Khulna University, Khulna

School: Life Science **Discipline: Environmental Science** **Program:** B.Sc in Envi. Sci.

Year: 3rd **Term: 2nd** **ExaminationYear: 2026** **Session: 2024-2025**

Course Code: 052110 ES 3203 **Course Title: Meteorology and Climate Change**

Total Marks: 60 **Time:** 03 Hours **Credit: 03**

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate sheet for each section.

Section A

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

1. a) Define meteorology. How does weather differ from climate? [L2, CLO1] 03
   b) Provide a brief discussion on the importance of meteorology in environmental management. [L6; CLO1] 04
   c) Discuss the effects of El-Nino and La-Nina on meteorological conditions in the Asia-pacific region. [L6; CLO2] 03

2. a) What is 'Lapse Rate'? Derive a mathematical expression of dry adiabatic lapse rate. [L1; CLO1] 03
   b) Define 'Mixing Depth'. How will you estimate the maximum mixing depth? [L1;CLO2] 03
   c) Mention the conditions for Cyclone formation in the Bay of Bengal. [L3; CLO2] 02
   d) Why does wind blow from one area to another area? [L1; CLO1] 02

3. a) What is 'Atmospheric Stability'? Explain different types of atmospheric stability. [L1; CLO2] 03
   b) Elaborate the Gaussian plume model of air pollutant dispersion from point source. [L6; CLO2] 03
   c) What are the ways by which pollutants are removed from the atmosphere? Explain. [L2; CLO2] 04

4. a) Explain the effects of topography on meteorology. [L2; CLO1] 04
   b) Define 'Atmospheric Inversion'. Illustrate different types of atmospheric inversion. [L1; CLO2] 04
   c) Illustrate a typical 'Wind Rose' diagram of your locality. [L2; CLO1] 02

Section B

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

5. a) Define 'Climate Change'. [L2; CLO3] 02
   b) Narrate the various type of consequences of climate change. [L4; CLO3] 04
   c) Discuss the historic impact of climate variations in Bangladesh. [L6; CLO3] 04

6. a) Discuss the different types of measurement of climate change. [L6; CLO3] 03
   b) Describe the human activities affecting climate change. [L2; CLO3] 03
   c) Demonstrate the prediction process of climate change. [L4; CLO3] 04

7	a)	Elaborate the mechanism of 'Global Warming'. [L5; CLO4]	03
	b)	Mention the major consequences of global warming and climate change. [L3; CLO4]	03
	c)	Illustrate the different causes of climate change. [L5; CLO4]	04
8.	a)	Explain the climate change vulnerabilities. [L4; CLO4]	03
	b)	Discuss the climate change induced vulnerability in South West coastal Bangladesh. [L6; CLO4]	03
	c)	Narrate the different climate change adaptation and mitigation practice in Bangladesh. [L5; CLO4]	04

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School: Life Science **Discipline: Environmental Science** **Program: B.Sc in Env. Sci.**

Year: 3rd **Term: 2nd** **ExaminationYear: 2026** **Session: 2024-2025**

Course Code: 052110 ES 3205 **Course Title: Limnology and Oceanography in Environmental Science**

Total Marks: 60 **Time:** 03 Hours **Credit: 03**

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate sheet for each section.

Section A

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

1. a) What do you mean by Limnology? Why does it necessary to read in Environmental Science? [L1; CLO1,2] 04
   b) Illustrate the necessity and history of limnological study in Bangladesh. [L2; CLO1,2] 04
   c) Identify the economic significance of Limnology. [L3; CLO1,2] 02

2. a) Explain the procedure to measure the productivity of a water body. [L2; CLO2] 03
   b) Classify lakes based on productivity with figures. [L4; CLO2] 07

3. a) Elaborate the interrelationship of temperature, electric conductivity, pH, free CO_2, alkalinity, DO, BOD, and PO_4 of a fresh water body. [L6; CLO1,2] 08
   b) Determine the procedure to measure the BOD_5, if initial DO is less than 1 mg/l of any water body? [L5; CLO1] 02

4. a) Explain eutrophication and how can we control it. [L2; CLO2] 05
   b) Discuss the importance of benthos in fresh water food chain. [L4; CLO2] 05

