

THIRUVALLUVAR UNIVERSITY
BACHELOR OF SCIENCE
B.SC. ENVIRONMENTAL MANAGEMENT
(With effect from 2020 - 2021)

The Course of Study and the Scheme of Examinations

S. No.	Part	Study Components		Ins. Hrs / week	Credit	Title of the Paper	Maximum Marks		
		Course Title					CIA	Uni. Exam	Total
SEMESTER I									
1	I	Language	Paper-1	6	4	Tamil/Other Languages	25	75	100
2	II	English (CE)	Paper-1	6	4	Communicative English I	25	75	100
3	III	Core Theory	Paper-1	6	4	Basics of Earth Science	25	75	100
4	III	Core Practical	Practical-1	4	0	Basics of Earth Science	0	0	0
5	III	Allied -1	Paper-1	4	3	Environmental Botany	25	75	100
6	III	Allied- 1	Practical-1	2	0	Environmental Botany	0	0	0
7	III	PE	Paper 1	6	3	Professional English I	25	75	100
8	IV	Environmental Studies		2	2	Environmental Studies	25	75	100
		Sem. Total		36	20		150	450	600
SEMESTER II									
8	I	Language	Paper-2	6	4	Tamil/Other Languages	25	75	100
9	II	English (CE)	Paper-2	6	4	Communicative English II	25	75	100
10	III	Core Theory	Paper-2	5	4	Environment and Ecology	25	75	100
11	III	Core Practical	Practical-1	3	2	Basics of Earth Science and Environment and Ecology	25	75	100
12	III	Allied-1	Paper-2	4	3	Environmental Zoology	25	75	100
13	III	Allied-1 Practical	Practical-1	2	2	Environmental Botany and Zoology	25	75	100
14	III	PE	Paper 1	6	3	Professional English II	25	75	100
15	IV	Value Education		2	2		25	75	100
16	IV	Soft Skill		2	1		25	75	100
		Sem. Total		36	25		225	675	900

THIRUVALLUVAR UNIVERSITY

B.SC. ENVIRONMENTAL MANAGEMENT

SYLLABUS CBCS PATTERN (With effect from 2020 - 2021)

SEMESTER I

CORE PAPER - 1

BASICS OF EARTH SCIENCE

Course Objectives

1. To know about the basics of earth and its segments
2. To learn about the structure and composition different spheres of earth
3. To understand the processes of atmosphere, lithosphere, hydrosphere
4. To understand the biosphere and its interactions
5. To attain knowledge about biogeographic regions of the world

UNIT I: Environmental Segments

Environment and its components - Abiotic - Biotic - Spheres of the earth system - Atmosphere Lithosphere - Hydrosphere - Biosphere - Anthrosphere - Elements and factors contributing man's environment.

UNIT II: Atmosphere

Structure of atmosphere - Layer of atmosphere earth - Troposphere - Stratosphere - Ionosphere - Composition of atmosphere - Temperature profile of the atmosphere- Insolation - Solar constant - Heating of the atmosphere - Change in global temperature pattern - *El nino*.

UNIT III: Lithosphere

Layers of earth – sial, sima and nife - Barysphere - Rock formation- Igneous Rocks- intrusive and extrusive Rocks – Acid and basic Rocks- Sedimentary rocks- Arenaceous and Argillaceous Rocks- Calcareous and Carbonaceous Rocks- Metamorphic Rocks- Weathering and its types.

UNIT- IV: Hydrosphere

Sources of water- Importance and characteristics of water - Hydrological cycle - Zones of hydrosphere- Salinity of the ocean - Ocean deposits - Ocean movements - Southern oscillation (ENSO).

UNIT- V: Biosphere

Characteristics of biosphere- Phyto-geographic and Zoo geographic regions of the world - Bio geographical classification of India- Major forest in India.

Course Outcomes

1. After studied Unit I, the student will be able to understand about various spheres of the earth system and their structures and compositions.
2. After studied Unit II, the student will be able to understand about atmosphere, pattern change in global temperature and *El-nino*.
3. After studied Unit III, the student will be able to understand about the types and formation of rocks.
4. After studied Unit IV, the student will be able to understand hydrosphere, hydrological cycle, ocean movement and ENSO.
5. After studied Unit V, the students will be able to explain the biosphere and biogeographical regions of the world.

