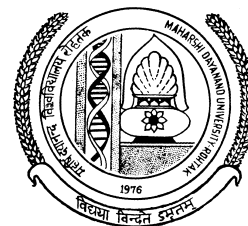


Maharshi Dayanand University Rohtak



Ordinance, Syllabus and Courses of Reading for M.Sc. Environmental Science (3rd & 4th Semester) Examination

Session - 2009-2010

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SYLLABUS**M.SC. ENVIRONMENTAL SCIENCE**

Semester -1	Full nomenclature of paper	Max. Marks
ENV-201	Environmental Biology	80
ENV-202	Environmental Chemistry	80
ENV-203	Concept of Environmental Sciences	80
ENV-204	Environmental Pollution	80
ENV-205	Environmental Modeling and Biostatistics	80
	Seminar - 1	50
	Lab course 1	150
	Internal Assessment	20 in each theory paper
	Total Marks (Semester-1)	700

Semester - II

ENV-206	Elementary concept of Physical Environmental	80
ENV-207	Environmental management and planning	80
ENV-208	Natural Resources	80
ENV-209	Environmental Geology	80
ENV-210	Environmental Laws	80
	Seminar - II	50
	Lab course II	150
	Internal Assessment	20 in each theory paper
	Total Marks (Semester - II)	700

Semester -III	Full nomenclature of paper	Max. Marks
ENV-211	Resource Management	80
ENV-212	Solid Waste Management	80
ENV-213	Environmental Toxicology	80
ENV-214	Instrumentation for Environmental Analysis	80
ENV-215	Concept of Biochemistry	80
	Seminar - III	50
	Lab course III	150
	Internal Assessment	20 in each theory paper
	Total Marks (Semester-III)	700

Semester - IV

ENV-216	Environmental Impact Assessment	80
ENV-217	Environmental Microbiology	80
ENV-218	Remote sensing and GIS	80
ENV-219	Agriculture and Environment	80
ENV-220	Biodiversity	80
	Seminar - IV	50
	Lab course IV	150
	Internal Assessment	20 in each theory paper
	Total Marks (Semester - IV)	700

M.SC. ENVIRONMENTAL SCIENCE
SEMESTER - III

M.M. : 80

Time : 3 Hrs.

ENV - 211 Resource Management

- Note :** 1. Nine questions will be set in all.
 2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Resource management meaning & concept, management of rangelands & watersheds, management of Agricultural system

Unit - 2

Management of waste resources, Management of forests, effects of deforestation.

Management of fresh water ecosystem conservation strategies for non-renewable energy resources

Unit - 3

Wildlife Management & conservation efforts for threatened species, Water Management Ganga Action Plan, Yamuna Action Plan, Environmental priorities in India

Unit- 4

Reclamation & Management of waste lands, soil erosion, soil conservation, rural planning & land use pattern. Sustainable development, urban planning for India, Land use policy for India.

References :

1. Natural resources conservation -Oliver Ss. Owen.
2. Living of environment - T.J. Miller
3. Ecology of Natural resources - Ramade
4. Environmental Science- Cunningham Saigo
5. Restoration of degraded lands- J.S. Singh

M.SC. ENVIRONMENTAL SCIENCE
SEMESTER - III

M.M. : 80

Time : 3 Hrs.

ENV - 212 Solid Waste Management

- Note :** 1. Nine questions will be set in all.
 2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Sources, generation, classification & composition of solid wastes. Solid waste management methods - Sanitary land filling, Recycling, Composting, Vermi composting, Incineration, energy recovery from organic waste.

Unit - 2

Solid Waste Management Plan. Waste minimization technologies. Hazardous Waste Management, Sources & Classification, physicochemical properties, Hazardous Waste Control & Treatment.

Unit - 3

Hospital Waste Management. Hazardous Waste Management & Handling rules, 1989 & 2000 (amendments)

Unit- 4

Disaster Management. Fly ash generation & utilization, Primary, secondary & tertiary & advance treatment of various effluents.

References :

1. Solid Waste Management CPCB. New Delhi.
2. Ecotechnology for pollution control & environmental management - By R.K. Trivedi & Arvind Kr.
3. Basic Environmental Technology - J.A. Nathanson.

**M.SC. ENVIRONMENTAL SCIENCE
SEMESTER - III**

M.M. : 80

Time : 3 Hrs.

ENV - 213 Environmental Toxicology

- Note :** 1. Nine questions will be set in all.
2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight question will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Toxic chemicals in the environment - air, water & their effects. Pesticides in water. Biochemicals aspects of arsenic, cadmium, lead mercury, carbon monoxide, OZONE & PAN pesticide.

