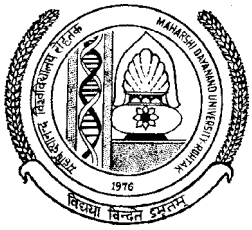
Maharshi Dayanand University
Rohtak



Ordinances, Syllabus and Courses of Reading for M.Sc. Environmental Science Examination

Session 2008-2009

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SCHEME OF EXAMINATION
M.SC. ENVIRONMENTAL SCIENCE

Semester-I	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 modelling and biostatistics	80
	Seminar - I	50
	Lab Course I	150
Internal Assessement		20 in each theory paper
Total Marks (Semester-1)		**700**

Semester-II	Full nomenclature of paper	Max. Marks
ENV-206	Elementary concept of physical Environment	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 Assessement		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 Assessement		20 in each theory paper
Total Marks (Semester-III)		**700**

Semester-IV	Full nomenclature of paper	Max. Marks
ENV-216	Environmental impact assessement	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 Assessement		20 in each theory paper
Total Marks (Semester-IV)		**700**

M.Sc. Environmental Science

Semester-I

ENV - 201 Environmental Biology

Max. Marks : 80
Time : 3 Hours.

Note

1. Nine questions will be set in all.
2. Question No. 1 will be objective covering th 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 I and four by selecting one from each section.

UNIT - I

Definition, principles and scope of ecology, human ecology and human settlements, evolution, origin of life and specification, Ecosystem stability-cybernatics and ecosystem regulation, evolution of biosphere

UNIT - II

Eco system structure and functions, abiotic and biotic component. Energy flow, food chain, food web, Ecological Pyramids-types, biogeochemical cycles, ecological succession, Ecads and ecotypes.

UNIT - III

Population ecology- density, natality, mortality, survivorship curves, age distribution, growth curves and models .r & k selection, population interactions-

Mutualism, Parasitism, Predator- Prey relations, System Theory and Ecological Model.

UNIT - IV

Earths major ecosystem - terrestial and aquatic ecosystem, soil microorganism and their functions, coastal management, criteria employed for disposal of pollutants in marine ecosystem.

References

1. Basic ecology - E. P. Odum
2. Ecology and field biology - R.L. Smith
3. Ecology - P.D. Sharma
4. Fundamentals of ecology -E.P. Odum
5. Principles of ecology - Rickleff

M.Sc. Environmental Science

Semester-I

ENV - 201 Environmental Chemistry

Max. Marks : 80
Time : 3 Hours.

Note

1. Nine questions will be set in all.
2. Question No. 1 will be objective covering th 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 I and four by selecting one from each section.

UNIT - I

Stochiometry, Gibb's energy, Chemical potential, Chemical equilibria, acid-base. reactions. Solubility product, solubility of gases in water, the carbonate system, unsaturated and saturated hydrocarbons, Radionuclides.

UNIT - II

Classification of elements, chemical speciation, Particles, ions and radicals in the atmosphere. Chemical processes for formation of inorganic and organic particulate matter. Thermochemical and photochemical reactions in the atmosphere.

UNIT - III

First law of thermodynamics, enthalphy, adiabatic transformations, second law of thermodynamics, Carnot's cycle, entropy, Gibb's free energy, chemical potential, phase equilibria, Gibb's Donnan equilibrium, third law of thermodynamics, enzymes catalysis, Michaelis/ Menten equation.

UNIT - IV

Oxygen and ozone chemistry, Chemistry of air pollutants, Photochemical Smog, Chemistry of water, concept of D.O., B.O.D., and C.O.D. Water treatment : Sedimentation, Coagulation, Filtration, tertiary and advanced treatment. Redox potential. Inorganic and organic components of soil, nitrogen pathways and NPK in soils.

References

1. Environmental Chemistry - G.S. Sodhi
2. Environmental Chemistry - Mannhan
3. Fundamantals of soil science - Henry D. Futh
4. Textbook of limnology - G.A. Cole
5. Environmental Chemistry - Sharma and Kaur

M.Sc. Environmental Science

Semester-I

ENV - 203 Concept of Environmental Sciences

Max. Marks : 80

Time : 3 Hours.

Note

1. Nine questions will be set in all.
2. Question No. 1 will be objective covering th 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 I and four by selecting one from each section.

UNIT - I

Composition of atmosphere, vertical and horizontal distribution of temperature, Relationship of earth with sun, Insolation and heat budget of earth atmospheric system.

UNIT - II

Winds, Coriollis force, Global pressure belt system, Monsoons, Lapse rates, Vertical stability of atmosphere, Humidity and precipitation, Cyclones and anticyclones, Mixing heights, Wind roses.

