

Curriculum Framework for Three-year Undergraduate Programme in Colleges and Universities of Karnataka State under State Education Policy (SEP)



**B.Sc Programme
(Fifth and Sixth Semester - 2026-27)**

**Syllabus
For
Environmental Science**

**Department of Environmental Science
Bangalore University
Bengaluru**

BANGALORE UNIVERSITY

Department of Environmental Science

Bangalore – 560056

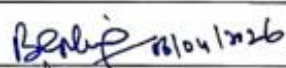
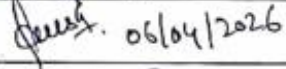
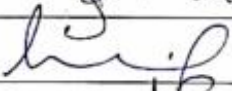
**Proceeding of the Board of Studies (UG) meeting in Environmental Science held on
06.04.2026 in the Department of Environmental Science, Bangalore University,
Bengaluru – 560056.**

A meeting of BOS (UG) in Environmental Science was convened on 6th of April, 2026 at 10.30 am in the Department of Environmental Science, Bangalore University, Bengaluru -56. The Chairman welcomed all the members of the BOS (UG) in Environmental Science and the members were invited to discuss on the following agenda in the meeting.

AGENDA

1. Approval of Third year (Fifth & Sixth semester) syllabus including skill courses for implementation from the academic year 2026-27.
2. Approval of Course pattern and scheme of examination 2026-27.
3. Approval of Panel of Examiners (UG) Environmental Science for the academic year 2026-27.
4. The Chairperson is authorized to change/incorporate corrections as per the direction of the University.

Members have examined the scheme and course patterns as per the State Education Policy. Committee members have discussed and approved the syllabus for third year B.Sc Environmental Science for implementation from the academic year 2026-27. The meeting ended with vote of thanks by the Chairman.

Sl No.	Name of the Members of BOS	Signature
1.	Prof. B.C. Nagaraja	
2.	Prof. K.L. Prakash	
3.	Prof. Suresh. S	
4.	Dr. Kumar. M	
5.	Dr. Sachin. A. Rosario	


Chairman 06/04/2026

BOS (UG) Environmental Science

Dr. B. C. NAGARAJA Ph.D.
PROFESSOR & CHAIRMAN
Dept. of Environmental Science
Bangalore University
Bengaluru - 560 056.

Distribution of Courses/ Papers in Undergraduate Programme I to II Semester as per State Education Policy (SEP) proposed for B.Sc., Courses B.Sc., Environmental Science: Syllabus: (Major with General) effect from 2024-25

Semester	Course Title	Theory/ Practical	Credits	Teaching hours/ week	Paper Title	Marks	
						S.A.	I.A.
I	EVSC1-T	Theory	3	3	Ecology and Environment	80	20
	EVSC2-P	Practical	2	3	Ecology and Environment	40	10
II	EVSC3-T	Theory	3	3	Atmosphere and Climate Change	80	20
	EVSC4-P	Practical	2	3	Atmosphere and Climate Change	40	10
III	EVSC5-T	Theory	3	3	Natural Resources and Management	80	20
	EVSC6-P	Practical	2	3	Natural Resources and Management	40	10
IV	EVSC7-T	Theory	3	3	Environmental Chemistry and Environmental Pollution	80	20
	EVSC8-P	Practical	2	3	Environmental Chemistry and Environmental Pollution	40	10
V	EVSC9-T	Theory	3	3	Environmental Engineering	80	20
	EVSC10-P	Practical	2	3	Environmental Engineering	40	10
	EVSC11-T	Theory	3	3	Environment Social Governance	80	20
	EVSC12-P	Practical	2	2	Environment Social Governance	40	10
VI	EVSC13-T	Theory	3	3	Solid Waste Management	80	20
	EVSC14-P	Practical	2	3	Solid Waste Management	40	10
	EVSC15-T	Theory	3	3	Environmental Impact Assessment and Auditing	80	20
	EVSJOC1-P	Practical	2	3	Environment Health and Safety	40	10

Programme Outcomes (POs):

