

**VEER NARMAD SOUTH GUJARAT UNIVERSITY
SURAT**

B. Sc. ENVIRONMENTAL SCIENCE

Semester - IV

SYLLABUS

With Effect from 2016-17

Semester IV
CORE - I
PAPER – II

Env 402 : ENVIRONMENTAL SCIENCE – IX
(WATER RESOURCES)

OBJECTIVES: *The paper intends to deal with various water resources like ground water, surface water including sea water their uses, overuses, conservation, recharging and desalination.*

		Total Hours: 30
UNIT 1	Introduction of Water Resources	08 Hours
1.1	Indian Scenario	
1.2	Characteristics of water: physical, chemical and biological	
1.3	Uses of water	
1.4	Overuses of water	
1.5	Water scarcity	
1.6	Conservation of water	
1.7	Rain water harvesting	
UNIT 2	Ground water	06 Hours
2.1	Sources of ground water	
2.2	Terms related to ground water	
2.3	Groundwater movements	
2.4	Effects of overuse of ground water	
2.5	Ground water recharging	
2.6	Significance and strategies of ground water management	
UNIT 3	Surface water-1 (fresh water)	09 Hours
3.1	Surface water sources (lakes, ponds, reservoir, rivers and streams)	
3.2	Terminology in freshwater	
3.3	Problems related with overuse of surface water	
3.4	Chemical composition of surface water	

- 3.5 Dynamics and interactions of some major elements in an aquatic ecosystem
- 3.6 Complexation in natural water
- 3.7 Biological diversity in fresh water

UNIT 4 Surface Water-2 (marine & brackish)

07 Hours

- 4.1 Marine water sources (estuaries, sea)
- 4.2 Chemical composition of sea water
- 4.3 Sea water equilibrium
- 4.3 Sea water model
- 4.4 Desalination of brackish water
- 4.5 Biological diversity in marine water

References:

1. Environmental Chemistry, Kaur H, 8th Edition , 2014, Pragati Prakashan
2. Environmental Studies, Rethaliya R.P. , Patel F.M. , Vaidya V.H.
2nd Edition, 2015, Atul Prakashan
3. Marine Biology, Roy D.,1st Edition, 2014, Random Publication
4. Basics of Environmental Studies, Shroff R.B., 1st Edition, 2010, New Popular Prakashan
5. Engineering Chemistry, Jain P. & Jain M., 2011 – Reprint, Dhanpat Rai Publishing
6. Environmental Chemistry, Sharma B.K, 9th Edition,2005, Krishna Prakashan
7. Environmental Studies, Shah B.R., Popli S., 7th Edition, 2015, Mahajan Publishing
8. Ecology and Environment. Sharma P.D., 12th edition, 2014, Rastogi Publication
9. Groundwater Management, Bhatnagar M., 1st edition, 2014, SBS Publisher

PRACTICAL – IX

1. Assessment of pH and alkalinity of water sample.
2. Assessment of salinity and chloride of water sample.
3. Assessment of sodium and potassium of water sample.
4. Assessment of DO of water sample.
5. Assessment of electrical conductivity of water sample.
6. Study of some algae through permanent slide.
7. Study of some cyanobacteria through permanent slide.
8. Isolation of heterotrophs from water sample.

Semester IV
CORE - I
PAPER – I

Env 401 : ENVIRONMENTAL SCIENCE – VIII
(LAND RESOURCES)

OBJECTIVES: *The paper intends to deal with various natural resources like land, soil, forest and agriculture.*

Total Hours: 30

UNIT 1:	Land Resources	08 Hours
1.1	Introduction	
1.2	Land as a resource	
1.3	Land use patterns	
1.4	Impact of land use on environmental quality	
1.5	Relationship of land use and natural disasters	
1.6	Land degradation	
1.7	Control of land degradation	
1.8	Struggle against aridisation and desertification	
UNIT 2:	Soil Resources	07 Hours
2.1	Biological and chemical aspects of soil productivity	
2.2	Soil resource degradation	
2.2.1	Kinds of soil erosion	
2.2.2	Agents of soil erosion	
2.3	Soil conservation	
2.3.1	Principles of soil conservation	
2.3.2	Methods of soil conservation	
UNIT 3:	Forest Resources	07 Hours
3.1	Introduction	
3.2	Forest resources-Indian scenario, types of forests in India	
3.3	Forest soil and carbon storage	
3.4	Nutrient cycling in forests	
3.5	Production, commercial and exploitative forestry	
3.6	Deforestation	
3.7	Causes and effects of deforestation	
3.8	Forest degradation in India	
3.9	National forest policy,1988	
3.10	Measures of forest conservation and management	
UNIT 4:	Agriculture Resources	08 Hours
1.1	Introduction	

