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

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SYLLABUS

FIRST YEAR B.Sc. ENVIRONMENTAL SCIENCE

ACADEMIC YEAR (2022-2023)

SEMESTER -II

DEPARTMENT OF ENVIRONMENTAL SCIENCE

PAPER CODE: USES121

PAPER - I: FUNDAMENTALS OF ENVIRONMENTAL SCIENCE-II

Credit -2: No. of Lectures -36.

A. Learning objectives:

- To understand the basics of Environmental Sciences.
- To learn about interrelationship and various disciplines in environmental science
- To make the students aware about conservation and sustainable use of Biodiversity.
- To make student understood GIS and remote sensing application

B. **Learning outcomes** :

- Imparts conceptual knowledge of environment, and meteorology
- Students will understand the distinguishing characters and the Energy and its resources.
- Student will know the concept of meteorology and apply their knowledge in day to day life.
- Students will acquire the knowledge about bio resources their conservation and sustainable use of Biodiversity.

Unit I: Energy and Environment

Sun as source of energy; solar radiation and its spectral characteristics. Fossil fuels: classification, composition, physico-chemical characteristics and energy content of coal, petroleum and natural gas. Gross-calorific value and net-calorific value. Principles of generation of hydro-power, tidal energy, ocean thermal energy conversion, wind power, geothermal energy, solar energy (solar collectors, photo-voltaic modules, solar ponds). Nuclear energy - fission and fusion, nuclear fuels, Nuclear reactor – principles and types. Bioenergy: Introduction and uses of bioenergy. (10L)

Unit II: Meteorology

Definition, Concept and importance, Meteorological parameters – Pressure, temperature, precipitation, humidity, mixing ratio, saturation mixing ratio, radiation and wind velocity, lapse rate, environmental lapse rate. Wind roses, Climograph. (08L)

Unit III: Introduction to GIS and Remote Sensing

Introduction to GIS and Remote sensing, Components and Types of GIS Data, Digital image processing and ground truthing. Application of remote sensing and GIS in land cover/land use planning and management (urban sprawling, vegetation study, forestry, natural resource). (08L)

Unit IV: Social cultural and Ethical aspect of Environment

Environmental Values, Cultural Value, Environmental Aesthetics, Recent Developments In Environmental Aesthetics, Environmental ethics: Issues and possible solutions. impact of cultural change on environment, Case studies on environment conservation, role of tribal people in conservation of Environment. (10L)

References:

1. Cunningham W.P. & Saigo S.W. (1997) **'Environmental Science: A Global Concern'** WCB, McGraw Hill
2. Tyler M.G. Jr. (1997) '**Environmental Science'** Wadsworth Publ. Co
3. Benny Joseph (2005) '**Environmental Studies'** Tata McGraw Hill Publ. Co. Ltd.
4. **Perspectives in Environmental Studies:** Anubha Kaushik, C.P.Kaushik (New Age International(P) Limited, Publishers)
5. **Environmental Science and Engineering:** Dr.N.Arumugam,Prof.V.Kumaresan(Saras Publication, Kottar, Dist. Kanyakumari)
6. Environmental Geography-Savindra Singh, Prayog pustak Bhavan
7. A manual on Conservation of soil & water-UNDA, Scientific Publisher Rs.- 450/-
8. Environmental Remote sensing - F. Mark Danson, Wiley Publisher
9. A text book of Environmental Science- Vidya Thakur, Scientific Publisher Rs- 250/
10. Environmental Law & Policy of India, Diwans. &Rosencranz, A, Oxford University Press, 2001
11. Sustainable Energy and Environment: An Earth System Approach- edited by Sandeep Narayan Kundu, Muhammad Nawaz, apple academic press.
12. Introduction to forestry & Agroforestry - K.T. Parthiban, N. Krishnakumar .M. Karthick
13. Environmental Policy in India-Surendra Kumar,Northen Book Centre,New Delhi

PAPER CODE: USES122
PAPER - I: FUNDAMENTALS OF ENVIRONMENTAL BIOLOGY – II
Credit -2: No. of Lectures 36.

A. Learning objectives:

- To understand the basics of Environmental Biology.
- To learn about interrelationship and various disciplines in ecosystem and its importance.
- To make the students aware about conservation and sustainable use of Biodiversity.