Unit - 2

Mode of entry of toxic substance, biotransformation of xenobiotics detoxification. Carcinogens in air, chemical carcinogenicity, mechanism of carcinogenicity. Environmental carcinogenicity testing.

Unit - 3

Insecticides, MIC effects. Concept of major, trace & REE-possible effects of imbalance of some trace elements

Unit- 4

Biogeochemical factors in environmental health. Epidemiological issues goiter, fluorosis, arsenic poisoning.

References :

1. Environmental chemistry - Sodhi
2. Principals of Environmental chemistry - Manhan
3. Environmental hazards & human health R.B. Philip
4. Toxicology - principles & applications - Niesink & Jon devries
5. Parasitology - Chatterjee
6. Preventive & Social medicines - Perk

**M.SC. ENVIRONMENTAL SCIENCE
SEMESTER - III**

M.M. : 80

Time : 3 Hrs.

ENV - 214 Instrumentation for Environmental Analysis

- Note :** 1. Nine questions will be set in all.
2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Principles and application of Spectrophotometry (UV-Visible spectrophotometry), Titrimetry, Gravimetry, Colourimetry, NMR, ESR, Microscopy-phase, light and fluorescence microscopes, Scanning and Transmission electron microscopes.

Unit - 2

Chromatographic techniques (Paper chromatography, thin layer chromatography, ion exchange chromatography, Column chromatography), Atomic absorption spectrophotometry.

Unit - 3

Electrophoresis, solid and liquid scintillation, X-ray fluorescence, X-ray diffraction. Flame photometry, Gas-liquid chromatography, High pressure liquid chromatography - auto radiography, Ultracentrifugation.

Unit- 4

Methods for measuring nucleic acid and protein interactions, DNA finger printing Molecular markers RFLP, AFLP, RAPD, Sequencing of proteins and nucleic acids, southern, northern, western blotting techniques, PCR polymerase chain reaction.

References :

1. Principles of Biophysical chemistry - Uppadahay -Uppadahay - and Nath.
2. Analytical Techniques - S.K. Sahani

M.SC. ENVIRONMENTAL SCIENCE**SEMESTER - III****M.M. : 80****Time : 3 Hrs.****ENV - 215 Concept of Biochemistry**

- Note :**
1. Nine questions will be set in all.
 2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Organisation of Biomolecules, Buffers, Principle and biological application of diffusion osmosis, viscosity and Donnan membrane equilibrium. Carbohydrates : structure and classification of carbohydrates, metabolism of carbohydrates : glycolysis, TCA cycle HMP pathways.

Unit - 2

Lipids : Classification, structure and nomenclature of lipids, Biological significance of lipids, physico-chemical properties of fatty acids and triacyl glycerol.

Unit - 3

Amino acids : classification, structure and nomenclature of amino acids, physico-chemical properties of amino acids. proteins: confirmation of proteins and polypeptides secondary, tertiary and quaternary and domain structure of proteins, denaturation of proteins and Ramchandran plots.

Unit- 4

IUB Classification and nomenclature of enzymes, general properties of enzymes, enzyme kinetics- Michaelis Menten equations, Coenzymes - structure and biological function of coenzymes A, TPP, FMN, FAD, NAD and lipoic acid, structure of purine and pyrimidine bases, nucleosides and nucleotides. Primary structure of nucleic acid, Structural polymorphism of DNA and RNA, Three dimensional structure of t-RNA.

References :

1. Principles of Biochemistry Lehninger.

M.SC. ENVIRONMENTAL SCIENCE
SEMESTER - IV

M.M. : 80

Time : 3 Hrs.

ENV - 216 Environmental Impact Assessment

- Note :**
1. Nine questions will be set in all.
 2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Introduction to environment impact analysis, Environmental impact statement and Environmental management plan, ISO14000, EIA guidelines 1994, Notification of Govt. of India.

Unit - 2

Impact assessment methodologies, Generalized approach to impact analysis. Case study : EIA of some dam, procedure for reviewing Environmental impact analysis and statement.

Unit - 3

Guidelines for Environmental Audit, Baseline information and prediction (land, water, atmosphere, energy), Restoration and rehabilitation technologies.

Unit- 4

Risk analysis - definition of risk, Environmental risk analysis, risk assessment and risk management, Basic steps in risk assessment -

hazard identification, dose- response assessment, exposure assessment, Risk characterization.

References :

1. Environmental Impact Assessment- John Glasson.
2. Methods of Environmental Impact Assessment - Morris and the rivell.
3. Environmental Impact Assessment - L. W. Canter.
4. Chemical principles of Environmental pollution - Lalloway and Ayers.
5. Industrial Environment - Assessment and strategy - S.K. Aggarwal

M.SC. ENVIRONMENTAL SCIENCE**SEMESTER - IV****M.M. : 80****Time : 3 Hrs.****ENV - 217 Environmental microbiology**

- Note :**
1. Nine questions will be set in all.
 2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Microbiology- organisms in nature & their importance, sampling, culture & cultivation of microorganisms, microbes in service of nature & mankind. Batch culture & continuous culture of microbes for commercial use.