- 1.2 Sources: crops, livestock
- 1.3 Changes caused by agriculture
- 1.4 Changes caused by overgrazing
- 1.5 Effects of modern agriculture

References:

1. Environmental studies, Dhameja S.K., 3rd Edition, 2007, Kataria Publishers
2. Environmental Studies, Shah B.R., Popli S., 7th Edition, 2015, Mahajan Publishing
3. Forest Soils, Yadav S., 1st Edition, 2014, Anmol Publications
4. An Introduction to Agro Forestry, Bhattacharya A., 1st Edition 2014, Random Publications
5. Environmental Chemistry, Sharma B.K., 9th Edition, 2005, Krishna Prakashan
6. Ecology and Environment. Sharma P.D., 12th edition, 2014, Rastogi Publication
7. Basics of Environmental Studies, Shroff R.B., 1st Edition, 2010, New Popular Prakashan
8. Environmental Studies, Rethaliya R.P., Patel F.M. , Vaidya V.H.
2nd Edition, 2015, Atul Prakashan

PRACTICAL VIII

1. Study of chart quadrats of major plants
2. Study of chart quadrats of animals
3. Study of chart quadrats of birds
4. Study of chart quadrats of insects
5. Assessment of pH and Acidity of soil sample.
6. Assessment of Alkalinity of soil sample.
7. Isolation of heterotrophic bacteria from soil.
8. Isolation of actinomycetes from soil.

PAPER – III

Env 403 : ENVIRONMENTAL SCIENCE – X (ENERGY RESOURCES)

OBJECTIVE: *This paper intends to deal with various energy resources like renewable and non-renewable, sustainable utilization of energy resources and energy conservation.*

		Total Hours: 30
Unit:1	Energy Utilization	08 Hours
1.1	Introduction, basic concepts and role in human civilization	
1.2	Classification of energy resources	
1.3	Energy scenario in India	
1.4	Sustainable use of energy resources	
1.5	Sources and use of Energy	
1.6	Thermistor and their characterisation	
1.7	Maximum power theorem	
Unit 2 :	Non-Renewable Energy Resources	07 Hours
2.1	Types of non-renewable energy resources	
2.2	Fossil fuels	
2.3	Types of mineral resources	
2.4	Use and exploitation	
2.5	Mineral exploration and extraction	
2.6	Environmental effects of extracting and using mineral resources	
2.7	Mineral wealth of India & mineral production in India	
UNIT 3:	Renewable Energy Resources	08 Hours
3.1	Types of renewable energy resources	
3.2	Solar energy	
3.3	Wind energy	
3.4	Hydro energy	
3.5	Nuclear energy	
3.6	Tidal energy	
3.7	Geothermal energy	
3.8	Bioenergy	
Unit:4	Energy Conservation	08 Hours
4.1	Energy crisis and energy conservation	
4.2	In agriculture and industrial sector	
4.3	Energy plantation, petro crops	
4.4	Hydrogen as a source of energy	
4.5	Energy from waste	
4.6	Problems due to overexploitation of energy resources	

References:

1. Environmental studies, Dhameja S.K., 3rd Edition, 2007, Kataria Publishers

2. Environmental Studies, Shah B.R., Popli S., 7th Edition, 2015, Mahajan Publishing
3. Forest Soils, Yadav S., 1st Edition, 2014, Anmol Publications
4. An Introduction to Agro Forestry, Bhattacharya A., 1st Edition, 2014, Random Publications
5. Environmental Chemistry, Sharma B.K., 9th Edition, 2005, Krishna Prakashan
6. Ecology and Environment. Sharma P.D., 12th edition, 2014, Rastogi Publication
7. Basics of Environmental Studies, Shroff R.B., 1st Edition, 2010, New Popular Prakashan
8. Environmental Studies, Rethaliya R.P. , Patel F.M. , Vaidya V.H., 2nd Edition, 2015, Atul Prakashan
9. Engineering Chemistry, Jain P. & Jain M., 2011 – Reprint, Dhanpat Rai Publishing
10. Renewable energy technologies, A practical guide for beginners, Solanki C., 1st edition 2009, PHI learning

PRACTICAL – X

1. Measurement of efficiency of solar cell.
2. Volt-Ampere characteristics of solar cell.
3. Thermistor and their characteristics.
4. To study maximum power transfer theorem.
5. Characteristics of photo voltaic cell.
6. Estimation of heat capacity of water.
7. Production and estimation of ethanol from biomass.
8. Estimation of required wind turbine power rating.