



Anekant Education Society's
Tuljaram Chaturchand College, Baramati.
(Autonomous)
(Faculty of Science & Technology)

F.Y.B.Sc. (Environmental Science) Semester-II
For Department of Environmental Science
Tuljaram Chaturchand College, Baramati.

Programme Specific Outcomes (PSOs)

PO1: Disciplinary Knowledge: Demonstrate comprehensive knowledge of the disciplines that form a part of a graduate programme. Execute strong theoretical and practical understanding generated from the specific graduate programme in the area of work.

PO2: Critical Thinking and Problem solving: Exhibit the skills of analysis, inference, interpretation and problem-solving by observing the situation closely and design the solutions.

PO3: Social competence: Display the understanding, behavioral skills needed for successful social adaptation, work in groups, exhibit thoughts and ideas effectively in writing and orally

PO4: Research-related skills and Scientific temper: Develop the working knowledge and applications of instrumentation and laboratory techniques. Able to apply skills to design and conduct independent experiments, interpret, establish hypothesis and inquisitiveness towards research.

PO5: Trans-disciplinary knowledge: Integrate different disciplines to uplift the domains of cognitive abilities and transcend beyond discipline-specific approaches to address a common problem

PO6: Personal and professional competence: Performing dependently and also collaboratively as a part of a team to meet defined objectives and carry out work across interdisciplinary fields. Execute interpersonal relationships, self- motivation and adaptability skills and commit to professional ethics.

PO7: Effective Citizenship and Ethics: Demonstrate empathetic social concern and equity centred national development, and ability to act with an informed awareness of moral and ethical issues and commit to professional ethics and responsibility.

PO8: Environment and Sustainability: Understand the impact of the scientific solutions in societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

PO9: Self-directed and Life-long learning: Acquire the ability to engage in independent and life-long learning in the broadest context of socio-technological changes.

Anekant Education Society's
TULJARAM CHATURCHAND COLLEGE OF ARTS, SCIENCE & COMMERCE,
BARAMATI.
(AUTONOMOUS)
F.Y.B.Sc. Scheme of Course Structure (Faculty of Science)
Department: Environmental Science (2019-2020)

Class	Semester	Paper Code	Title of Paper	No. of Credits
F.Y.B.Sc.	I	EVS1101	Fundamentals of Environmental Science - I	2
		EVS1102	Fundamentals of Environmental Biology - I	2
		EVS 1103	Practical based on EVS1101 & EVS1102	2
	II	EVS 1201	Fundamentals of Environmental Science - II	2
		EVS 1202	Fundamentals of Environmental Biology - II	2
		EVS 1203	Practical based on EVS1201 & EVS1202	2

SYLLABUS
FIRST YEAR B.Sc. ENVIRONMENTAL SCIENCE
ACADEMIC YEAR 2019-2020
SEMESTER – II

DEPARTMENT OF ENVIRONMENTAL SCIENCE

A. Learning objectives:

- To learn basic characteristics of environment.
- To learn about interrelationship and discipline in environment science
- To make the students aware about conservation and sustainable use of Biodiversity.
- To emphasize on the bioresources.

B. Learning outcomes :

- Imparts conceptual knowledge of environment, their adaptations and interrelationship.
- To understand the distinguishing characters of ecological adaptations.
- Study of biodiversity and apply that knowledge in day to day life.
- Students acquire knowledge about bioresources.
- Contributes the knowledge for conservation and sustainable use of Biodiversity.

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TULJARAM CHATURCHAND COLLEGE OF ARTS, SCIENCE & COMMERCE,
BARAMATI.
(AUTONOMOUS)
SYLLABUS

FIRST YEAR B.Sc. ENVIRONMENTAL SCIENCE

ACADEMIC YEAR (2019-2020)

SEMESTER -I I

DEPARTMENT OF ENVIRONMENTAL SCIENCE

PAPER CODE: EVS 1201

PAPER - I: FUNDAMENTALS OF ENVIRONMENTAL SCIENCE - II

Credit -2: No. of Lectures -36.

Course Outcomes:

CO1. Imparts conceptual knowledge of environment, and meteorology

CO2. Students will understand the distinguishing characters and the Energy and its resources.

CO3. Student will know the concept of meteorology and apply their knowledge in day to day life.

CO4. Students will acquire the knowledge about bio resources their conservation and sustainable use of Biodiversity.

CO5. Students will understand the knowledge about Environmental problems and their solutions.

CO6. Discover knowledge in ecological perspective and value of environment.

CO7. Demonstrate a comprehensive understanding of the world's biodiversity and the importance of its conservation.

Credit -1

Unit I: Biogeochemical cycles:

Biogeochemical cycles: a) Gaseous cycles: Oxygen cycle, Carbon cycle and Nitrogen Cycle. b) Sedimentary cycles: Phosphorus cycle and Sulphur cycle. 08

Unit II: Energy

Laws of thermodynamics, heat transfer processes, mass and energy transfer across various interfaces. 08

Credit -2

Unit III: Metrology

Meteorological parameters – Pressure, temperature, precipitation, humidity, mixing ratio, saturation mixing ratio, radiation and wind velocity, adiabatic lapse rate, environmental lapse rate. Wind roses. 10

Unit IV: GIS: Principles of remote sensing and GIS. 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). 10

Unit-V : Society, Government and Environment:

Concept of sustainable development and the bearing capacity of resources.

