SARVAJANIK UNIVERSITY
Faculty of Science
B. Sc. Environment Science

SARVAJANIK UNIVERSITY

INCLUSIVE | INTEGRATED | INNOVATIVE

Faculty of Science

B. Sc. Environment Science

Semester - 6

SARVAJANIK UNIVERSITY
Faculty of Science
B. Sc. Environment Science

Faculty: Science	**Department:** Environmental Science
Program: B. Sc. Environmental Science	**Type of Subject:** Theory + Practical
Subject: Environmental Legislations and Policy	
Semester- 6	

Student Learning Outcomes (SLOs):

- The paper will enable students to acquire knowledge on various laws, policies, control and management of pollution in various abiotic environment.
- The objective of this paper is to acquaint the students with the environmental issues, pollution and control and the measures taken for its protection along with the norms prevailing at international and national level.

References and Textbooks: (With Author, Edition, Publishers, ISBN)

1. Dhameja S.K (2005): Environmental Engineering and Management, Kataria Publication, New-Delhi.
2. Misry K.U (2012): Fundamentals of Industrial Safety & Health – I, Siddharth Prakashan, Ahmedabad.
3. Misry K.U (2012): Fundamentals of Industrial Safety & Health – II, Siddharth Prakashan, Ahmedabad.
4. Leelakrishnan P. (2015): Environmental Law Case Book, LexisNexis.
5. Shantakumar S. (2005): Introduction to Environmental Law, LexisNexis.
6. Sahasranaman P.B. (2012): Handbook of Environmental Law in India, Oxford University Press (India).
7. Holder Jane AND Lee Maria (2012): Environmental Protection, Law and Policy, Cambridge University Press.
8. Chapman S.R (1997): Ensvironmental Law and Policy, Prentice Hall.
9. Nawneet Vibhav (2017): Environmental Law-An Introduction, LexisNexis.

UNIT-1: Environment Safety (7 hours)

1.1 Terminology

1.2 Concept of Environment

1.3 Environment v/s Safe Environment

1.4 Cleaner Production v/s Pollution Control

UNIT-2: Environmental Legislation- I (7 hours)

2.1 The Water (Prevention and Control of Pollution) Act, 1974

2.2 The Air (Prevention and Control of Pollution) Act, 1981

2.3 The Environment (Protection) Act, 1986

2.4 The Noise Pollution (Regulation and Control) Rules, 2000

UNIT-3: Environmental Legislation- II (7 hours)

3.1 Municipal Solid Wastes (Management and Handling) Rules, 2000

3.2 The Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008

SARVAJANIK UNIVERSITY

RATIFIED

3.3 The Bio-Medical Waste (Management and Handling) Rules, 1998
3.4 E-Waste (Management and Handling) Rules, 2011

UNIT-4: Legislation on Forest-I (7 hours)

4.1 The Indian Forest Act, 1927
4.2 Wildlife Protection Act, 1972
4.3 The Forest Conservation Act, 1980
4.4 The Biological Diversity Act, 2002

UNIT-5: Legislation on Forest-II (7 hours)

5.1 National Green Tribunal Act, 2010
5.2 The Wetland (Conservation and Management) Rules, 2009
5.3 Coastal Regulation Zone, 2011
5.4 The National Forest Policy, 1988

UNIT-6: Environmental Management (7 hours)

6.1 Environment Management Systems
6.2 Preparation of EMS
6.3 ISO – 14010 Audit Standards
6.4 ISO – 14020 Labelling Standards

UNIT-7: Environmental Audit (7 hours)

7.1 Practice in developed Countries
7.2 Audit Objectives
7.3 Audit Methodology
7.4 Environment Audit Report

UNIT-8: Environment Impact Assessment (7 hours)

8.1 Purpose and Goal
8.2 Methodology of EIA
8.3 EIA of Hazardous Waste
8.4 Limitations of EIA

Practicals:

1. Seminar on various case studies.

SARVAJANIK UNIVERSITY

RATIFIED

SARVAJANIK UNIVERSITY
Faculty of Science
B. Sc. Environment Science

Faculty: Science	**Department:** Environmental Science
Program: B. Sc. Environmental Science	**Type of Subject:** Theory + Practical
Subject: Ecotoxicology	
Semester- 6	

Student Learning Outcomes (SLOs):

- Gain Knowledge of basic toxicological impact of chemicals on ecosystem.
- The course emphasizes on the contemporary tools and techniques to assess various environmental impacts due to hazardous chemicals and pollutants.