Unit - 2

Microbial Reactors, genetically modified microbes & their uses in Environmental management recycling & up gradation technologies. Production of products, energy from waste.

Unit - 3

Biogas technology, plant design, construction, operation, biogas from organic wastes, water weeds, landfills, microbiology of anaerobic fermentation

Unit- 4

Biotransformation, bioconversion, bioremediation, phytoremediation technology fermentation technology, development of stress tolerant plants, Environmental problems & Environmental monitoring through microorganism.

References :

- Principles of microbiology - Pelzar
- Microbial bio technology - A.N. Glazer
- Microbial ecology - R.M. Atlas
- Molecular biology - H.D. Kumar
- Environmental bio Technology - Sayler & Fox

M.SC. ENVIRONMENTAL SCIENCE**SEMESTER - IV****M.M. : 80****Time : 3 Hrs.****ENV - 218 Remote sensing and Geographical Information**

- Note :**
1. Nine questions will be set in all.
 2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Definition, Introduction and scope of remote sensing. Electromagnetic radiation, atmosphere window, Platforms, Sensors and type of scanning systems. Basic characteristics of sensors; salient features of sensors used in LANDSAT, SPOT and Indian remote sensing satellites.

Unit - 2

Aerial photography- vantage point, cameras, Filters and types of films. Elements of visual image interpretation. Multispectral Remote sensing, Microwave Remote sensing, Photogrammetry - Introduction, Stereo- scopic vision, Projection types.

Unit - 3

Digital image and image structure, Image restoration and image and image enhancement. Image classification. Remote sensing application in Forestry, Ecology and environment, Landuse, Agriculture, soils and geology, Disaster management.

Unit- 4

GIS technology and its uses in environmental science, Hardware and software requirement for GIS. Conceptual model of spatial information, Conceptual model of non spatial information. GPS.

References :

1. Introduction to Environmental remote sensing - Curtis
2. Principles of Remote sensing - Lily and Kliffner.
3. Remote sensing of the Environment - Jenson.

M.SC. ENVIRONMENTAL SCIENCE**SEMESTER - IV****M.M. : 80****Time : 3 Hrs.****ENV - 219 Agricultural and environment**

- Note :**
1. Nine questions will be set in all.
 2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Agricultural ecosystem, sustainable Agriculture, organic farming and eco farming

Agroforestry, Social forest, dryland Agriculture and zero tillage.

Unit - 2

Irrigation practices - tank, canal sprinkler and their merits and demerits, Water Logging, environmental impact of multipurpose projects.

Unit - 3

Pesticides - classification, pesticides resistance, Biology and ecology of pest control Integrated Pest Management, pesticide safety, alternative sources of fertilisers- biofertilisers, vermicomposting and crop residue.

Unit- 4

Weather and crop productivity - impact of global warming in Agriculture and food security, green, blue and white revolution, synthetic fertilizers and their impact on Agriculture

References :

1. India - A comprehensive geography - D.R. Khuller
2. Sustainable Agriculture - H.R. Sharma
3. Global Climate change - Pary Martin
4. Environmental and Agriculture - Dhaliwal and Jai Rath and Hansra

M.SC. ENVIRONMENTAL SCIENCE**SEMESTER - IV****M.M. : 80****Time : 3 Hrs.****ENV - 220 Biodiversity**

- Note :** 1. Nine questions will be set in all.
2. Question No. 1 will be objective covering the entire syllabus & compulsory. The remaining eight questions will be set with two questions from each unit. The candidate will be required to attempt five in total, Question 1 and four by selecting one from each section.

Unit - I

Biodiversity - definition, hot spots of Biodiversity, strategies for Biodiversity

Conservation, National Parks, Sanctuaries and Biosphere reserves, gene pool

Unit - 2

Aquatic common flora and fauna in India - phytoplankton, zooplankton and macrophytes terrestrial common flora and fauna in India - forests, endangered and threatened species.

Unit - 3

Strategies for Biodiversity Conservation, cryopreservation, gene banks, tissue culture and artificial seed technology new seed development policy 1988, conservation of medicinal plants.

Unit- 4

International conventions, treaties and protocols for Biodiversity Conservation Biodiversity in the welfare of mankind.

References :

1. Global Biodiversity - W.R. L.IUCN
2. Ecology of natural resource - Ramade
3. Ecology - P.D. Sharma