UNIT - III

Classfication of aquatic systems, Salient features of lentic, lotic and marine systems, ocean deposits, ocean wave, currents, tides, Marine biology, coral reefs, Ice sheet and sea level changes.

UNIT - IV

Global warming, Ozone hole, Western disturbances, El-nino, La-nino, Green house gases and their effects, Environmental ethics, History of climate change, Milanckovitchs theory of climate change.

References

1. Climatology - D.S. Lal
2. Physical geography - Savinder Singh
3. Oceanography - Sharma and Vattal
4. The Atmosphere an introduction - F.K. Lutagens

M.Sc. Environmental Science
Semester-I
ENV - 204 Environmental Pollution

Max. Marks : 80
Time : 3 Hours.

Note

1. Nine questions will be set in all.
2. Question No. 1 will be objective covering th 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 I and four by selecting one from each section.

UNIT - I

Air pollution- natural and anthropogenic sources of pollution, primary and secondary pollutants, transport and diffiusion of pollutants, gas laws governing the behaviour of pollutants in the atmosphere. Methods of monitoring and control of air pollution, SO_2, NO_x, CO, SPM.

UNIT - II

Water pollution - types sources and consequences of water pollution, physico chemical and bacteriological sampling. Analysis of water quality, standards, sewage and wastewater treatment and recycling, water quality and standards.

UNIT - III

Soil pollution chemical and bacteriological sampling as analysis of soil quality, soil pollution ontrol industrial waste effluents and heavy metals and their intreactions with soil components.

UNIT - IV

Noise pollution - sources of noise pollution, measurement and indices. Marine pollution, sources of marine pollution and its control. Effects of pollutants on human beings, plants, animals and climate. Air quality standards and air pollution.

References

1. Air pollution and control - K.V.S.G. Murlikrishan
2. Industrial noise control - Bell & Bell
3. Environmental engineering -Peary
4. Introduction to environmental engineering and science - Gilbert Masters.

M.Sc. Environmental Science

Semester-I

ENV - 205 Environmental modelling and Biostatistics

Max. Marks : 80

Time : 3 Hours.

Note

1. Nine questions will be set in all.
2. Question No. 1 will be objective covering th 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 I and four by selecting one from each section.

UNIT - I

Measurement of central tendency - mean (Geomatric and Harmonic), median, mode, Measurement of dispersion moments, standard deviation, skewness and kurtosis. Correlation and linear regression of one independent variable, Basic laws and concepts of probability

UNIT - II

Definition of random variable, density function, Basic concepts of binomial and normal distributions. Sampling measurement and distribution of attributes. Moments, matrics and simultaneous linear equations, tests of hypothesis and significance.

UNIT - III

Role of modelling in environmental sciences, Model classification deterministic models, stochastic models, steady

state models, dynamic models. Different stages involved in model building. Simple microbial growth kinetics monod equation. Methods for formulation of dynamic balance equations mass balance procedures.

UNIT - IV

Models of population growth and interactions Lotka Volterra model, Leslies matrix model, Point source stream pollution, Box model, Gaussian plume model, Linear, simple and multiple regression models, validation and forecasting.

References

1. Dynamics of Environmental Bioprocesses-Modelling and simulation-Snape and Dunn.
2. Environmental Modeling - Jorgensen.

M.Sc. Environmental Science

Semester-II

ENV - 206 Elementary Concept of Physical Environment

Max. Marks : 80

Time : 3 Hours.

Note

1. Nine questions will be set in all.
2. Question No. 1 will be objective covering th 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 I and four by selecting one from each section.

UNIT - I

Definition, Principles and scope of Environmental Science. Earth, Man and Environment, Ecosystem, Pathways in Ecosystems, Physico- chemical and biological factors in the Environment.

UNIT - II

Geographical classification and zones. Structure and

composition of Biosphere. General relationship between landscapes, biomes and climates.

UNIT - III

Primary differentiation and formation of core, mantle and crust. Igneous, sedimentary and metamorphic rocks, weathering, erosion, transportation and deposition of earth's material by running water, wind and glaciers.

UNIT - IV

Mass and energy transfer across the various interphases, Material Balance Heat Transfer processes, scales of Meteorology, various kinds of lapse rates, vertical stability of atmosphere, cloud classification & formation.

References

1. Ecology - P.D. Sharma
2. Concepts of physical environment- Savinder Singh
3. The Atmosphere- an Introduction- F.K. Lutagens
4. Atmospheric weather and climate - Navarra.

M.Sc. Environmental Science

Semester-II

ENV - 207 Environmental Management and Planning

Max. Marks : 80

Time : 3 Hours.