References and Textbooks: (With Author, Edition, Publishers, ISBN)

1. I. C. Shaw and J. Chadwick, Principles of Environmental Toxicology; Taylor & Francis ltd
2. Basic Environmental Health (2001): AnnaleeYassi, TordKjellstom, Theo de Kok, Tee Guidotti Environmental Chemistry: Stanley. E. Manahan, 10th Edition, 2017, CRC Press.
3. Environmental Chemistry: A. K. De, 7thedition, (2018), New Age International Publisher.
4. Walker, C.H., Hopkin, S.P., Sibly, R.M., and Peakall, D.B. (2001). Principles of Ecotoxicology. 2nd Ed. Taylor & Francis, London.

UNIT-1: Basic concept of Ecotoxicology (7 hours)

1.1 Introduction

1.2 Principal and Scope

1.3 Types of toxic substances

1.4 Classification of toxicants

UNIT-2: Biochemical basis of toxicity (7 hours)

2.1 Mechanism of toxicity and receptor mediated events

2.2 Acute and chronic toxicity

2.3 Sigmoid relationships and Corollary of toxicology

2.4 Influence of ecological factors on the effects of toxicity

UNIT-3: Toxicants in the Environment (7 hours)

3.1 Toxic substances in the environment

3.2 Sources and Entry routes

3.3 Transport of toxicants by air, water and through food chain

3.4 Bioaccumulation and Biomagnification of toxic materials in food chain

UNIT-4: Toxicology of major pesticides (7 hours)

4.1 Biotransformation, Biomonitoring, Programs and parameters of biomonitoring

4.2 Concept of bioindictor, Bioindicator groups and examples

4.3 Environmental impacts of pesticides

4.4 Physiological and metabolic effects on flora and fauna

UNIT-5: Toxicology of Heavy Metals (7 hours)

5.1 Toxic chemicals in the environment: Introduction and Classification

SARVAJANIK UNIVERSITY

5.2 Impact of toxic chemicals on enzymes
5.3 Biochemical toxic effect of Cadmium and Lead
5.4 Biochemical toxic effect of Arsenic and Mercury

UNIT-6: Toxicology of Hazardous Chemicals (7 hours)

6.1 Biochemical effects and toxicology of hazardous chemicals: Introduction and types
6.2 Ozone & Peroxy Acetyl Nitrate: Biochemical and toxicological impact
6.3 Cyanide & Methyl Iso Cyanate (MIC): biochemical and toxicological impact
6.4 Carcinogenic chemicals: types and effect
6.5 Prevention and measures to protect environment

UNIT-7: Evaluation of toxicity (7 hours)

7.1 Methods used to assess toxicity classification of toxic materials
7.2 Concepts of Bioassay- types, characteristics. Importance and significance of bioassay, Microbial bioassay for toxicity testing, Bioassay test models and classification
7.3 Threshold limit value, LC50, LD50, Toxicity testing, Concept of Dosimetry, Lethal, sub-lethal & chronic tests
7.4 Dose response curves

UNIT-8: Organ toxicity (7 hours)

8.1 Hepatotoxicity: Common examples of hepatotoxicants, injuries caused to liver
8.2 Nepherotoxicity: Common examples of nepherotoxicants, injuries caused to kidney
8.3 Pulmonary toxicity: Common examples of pulmonary toxicants, injuries caused to lungs
8.4 Neurotoxicity: Common examples of neuro toxicants, injuries caused to nervous tissues

Practicals:

1. Effect of chemicals in microbial growth.
2. Effect of phenol on microbial growth.
3. Isolation and enumeration of microorganism from polluted soil.
4. Enrichment and isolation of heavy metal tolerant microorganisms.

SARVAJANIK UNIVERSITY

RAReived

SARVAJANIK UNIVERSITY
Faculty of Science
B. Sc. Environment Science

Faculty: Science	**Department:** Environmental Science
Program: B. Sc. Environmental Science	**Type of Subject:** Theory + Practical
Subject: Health and Epidemiology	
Semester- 6	

Student Learning Outcomes (SLOs):

- To make them aware about the microbial diseases and its Pathogenicity
- They will learn about the various diseases caused by bacteria, viruses, fungi and protists.
- Students will learn about the various Hospital-Associated Infections and get a overview of the Epidemiology.

References and Textbooks: (With Author, Edition, Publishers, ISBN)

7. Patwardhan N. and Patwardhan S. (2018). Hospital-Associated Infections: Epidemiology, Prevention and Control. ISBN : 9789352700189.
8. Wiley J. and Sherwood L. (2014). Prescott, Harley and Klein's Microbiology, 9th Ed., McGraw-Hill Science/Engineering/Math. ISBN 9780073402406.