Text Books

1. Das Gupta, A., Kapoor, A. N. (2001) Principles of Physical Geography, S. Chand & co Ltd, New Delhi.
2. Mahapatra, G. B. (2001) Text book of physical Geology, CBS publishers and distributors Ltd, New Delhi.
3. Peter O, Muller, Harm J, De Blij, Richard S, (2004) Environmental Geography, Oxford university press, USA.
4. Asim K. Das, (2012) Environmental chemistry with green chemistry, Book and Allied (p) Ltd, Kolkata.
5. Verma, P. S., Agarwal, V. K. (2012) Environmental Biology, S. Chand & co Ltd. New Delhi.

Reference Books

1. Sawyer C. N, Mc Carty P.L., Perkin G.F. (1994) Chemistry for Environmental engineering. II Edition Mc Graw Hill.
2. Bailey Ronald Albert, (1978) Chemistry of the Environment, Academic press, New York.
3. Gary W, Vanhoon, Stephen J. Duffy, (1999) Environmental Chemistry- a global perspective, Oxford university press USA.

E-Materials

1. <https://www.educationobserver.com>.
2. <https://www.space.com>.
3. <https://www.geography.com>.
4. <https://www.universetoday.com>.
5. <https://www.biadiversidad.com>.
6. <https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-018j-ecology-i-the-earth-system-fall-2009/>

ALLIED 1
PAPER – 1

ENVIRONMENTAL BOTANY

Course Objectives

1. To know about the classification of plants
2. To understand the plant cell structure and biology
3. To examine the anatomy of the plants of different groups
4. To study the plant genetics
5. To estimate the economic values of important plants

UNIT I – Plant Classification

Fundamentals of Classification, Basic unit of Classification - Classification of Plants - Taxonomic Hierarchy – Artificial, Natural Classification, and Artificial Systems based on superficial features. Natural systems based on form relationships. Phylogenetic systems based on evolutionary and genetic relationships. Merits and Demerits of Classification systems.

UNIT II – Plant Cell Biology

Prokaryotic and Eukaryotic Cell - Cell Organelles - Mitochondria, Chloroplast and Nucleus, Cell Division - Mitosis - its Significance.

UNIT III – Plant Anatomy and Life History

Anatomy of Dicot Stem, Root - Monocot Stem, Root - Leaf structure and anatomy - Structure and Life History of Lichens, Gracilaria, Agaricus, Lycopodium, Cycas, Pinus - Teak.

UNIT IV – Plant Genetics

Mendel - Reason for Mendel's success - Characters selected by Mendel - Monohybrid Experiment - Homozygous, Phenotype, Genotype - Back cross & Test cross - Di-hybrid Experiments - Mendel's Laws, Law of Dominance, Law of Segregation and Law of Independent Assortment.

UNIT V: Economic Botany

Economic Botany - Medicinal Plants, Edible oil seeds, Pulses, Vegetables, Fruits, Mushrooms, Single Cell Protein - Spirulina - Seaweeds: Gracilaria.

Course Outcomes

1. After studied Unit I, the students will be able to explain the plant classification.
2. After studied Unit II, the students will be able to understand the structure and functions of plant cells.
3. After studied Unit III, the students will be able to understand the anatomy of the various types of plants.
4. After studied Unit IV, the students will be able to explain the genetics and various laws of genetics.
5. After studied Unit V, the students will be able to evaluate the economic importance of importance of various plants.

Text Books

1. Singh Pandey Jain (2017) A Text Book of Botany. Publisher: Rastogi.
2. Pandey S.N., Trivedi, P.S. (2015) A text Book of Botany, S. Chand Publisher
3. Mathawat, G.S.P., Sharma, D. and R.K. Sahni, (1996) A text book of Botany, Ramesh Book depot, Jaipur.
4. Verma, V., (1980) A text book of Economic Botany, Emkay Publications, New Delhi, 1980.