Note

1. Nine questions will be set in all.
2. Question No. 1 will be objective covering th 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 I and four by selecting one from each section.

UNIT - I

Role of NGO's public partcipation in environmental movements, Concepts of Enviornmental education and

awareness Internationals environmental initiatives - the club of Rome report, Stockholm Declaration, environmental ethics.

UNIT - II

Vehicular pollution and urban air quality, Fly ash utilization, Eutrophication and restoration of Indian lakes, Wet land conservation, Water crisis-conservation of water. Narmada dam, Tehri dam, Almetti dam.

UNIT - III

Basic concepts of environmental planning, Environmental priorities in India, Land use planning : The land use plan (India). Soil surveys in relation to land use planning. Methods of site selection and evaluation, global imperatives, soil erosion, Formation and reclamation of Usar, alkaline and saline soil, waste lands and their reclamation, Desertification and its control.

UNIT - IV

Urban planning and rural planning for India. Sustainable development- principles and practices in relation to economics and ecology. Cost-benefit analysis- its relevance. Ramsar convention on wetlands, Vienna convention and Montreal Protocol, Kyoto protocol, Earth Summit, Agenda-21.

References

1. Natural Resource Conservation Owen and Chiras.
2. Environmental planning, policies and programs in India - K.D. Saxena.
3. Conservation Ecology- G.W.Cox.
4. Global Biodiversity - W.R. L. IUCN

M.Sc. Environmental Science

Semester-II

ENV - 208 Natural Resources

Max. Marks : 80
Time : 3 Hours.

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 I and four by selecting one from each section.

UNIT - I

Sun as a source of energy, solar radiations and its spectral characteristics fossil fuels-classification, composition,physico- chemical characteristics and energy content of coal, petroleum and Natural gas.

UNIT - II

Principles of generation of hydroelectric power, tidal power, thermal energy conversion, wind, geo thermal energy, solar collectors, photovoltaics, solar ponds, oceans.

UNIT - III

Nuclear energy- fission and fusion, bio energy -energy from biomass and biogas, anaerobic digestion, energy use patterns in different parts of the world. Impacts of large scale exploition of solar, wind, hydro ad ocean energy.

UNIT - IV

Mineral resources and reserves, ocean ore and recycling of resources, Environmental impact of exploitation, processing and smelting of Mineral, oceans as need areas for exploitation of Mineral resources.

References

1. Living in the environmental - T.J. Miller.
2. Natural resource conservation - Owen & Chiras.
3. Encyclopedia Energy - I & II.

M.Sc. Environmental Science

Semester-II

ENV - 209 Environmental Geology

Max. Marks : 80
Time : 3 Hours.

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 I and four by selecting one from each section.

UNIT - I

Earth processes, Geological cycle, Tectonic cycle, Rock cycle, Hydrological cycle, Biogeochemical cycles, Special problems of time and scale in geology, concept of residence time and rates of natural cycles.

UNIT - II

Catastrophic geological hazards, Prediction and perception of the hazards and adjustment to hazardous activities.

UNIT - III

River flooding- causes, nature and frequency of floods. Landslides- causes, intensity and magnitude. Volcanism- nature extent and causes, Volcanism and climate. Avalanches causes and effects.

UNIT - IV

Mineral and human use, geology of mineral resources, EIA of mineral development, recycling of mineral resources.

References

1. Environmental geology- Edward A. Keller
2. Physical geology - C.W. Montgomery.
3. Geology of India - National book trust series.

M.Sc. Environmental Science
Semester-II

ENV - 210 Environmental Laws

Max. Marks : 80
Time : 3 Hours.

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 I and four by selecting one from each section.

UNIT - I

Scheme of lebeling of environmentally friendly products (ecomark). Public liability Insurance Act. 1991. Provision of constitution of India regarding environment (article 48 A & 58A).

UNIT - II

Environmental policy resolution, legislation, public policy strategies in pollution control. Wild life protection act, 1972 amended 1991. Forest conservation act, 1980. Indian forest act (revised) 1982.

UNIT - III

Air (prevention & control of pollution) Act 1981 as amended by amendment 1997 & rule 1992. Motor vehicle act, 1988, The environment (protection) Act, 1986, rules 1986.

UNIT - IV

The water (prevention & control of pollution) Act, 1974 as amended up to 1988 & rules 1975. Environment protection-issues & problems, international & national efforts for environment protection, provision of constitution of India regarding environment (Article A & 58 A).

References

1. Environmental administration & law - Paras Diwaa.
2. Environmental planning, policies & programs in India-1- K.D. Saxena.