B. **Learning outcomes** :

- Imparts conceptual knowledge of Bioresources.
- Student will know the concept of Environmental microbiology and apply their knowledge in day to day life.
- Students will acquire the knowledge about bio resources their conservation and sustainable use of Biodiversity.

Unit-I: Introduction of Ecology

Ecology, Ecosystem, Biomes Concept: classification and distribution. Characteristics of different biomes: Tundra, Taiga, Grassland, Deciduous forest biome, Highland Icy Alpine Biome, Chaparral, Savanna, Tropical Rainforest. (06L)

Unit-II: Man - Environment & Bioresources

Introduction, Uses of Environment, threats to the Environment, Environmental Deterioration, Effects of habitat destruction and climate change on Earth; Conservation of Environment. Bioresources, Significances of the Bioresources; Extraction of Bioresources by traditional & modern methods; Threat to local bioresources - overexploitation, habitat loss, invasive species etc., Human dependence on Environment (12L)

Unit III: Biodiversity and its conservation

Biodiversity: Introduction, Concept and Importance of Biodiversity, classification and types of, Biodiversity Hotspot, threats to biodiversity, Endangered, Threatened and rare species and Endemic species of India, Conservation of Biodiversity: In-situ and Ex-Situ Conservation Methods. (12L)

Unit IV: Introduction to Environmental Microbiology

Introduction, Classification of microbes and their metabolism and ecology, Micro-organisms and their association with man, animals and plants, Role of microbes in bio-remedial processes, ecological restoration and other environmental applications, Useful and harmful microbes. (06L)

References:

01. Fundamentals of Ecology: Eugene P. Odum, (Natraj Publishers, Dehradun.)
02. Principles of Ecology: P. S. Verma, V. K. Agarwal (S. Chand and Co. New Delhi)
03. Environmental Biology: P. D. sharma (Rastogi Publications, Meerut)
04. Ecology and Environment: P. D. sharma (Rastogi Publications, Meerut)
05. Principles of Environmental Biology: P. K. G. Nair (Himalaya Publishing House, New Delhi)
06. Environmental Biology: M. P. Aroras (Himalaya Publishing House, New Delhi)
07. Environmental Science: Enger Smith, Smith, W. M. C. Brown (Company Publishing)
08. Principles of Soil Science: Watt K. E. F. (1973), (McGraw Hill Book Company, New Delhi)
09. Introduction to Environmental Studies: Turk & Turk
10. Ecology and Field Biology: Robert Leo Smith (Harper Collins college publication)
11. General Ecology: H. D. Kumar (Vikas Publishing house, New Delhi)
12. Elements of Ecology: Brijgopal, N. Bharadwaj (Vikas Publishing house, New Delhi)
13. Fundamentals of Environmental Science: G. S. Dahliwal, G. S. Sangha, P. K. ralhan (Kalyani Publishers, New Delhi)
14. Environmental Ecology: Bill Freedman (Academic Press, New York)
15. Concepts of Ecology: N. Arumugam (Saras Publication, Kottar, Dist. Kanyakumari)
16. Plant Ecology: P. L. Kochhar

Books:

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

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PAPER CODE: USES123
PAPER - III: PRACTICAL BASED ON USES121 and USES122
Semester –II

A. Learning objectives:

- To understand the basic analytical methods.
- To make the students aware about medicinal and economical plants around them.
- To make student aware about GIS and its basics.

B. **Learning outcomes** :

- Imparts conceptual knowledge of environment, meteorology and Bioresources.
- Students will understand the basics of microbial practices their knowledge in day to day life.
- Students will acquire the knowledge about Food Adulterant and sustainable use of healthy food.

1. Measurement of Atmospheric Humidity by Hair-Hygrometer and light by Lux Meter.
2. Study of land use planning and management.
3. Study of economical and medical values of plant species in local area.
4. To Study the basics of Geographical Information System
5. Study of satellite image and interpret it.
6. Isolation and culture of microbes from soil / water samples by Gram staining.
7. Draw the simple wind rose from given data and interprets the graph using given information.
8. Draw the Climograph from given data and interprete it.
9. Preparation of Media (Broth, Agar and Slant).
10. Case study related to invasive species.
11. Study of Food Adulterant and their human health affect.
12. Visit of any community and submission of Excursion report is compulsory at the time of practical examination.

(Any other practical relevant to syllabus)