


UNIVERSITY OF MYSORE
Estd. 1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysuru- 570 005

No.AC2(S)/55/2024-25

Dated: 20.07.2024

Notification

Sub:-Syllabus and Scheme of Examinations of Environmental Science (UG) programme (I & II Semester) from the Academic year 2024-25.

- Ref:-**1. Decision of Board of Studies in Environmental Science (CB) meeting held on 10-06-2024.
2. Decision of the Faculty of Science & Technology meeting held on 19-06-2024.
3. Decision of the Academic Council meeting held on 28-06-2024.

The Board of Studies in Environmental Science (CB) which met on 10-06-2024 has resolved to recommend and approved the Syllabus and Scheme of examinations of Environmental Science (UG) programme (I & II Semester) with effect from the Academic year 2024-25.

The Faculty of Science & Technology and Academic Council at their meetings held on 19-06-2024 and 28-06-2024 respectively has also approved the above said Syllabus and Scheme of examinations hence it is hereby notified.

The Syllabus and Scheme of Examinations content may be downloaded from the University Website i.e., www.uni-mysore.ac.in.


Registrar
Registrar
University of Mysore
Mysore

To:

1. All the Principal of affiliated Colleges of University of Mysore, Mysore.
2. The Registrar (Evaluation), University of Mysore, Mysuru.
3. The Chairman, BOS/DOS in Environmental Science, Manasagangothri, Mysore.
4. The Dean, Faculty of Science & Technology, DOS in Mathematics, MGM.
5. The Director, Distance Education Programme, Moulya Bhavan, Manasagangothri, Mysuru.
6. The Director, PMEB, Manasagangothri, Mysore.
7. Director, College Development Council, Manasagangothri, Mysore.
8. The Deputy Registrar/Assistant Registrar/Superintendent, Administrative Branch and Examination Branch, University of Mysore, Mysuru.
9. The PA to Vice-Chancellor/ Registrar/ Registrar (Evaluation), University of Mysore, Mysuru.
10. Office Copy.

University of Mysore

B.Sc., Degree Course

**Environmental Science
(Three Year – Six Semester Scheme)
(I and II Semester)**

**Revised Syllabus
2024-2025 onwards**

**Department of Environmental Science
University of Mysore
Mysore – 570005**

2024-2025

Environmental Science
B, Sc., I and II Semester
(2024-25 on wards)
List of the Papers - Environmental Science

Papers	Core Course Discipline Specific Course (DSC)	Ability Enhancement Compulsory Course (AECC)	Discipline Specific Elective (DSE)	Skill Enhancement Course (SEC)	L	T	P	Total Credit
First Semester								
DSC/T Paper 1	ECOLOGY AND ENVIRONMENT	-	-	-	3	-	-	3
DSC/P	PRACTICAL	-	-	-	-	-	2	2
Environmental Studies (Common Paper)								
		ENVIRONMENTAL STUDIES (FOR PHYSICAL SCIENCE)	--	--	2	-	--	2
Second Semester								
DSC/T Paper 2	ATMOSPHERE AND CLIMATE CHANGE	-	-	-	3	-	-	3
DSC/P	PRACTICAL	-	-	-	-	-	2	2
Environmental Studies (Common Paper)								
		ENVIRONMENTAL STUDIES (FOR BIOLOGICAL SCIENCE)	--	--	2	-	--	2

The aims and Objectives of B.Sc. Environmental Science is to:

- Provide students with the scope to develop knowledge base covering all attributes of the environment and enable them to attain scientific/technological capabilities to find answers to the fundamental questions before the society with regards to human action and environmental effects with due diligence.
- Enhance the ability to apply this knowledge and proficiency to find solutions relating to environmental concerns of varied dimensions of present times
- Provide with a direction and technical capability to carry on lifelong learning and show teamwork and collaborative endeavour, and decision making
- Improve the employability of the graduates including the enhancement of self employment potential and entrepreneurial aptitude, and fill the technical resource gap especially in the Indian context
- Help graduates appreciate requirement of framing environmental policy guidelines
- Motivate graduates to appreciate that they are an integral stakeholder in the environmental management of India irrespective of their future jobs or working environments.
- Help graduates to understand the concerns related to Sustainable Development Goals (SDGs) and the Indian obligations

