

BHAGWANT UNIVERSITY
Sikar Road, Ajmer
Rajasthan



Syllabus

Institute of Life Sciences & Applied Sciences
M. Phil
(ENVIRONMENTAL SCIENCE)

ANNUAL SCHEME OF EXAMINATION:

1. Every candidate shall be required to offer three written papers and one dissertation (equivalent to one paper). Within this frame work the Board of Studies shall recommend the course of study for the M. Phil examination.
2. The course of study for the M. Phil degree shall extend over a period of one academic year. There shall be a continuous internal assessment and as external assessment. The proportion of internal and external assessment shall be 30:70. There will be no internal assessment in the dissertation. Total marks for M. Phil will be 400. Dissertation may be written by the candidates under the supervision of any teacher who is registered as M. Phil Supervisor. Supervisor can guide normally five dissertations. However, the maximum limit may be relaxed by the permission of Vice-Chancellor on the recommendation of Head. The internal Supervisor can guide five candidates and workload of six hours is admissible for each M. Phil course for dissertation. The Supervisor will sign and issue a certificate counter signed by the Head of department concerned.
3. The internal assessment may be evaluated on the basis of:

(a) Mid Terms	:	15 Marks
(b) Assignments /Seminar Presentation /Group Discussion:		15 Marks
4. Each theory paper shall consist of 100 marks. The dissertation shall also consist of 100 marks. For a pass, a candidate shall be required to obtain (a) at least 40% marks in each paper separately (b) a minimum of 50% marks in the aggregate of all the papers prescribed for the examination. In the mark sheet, successful candidates shall be classified as under

First Division	65% or more.
Second Division	50-65%
- 6- A candidate will have to pass individually both in the Internal as well as external examination and it should be shown separately in the marks sheet.
- 7- The placement of every candidate under a Supervisor/Guide shall be decided within two months from the last date for admission.
- 8- A candidate who fails at the examination even in one paper/dissertation shall be required to reappear at the examination in a subsequent year in all the papers/dissertation prescribed for the examination, provided that a candidate who obtains at least 50% marks in dissertation shall be exempted from the submitting a fresh dissertation and the marks obtained by him shall be carried forward for working out his result.
- 9- For each theory paper 10 questions will be set for the final examination and the candidate will have to attempt at least five questions. All the questions will carry equal marks.
- 10- Workload distribution: There will be a teaching of four periods of one hour duration per week for each theory paper and six hours for dissertation.
i.e. 4X3 = 12 hours for theory papers and six hours for dissertation per week.

Paper Code	Papers Name	TEACHING PERIOD			External Marks	Mid Terms 15 marks	Internal Assignments /Seminar Presentation / Group Discussion	G. Total
		L	T	P				
01MPL10101	<u>Research Methodology Theory And Techniques</u>	4	-	-	70	15	15	100
01MPL10102	<u>Current Issues In The Environment & Pollution Control</u>	4	-	-	70	15	15	100
01MPL10103	<u>SOLID WASTE MANAGEMENT</u>	4	-	-	70	15	15	100
01MPL10201	DISSERTATION	-		2	100	-	-	100
Total		12	-	2	310	45	45	400

Research Methodology Theory And Techniques

Course/Paper: 01MPL10101

Year-I

UNIT - I

Research – Definition – Importance and Meaning of research – Characteristics of research – Types of Research – Steps in research – Identification, Selection and formulation of research problem – Research questions – Research design – Formulation of Hypothesis – Review of Literature.

UNIT – II

Sampling techniques : Sampling theory – types of sampling – Steps in sampling – Sampling and Non-sampling error – Sample size – Advantages and limitations of sampling.

Collection of Data : Primary Data – Meaning – Data Collection methods – Secondary data – Meaning – Relevances, limitations and cautions.

UNIT – III

Statistics in Research – Measure of Central tendency – Dispersion – Skewness and Kurtosis in research. Hypothesis – Fundamentals of Hypothesis testing – Standard Error – Point and Interval estimates – Important Non-Parametric tests : Sign, Run, Kruskal – Wallis tests and Mann-Whitney test.

UNIT – IV

Para metric tests : Testing of significance – mean, Proportion, Variance and Correlation – testing for Significance of difference between means, proportions, variances and correlation co-efficient. Chi-square tests – ANOVA – One-way and Two-way.

UNIT – V

Research Report : Types of reports – contents – styles of reporting – Steps in drafting reports – Editing the final draft – Evaluating the final draft.

Reference Books

1. Statistical Methods - S.P. Gupta
2. Research Methodology Methods and Techniques - C.R. Kothari
3. Statistics (Theory and Practice) - B.N. Gupta
4. Research Methodology Methods and Statistical Techniques - Santosh Gupta

Current Issues In The Environment & Pollution Control

Course/Paper: 01MPL10102

Year-I

UNIT – I FUNDAMENTALS OF ENVIRONMENTAL SCIENCE

Definition – Principles & Scope of Environmental Science. Earth – Man & Environment – Ecosystems – pathways in Ecosystems. Physico – Chemical & Biological factors in the environment. Structure & composition of atmosphere – hydrosphere, lithosphere & biosphere. Natural resources – conservation – sustainable development.