PO's	Content
POs 01	Ability to recognize the need for learning the topic and develop foundational knowledge on the topic
POs 02	Acquisition of knowledge on structure, to develop critical thinking and problem- solving skills to solve interdisciplinary issues related to the topic
POs 03	Understanding of various relationships between natural and manmade systems
POs 04	Understanding of the major elements of variation that exist in the living world through apply technical methods and innovative techniques in classroom, field and laboratory to analyze scientific data
POs 05	Ability to develop lifelong learning and professional skills
POs 06	Ability to design and execute a scientific project, write scientific reports, and develop research
POs 07	Ability to spread awareness about the environment around us, development and conduct outreach activities
POs 08	Internalization of the concept of conservation and evolution through the channel of spirit of inquiry
POs 09	Ability to gain empirical knowledge on the topic and contribute in decision-making processes
POs 10	To recognize human activities, to identify trends and patterns, environmental data globally by using effective communication.
POs 11	Find solution to environmental and Human issues.
POs 12	Conflicts of interest and other factors interaction, management of physical and human environments to bring environmental sustainability

**5th Semester B.Sc.
Environmental Science**

Programme	B.Sc. Environmental Science
Semester	Fifth
Course Title	Paper – V –Environmental Engineering
Course Code	EVSC9 - T
Credits	03
Contact Hours	4 hours/Week, Total – 56 hours
Duration of Exam	03 hours
Formative Assessment	20 Marks
Summative Assessment	80 Marks

COURSE OUTCOMES (COs): Students are able to	
COs 01	To develop competency in understanding the concepts of Air pollution and pollutants
COs 02	To instill an introductory knowledge of water engineering concepts for controlling the pollution.
COs 03	To motivate and inspire to acquire contemporary understanding and skills leading to issue identification.
COs 04	To develop knowledge on Meteorological parameters.
COs 05	To understand the existing treatment technologies and scope of developing these methods.

Unit	Content	Hours
I	Environmental Sampling: Definition and purpose, Importance in environmental monitoring and assessment, Types of environmental media (air, water, soil, biota). Sampling Design and Planning: Random vs. systematic sampling, Stratified sampling, Sample size determination, Representative sampling, sampling frequency and data quality objectives (DQO). Water Sampling Techniques: Surface water and groundwater sampling, Grab and composite sampling, Use of sampling bottles and field filtration, <i>In-situ</i> measurements (pH, temperature, DO, etc.). Soil and Sediment Sampling: Core sampling, auger sampling, depth-specific collection, field logs and documentation Air Sampling Techniques: Passive and active sampling, Particulate and gaseous sampling methods, Use of high-volume samplers and personal air monitors. Sample Preservation and Transport: Holding times and preservation techniques, Chain of custody, Field and laboratory quality control	19

II	Air Pollution Control Engineering: Monitoring and Control of Air Pollution: Scope and significance. Air Sampling: Ambient, Indoor and Stack - Gaseous and particulates. National Ambient Air Quality Monitoring Programme (NAQMP) – Introduction, Guidelines for Sampling and Measurement of notified Ambient Air Quality Parameters (NAAQS), National Ambient Air Quality Standards. Bharat Stage Emission Standards (BSES) – Introduction, Timeline of Implementation of BSES in India. Current Emissions norms. Air Quality Indices. Concept of Air Pollution Tolerance Index and Industrial Greenbelts. Gaseous – Absorption, Adsorption and Condensation. Particulate – Settling Chambers, Inertial Separators, Cyclones, Filters (Baghouse), Electrostatic Precipitators and Scrubbers. Salient features of Air Pollution (Prevention and Control) Act, 1981 and latest amendments; National Clean Air Programme 2019 and latest amendments.	19
III	Water and Wastewater Engineering: Physical, chemical and Biological characteristics of water and wastewater Preliminary and Primary treatment: Screening (fine, medium and coarse – stationary, moving and movable – disposal of screenings), pumping, grit removal (sedimentation tank and detritus tank – types; disposal of detritus) and skimming. Secondary treatment: Activated Sludge Process and Trickling filters. Sludge management. Tertiary treatment: Chlorination; Reverse Osmosis, Activated Carbon. Advanced treatment methods: Filtration, ion exchange, activated carbon adsorption, electro dialysis, nitrification, de-nitrification and Phosphorous removal. Other treatment methods: Oxidation ponds and oxidation of ditches; septic tanks Anaerobic lagoons, Anaerobic filter reactors and Up-flow anaerobic digesters. Treatment of Industrial Effluents: Dairy and Electroplating industry. Monitoring of water pollutants: Scope and significance. Salient features of Water Pollution (Prevention and Control) Act, 1974. Water Quality Standards – Drinking water - IS 10500 & Inland Surface water - IS 2296.	18