Program Learning Outcomes of B.Sc. Environmental Science is to :

- Ability to recognize the need for learning the topic and develop foundational knowledge on the topic.
- Ability to develop critical thinking and problem solving skills to solve interdisciplinary issues related to the topic.
- Ability to understand the relationships between natural and man-made systems
- Ability to apply technical methods and innovative techniques in classroom, field and laboratory to analyze scientific data
- Ability to develop lifelong learning and professional skills
- Ability to design and execute a scientific project, write scientific reports, develop research and communication skills
- Ability to spread awareness about the environment around us, sustainable development and conduct outreach activities
- Ability to gain empirical knowledge on the topic and contribute in decision making processes

MODEL CURRICULUM (UNDER-GRADUATE) 2024-25
DEGREE: BACHELOR OF SCIENCE (B.Sc.) IN ENVIROMENTAL SCIENCE
SYLLABUS
(With New Regulations)
I Semester Theory Syllabus

Year - I	Course Code	LTP/Credits: 300
Sem – I	Paper Title: Ecology and Environment	Total Teaching Hours: 48 Hrs. (3/Week)
Summative Assessment Marks (C₃): 80 marks		Exam. Duration: 3 Hrs
Formative Assessment C ₁ Test = 10 marks C ₂ Test/Assignment/ Tour Report/Seminar = 10 marks		Exam. Marks Total: 80 + 20 = 100 Marks
Objectives of the Course	<p>This paper enable the students to gain/understand/obtain/Learn the knowledge about</p> <ul style="list-style-type: none"> • Ecosystem and its structural and functional aspects. • Knowledge of interconnections among all the biotic and abiotic components of environment. • The dynamic nature of the ecological processes in maintaining the equilibrium. 	
Course out come	<p>After studying this Course, the students are able to</p> <ul style="list-style-type: none"> ➤ Acquire new knowledge of the interdependence between people and nature that is vital for food production, maintaining clean air and water, sustaining biodiversity. ➤ Understand to maintain a mosaic of habitats that ensures the survival of a rich variety of species and Knowledge on ecology, and ecological dynamics. ➤ Learn how Biodiversity boosts ecosystem productivity where ➤ each species, no matter how small, all have an important role to play. ➤ Ability to correlate ecological dynamics and regulation of vital processes on earth as biogeochemical cycles ➤ Ability to interpret ecosystem services, ecological resilience, ecological economics, and landscape ecology ➤ Set up experiments to appreciate concepts of Ecology ➤ Critically examine the forces impacting ecosystems viz., climate change, stress, population, consumerism, globalization, land use change 	

I Semester Theory Syllabus

Unit No	Course Content	Hours
UNIT 1	<p>Introduction to Environmental Science: Definition and Scope. Theoretical and applied aspects of Environmental Science. Types of Environment - Natural and Anthropogenic Environment.</p> <p>Fundamentals of Ecology : Definition, types of ecosystem. Structure and function of an ecosystem – abiotic and biotic components of an ecosystem. Energy flow – Laws of Thermodynamics in relation to</p>	16 Hrs.

