment

1. Minimum 8 weeks training/ Internship/projectrelated to Environment in any industry / organization with a minimum attendance of 75%.

2. Submission ofsuccessful Training / Internship Certificate as mentioned above.

3. Submission of detailed Training / internship Report in the form of Dissertation (Minimum 25 pages) which shall include following details :

    a. Introduction

    b. Objectives

    c. Detailed methodology

    d. Results including data collection and interpretation

    e. Conclusion and discussion supported with relevant references

4. Maximum marks for the paper is 100 (at par with theory paper - 80 for submission and 20 for internal assessment

M. Sc. Environmental Sciences, 2019-20
Semester IV
(PRACTICAL COURSE – CCPR-VI)

M4 ENV05-EP03   **CREDITS-O4**

1. To determine the LAI, chlorophyll content, soluble leaf protein, ascorbic acid, phenol, carbohydrate andair pollution tolerance index (APTI) of selected plants species and comparison of plants for their relative susceptibility to pollution

2. Permanent Preparation of slides- xerophytes, hydrophytes, zooplankton and phytoplankton in polluted and non polluted areas.

3. Assessment of respiratory activity with increasing branch diameter

4. Qualitative and Quantitative analysis of plant enzymes

5. Estimation of chlorophyll a, b and total chlorophyll from commercial, roadside and industrial areas.

6. Estimation of crude proteins

7. To evaluate bryophytes and lichens for their sensitivity to different pollutants

    (a) Number of species

    (b) Degree of cover

    (c) Frequency of each species

    (d) Growth and development

    (e) Biomass

    (f) Chlorophyll content

8. Use of animals in terrestrial amd aquatic ecosystem as bio indicators/ bio monitors (mammals/micro arthropods/earthworms/wood lice/molluscs)

9. Test the difference between means of two samples using 't' test and paired t test.

10. To determine the correlation between two variables.

11. Test of null hypothesis by computing SE of difference between two means.

12. To determine the association between two species by using chi- square test.

13. To determine mean, median and mode between various samples.

M. Sc. Environmental Sciences, 2019-20
Semester IV
(PRACTICAL COURSE – DSE PR-II)

M4 ENV06-EP04   **CREDITS-O4**

1. Training / internship report submission

2. Presentation of report to Internal and External Examiners.

3. Evaluation of report at departmental level for 20 marks (Internal assessment)

4. Evaluation of Training / Internship Report / Dissertation by External Examiner and conduct of *Viva-voce*. (For 80 marks -at par with practical paper)