Course Articulation Matrix: mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs)/ Program Outcomes (POs)	Program Outcomes (POs)											
	01	02	03	04	05	06	07	08	09	10	11	12
CO 1	3	2	3	2	2	2	3	2	2	3	3	2
CO 2	3	3	2	2	2	2	2	2	2	2	3	2
CO 3	2	3	3	2	2	3	3	2	3	3	3	3
CO 4	3	2	3	2	2	1	2	2	2	3	2	2
CO 5	2	3	2	3	2	3	2	2	3	2	3	3

Pedagogy:

Teaching Strategies: Use of Digital tools and platforms for teaching, learning and research/ dissertation analysis. Inquiry-based learning, group discussions, Interactive Lectures, quiz, group work, Field –oriented studies, Study trip, case studies and debates, hands on training.

Continuous Assessment and Evaluation: Formative and Summative Assessments, Feedback and oral examinations.

Formative Assessment for Theory	
Assessment type	Marks
Sessional Tests- 1	10
Attendance	05
Assignment/Seminar	05
Total	20 marks
Formative Assessment as per SEP Guidelines	

EVSC10-P: Environmental Engineering

Number hrs/week	Duration of the exam	Total hours	Credits
4 hours	3 hours	40	2
Formative Assessment	Test = 05	Summative assessment	Exam = 30
	Attendance = 05		Viva = 05
			Record = 05
	Total = 10		Total = 40

List of Practicals:

1. Sampling techniques of air
2. Determination of Particulate Matter
3. Determination of Sulphur-di-oxide in ambient air
4. Determination of Nitrogen-di-oxide in ambient air
5. Determination of Carbon-di-oxide in ambient air
6. Calculate Air Quality Indices
7. Sampling techniques of wastewater
8. Determination of total solids in wastewater
9. Determination of Chromium in liquid effluents
10. Determination of Copper in liquid effluents
11. Determination of Iron in liquid effluents
12. Determination of BOD
13. Determination of COD
14. Visit to Water treatment plant

Reference:

1. Anjaneyulu Yerramilli. (2019). Air Pollution Prevention and Control Technologies. BS Publications. 1-828.
2. Garg, S.K. (1990). Environmental Engineering Vol I &II Sewage Disposal and
3. Air Pollution Engineering, Khanna Publ. Delhi.
4. Harrison, R. M. and Perry, R. 1986. Handbook of Air Pollution Analysis. Chapman and Hall.
5. Kazt, M. 1969. Measurement of Air Pollutants. WHO.
6. NEERI Manual. 1982. Air Quality Monitoring. NEERI Publications.
7. Paul Guyer. J. (2021). An Introduction to Air Pollution Control Engineering. UNICORN Publishing Group. 1-182.
8. Sawyer, C. N. and Mc Carty, P. L. 1978. Chemistry for Environmental Engineering. McGraw – Hill International.
9. Stern, A. C. 1986. Air pollution Vol. I – VIII. Academic Press Inc
10. Standard Methods for Examination of Water and Wastewater. 2012. APHA – WEF.
11. NEERI Manual. 1982. Air Quality Monitoring. NEERI Publications.