	<p>energy flow. Food chain - Grazing and detritus. Food web. Ecological pyramids - Pyramid of number, biomass and energy. Productivity - Primary secondary and net productivity. Bio magnification.</p> <p>Major Ecosystem : Types and characteristics of Terrestrial ecosystem - Forest ecosystem, Mangrove, grassland, arid land, wetland, aquatic ecosystem-ponds, rivers, estuaries and Marine ecosystem. Crop land ecosystem.</p> <p>Principle of Ecology : Adaptation, Variation, Natural solution etc...</p>	
UNIT 2	<p>Abiotic factors: Nature of response of organisms to abiotic factors. Essential elements and limiting factors; Liebig-Black Man Laws of limiting factors and Shelford's Law of Tolerance. Classification of organisms according to temperature tolerance and regulation. Thermal adaptation of plants and animals. Effect of light on plants and animals.</p> <p>Ecological succession – Primary and Secondary succession – Natural and man-influenced succession, – Hydrarch and Xerarch. Ecotone and Edge effect; Ecotypes and Ecophenes; Ecological indicators. Ecological Niche: Concept and Types of niches:</p>	16 Hrs.
UNIT 3	<p>Biogeochemical cycles : Definition, types, organic and biotic phases of geochemical cycles; types of biogeochemical cycles, water cycle, gaseous cycle-the carbon cycle, the nitrogen cycle, oxygen cycle; sedimentary cycles - sulphur cycle and phosphorous cycle.</p> <p>Population Ecology: Population definition, density, nasality, mortality, life table, age distribution; age pyramids, sex ratio, biotic potential and environmental resistance; population growth rate, dispersion-emigration, immigration, migration and regulation of population size.</p> <p>Concept of Community Ecology: Definition of community concept and types of biological interaction</p>	16 Hrs.

I SEMESTER PRACTICAL

Year - I	Course Code	LTP/Credits: 004/2
Sem – I	Paper Title: Ecology and Environment	Total Teaching Hours: 64 Hrs. (4/Week)
Summative Assessment Marks (C₃): 40 marks		Exam. Duration: 3 Hrs
Formative Assessment C ₁ Test = 05 Marks C ₂ Test/Assignment/ Tour Report/Seminar = 05 Marks		Exam. Marks Total: 50 + 10 = 50 Marks
<ol style="list-style-type: none"> 1. Observation & Identification of Macro flora & fauna 2. Study of ecological adaptations, morphology and anatomy of leaf and stem of. <ol style="list-style-type: none"> a. Hydrophytes b. Xerophytes c. Epiphytes 3. Study of plant community- quadrat method and calculate the frequency percentage of different species of plants in an area. 4. A study of artificial ecosystem. 5. Estimation of carbon capture and storage of trees. 6. Estimation of primary productivity of a pond – Light and Dark bottle method 7. Estimation of primary productivity of terrestrial vegetation – Chlorophyll method 8. Estimation of primary productivity of grasses – Harvest method 9. Determination of turbidity of water sample using sacchi disc. 10. Study of physical parameters of ponds and lakes(Color, odor, temperature and turbidity) 11. Visit to national parks/social forestry/urban forestry/ wild life sanctuary/pond/forest ecosystem 		

Reference:	<ol style="list-style-type: none"> 1. Michael, P. (1986). Ecological Methods for Field and Laboratory Investigations. 2. Tata Mc Graw-Hill Publishing Co. Ltd. 3. Rolan, R. G. (1973). Laboratory and Field Investigations in General Ecology. Macmillan Co. 4. Standard Method for Examination of Water and Wastewater. (2017). APHA –WEF. 5. Subrahmanyam, N. S. and Sambamurty, A. V. S. S. (2000). Ecology. Narosa Publishing House. 6. Trivedi, P. K. and Goel, P. K. (1984). Chemical and Biological Methods of Water Pollution Studies. Environmental Publications. 7. Environmental Science – Turk A. (1984) Saunders 8. Environmental Science –Eugen, E.d. (1983) W.C. Brown Co. 9. Man and Biosphere Today-Dusman R.S. (1974) Sterling Pub. Co. 10. Basic Ecology – E. Odum (1983) – Sunders 11. Concepts of Ecology – Kormondy 12. Introduction to Ecology-Colinvaux, P.A. (1973) John Wiley 13. Ecology of Tropical Oceans – Longhurst, A.R. and Daniel Pauly, Academic Press 14. Ecology of Inland waters and Estuaries – Reid, G.K. (1961), Reinhold Pub.
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| | <ol style="list-style-type: none">15. Practical Methods in Ecology and Environmental Science – Trivedi R.K. and others (1987)16. Encyclopaedia of Environmental Science – Parker S.P. (1980)17. Ecology- study of Ecosystems – Kisra K.C. and others – Wheeler and comp. Allahabad18. New Approaches to Monitoring Aquatic Ecosystems –Boylo T.P. (1987) ASTM Philadelphia19. Essentials of Ecology and Environmental Science IVth edn. SVS Rana (2010)Eastern Economy Edition PHI20. Ecology Principles and Application II nd EDn J.L Chapman and M.J. Reiss(2010)Cambridge University Press21. Ecology 2nd edn: N.S. Subramanyam and A.V.S.S. Sambamurty (2008) Narosa publishing House.22. Biological invasions: economic and environmental costs of alien plant, animal, and microbes. Pimentel ,D (2011) CRC publication |
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II Semester Theory Syllabus

