

Anekant Education Society's
TULJARAM CHATURCHAND COLLEGE OF ARTS, SCIENCE & COMMERCE,
BARAMATI.
AUTONOMOUS

Scheme of Course Structure (Faculty of Science)
Department: Environmental Science (2022- 2023)

Class	Semester	Paper Code	Title of Paper	No. of Credits
F.Y.B.Sc.	I	USES111	Fundamentals of Environmental Science - I	2
		USES112	Fundamentals of Environmental Biology - I	2
		USES113	Practical based on USES111 & USES112	2
	II	USES121	Fundamentals of Environmental Science - II	2
		USES122	Fundamentals of Environmental Biology - II	2
		USES123	Practical based on USES121 & USES122	2
S.Y.B.Sc.	III	USES231	Natural Resources	3
		USES232	Environmental Pollution and Control-I	3
		USES233	Practical based on EVS2301 & EVS2302	3
	IV	USES241	Solid and Hazardous Waste Management	3
		USES242	Environmental Pollution and Control-II	3
		USES243	Practical based on EVS2401 & EVS2402	3
T.Y.B.Sc	V	USES351	Ecosystem Management	3
		USES352	Wildlife Biology	3
		USES353	Geoscience	3
		USES354	Nature Conservation	3
		USES355	Environmental Governance, Laws and Ethics	3
		USES356	Environmental Biotechnology	3
		USES357	Practical based on EVS3501 and EVS3502	2
		USES358	Practical based on EVS3503 and EVS3504	2
		USES359	Practical based on EVS3505 and EVS3506	2
	VI	USES361	Climate Change	3
		USES362	Analytical Methods	3
		USES363	Sustainable Development	3
		USES364	Environmental Statistics	3
		USES365	Environmental Safety and Risk Management	3
		USES366	Environmental Economics And Audit	3
		USES367	Practical based on EVS 3601 to EVS 3603	2
		USES368	Practical based on EVS 3604 to EVS 3606	2
		USES369	Project	2

SYLLABUS
FIRST YEAR B.Sc. ENVIRONMENTAL SCIENCE
ACADEMIC YEAR 2022-2023
SEMESTER - I

DEPARTMENT OF ENVIRONMENTAL SCIENCE

Name of the programme: B.Sc Environmental Science

Programme code:USES

Class:F.Y.B.Sc

Semester: I

Course Name: Fundamentals of Environmental Science – I

Course Code;USES111

No.of Lecture:36

Learning objectives:

- To learn basic characteristics of environment.
- To make the students aware about the environment and its significance.
- To learn about interrelationship and discipline in environment science.
- To make the students aware about resources.

Learning outcomes :

On completion of this subject, students will able to:

- Imparts conceptual knowledge of environment, their adaptations and interrelationship.
- Students would understand the knowledge about components of environment.
- Students will understand the knowledge about Environmental problems and their solutions.
- Study of biodiversity and apply that knowledge in day to day life.
- Students will acquire knowledge about bioresources.

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PAPER CODE: USES111

PAPER - I: FUNDAMENTALS OF ENVIRONMENTAL SCIENCE - I

Credit -2: No. of Lectures 36.

Unit I: Introduction:

Definition, principles and scope of Environmental Science, Interrelationship of ecology with other disciplines, Multidisciplinary and dynamic nature of environmental science.
06

Unit II: Components of Environment

Lithosphere: Definition; Significance Types of rocks; weathering, Process of soil formation;; Soil profile; Physical properties of soil, Chemical properties of soil, Soil microflora, Types of soil.
06

Hydrosphere: Definition, significance, Distribution of water in world and India, Physical properties of water; Chemical properties of water, Hydrological cycle, Stoichiometry.
06

Atmosphere: Definition, Significance Composition of Atmosphere; Physico:-chemical structure of atmosphere: Troposphere, Stratosphere, Mesosphere, Ionosphere, Exosphere.
06

Unit III: Man & Biosphere:

Definition of Biosphere, Components of biosphere, Biodiversity, Concept of Holocene, Holocene Climate Optimum, Characteristics and causes of the Anthropocene, Human influence on environment, Current Environmental issues: Greenhouse effect, Global warming, Climate change etc. 06

Unit IV: Role of Environmental Education

Concept of Environmental Education, History and nature of education in India, environmental challenges, Awareness and action through environmental education, Role of NGOs and Government in environmental education, importance of community Participation.
06

References:

- 01. Fundamentals of Ecology:** Eugene P. Odum, (Natraj Publishers, Dehradun.)
- 02. Climatology:** D.S.Lal (Sharda Pustak Bhawan,Allahabad)
- 03. Environmental Geography :** Savindra Singh (Pravalika Publications,Prayagraj)
- 04. Physical Geography:** Savindra Singh (Pravalika Publications,Prayagraj)
- 05. Disaster Management:** Savindra Singh (Pravalika Publications,Prayagraj)
- 06. Principles of Ecology:** P. S. Verma, V. K. Agarwal (S. Chand and Co. New Delhi)
- 07. Environmental Biology:** P. D. sharma (Rastogi Publications, Meerut)