Programme	B.Sc. Environmental Science
Semester	Fifth
Course Title	ENVIRONMENT SOCIAL GOVERNANCE
Course Code	EVSC11-T
Credits	03
Contact Hours	4 hours/Week, Total – 56 hours
Duration of Exam	03 hours
Formative Assessment	20 Marks
Summative Assessment	80 Marks

COURSE OUTCOMES (COs): Students are able to	
COs 01	To understand the concept of corporate sustainability and CSR
COs 02	To identify and understand environment dimension and sustainability
COs 03	To identify and understand social dimension of sustainability
COs 04	To identify/stakeholder engagement in environmental protection
COs 05	To understand ESG reporting framework in corporate governance

Unit	Content	Hours
I	Fundamentals of corporate sustainability and CSR: Corporate Sustainability: Definition, Scope and Importance. Relevance in the Indian and global context. Triple bottom line: People, Planet, Profit. Corporate Sustainability vs. Corporate Responsibility. Introduction to responsible investing: ESG investing; Impact and Social investing Corporate Social Responsibility (CSR): Concept, history and evolution of CSR. Drivers of CSR: Legal, ethical, philanthropic and strategic. Sustainable Development Goals (SDGs) and CSR. CSR in India: Provisions under the Companies Act, 2013; Applicability, spending norms and implementation	19
II	Environmental and Social Dimensions of Sustainability Environmental responsibility: Key environmental concepts: Climate change, mitigation and adaptation. Business and the environment: Environmental risks and opportunities Circular economy and clean innovation. Blue Economy: Definition and business potential. Environmental reporting: Ecological footprint; Importance of environmental disclosures. Social Responsibility and Stakeholders: Social factors: Human capital, employee welfare, community development. Health & safety, product liability, consumer rights. Stakeholder engagement: Customers, employees, investors, communities	19

	Social reporting and impact assessment: Social Return on Investment (SROI).	
III	Governance and ESG Reporting frameworks Corporate governance: Meaning and importance. Governance components: Board structure, diversity, executive pay. Transparency, accountability, and business ethics. Role of auditors in corporate governance. Governance codes: OECD Principles. ESG reporting and integrated frameworks: Meaning, importance and rise in relevance. Integrated reporting: Benefits and components. ESG disclosure drivers: Investors, regulators, consumers. Key international ESG frameworks: GRI, CDP, SASB, UN Global Compact, TCFD, Science-Based Targets. Indian Framework: SEBI's Business Responsibility and Sustainability Report (BRSR). Assurance and stakeholder engagement: Basics of assurance and verification in ESG reporting. Engaging with stakeholders and collaborative industry initiatives.	18

Course Articulation Matrix: mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs)/ Program Outcomes (POs)	Program Outcomes (POs)											
	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	3	2	2	1	2	1	1	1	1	1	1	1
CO 2	3	2	2	1	2	1	1	1	2	2	1	1
CO 3	3	3	2	2	2	2	1	1	2	2	2	2
CO 4	2	3	2	3	2	3	2	2	2	3	2	2
CO 5	2	3	3	3	3	3	3	3	3	3	3	3

Pedagogy:

Teaching Strategies: Use of Digital tools and platforms for teaching, learning and research/ dissertation analysis. Inquiry-based learning, group discussions, Interactive Lectures, quiz, group work, Field –oriented studies, Study trip, case studies and debates, hands on training. Continuous Assessment and Evaluation: Formative and Summative Assessments, Feedback and oral examinations.

Formative Assessment for Theory	
Assessment type	Marks
Sessional Tests- 1	10
Attendance	05
Assignment/Seminar	05
Total	20 marks
Formative Assessment as per SEP Guidelines	

EVSC12-P: ENVIRONMENT SOCIAL GOVERNANCE

Number hrs/week	Duration of the exam	Total hours	Credits
4 hours	3 hours	40	2
Formative Assessment	Test = 05	Summative assessment	Exam = 30
	Attendance = 05		Viva = 05
			Record = 05
	Total = 10		Total = 40

List of Practicals:

1. Study of SDG India index report by NITI Aayog.
2. Introduction to ESG frameworks: GRI, BRSR and WRI.
3. Study of ISO standards for 14001, 26000, 37000 guidelines.
4. Study of ISO standards related to GHG protocol-14064-1/2/3, 14067
5. Quantification of GHG emissions in energy sector-Electricity consumption
6. Quantification of GHG emissions in energy sector-Fossil fuels
7. Quantification of GHG emissions in agriculture sector-Livestock population
8. Quantification of GHG emissions in waste sector- Solid and Liquid waste generation
9. Calculate carbon footprint of the organisation.
10. Analyse organisation's CSR initiative and its role in achieving SDG.
11. Mapping and analysis of supply chain of a product.
12. Study the Life Cycle Analysis (LCA) of a product.
13. Calculate Human Development Index (HDI)

Reference:

- Aras, G. (2016). *A handbook of corporate governance and social responsibility*. CRC Press.
- Baxi, C. V., & Prasad, A. (Eds.). (2005). *Corporate social responsibility: Concepts and cases: The Indian experience*. Excel Books India.
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- Mondal, S., & Das, G. (2021). *Business, sustainable development & other emerging issues*. Sheba Blake Publishing.

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- Solomon, J. (2020). *Corporate governance and accountability*. John Wiley & Sons.
- Tricker, R. I. (2015). *Corporate governance: Principles, policies, and practices*. Oxford University Press, USA.
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**6th Semester B.Sc.
Environmental Science**

Programme	B.Sc. Environmental Science
Semester	Sixth
Course Title	Solid Waste Management
Course Code	EVSC13-T
Credits	03
Contact Hours	4 Hours/week, Total- 56 hours
Duration of Exam	3 Hours
Formative Assessment	20 Marks
Summative Assessment	80 Marks

COURSE OUTCOMES (COs): Students are able to	
COs 01	Explain the sources, types, and characteristics of different waste streams (municipal, C&D, biomedical, hazardous, e-waste), and the regulatory framework governing their management in India.
COs 02	Describe and compare various waste collection, storage, and processing systems, including recycling strategies, source reduction techniques, and extended producer responsibility.
COs 03	Evaluate treatment and disposal technologies such as composting, bio-gasification, incineration, sanitary landfills, and specific methods for biomedical, hazardous, and e-waste.
COs 04	Analyze the role of innovation and technology in waste monitoring and management, including smart systems, GIS, drones, and IoT tools for optimizing collection and treatment.
COs 05	Assess community-based approaches and case studies involving awareness programs, PPP models, biomining, landfill rehabilitation, and circular economy initiatives for sustainable waste management.

Unit	Content	Hours
I	Introduction to Solid Waste: Definition and classification of solid waste, Waste generation trends: urban vs. rural, Sources and types: Municipal solid waste (MSW), Construction & Demolition (C&D), Biomedical, Hazardous, and E-waste. Characteristics & Quantification: Physical, chemical, and biological properties of solid waste. Estimation of generation rates: per capita generation, density, moisture content. Sampling and analysis methods Functional Elements of Waste Management: Collection systems: Primary and secondary collection. Design of collection routes and frequency. Transfer stations: location, design, and operation. Storage: types of containers, community bins Source Reduction and Recycling: Principles and strategies of waste minimization. Material recovery facilities (MRFs). Composting, vermicomposting, anaerobic digestion. Mechanical and	19