Further Reading:

6. Greenwood. D. and Black R.C. (2012). Medical Microbiology, 6th Ed., Churchill Livingstone. ISBN: 9780702040894.
7. Tortora G.J., and Funke B.R. (2016), Microbiology an Introduction, 12th Ed., Benjamin Cummings. ISBN: 9781292099149.

Unit-1: Microbial Diseases and Pathogenicity (7 hours)

1.1 Pathogenicity and infectious disease

1.2 Virulence

1.3 Exposure and transmission

Unit-2: Human Diseases Caused by Viruses and Prions (10 hours)

2.1 Airborne diseases: Influenza, smallpox and SARS

2.2 Arthropod-borne diseases

2.3 Direct contact diseases: AIDS, Common Cold and Viral Hepatitides

2.4 Food-borne and waterborne diseases: Gastroenteritis and Poliomyelitis, Zoonotic diseases: Rabies.

2.5 Prion diseases

Unit-3: Human Diseases Caused by Bacteria (12 hours)

3.1 Airborne diseases: Diphtheria, Mycoplasmal Pneumonia and Mycobacterium Infection

3.2 Arthropod borne diseases: Plague and RMSF

3.3 Direct contact diseases: STD and Staphylococcal Diseases

3.4 Food borne and waterborne diseases: Botulism, Cholera and *Escherichia coli* Gastroenteritis

3.5 Zoonotic diseases: Anthrax and Q fever

3.6 Opportunistic diseases: Streptococcal Pneumonia

Unit-4: Human Diseases Caused by Fungi and Protists- I (10 hours)

SARVAJANIK UNIVERSITY

RATrivedy

4.1 Airborne diseases: Blastomycosis and Histoplasmosis
4.2 Arthropod-borne diseases: Malaria and Leishmaniasis
4.3 Direct contact diseases

Unit-5: Human Diseases Caused by Fungi and Protists- II (04 hours)

5.1 Food borne and waterborne diseases: Amebiasis and Giardiasis
5.2 Opportunistic diseases

Unit-6: Introduction to Epidemiology (5 hours)

6.1 Epidemiological methods
6.2 Measuring infectious disease frequency
6.3 Patterns of infectious disease in a population
6.4 Emerging and reemerging infectious disease and pathogens
6.5 Health-care-associated infections

Unit-7: Epidemiology of Hospital-Associated Infections (6 hours)

7.1 Factors affecting development of hospital-associated infections (HAI)
7.2 Common hospital-associated infections
7.3 Microbiology of hospital-associated infections
7.4 Sources of infection

Unit-8: Control and Prevention of Hospital-Associated Infections (6 hours)

8.1 Role of microbiology in surveillance and control
8.2 Breaking the chain of infection
8.3 Prevention and Control of Epidemics
8.4 Appropriate use of antibiotics

Practicals:

1. Bacteriological investigation of diagnostic problems related to blood.
2. Bacteriological investigation of diagnostic problems related to urine.
3. Bacteriological investigation of diagnostic problems related to stool.
4. Bacteriological investigation of diagnostic problems related to purulent exudates, wound, abscess.
5. Determination of MIC for given antibiotic against test organism.
6. Study of permanent slides of arthropod vectors. (Aedes and Anopheles mosquitoes, Rat flea, Mite).
7. Estimation of haemoglobin by Sahli's method.
8. Total count of WBC & RBC.
9. Differential count of leucocyte.

SARVAJANIK UNIVERSITY

Received

SARVAJANIK UNIVERSITY
Faculty of Science
B. Sc. Environment Science

Faculty: Science	**Department:** Environmental Science
Program: B. Sc. Environmental Science	**Type of Subject:** Theory + Practical
Subject: Essential Skills in Computer	
Semester- 6	

Student Learning Outcomes (SLOs):

On completion of course students will be able to:

- Understand concepts of computer component.
- Manage the documents, presentation and gain practical exposure on spreadsheet using office tool.
- Create and manage database using database tool.
- Use SQL statements to store, modify and retrieve data from tables gain skills & knowledge to browse and get updated worldwide information.