- 08. Ecology and Environment:** P. D. sharma (Rastogi Publications, Meerut)
- 09. Principles of Environmental Biology:** P. K. G. Nair (Himalaya Publishing House, New Delhi)
- 10. Environmental Biology:** M. P. Arora (Himalaya Publishing House, New Delhi)
- 11. Environmental Science:** Enger Smith, Smith, W. M. C. Brown (Company Publishing)
- 12. Principles of Soil Science:** Watt K. E. F. (1973),(McGraw Hill Book Company, New Delhi)
- 13. Introduction to Environmental Studies:** Turk & Turk
- 14. Ecology and Field Biology:** Robert Leo Smith (Harper Collins college publication)
- 15. General Ecology:** H. D. Kumar (Vikas Publishing house, New Delhi)
- 16. Elements of Ecology:** Brijgopal, N. Bharadwaj (Vikas Publishing house, New Delhi)
- 17. Fundamentals of Environmental Science :**G. S. Dahliwal, G. S. Sangha, P. K. ralhan(Kalyani Publishers, New Delhi)
- 18. Environmental Ecology :**Bill Freedman (Academic Press, New York)
- 19. Concepts of Ecology :**N. Arumugam (Saras Publication, Kottar, Dist. Kanyakumari)
- 20. Plant Ecology :**P. L. Kochhar
- 21. Environmental Science and Engineering:** Dr.N.Arumugam,Prof.V.Kumaresan(Saras Publication, Kottar, Dist. Kanyakumari)
- 22. Perspectives in Environmental Studies:** Anubha Kaushik, C.P.Kaushik (New Age International(P) Limited, Publishers)

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PAPER CODE: USES112

PAPER - II: FUNDAMENTALS OF ENVIRONMENTAL BIOLOGY - I

Credit -2: No. of Lectures 36.

Name of the programme: B.Sc. Environmental Science

Programme code: USES

Class: F. Y. B. Sc

Semester: I

Course Name: Fundamentals of Environmental Biology – I

Course Code;USES112

No. of Lecture:36

Unit- I: Origin of Life and evolution:

Introduction to Biology, branches, scope and importance. The origin of Life; Evolution of Life through the geological time i.e. – Eras, Periods, Epochs; Chemical evolution, Events of ‘Explosions’ and ‘Mass Extinctions’ & Paleontological Evidences for these, Geological time scale,.

09

Unit -II: Ecology & Ecosystem:

Ecology and its types: Behavioral ecology, Population ecology, Community ecology, Landscape ecology. structure & function of ecosystem, Ecological pyramids, Food chain, Food web Basis of Ecosystem classification. Types of Ecosystem: Terrestrial e.g. Desert (hot and cold), forest, rangeland, Aquatic e.g. wetlands, lotic, lentic, estuarine,(mangrove),Oceanic ecosystems. 09

Unit -III: Ecology and Environment

Major ecological types of India, Population ecology: Characteristics of population, concept of carrying capacity, population growth and regulations. Population fluctuations, dispersion and metapopulation. Concept of ‘r’ and ‘k’ species. Keystone species. Community ecology: Definition, community concept, types and interaction – predation, herbivory, parasitism and allelopathy. Biological invasions.

09

Unit -IV: Ecological adaptation and Bioresources:

Introduction, Ecological Adaptations under various environmental conditions –

In plants- hydrophytes, mesophytes, epiphytes, xerophytes & halophytes.

In animals- mimicry, vestigiality etc.

Bioresources- Definition, Bioindicator, Biopesticides, Biofertilizers, Biofuels, Biosensors.

09

References:

1. Ambashta R.S. & Ambashta N.K (1999) '**A Textbook of Plant Ecology**' CBS Publ. & Distributers, New Delhi
2. Chapman J.L. & Reiss M.J. (1995) '**Ecology: Principles and Applications**' Cambridge University Press
3. Cunningham W.P. & Saigo S.W. (1997) '**Environmental Science: A Global Concern**' WCB, McGraw Hill
4. Sharma P.D. '**Elements of Ecology**'
5. Tyler M.G. Jr. (1997) '**Environmental Science**' Wadsworth Publ. Co
6. Vashista P.C. '**Textbook of Plant Ecology**'
7. Smith R.L. '**Ecology and Field Biology**'
8. Benny Joseph (2005) '**Environmental Studies**' Tata McGraw Hill Publ. Co. Ltd.
9. '**Patterns in the Living World**' – Biology-an Environmental approach, John Murray, London
10. '**Diversity Among Living Things**' Biology-an Environmental approach, John Murray, London
11. Bell P.R. & Woodcock Christopher (1973) '**The Diversity of Green Plants**' Edward Arnold Ltd.
12. Wilson N. Stewart (1983) '**Paleobotany and the Evolution of Plants**' Cambridge University Press
13. '**Perspectives in Environmental Studies**: Anubha Kaushik, C.P.Kaushik (New Age International(P) Limited, Publishers)
14. '**Environmental Science and Engineering**: Dr.N.Arumugam,Prof.V.Kumaresan(Saras Publication, Kottar, Dist. Kanyakumari)
15. '**Environmental Biology**: P. D. sharma (Rastogi Publications, Meerut)
16. '**Ecology and Environment**: P. D. sharma (Rastogi Publications, Meerut)

PAPER CODE: USES113

PAPER - III: PRACTICAL BASED ON USES111 & USES112

Semester –I

Name of the programme: B.Sc. Environmental Science

Programme code: USES

Class: F. Y. B. Sc

Semester: I

Course Name: Practical Based on USES111 & USES112

Course Code;USES113

No. of Lecture:36

1. To study the lab safety rules.
2. To study the basics of chemical preparation.
3. Determination of Soil and water pH and Electric Conductivity.
4. Determination of water holding capacity of a given soil sample.
5. To study of Soil Profile & Soil Texture.
6. Estimation of acidity of given water sample.
7. Estimation of alkalinity of given water sample
8. To determine the hardness of given water sample.
9. To study the ecological adaption: Hydrophytes, Mesophytes, Epiphytes, Xerophytes, etc.
10. To study of preparation of Biofertilizers.
11. Study of vegetation by quadrat method.
12. Visit of any ecosystem and submission of Excursion report is compulsory at the time of practical examination.

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