	biological processing. Extended Producer Responsibility (EPR) and take-back programs.	
II	Treatment & Disposal Technologies Treatment Technologies: Incineration: types, advantages, and emissions. Refuse-Derived Fuel (RDF). Energy recovery: WTE (waste-to-energy) plants. Drying and mechanical volume reduction techniques. Disposal Technologies: Design and operation of sanitary landfills- Site selection, liners, leachate and gas collection systems, Landfill capping and post-closure care. Secure landfills for hazardous waste. Biomedical waste treatment: autoclaving, microwaving, chemical disinfection, pyrolysis. E-waste dismantling, refurbishment, LCA (Life Cycle Assessment) concept. Technological Innovations in Waste Management: Smart bins and sensor-based collection. IoT-enabled waste tracking systems. Drone surveillance and mapping of dumpsites. GIS-based route optimization and fleet management. Mobile apps for citizen reporting and feedback	19
III	Community-Based Approaches: Role of communities in waste segregation at source. Awareness campaigns, street plays, door-to-door engagement. Public-Private Partnerships (PPP) in waste services. Role of SHGs and cooperatives in waste collection and recycling. Emerging Concepts: Zero waste and circular economy models. Urban mining and biomining of legacy waste. Climate-smart waste management. Carbon credits and GHG mitigation through waste diversion National & International Regulatory Framework: Solid Waste Management Rules (2016), Biomedical Waste Rules (2016), Hazardous Waste Rules (2016), E-Waste Rules (2016), Plastic Waste Management Rules: Polluter Pays Principle, Extended Producer Responsibility (EPR), User charges, Urban local bodies' role: Basel Convention, SDGs and waste, UN-Habitat guidelines Institutional Roles & Stakeholders: Role of CPCB, SPCBs, ULBs, NGOs, RWAs, informal sector. Case study: Urban composting initiatives (e.g., Pune, Mysuru). Indore's success story in segregation and cleanliness. International: San Francisco Zero Waste goal, Sweden's WTE model	18

Course Articulation Matrix: mapping of Course Outcomes (COs) with Program Outcomes (POs 1-12)

Course Outcomes (COs)/ Program Outcomes (POs)	Program Outcomes (POs)											
	01	02	03	04	05	06	07	08	09	10	11	12
CO 1	3	2	2	1	2	1	2	2	2	2	3	3
CO 2	2	3	2	2	2	2	2	1	2	2	3	3
CO 3	2	3	3	2	2	2	2	2	3	2	3	3

CO 4	2	3	2	3	3	3	2	1	2	3	3	3
CO 5	2	2	3	2	3	2	3	2	3	3	3	3

Pedagogy:

Teaching Strategies: Use of Digital tools and platforms for teaching, learning and research/ dissertation analysis. Inquiry-based learning, group discussions, Interactive Lectures, quiz, group work, Field –oriented studies, Study trip, case studies and debates, hands on training.

Continuous Assessment and Evaluation: Formative and Summative Assessments, Feedback and oral examinations.

Formative Assessment for Theory	
Assessment type	Marks
Sessional Tests- 1	10
Attendance	05
Assignment/Seminar	05
Total	20 marks
Formative Assessment as per SEP Guidelines	

EVSC14-P: SOLID WASTE MANAGEMENT

Number hrs/week	Duration of the exam	Total hours	Credits
4 hours	3 hours	40	2
Formative Assessment	Test = 05	Summative assessment	Exam = 30
	Attendance = 05		Viva = 05
			Record = 05
	Total = 10		Total = 40

List of Practicals:

1. Sampling techniques of Municipal waste.
2. Characterization of Municipal solid waste.
3. Estimation of Solid Waste Generation in a Local Area/Campus or Household.
4. Determination of Moisture content of the Municipal Solid Waste.
5. Determination of crude and bulk density of Municipal Solid Waste.
6. Composting/vermicomposting of organic waste.
7. Estimation of oxidizable organic carbon in compost.
8. Estimation of pH of the leachate sample.
9. Estimation of sulphates in leachate sample.
10. Estimation of phosphates in leachate sample.
11. Study of characteristics and use of biochar.
12. Visit to a Municipal Solid Waste Segregation unit or Landfill Site.

References:

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- Cheremisnoff, N. P. (2003). Handbook of Solid Waste Management and Waste Minimization Technologies. Butterworth-Heinemann.
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- National Green Tribunal (NGT) Reports & NDMA Guidelines on waste management in emergencies.
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- Tchobanoglous, G., Theisen, H., & Vigil, S. A. (2014). Integrated Solid Waste Management: Engineering Principles and Management Issues. McGraw Hill Education.