Year - I	Course Code	LTP/Credits: 300
Sem – II	Paper Title: Atmosphere and Climate Change	Total Teaching Hours: 48 Hrs. (3/Week)
Summative Assessment Marks (C₃): 80 marks		Exam. Duration: 3 Hrs
Formative Assessment C ₁ Test = 10 marks C ₂ Test/Assignment/ Tour Report/Seminar = 10 marks		Exam. Marks Total: 80 + 20 = 100 Marks
Course learning outcome:	<p>After studying this Course, the students are able to</p> <ul style="list-style-type: none"> ➤ Students will understand the Earth's atmosphere, meteorology, pollution, gas emissions, and airborne contaminants, thereby the dynamics of atmosphere. ➤ Studying climate and a changing climate is important, which will affect people around the world. ➤ Analysis of atmospheric circulation and/or temperature alone can be used for modelling or prediction purposes. ➤ Climatic Change is important since it helps to determine future climate expectations. ➤ Preparing for climate change — also known as climate change adaptation — is about reducing the risk of climate change impacts to people, places and resources. 	
Broad contents of the course:	The course presents an understanding of the processes in action on the earth's surface and their impact on man and his institutions.	
Skills to be learned:	The students will understand the origin of our solar system and planets, including earth. The students are exposed to the interior of the earth and be able to appreciate the dynamics of earth evolution through time.	

Unit No	Course Content	Hours 48
UNIT 1	<p>Environmental segments: Atmosphere- : Nature, origin and evolution of atmosphere. Atmospheric structure and composition. Hydrosphere-definition, Types and forms precipitation, Bergeron process – Cloud formation and classification. Forms of condensation. Cloud seeding for artificial rain.</p> <p>Lithosphere: Definition. Internal structure of the earth.</p>	16 Hrs.
UNIT 2	<p>Weather and Climate : Definition, scope and importance. Meteorological parameters - temperature, pressure, precipitation, humidity, wind speed & direction.</p> <p>Nature of solar energy radiations, Insolation-Factors affecting the insolation, transfer of insolation – absorption, scattering. Reflectance,</p>	16 Hrs.

	<p>diffusion and transmission. Terrestrial radiation and heat budget of the earth atmosphere.</p> <p>Monsoons Climates – Definition, Tropical cyclone-formation, structure, movement and path and its effects. Anticyclones - characteristics and origin. Thunder storms and tornadoes. Weather forecasting and modification, El Nino and La Nina effect. Indian monsoon climate.</p>	
<p>UNIT 3</p>	<p>Greenhouse effect and global warming: Definition, impacts, major greenhouse gases, sources and sinks of greenhouse gases; Urban Heat Islands; global dimming. Carbon foot print.</p> <p>Impacts of global climate change-Increased surface mean temperature, vector borne/zoonotic diseases, forest fire, influence on agriculture, increase in floods and drought, loss of biodiversity and extinction of species, sea level rise. Climate change and food security. Vulnerable populations – The Kiribati story.</p> <p>Climate change and policy frame works: Kyoto protocol 1997;</p> <p>United Nation Framework Convention on climate change (UNFCCC), The United Nations Conference on Environment and Development, Intergovernmental Panel on Climate Change (IPCC), Ministry of Environment, Forests & Climate Change (MoEF&CC), National Action Plan on Climate Change (NAPCC), Agenda 21, The Kyoto protocol, Paris agreement. Overview of Conference of Parties (CoP). Evolution of climate change negotiations. Koppen hagen; Convention on climate change; carbon credit and carbon trading; Earth summit. Green Climate Fund. Role of individuals in achieving Sustainable Development Goals.</p>	<p>16 Hrs.</p>