UNIT – II ENVIRONMENTAL CHEMISTRY

Chemical composition of air: Classification of elements, chemical speciation. Chemical processes for formation of inorganic and organic particulate matter. Thermochemical & photochemical reactions in the atmosphere. Oxygen & ozone depletion , photochemical smog. Water chemistry: chemistry of water, concept of DO, BOD, COD, Sedimentation, coagulation, filtration, Redox potential. Toxic chemicals in the environment air & H₂O : Pesticides in H₂O. Biochemical aspects of Arsenic, cadmium, Mercury, carbonmonoxide, O₃, carcinogens in the air.

UNIT – III ENVIRONMENTAL BIOLOGY

Definition, Principles & Scope of ecology. Evolution, origin of life & Speciation. Ecosystems: Structure & functions, abiotic & Biotic components, Energy flow, food chains, food web & Ecological pyramid. Common flora & fauna in India: (i) Aquatic: Phytoplankton, Zooplankton & Macrophytes. (ii) Terrestrial: Forests. Endangered & Threatened species.

UNIT – IV ENVIRONMENTAL POLLUTION & CONTROL

Air: Natural & anthropogenic sources of pollution, primary & Secondary pollutants. Effects of pollutants on human beings, plants, animals, materials & on climate. Methods of monitoring & control of air pollution. Water: Types, sources of H₂O pollution, physico-chemical & bacteriological sampling & analysis of H₂O quality, water borne diseases. Waste water treatment & recycling. Noise: Sources of noise pollution, Measurement of noise & indices. Noise exposure levels & standards. Noise control & abatement measures. Impact of noise on human health. Marine: Sources of marine pollution & control. Radioactive & Thermal Pollution.

UNIT – V ENVIRONMENTAL MANAGEMENT, LAWS & POLICIES

Sources & generation of solid wastes. Different methods of disposal & management of solid wastes (Hospital wastes & Hazardous wastes). Environmental Policy Resolution, Legislation, Wildlife protection Act, 1972 amended in 1991, Forest conservation Act, 1980. Air (Prevention & control of pollution) Act, 1981. The water (Prevention & control of pollution) Act 1974. Environmental education & Awareness. Global Environmental Problems – Ozone depletion, global warming & climatic change. Rain water Harvesting. Waste Lands & their reclamation. Epidemiological issues (Goitre, Fluorosis, Arsenic). Bio-diversity conservation & Agenda-21.

Reference:

1. Sharma, P.D. Ecology & Environment – Meerut: Rastogi Publications, Meerut, 1990.
2. Manivasakam, "Environmental Pollution", New Delhi, Natural Book Trust of India, 1984.
3. Dara. S.S. - Text Book of Environmental chemistry & Pollution control. S.Chand & Company.
4. Sharma. B.K. – Environmental Chemistry, Goel Publishing House.
5. Biswarup Mukerjee. Environmental Biology.
6. Dr. Ifthikarudeen et al., Principles of Environmental Science & Engineering, Sooraj Publications, May 2005.

Solid Waste Management

Course/Paper: 01MPL10103

Year-I

UNIT1: INTRODUCTION

Sewage and sewer, Sewage characteristics – physical, chemical and bacteriological.

UNIT II: SEWAGE

Classification of sewage – treatment – preliminary, primary and final – Sewage treatment methods – and disposal and dilution techniques – Construction and working of oxidation pond and ditches.

UNIT – III: SEWAGE TREATMENT PLANT

Physical, chemical and biological methods for treating solid waste. Treatment of municipal solid waste

UNIT-IV SLUDGE TREATMENT

Type of sludge – sludge digestion – Thickening and drying – Collection-Transportation. Disposal of solid wastes – Choice of disposal methods – Disposal without water carriage system – Integrated solid waste management

UNIT – V BIOMEDICAL WASTES

Sources, effects and control measures of biomedical wastes,. Colour coding of biomedical wastes. Disposal of biomedical waste-Collection – Labeling – Storage – Transportation and disposal of biomedical wastes.

REFERENCES:-

1. Gilbert M. Masters, “Introduction to Environmental Engineering and Science”, Peason Education, New Delhi.
2. S. K. Garg, “Sewage Disposal and Air Pollution Engineering”, Khanna Publishers, New Delhi.
3. A. K. Chatterjee. “Water Supply, Water Disposal, Environmental Pollution Engineering”, Khanna Publishers, New Delhi.

DISSERTATION

Course/Paper: 01MPL10201

Year-I

Marks -100

Each student will submit dissertation on any one topic related to Env.Science. Dissertation will be guided by supervisor of the university and will be examined by external.