Syllabus Outline: Environmental Studies [CHM1203]

Unit 1 ECOLOGY AND BIO-DIVERSITY

1.1 Ecology & Ecosystem

1.2 Fundamentals of Ecosystem: Ecological succession, Food Chain & Food Web, Ecological Pyramids

1.3 Ecosystem Functions: Productivity, Decomposition, Energy flow Models (single & double channel), Nutrient Cycling- Biogeochemical Cycles

1.4 Bio-diversity: Genetic, species & Ecosystem diversity, Mega Diversity Zones, Biodiversity Hot Spots, Biogeographic classification of India, Values & Services of Biodiversity, Threats to Biodiversity, Conservation of Biodiversity: In-Situ & Ex-Situ Conservation

1.5 Case Study

Unit 2 ENVIRONMENT AND NATURAL RESOURCES

2.1 Environment: Components & types, Earth's Environment- Atmosphere, Lithosphere, Hydrosphere & Biosphere

2.2 Renewable and Non-renewable Resources, Natural resources and associated problems

2.3 Study of major Resources on Earth (overview): Forest Resources, Water Resources, Mineral Resources, Food Resources, Energy Resources & Land resources

Unit 3 ENVIRONMENTAL POLLUTION

3.1 Introduction, Causes of Environmental degradation. Atmosphere - Structure, composition, temperature variation & functions, Energy Balance & Green House Effect, Enhanced Green House Effect

3.2 Air pollution : Classification, Sources & effect of air Pollutants- Primary & Secondary

3.3 Stratospheric Ozone: Importance, Natural formation & destruction, Ozone layer Depletion & effects

3.4 Atmospheric Stability: Lapse Rate, Temperature inversion- Subsidence & Radiation Inversion: Cause, Consequences of Temperature Inversion

3.5 Air Pollution Control: Ambient Air Quality Standards, Approaches for air pollution control- preventive & controlling strategies, Principles of air pollution control

3.6 Control Techniques for Gaseous Air Pollutants: Absorption, Adsorption, Combustion

3.7 Control Techniques for Particulate Air Pollutants: Gravity Settling Chamber, Electrostatic Precipitator, Cyclone collector, Fabric Filter/ Bag House, Scrubber

3.8 Water Pollution: sources- point & non-point, classification. Eutrophication, Trace element contamination

3.9 Water Quality measurement: Dissolved Oxygen (DO), Bio chemical Oxygen Demand (BOD), Chemical Oxygen Demand(COD)

3.10 Waste water management: Objective & Steps- Preliminary, Primary, Secondary & Tertiary Treatment

3.11 Soil Pollution: Lithosphere - importance & functions, Soil formation, composition & Profile

3.12 Sources of Soil pollution, soil pollutants-Agricultural, Industrial, Urban & Hazardous Waste
3.13 Solid Waste Management (SWM): Solid Waste, classification & impacts, SWM: objective, process, strategy, steps & disposal
3.14 Disposal Techniques for Solid Waste: Open Dumping, Sanitary Land Filling, Thermal Pyrolysis, Composting
3.15 Noise, Thermal & Radioactive Pollution
3.16 Case Study

Unit 4 Social Issues and the Environment

4.1 Urban problems related to energy: Urban residential energy demand, Urban industrial energy demand, Consequences of increasing energy demand
4.2 Sustainable development: Models, Indicators, Principles, Key issues and priorities of sustainable development
4.3 Water conservation-rain water harvesting, Watershed management, Problems related to rehabilitation
4.4 Wasteland reclamation, consumerism and waste products
4.5 Environment protection act air, water conservation act, Wildlife and forest conservation act, Environmental legislation and public awareness

Unit 5 Human Population & Environment

5.1 Population Growth, Variation Among Nations
5.2 Population explosion—Family Welfare Programme
5.3 Environment and human health: Environmental health, Climate & health, Infectious Diseases, Water related diseases, Risks due to chemicals in Food
5.4 Human rights, Role of Information Technology in environment and human health

Assessment Outline

Component	Weightage (%)
Quizzes & home work	20
Mid semester exam	30
End semester exam	50

Exam Question paper specifications

Component	Weightage (%)	Duration		Format
		Mid sem	End sem	
Sec-A	20	30 min	30 min	30 very short answer type questions
Sec-B	30	1 hour 30 min	2 hour 30 min	Short answer questions (All compulsory)
Sec-C	50			Two extended-response questions from a choice of three questions (mid sem) and four questions (end sem)

RESOURCES AND REFERENCES

Text books:

1. Kurian Joseph & R. Nagendran, "Essentials of Environmental Studies", 1st Edition, Pearson Education, 2004.
2. A.K. Dey “Environmental Chemistry” (New Age International Publishers).
3. Smriti Srivastava. “Environment & Ecology” S.K. Kataria & Sons, New Delhi
4. SS Dara & DD Mishra, Environmental Chemistry & pollution control, S. Chand & Company Ltd., 2012

References books:

1. Keerthinarayana & Daniel Yesudian, "Environmental Science and Engineering", 1st Edition, Hi-Tech publications, 2004.
2. Erach Bharucha, “A Text Book for Environmental Studies”, Text Book of University Grants Commission, 2004.
3. Peavy, H.S., D.R. Rowe & T.George, “Environmental Engineering”, New York: Mc Graw Hill, 1987.
4. Metcalf & Eddy, "Wastewater Engineering: Treatment and Reuse", New Delhi, Tata McGraw Hill, 2003.
5. Principles of Environmental Science Inquiry & Applications by W.P. Cunningham & Mary Ann Cunningham (Tata Mc Graw Hill Publishing Company Ltd.).

Online Resources:

1. http://ourworldindata.org/data/population-growth-vital-statistics/world-population-growth/2
2. http://www.howmany.org/big_picture.php
3. http://www.powershow.com/view/3bbe79-NGIxM/Hazardous_Waste_Training_Environmental_Health_Safety_May_powerpoint_ppt_presentation
4. http://www.who.int/topics/environmental_health/en/
5. http://www.livestrong.com/article/497730-bad-effects-of-chemicals-in-our-food
6. https://www.plannedparenthood.org/learn/stds-hiv-safer-sex/hiv-aids
7. http://www.slideshare.net/contactnitika1/women-and-child-welfare
8. http://agridr.in/tnauEAgri/eagri50/ENVS302/pdf/lec17.pdf
9. http://www.yourarticlelibrary.com/essay/role-of-information-technology-in-environment-and-human-health/30230/