

**VEER NARMAD SOUTH GUJARAT UNIVERSITY  
SURAT**

**B. Sc. ENVIRONMENTAL SCIENCE  
S. Y. B. Sc.  
Semester - III and IV  
SYLLABUS**

**With Effect from 2016-17**

**VEER NARMAD SOUTH GUJARAT UNIVERSITY  
SURAT**

**B. Sc. ENVIRONMENTAL SCIENCE**

# **Semester - III**

**SYLLABUS**

**With Effect from 2016-17**

**Semester III**  
**CORE - I**  
**PAPER – I**

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**Env 301 : ENVIRONMENTAL SCIENCE – V**  
**ENVIRONMENTAL CHEMISTRY - I**

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**OBJECTIVES:** *The paper intends to deal with phenomena taking place in different segments of environment, chemical reactions in atmosphere, different aspects of meteorology and effects of atmospheric gases in environment.*

**Total Hours: 30**

<b>UNIT 1</b>	<b>Environment</b>	<b>Text Book: H.Kaur</b>	<b>05 Hours</b>
1.1	Scope of Environmental Chemistry		
1.2	Environmental Pollution : Classification of Pollution and Pollutants		
1.3	Environmental Segments : Lithosphere, Hydrosphere, Biosphere, Atmosphere		
1.4	Heat/Radiation Budget of the Earth – Mechanism		
1.5	Energy Balance of the Earth		
1.6	Calculation of Global Mean Temperature		
<b>UNIT 2</b>	<b>Atmosphere</b>	<b>Text Book: A.K.De</b>	<b>08 Hours</b>
2.1	Composition of the Atmosphere		
2.2	Vertical Structure of the Atmosphere		
2.3	Evolution of the Atmosphere		
2.4	Particles, Ions and Radicals in the Atmosphere		
2.4.1	Chemicals Processes for Formation of Inorganic Particulate Matter		
2.4.2	Chemicals Processes for Formation of Organic Particulate Matter		
2.4.3	Ions and Radicals		
<b>UNIT 3</b>	<b>Meteorology</b>	<b>Text Book: H.Kaur</b>	<b>08 Hours</b>
3.1	Introduction		
3.2	Temperature Lapse Rates		
3.3	Adiabatic Lapse Rates		
3.4	Inversions		
3.5	Circulation of the Atmospheric Air		
3.6	Wind Velocity and Turbulence		
3.7	Plume Characteristics Under Different Lapse Conditions		

**UNIT 4        Effects of Atmospheric Gases on Environment****09 Hours****Text Book: Jain and Jain**

Sources, Mechanism-, Effects and Control Measures of

- 4.1 Green House Effect and Global warming
- 4.2 Ozone Layer Depletion
- 4.3 Smog : Sulphurous or London and Photochemical or Los Angeles
- 4.4 Acid Rain

**Assignment: Global Warming and Climate Change****Text Books:**

1. Environmental Chemistry – H. Kaur, (8<sup>th</sup> Edition), 2014, Pragati Prakashan.
2. Environmental Chemistry- A.K De, (6<sup>th</sup> Edition), New Age International.
3. Engineering Chemistry – P.C. Jain and Monica Jain, (17<sup>th</sup> Edition), Reprint -2011  
Dhanpat Rai Publishing Company.

**References:**

1. Environmental Science – S.C. Santra, (2<sup>nd</sup> Edition), New Central Book Agency (P) Ltd.
2. Environmental Chemistry- B.K Sharma (9<sup>th</sup> Edition), Krishna Prakashan.

**PRACTICAL – V****Following parameters of weather monitoring can be determined at (Any place)**

1. To determine wind velocity by cup type Anemometer.
2. To determine wind direction by cup type Anemometer.
3. To determine wind type on the basis of Baufort's scale.
4. To determine atmospheric pressure by Barometer.
5. To determine atmospheric temperature by max-min Thermometer.
6. To determine relative humidity of ambient air by Psychrometer.
7. To determine intensity of the solar radiation by Albedometer.
8. Draw and explain earth's radiation budget and energy balance of the earth's surface.
9. **A Visit to Weather Monitoring Station.**

**Reference:**

1. Recent Advances in Environmental Analysis ( water, soil and air )- B.S. Yadav  
(1 st Edition), Adhyayan Publishers.

**Semester III**  
**CORE - I**  
**PAPER – II**

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**Env 302 : ENVIRONMENTAL SCIENCE – VI**  
**SOIL SCIENCES**