II SEMESTER PRACTICAL

Year - I	Course Code	LTP/Credits: 004/2
Sem – II	Paper Title: Atmosphere and Climate Change	Total Teaching Hours: 64 Hrs. (4/Week)
Summative Assessment Marks (C₃): 40 marks		Exam. Duration: 3 Hrs
Formative Assessment C ₁ Test = 05 Marks C ₂ Test/Assignment/ Tour Report = 05 Marks		Exam. Marks Total: 50 + 10 = 50 Marks
<ol style="list-style-type: none"> 1. Determination of pH of water from different to assess the quality 2. Determination of Humidity: Principle and use of dry & wet bulb thermometer. 3. Pressure: Aneroid barometer 4. Wind: direction and speed –wind vane and anemometer. 5. Construction of wind rose 6. Demonstration of Rain gauge. 7. Mean rainfall calculation over a drainage basin using Thiessen’s Polygon method and Isohyetal method. 8. Demonstration of Altimeter. 9. Evaporation & transpiration problems. 10. Determination of solar radiation intensities 11. Determination of moisture content in different soil samples 12. Visit to any regional Meteorological centre 		

Reference:	<ol style="list-style-type: none"> 1. Fundamentals of soil science – Forth H.D. (1984) – John Wiley. 2. Environmental Science – Turk J & Turk A (1984) – Saunders 3. Geography and Man’s Environemnt Strahler & Strahler(977) Wiley 4. Environmental Science – Eugen E.D. (1983) –W.C. Brown Co. 5. Man and Biosphere today –Dusman, R.S. (1974) Sterling Publication 6. Man and changing environment – R.G. Franke, D.N. Franks Publ: Holt, Rinehart & Winston. 7. The Earth: Our Physical Environment – W.L. Donn-John Wiley & Sons, N.Y. 8. Barry,R.G. 2003 Atmosphere, Wearther nd climate routledge Press,UK. 9. Philander,S G 2012,Encyclopedia of Global Warming and Climate Change (2nd Edn. Sage publication. 10. Mitra, Sharma, S., Bhattacharya,S., Garg. A., Devotta, S., & SenK 2004. Climate Change and India, Universities Press, India 11. Richard H Bryant., Physical Geography, Rupa publication. 2007 12. Howard J. Critchfield., Genearl Climatology IV edn. EEE,pPrentice –Hall India,2004 13. Siddhartha., atmosphere, Weather and Climate, Kisalaya Publications Pvt.ltd.2005 14. Frederick K. Lutgens., EdwardJ. Tarbuck., and D Taassa, The Atmosphere and Introduction to Meterology 11 edn. EEE, PHI 2012.
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(MODEL QUESTION PAPER 1st to 2nd semester)
ENVIRONMENTAL SCIENCE
(MAX MARKS: 100 (C₁:10 + C₂:10 + C₃:80))

Time: 3 hrs

Max. Marks: 80

Note: 1. Answer all questions
Draw neat-labeled diagrams and give examples wherever necessary

SECTION A

Answer all the questions

10X 1 =10 marks

1. Answer in one word or a sentence

- a.
- b.
- c.
- d.
- e.
- f.
- g.
- h.
- i.
- j.

SECTION B

Write short notes on any FIVE of the following:

5 X 6 = 30 Marks

- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

SECTION C

Answer any FOUR of the following:

4 x 10 = 40 Marks

- 9.
- 10.
- 11.
- 12.
- 13.
- 14.

University of Mysore
Scheme for Practical Examination for I and II Semester

(MAX MARKS: 50 (C₁:05 + C₂:05 + C₃:40))

Time: **3hours Max Marks 30**

I. Major Experiment (Preparation, Identification/ Estimation/Quantification)	20 Marks
II. Writing a Comments	10 Marks
III. Record	05 Marks
IV. Viva voce examination	05 Marks