Programme	B.Sc Environmental Science
Semester	Sixth
Course Title	Environmental Impact Assessment and Auditing
Course Code	EVSC15-T
Credits	03
Contact Hours	4 Hours/week, Total-56 hours
Duration of Exam	3 Hours
Formative Assessment	20 Marks
Summative Assessment	80 Marks

COURSE OUTCOMES (COs): Students are able to	
COs 01	Explain the definition, purpose, principles, historical evolution, and regulatory framework of EIA in India and globally.
COs 02	Describe the stages and methodologies of the EIA process, including screening, scoping, impact identification, and public participation.
COs 03	Analyze baseline environmental data and evaluate different project alternatives for physical, biological, social, and economic impacts using standard EIA tools.
COs 04	Assess various case studies of industrial, infrastructural, and development projects to understand EIA applications and decision-making frameworks, including EIS preparation and clearance procedures.
COs 05	Interpret key environmental laws and policies in India relevant to EIA, including major acts and rules on pollution control, biodiversity, forest conservation, and hazardous waste management.

Unit	Content	Hours
I	Basics of EIA and Regulatory Framework: Introduction to EIA, definition, purpose, and importance of EIA. Basic principles and characteristics of EIA. Global evolution and history of EIA. Types of EIA (Rapid, Comprehensive, Strategic) EIA in India: Stages of the EIA process: Screening, Scoping, Impact Analysis, Mitigation, Reporting. Key participants in the EIA process: project proponents, consultants, regulators, and the public. EIA Notification (2006) and its amendments. Terms of Reference (ToR) and EIA in the project life cycle. Environmental Policies and Legal Aspects: National Environment Policy (NEP) and role of MoEFCC. Challenges in EIA implementation: Legal, technical, and administrative issues. Importance of public consultation and transparency.	19
II	EIA Process and Methodologies: Impact Identification Methods: Ad-hoc, Checklists, Matrices (Leopold, Network), Overlays Data collection: Environmental baseline data (air, water, soil, flora-fauna), project and alternative data	19

	Types of impacts: Physical, biological, social and economic. Impact Evaluation and Mitigation. Impact prediction and significance analysis. Mitigation measures and environmental management plans. Public participation and stakeholder engagement Reporting and Review: Environmental Impact Statement (EIS) – structure and contents. Environmental Clearance (EC) – process, categories of projects (A, B1, B2). Role of Environmental Appraisal Committees (EACs). Criteria for EIA report review and approval. Case studies and Decision making Sector-Specific Case Studies: - Industrial projects: Sugar mills, distilleries, paper industry. - Infrastructure projects: Highways, SEZs, building construction, mining, river valley projects. - Waste management projects: CETPs, landfills, incinerators, TSDFs.	
III	Environmental Audit: Concept, Aims and Objectives; Elements of Environmental audit - Internal and External audit. Types of Environmental Audit: Environmental Compliance Audits, Environmental Management Audits and Functional Environmental Audits. Water audit, Energy audit, Health & Safety audit and Waste & Waste Minimisation audit. Audit procedure: Pre-audit activities, On-site activities and Post-audit activities. Evaluation of Audit data and Preparation of audit report. Auditor profile. Environmental Audit Notifications (with latest amendments) ISO 14010 - EA- General Principles of Environmental Auditing ISO 14011 - EA- Auditing of Environmental Management Systems ISO 14012 - EA- Qualification Criteria for Environmental Auditors ISO 14013 - Management of Environmental Audit Programmes Disaster management: Definition, scope, type-Natural and Man-made. Disaster Management Plan.	18

References

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Programme	B.Sc. Environmental Science
Semester	Sixth
Course Title	ENVIRONMENT HEALTH AND SAFETY
Course Code	EVSJOC1-P
Credits	02
Contact Hours	3 Hours/week, Total- 30 hours
Duration of Exam	2 Hours
Formative Assessment	10 Marks
Summative Assessment	40 Marks