References Books

1. Mehrothra, R.S., Plant Pathology, (1991) Tata McGraw Hill Publishing Co., Ltd., New Delhi.
2. Muneeswaran, A., (2004) Allied Botany, Titan Nooks, Madurai, India, 2004.
3. Pandey, B.P. (1999) Economic Botany, S. Chand and Co., New Delhi.
4. Rao, K.N. Krishnamoorthy, K. and G.S. Rao. (1979) Ancillary Botany, Rajalakshmi Publication, Nagerkoil.
5. Jeffery, C., (1982) An Introduction of Plant Taxonomy, Cambridge, Press.
6. Smith Gilbert, M. (1995) Cryptogrammic Botany, VOL 1&2, McGraw Hill, New York.
7. Verma, P.S and V.K. Agarwal, (1989) Principles of Ecology, S. Chand & Company, New Delhi.
8. Hill, A.W (1951) Economic Botany, McGraw Hill Publications.
9. Dash, M.C (1995) Fundamentals of Ecology, McGraw Hill, Publications.

SEMESTER I

CORE PAPER - 1

ENVIRONMENT AND ECOLOGY

Course Objectives

1. To learn the concept, principles of ecology and ecosystem
2. To understand the structure and functions of ecosystem
3. To impart knowledge about population ecology
4. To understand the community ecology and process
5. To study the ecological relationships among organism

UNIT I: Ecology

Definition - Scope and importance of Ecology - Sub divisions of Ecology- Autecology- Synecology - Branches of Ecology - Environmental Factors- Abiotic- Water- Air - Soil – Temperature – Light - Biotic Factors.

UNIT II: Ecosystem

Structure of Ecosystem - Principle steps and components of an Ecosystem- Ecosystem Types- Aquatic Ecosystem - Pond Ecosystem - Functions of Ecosystem - Energy - Food Chain- Food Web- Ecological Pyramids - Pyramid of Number, Biomass and Pyramid of Energy- Inverted Pyramids.

UNIT III: Population Ecology

Characteristics of Population - Nationality - Mortality - Age Distribution - Age Pyramids - Survivorship Curves - Population Dispersal - Population Growth Forms - Carrying Capacity- Ecological Adaptations - Hydrophytes - Morphology and Anatomy - Mesophytes - Morphology and Anatomy - Xerophytes - Morphology and Anatomy - Halophyte.

UNIT IV: Community Ecology

Definition - Ecological Dominance - Ecotone and Edge Effect - Ecological Niche - Ecological Equivalence - Ecological Indicators - Ecological Succession - Types - Primary and Secondary Succession - Process of Succession - Nudation - Invasion - Establishment- Competition- Reaction - Stabilization.

UNIT V: Animal Association

Inter-Specific Relationship - Neutralism - Symbiosis - Mutualism- Commensalism- Antagonism- Competition, Predation, Antibiosis, Exploitation, Parasitism- Parasitic Adaptations- Intra-Specific Relationship.

Course Outcomes

1. After studied Unit I, the student will be able to know about the scope and importance of ecology.
2. After studied Unit II, the student will be able to gain knowledge about the structure and functions of Ecosystem.
3. After studied Unit III, the student will be able to understand about the characteristics of population ecology.

4. After studied Unit IV, the student will be able to understand the community ecology, ecological succession, ecotone and ecological niche.
5. After studied Unit V, the student will be able to describe the intra and inter relationship of animals.

Text Books

1. Verma, P.S., Agarwal, V.K. (1983) Principles of Ecology, S Chand & Company Limited, New Delhi.
2. Jeyaraj, Veerabalarastogi, (1988) Fundamentals of Ecology, S Chand and Company, New Delhi.
3. Sharma, P.D., (1988), Ecology and Environment, Rastogi Publication, Meerut.
4. Smith, T.M., Smith, R.L. (2007) Elements of Ecology, Pearson Education.
5. Clarke, G.L. (2003) Elements of Ecology, John Wiley, London.

Reference Books

1. Odum, E.P. (1983) Fundamentals of Ecology, WB Sounder Company, Philadelphia.
2. Champman, J.L., Reiss, M.J. (1995) Ecology, Principles and Applications, Cambridge University Press.

E-Material

1. <https://www.environment-ecology.com>.
2. <https://www.britannica.com>.
3. <https://esj.Journalsonlinelibrary.wiley.com>.
4. <https://www.researchgate.net>.
5. <https://openoregon.pressbooks.pub>.