Problems of development.-Migration and unbalancing (Villages vs. Cities), Rehabilitation of displaced communities. Environmental ethics: Issues and possible solutions.

Environment protection Act. Air (Prevention and control of pollution) Act.

Water (Prevention and control of pollution) Act. Wild life protection Act.

Forest conservation and Biodiversity protection Act. Public awareness and human rights.

Global Earth summits.

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. Sustainable Energy and Environment: An Earth System Approach- edited by Sandeep Narayan Kundu, Muhammad Nawaz, apple academic press.
11. Climatology: D.S.Lal (Sharda Pustak Bhawan,Allahabad)
12. Environmental Geography : Savindra Singh (Pravalika Publications,Prayagraj)

13. Physical Geography: Savindra Singh (Pravalika Publications, Prayagraj)
14. Environmental Science: Enger Smith, Smith, W. M. C. Brown (Company Publishing)
15. Introduction to Environmental Studies: Turk & Turk
16. Fundamentals of Environmental Science :G. S. Dahliwal, G. S. Sangha, P. K. ralhan(Kalyani Publishers, New Delhi)
17. Environmental Science and Engineering: Dr.N.Arumugam, Prof.V.Kumaresan(Saras Publication, Kottar, Dist. Kanyakumari)
18. Perspectives in Environmental Studies: Anubha Kaushik, C.P.Kaushik (New Age International(P) Limited, Publishers)

Mapping of Program Outcomes with Course Outcomes

Programme Outcomes (POs)									
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1								2	
CO2	3							2	
CO3	3								2
CO4								2	
CO5	3	3							
CO6								2	
CO7	3							2	

Justification for the mapping

PO1: Disciplinary Knowledge:

CO2. Students will understand the distinguishing characters and the Energy and its resources and to know how to conserve energy and natural resources.

CO3. Student will know the concept of meteorology and apply their knowledge in day to day life.

CO5. Students will understand the knowledge about Environmental problems and be able to identify and analyze and to solve the environmental problems.

CO7. Students will demonstrate a comprehensive understanding of the world's biodiversity and enabling them to its conservation and management.

PO2: Critical Thinking and Problem solving:

CO5. Students will apply their knowledge of Environmental problems and to solve the environmental and social problems.

PO8: Environment and Sustainability:

CO1. Students will understand Imparts conceptual knowledge of environment, and meteorology concept to understand the impact of the scientific solutions in societal and environmental context.

CO2. Students will understand the distinguishing characters and the Energy and its resources.

CO4. Students will acquire the knowledge about bio resources their conservation and sustainable use of Biodiversity.

CO6. Discover knowledge in ecological perspective and value of environment.

CO7. Demonstrate a comprehensive understanding of the world's biodiversity and the importance of its conservation.

PO9: Self-directed and Life-long learning:

CO3. Student will know the concept of meteorology and apply their knowledge in day to day life and able to solve the climate change related problems.

PAPER CODE: EVS 1202**PAPER - I: FUNDAMENTALS OF ENVIRONMENTAL BIOLOGY – II****Credit -2: No. of Lectures 36.****Course Outcomes:****By the end of the course, students will be able to:****CO1.** Students will acquire knowledge about bioresources.**CO2.** Study of biodiversity and apply that knowledge in day to day life.**CO3.** Imparts conceptual knowledge of environment, their adaptations and interrelationship.**CO4.** Use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.**CO5.** Be proficient in ecological field methods such as wildlife survey, biodiversity assessment, mathematical modeling and monitoring of ecological systems.**CO6.** Apply the scientific method and quantitative techniques to describe, monitor and understand environmental systems.**CO7.** Evaluate current environmental issues and problems including the solutions and management practices that have been used or offered to address these issues and problems.**Credit -1**

Unit I: 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. 07

Unit II: Community ecology: Definition, community concept, types and interaction – predation, herbivory, parasitism and allelopathy. Biological invasions. 07

Unit III: Ecosystem Structure and functions: Structures – Biotic and Abiotic components. Functions – Energy flow in ecosystems, energy flow models, food chains and food webs. Biogeochemical cycles, Ecological succession. Species diversity, Concept of ecotone, edge effects, ecological habitats and niche. Ecosystem stability and factors affecting stability. Ecosystem services. 08

Credit -2

Unit IV: Basis of Ecosystem classification. Types of Ecosystem: Desert (hot and cold), Forest, rangeland, wetlands, lotic, lentic, estuarine (Mangrove), Oceanic. 07

Unit V: Biomes: Concept, classification and distribution. Characteristics of different biomes: Tundra, Taiga, Grassland, Deciduous forest biome, Highland Icy Alpine Biome, Chaparral, Savanna, Tropical Rainforest. 07

References:

1. Fundamentals of Ecology: Eugene P. Odum, (Natraj Publishers, Dehradun.)
2. Principles of Ecology: P. S. Verma, V. K. Agarwal (S. Chand and Co. New Delhi)
3. Environmental Biology: P. D. sharma (Rastogi Publications, Meerut)
4. Ecology and Environment: P. D. sharma (Rastogi Publications, Meerut)
5. Principles of Environmental Biology: P. K. G. Nair (Himalaya Publishing House, New Delhi)
6. Environmental Biology: M. P. Aroras (Himalaya Publishing House, New Delhi)
7. Environmental Science: Enger Smith, Smith, W. M. C. Brown (Company Publishing)
8. Principles of Soil Science: Watt K. E. F. (1973), (McGraw Hill Book Company, New Delhi)
9. 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

Mapping of Program Outcomes with Course Outcomes

Programme Outcomes (POs)									
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3								
CO2	3								
CO3	3							2	
CO4	3	2						2	
CO5					3				
CO6									

CO7									
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Justification for the mapping

PO1: Disciplinary Knowledge:

CO1. Students will acquire knowledge about bioresources and able to conserve and management of bioresources.

CO2. Students will develop knowledge about biodiversity and apply that knowledge in day to day life and able to conserve our biodiversity.

CO3. Students will acquire knowledge of environment, their adaptations and interrelationship.

CO4. Students use interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.

PO2: Critical Thinking and Problem solving:

CO4. Students will apply their knowledge interdisciplinary approaches such as ecology, economics, ethics and policy to devise solutions to environmental problems.

PO5: Trans-disciplinary knowledge:

CO5. Students will apply mathematical modelings in ecological field methods such as wildlife survey, biodiversity assessment, and monitoring of ecological systems to solve biodiversity related problems.

PO8: Environment and Sustainability:

CO3. Students will acquire knowledge of environment, their adaptations and interrelationship this knowledge will enable to continue learning and developing their skills throughout their careers.

CO4. Students use interdisciplinary approaches such as ecology, economics, ethics and policy this approach will able them to solve environmental and societal problems.

PAPER CODE: EVS 1203**PAPER - III: PRACTICAL BASED ON EVS 1201 & EVS1202****Semester –II****Course Outcomes:**

CO1. Imparts conceptual knowledge of environment, and meteorology

CO2. Students will understand the distinguishing characters and the Energy and its resources.

CO3. Student will know the concept of meteorology and apply their knowledge in day to day life.

CO4. Students will acquire the knowledge about bio resources their conservation and sustainable use of Biodiversity.

CO5. Students will understand the knowledge about Environmental problems and their solutions.

CO6. Discover knowledge in ecological perspective and value of environment.

CO7. Demonstrate a comprehensive understanding of the world's biodiversity and the importance of its conservation.

1. Study of Microscopy
2. Study of Plant Adaptations under various environmental conditions –Hydrophytes.
3. Study of Plant Adaptations under various environmental conditions –Mesophytes.
4. Study of Plant Adaptations under various environmental conditions -Epiphytes and halophytes.
5. Study of Plant Adaptations under various environmental conditions- Xerophytes).
6. Estimation of Nitrates from given soil sample by spectrophotometrically.
7. Estimation of Phosphorus from given sample by spectrophotometrically.
8. Estimation of Na and K from given soil samples by flame photometrically.
9. Estimation of Ca and Mg from given soil sample by titrimetric method.
10. Estimation of Chlorides from given soil sample by silver nitrate method.
11. Isolation and culture of microbes from soil / water samples. 1
12. Visit of Forest / water Reserve and submission of Excursion report is compulsory at the time of practical examination.

Mapping of Program Outcomes with Course Outcomes

Programme Outcomes (POs)									
Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	3							2	
CO2	3								
CO3	3								
CO4	3								
CO5	3	2							
CO6	3								2
CO7				3					

Justification for the mapping**PO1: Disciplinary Knowledge:**

CO1. Students will demonstrate a compressive understanding of the world biodiversity and to aware the importance of its conservation.

CO2. Students will understand the significance of various natural resources and able to its management.

CO3. Students will evaluate hazards and risks in order to carry out a risk assessment.

CO4. Students will use a verity of laboratory techniques and able to safely conduct chemical experiments and procedures.

CO5. Students will understand verity of ecosystem of their own locality and be able to conserve and management of local ecosystems

CO6. Students will able to understanding the ecological value and consumptive use of ecosystem in day to day life.

PO2: Critical Thinking and Problem solving:

CO5. Students will understand verity of ecosystem of their own locality and be able to solve the local ecosystems related problems.

PO4: Research-related skills and Scientific temper:

CO7. Students will have opportunity to work in research lab, enabling them to handling the instruments in laboratories and developing their skills throughout their careers entrepreneurs.

PO8: Environment and Sustainability:

CO1. Students will demonstrate a compressive understanding of the world biodiversity and to aware the importance of its conservation.

PO9: Self-directed and Life-long learning:

CO6. Students will able to understanding the ecological value and consumptive use of ecosystem in day to day life this knowledge will enable to continue learning and developing their skills throughout their careers