**OBJECTIVES:** *The paper intends to deal basics in soil ecosystems with interactions, reactions and impact.*

		<b>Total Hours: 30</b>
<b>UNIT 1</b>	<b>Soil Fauna:</b>	<b>Ref. Paul E. 08 Hours</b>
1.1	The Microfauna	
1.2	Rotifera	
1.3	Nematoda	
1.4	Microarthropods	
1.5	Enchytraeids	
1.6	Macrofauna	
<b>UNIT 2</b>	<b>Basic soil-Plant relationship Biological Participants</b>	<b>08 Hours</b>
		<b>Ref.: Havlin <i>et al.</i></b>
2.1	Ion exchange in soils	
2.2	Mineral solubility in soils	
2.3	Supply of nutrients from OM	
2.4	Movement of Ions from soils to roots	
2.5	Ion absorption by plants	
<b>UNIT 3</b>	<b>Soil Biota</b>	<b>Ref. Paul E.A 08 Hours</b>
3.1	Collection of sample, storage and pretreatment	
3.2	Microbial biomass and its measurement	
3.3	Physiological analyses	
3.4	Activities and locations of enzymes	
<b>UNIT 4</b>	<b>Biogeochemical cycles</b>	<b>Ref : Kormondy 06 Hours</b>
4.1	Carbon cycle	
4.2	Nitrogen cycle	
4.3	Sulfur cycle	
4.4	Phosphorus cycle	

**Text Book:**

1. Sharma P.D., (2014). *Ecology and Environment*. 12<sup>th</sup> edition, Rastogi publication.
2. Odum E.P. (2008). *Fundamentals of Ecology*, 5<sup>th</sup> Edition (India edition), Brooks/Cole

**References:**

1. Havlin *et al.*, (2009). *Soil fertility and fertilizers*. 7<sup>th</sup> edition, PHI.
2. Kormondy (2007). *Concept of Ecology*, 4<sup>th</sup> Edition, PHI.
3. Paul E.A. (2009). *Soil Microbiology, Ecology and biochemistry*. 3<sup>rd</sup> edition, Elsevier.

**PRACTICAL – VI**

1. Determination of soil biomass carbon
2. Determination of soil biomass nitrogen
3. Determination of soil biomass phosphorus
4. Life cycle of *Ascaris lumbricoides* / or *Taenia solium*
5. Measuring rate of water uptake by a plant shoot using a potometer
6. Estimation of cation exchange capacity of (CEC) plant-soil

**Reference:**

1. Analytical Techniques in Agriculture, Biotech and Environment Engineering- A. Nag , Eastern Economy Edition, Prentice hall of India Pvt. Ltd; New Delhi, 2006.

**Semester III**  
**CORE - I**  
**PAPER – III**

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**Env 303 : ENVIRONMENTAL SCIENCE – VII**  
**POPULATION ECOLOGY**

**OBJECTIVES:** *The paper intends to deal basics in population in ecosystems with dynamics, community characteristics and their functions.*

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	<b>Total Hours: 30</b>
<b>UNIT 1: Population structure and dynamics</b>	<b>Ref.: Sharma P.D. 05 Hours</b>
1.1 Basic concepts	
1.2 Population characteristics	
1.3 Population dynamics	
<b>UNIT 2: Community characteristics and Classification</b>	<b>Ref.: Sharma P.D. 08Hours</b>
2.1 Community characteristics	
2.2 Characteristics used to describe community structure	
2.3 Methods of community studies	
2.4 Classification of communities	
2.5 Main concepts in classification of communities	
<b>UNIT 3: Community dynamics</b>	<b>Ref. Sharma P.D. 08 Hours</b>
3.1 Ecological succession	
3.2 Causes and trends of succession	
3.3 Basic types of succession and its general process	
3.4 Hydrosere, lithosere and heterotrophic succession	
3.5 Ecosystem development	
3.6 Climax concept in succession	
<b>UNIT 4: Statistics in ecology</b>	<b>Ref : Odum E.P. 09 Hours</b>
4.1 Ecosystems and scale	
4.2 Inference methods and reliability	
4.3 Experimental versus observational method	
4.4 Statistical thinking in ecology	
4.5 Nature of evidence and hypothesis testing	
4.6 Evidence-oriented alternative	

**Text Book:**

- 1.Kormondy (2007). Concept of Ecology, 4<sup>th</sup> Edition, PHI.
- 2.Paul E.A.(2009). Soil Microbiology, Ecology and biochemistry. 3<sup>rd</sup> edition, Elsevier.

**Reference:**

1. Sharma P.D., (2014). *Ecology and Environment*.12<sup>th</sup> edition, Rastogi publication.
2. Odum E.P. (2008). *Fundamentals of Ecology* , 5<sup>th</sup> Edition (India edition), brooks/cole.

## PRACTICAL – VII

1. Determination of soil microbial communities and diversity indices.
2. Determination of density/abundance of various species occurring in given area.
3. Study the species composition of an area for analyzing biological spectrum and comparison with Raunkiaer's normal biological spectrum.
4. Estimation of biomass.
5. Field trip to count bird/animal population count and measure diversity indices.

### Reference:

1. Bendre, Kumar (2011). *A text book of Practical Botony*, Rastogi Publications.