ALLIED 1
PAPER - 2
ENVIRONMENTAL ZOOLOGY

Course Objectives

1. To know about the distribution of animals in the universe
2. To understand the evolutionary history of animals
3. To learn about economic importance of animals
4. To understand the breeding phenomenon in fishes
5. To learn about ornamental fish culture

UNIT-I: Zoo Geography

Animal Distribution- Definition- Classification of Animal Distribution-Patterns of Distribution- Cosmopolitan Distribution- Discontinuous Distribution- Bipolar Distribution- Isolated Distribution- With Examples- Factors Affecting Distribution- Factors Influencing Distribution.

UNIT-II: Evolution

Origin of Life- Theories of Evolution- Lamarck- Theory of Use and Disuse- Theory of Inheritance of Acquired Characters- Neo-Lamarckism- Darwin's Theory of Natural Selection- Variation- Geometric Ratio of Increase in Production- Struggle for Existence- Survival of the Fittest- Sexual Selection- Neo-Darwinism.

UNIT-III: Economic Zoology

Productive Insects- Honeybee- Culture- Production of Honey- Economic Importance of Honey- Silk-Worm- Culture- Production of Silk- Economic Importance of Silk, Lac Insect- Culture- Production of Lac- Economic Importance of Lac.

UNIT-IV: Induced Breeding in Fishes

Hypophysation - Principles of Hypophysation- Procedure- Collection- Preparation- Injection- Mechanism of Pituitary Action- Advantages- Seed Collection- Collection from Natural Habitat- Bundh Breeding- Transport of Fish Seeds- Open System- Closed System.

UNIT-V: Ornamental Fish Culture

Aquarium- Aims of Aquarium- Requirements of Aquariums- Types of Aquariums- Setting of Aquarium- Aquarium Fishes- Gold Fish- Angel Fish- Fighter Fish- Koi- Molly- Sword Tail- Zebra Fish- Guppy- Fish Marketing- Definition- Marketing Channels- Types of Fish Marketing- Risk of Fish Marketing.

Course Outcomes

1. After studied Unit I, the student will be able to gain knowledge about animal distribution.
2. After studied Unit II, the student will be able to understand the evolutionary significance of animal kingdom.
3. After studied Unit III, the student will be able to gain knowledge on and evaluate the economic importance of animals.

4. After studied Unit IV, the student will be able to impart knowledge on breeding pattern of fishes.
5. After studied Unit V, the student will be able to gain knowledge and skills on ornamental fish culture.

Text Books

1. Fundamentals of ecology, Veerbala Rastogi (1988), S Chand & Company, New Delhi.
2. Organic Evolution, Arumugam N, (2001), Saras Publication.
3. Economic Zoology, Ravindranath K.R. (2005), Dominant Publishers, New Delhi.
4. A Text Book of Aquaculture, Srinivasalu Reddy, M & Sambasivarao K.R.S, (2004), Discovery Publishing House, New Delhi.
5. Aquaculture. Principles & Practices, Pillay T.V.R. (1990), Black Well Publication, Oxford.

Reference Books

1. Applied Zoology, Pradip, Jaybde (2008), Discovery Publishing House, New Delhi.
2. Fish & Fisheries of India, Jhingaran C.G (1981), Hindustan Publishing Corporation.

E-Materials

1. <https://www.researchgate.net>
2. <https://www.aquaculturealliance.org> s

ALLIED PRACTICAL PAPER – 1

ENVIRONMENTAL BOTANY AND ENVIRONMENTAL ZOOLOGY

Experiments

1. Demonstration of Microscope.
2. Identification of Mendelian Population-Dominant-Recessive by P.T.C Test.
3. Identification of Blood Groups-A, B, AB, O.
4. Preparation of Thick and Thin Smear of Blood.
5. Study of any one Water Borne Disease - Bacterial Disease.
6. Micro Preparation and Anatomy of Dicot Stem.
7. Micro Preparation and Anatomy of Dicot Root.
8. Squash Preparation of Onion Root Tip for Mitosis.
9. Identification of Museum and Live specimen - Gracilaria, Agaricus.
10. Identification and Micro preparation of Lycopodium stem T.S, Strobilus L.S and Sporophyte
11. Identification and Micro preparation of Cycas Leaflet T.S, Microsporophyll and Megasporophyll.
12. Identification of Slides and Specimens Cycas - Corolloid Root-T.S.