References and Textbooks: (With Author, Edition, Publishers, ISBN)

1. Fundamentals of Computers by Rajaraman V and Adabala N.
2. Fundamentals of Computers by E Balagurusamy
3. WPS Office - Free Office Suite for Word,PDF,Excel ,WPS SOFTWARE PTE. LTD.[Available on google play store]
4. MS Office in a Nutshell -Publisher: Vikas Publishing House
5. Wps office 2016 writer eBook , by Lalit Mali, Kindle Edition
6. The Internet Book by Douglas E. Comer
7. Advanced Microsoft Access: Learn Techniques of Ms Access for Database Management Systems by Blerton Abazi

UNIT-1: Introduction of Computers (5 hours)

1.1 Evolution of computers ,Classification of Computers and components of computer

1.2 Fundamentals of Computers

- 1.2.1 Hardware
- 1.2.2 Software
- 1.2.3 Data and User

1.3 Essential Computer Hardware

- 1.3.1 Processing device
- 1.3.2 Memory device-RAM & ROM
- 1.3.3 Input and Output devices
- 1.3.4 Storage device-Optical & Magnetic

1.4 Operating System

UNIT-2: Operate the Computer System (4 hours)

2.1 Start Menu

- 2.1.1 Programs Documents Setting
- 2.1.2 Taskbar toolbar

SARVAJANIK UNIVERSITY

RAReceived

2.1.3. Find and replace utility
2.1.4 Help menu
2.1.5 Shut Down, Restart

2.2 Manage Computer
2.2.1 Files and Folders
2.2.2 Configuring Printers
2.2.3 Installing Programs
2.2.4 Display Settings

UNIT-3: Document Writer (9 hours)

3.1 Components of Word Writer
3.1.1 Creating Document Typing Text
3.1.2 Saving and Closing Opening an Existing
3.1.3 Password Protection
3.1.4 Printing & Previewing Documents
3.1.5 Switch between Multiple Documents
3.1.6 Save to PDF

3.2 Familiar Formatting Tools
3.2.1 Working with Text boxes & frame
3.2.2 Working with Pictures &Objects
3.2.3 Inserting Place Comments
3.2.4 Working with Tables
3.2.5 Spell Check utility
3.2.6 Use of hyperlink

3.3 Other features
3.3.1 Document templates
3.3.2 Insert and edit images
3.3.3 Add custom charts and manage charts
3.3.4 Add and manage table
3.3.5 View multiple documents
3.3.6 Mail merge

UNIT-4: WPS Presentation (10 hours)

4.1 Introduction of presentation , toolbar and files

4.2 Familiar Formatting Tools
4.2.1 WordArt text effects
4.2.2 Built-in slide styles
4.2.3 Use of templates

4.3 Advanced Animation
4.3.1 Multimedia: using audio and video - Audio and video formats - Inserting audio and video objects

SARVAJANIK UNIVERSITY

RATIONAL

4.3.2 Animations - Set and customize animation effects - Set text animations - Animate the elements of a chart

4.4 Extended Desktop

4.4.1. Organizing and publishing a presentation

4.4.2. Custom slide shows - Managing transitions

4.4.3. Graphic objects formatting - Editing of graphic objects , Visual communication: using graphics and images .

4.4.4. Insert Shapes, SmartArts, Charts and Diagrams

4.4.5. Other tools: equations

4.5 Use of Hypertext links

4.5.1 Action buttons

4.5.2 Import slides from other presentations

4.5.3 Export slides as graphics object

UNIT-5: WPS Spreadsheet (10 hours)

5.1 Introduction to workbook ,worksheet and manage worksheet

5.2 Introduction to toolbars, add and view toolbar

5.3 Formulas toolbar

5.4 Built in functions, types of functions

5.5 Table Formatting , Pivot Tables

5.6 Insert Built-in Charts & customize charts

5.7 View Multiple Documents

UNIT-6: Database Management System (04 hours)

6.1 Database system applications.

6.2 Purpose of Database system.

6.3 View of Data-Data abstraction, Instance and schema, Data model.

6.4 Database language - DDL, DML

6.5 Database Architecture-Two tier Architecture, Three tier Architecture.

UNIT-7: Practical Approach for Database (8 hours)

7.1 Introduction to tables ,data types and field properties

7.2 Create a table and add fields ,Guidelines for naming fields, controls, and objects

7.3 Set the field size , Combine fields using the Calculated data type

7.4 Add or change a table's primary key

7.5 Create and use an index to improve performance

7.6 SQL Queries: CREATE, INSERT, UPDATE, DELETE and SELECT with WHERE clause, ORDER BY etc.

UNIT-8: Awareness of Internet (6 hours)

8.1 Introduction of Internet and browser

8.2 Surfing Internet

8.3 Using of Search engine browser

SARVAJANIK UNIVERSITY

RATIFIED

SARVAJANIK UNIVERSITY
Faculty of Science
B. Sc. Environment Science

8.4 Mail Utility