COURSE OUTCOMES (COs): Students are able to	
CO 1	Apply standard industrial hygiene techniques to measure workplace parameters such as illumination, noise levels, and ergonomic conditions using appropriate tools and methods.
CO 2	Analyze workplace hazards and risks using structured approaches such as HIRA, safety audits, and questionnaire-based assessments.
CO 3	Evaluate occupational health and safety data, including MSDS interpretation, exposure levels, and life cycle assessment (LCA) of products based on ISO 14040:2006, to determine environmental and workplace impacts.
CO 4	Assess ergonomic risks in computer workstations using RULA and recommend corrective measures to improve worker health and productivity.
CO 5	Develop standard protocols and documentation, including SOPs for waste management and PPE usage, following industrial and environmental regulations.

EVSJOC1-P : ENVIRONMENT HEALTH AND SAFETY

Number hrs/week	Duration of the exam	Total hours	Credits
3 hours	3 hours	30	2
Formative Assessment	Test = 05	Summative assessment	Exam = 30
	Attendance = 05		Viva = 05
			Record = 05
	Total = 10		Total = 40

List of Practicals:

1. Measurement of illumination at workplace using lux meter.
2. Monitoring and evaluation of occupational noise levels.
3. Mapping of hazards and risk identification by HIRA method.
4. Assessment of occupational health hazards using questionnaire method.
5. Calculate Ergonomic Assessment of Computer Workstation Using RULA (Rapid Upper Limb Assessment).
6. Evaluation of Material Safety Data Sheet (MSDS).
7. Development of a protocol for use of Personal Protective Equipment (PPE) in industry.

8. Preparation of a Standard Operating Procedure (SOP) for waste management (eg., biomedical waste, e-waste, hazardous waste).
9. Conduct a workplace safety audit using descriptive checklist method.
10. Life Cycle Assessment (LCA) of a product using ISO14040:2006.
11. Conduct a mock drill for hazards at work place.
12. Industrial visit for practical exposure to EHS practices.

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BANGALORE UNIVERSITY
THEORY EXAMINATION QUESTION PAPER PATTERN FOR MAJOR
SUBJECTS

I/II/III/IV/V/VI Semester B.Sc Examination..... Month.....Year
(Semester Scheme: New Syllabus 2026-27 onwards)

Subject: Environmental Science

Paper Title:

Duration: 3 Hrs

Max Marks: 80

Instruction: Answer all sections.

SECTION – A

1. Answer ALL of the following:

10x2=20

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

SECTION – B

Answer any SIX of the following:

06x05=30

- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.

SECTION – C

Answer any THREE of the following:

03x10=30

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

Note: While drawing questions, all the units in the syllabus must be given equal weightage.

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Scheme of Practical Examination Valuation

**V and VI-Semester B.Sc Environmental Science [S.E.P] 2026-2027 onwards
Practical – EVS P (X)**

I. Internal Assessment	: 10 Marks
II. Final Practical	: 40 Marks

I. Assignment of marks for Internal Assessment

- i) Attendance : 5 marks
- ii) Internal test : 5 marks

II. Assignment of marks for Final Practical Examination

1. Writing Procedure experiment	: 05 Marks
2. Performing experiment/Spotters	: 25 Marks
3. Viva	: 05 Marks
4. Record	: 05 Marks

1. Assignment of marks for writing procedure experiment - 05 marks

Procedure Writing Experiment	Marks
Principle	1 mark
Procedure	3 marks
Diagram / Calculations	1 mark
Total	5 marks

2.a. Assignment of marks for performing/field experiment: 25 marks

- 1. Principle and Procedure writing- 10 M
- 2. Performance of experiment- 10 M
- 3. Data analysis and interpretation- 5 M

2.b. Field experiment: 25 marks

- 1. Spotters (5) – 10 M
- 2. Calculation- 10 M
- 3. Interpretation- 5 M

3. Viva Voce: Ask any five questions on the performing experiment and related environmental concepts. (1 mark each x 5 questions = 05 marks)

4. Record: Neatly maintained practical record book with all experiments completed. (05 marks)