Section B

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

5. a) According to the International Council for the Study of the Sea- what embraces oceanography? [L1; CLO3] 02
   b) Elaborate the Oceanographic advances those have been made since the twentieth century. [L3; CLO3] 05
   c) What are the types of physical properties of the Sea water? Clarify with examples. [L2; CLO3] 03

6. a) Explain Wave. Illustrate the anatomy of a wave. [L2; CLO3] 04

b) Mention all probable causes of producing *Current* in the marine environment. [L2; CLO3] 02

c) Discuss the role of Eastern boundary current in the ocean circulation. [L3; CLO3] 04

7 a) Explain El-nino and La-nina. What are the interesting facts regarding these events? [L4; CLO3] 04

b) Analyse the depressions resulting from crustal deformation. [L4; CLO3] 03

c) Illustrate the main divisions of the marine and oceanic environment. [L4; CLO3] 03

8. a) Mention the features of Swatch of No Ground (SoNG) with its importance. [L2; CLO3] 03

b) Analyse the major fishing grounds of the SoNG- with major wild lifes. [L4; CLO3] 04

c) "Blue economy is a marine based economy" – Justify with examples. [L5; CLO3] 03

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School: Life Science **Discipline: Environmental Science** **Program: B.Sc in Env. Sci.**

Year: 3rd **Term: 2nd** **ExaminationYear: 2026** **Session: 2024-2025**

Course Code: 052110 ES 3219 **Course Title: Research Methodology**

Total Marks: 60 **Time:** 03 Hours **Credit: 02**

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate sheet for each section.

Section A

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

1. a) What is research? Enumerate the criteria of good research. [L1; CLO1] 03
   b) Differentiate between covert and overt research. [L2; CLO1] 02
   c) Briefly describe the steps in deciding the research topic. [L2; CLO1] 05

2. a) Do you think that objectives are just a list of words related to your research title? Justify with example. [L5; CLO2] 03
   b) Design alternative hypothesis and null hypothesis for your proposed undergraduate research. [L6; CLO2] 03
   c) Literature review is not just a series of annotated article but a coherent essay- Justify. [L5; CLO2] 04

3. a) Briefly describe the 'Before-and-after with control' design with suitable example. [L2; CLO3] 04
   b) Suppose you have one year time to conduct your BSc research. Provide a timeline chart highlighting different activities of research. [L6; CLO3] 03
   c) How does Latin square design differ from randomized block design? [L2; CLO3] 03

4. a) Prove that "The greater the sample size, the more accurate the estimate of the true population statistics". [L5; CLO4] 04
   b) Discuss the potential threats to internal validity. [L6; CLO4] 03
   c) Dfferentiate between plagiarism and self-plagiarism. [L2; CLO5] 03

Section B

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

5. a) Which factors can influence the data collection of a research? [L1; CLO6] 02
   b) Illustrate the experimental data and observatory data. [L2; CLO6] 02
   c) Discuss the methods of primary data collection for your proposed research. [L6; CLO7,8] 06

6. a) Distinguish the significance of research in Environmental Science. [L4; CLO7,8] 03

b) Explain the procedure of data presentation of a research with their limitations. [L5; CLO7,8] 07

7 a) Identify the types of research reports with examples. [L3; CLO9] 03

b) Elaborate the procedure to write an academic research report. [L6; CLO9] 07

8. Write short notes on the followings: [L1,2,3,4,5,6; CLO7,8,9] 10

(a) Data analysis; (b) Variance of analysis

© Multiple correlation; (d) References

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School: Life Science **Discipline: Environmental Science** **Program:** B.Sc in Env. Sci.

Year: 3rd **Term: 2nd** **ExaminationYear: 2026** **Session: 2024-2025**

Course Code: 052110 ES 3221 **Course Title: Natural Hazards and Disaster Management**

Total Marks: 60 **Time:** 03 Hours **Credit: 03**

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate sheet for each section.

Section A

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

1. a) Define hazards and disaster. [L1; CLO1] 02
   b) Mention the major characteristics of hazards and disaster. [L3; CLO1] 04
   c) Explain how tropical cyclones form. [L2; CLO1,2] 04

2. a) Explain the relationship among risk, vulnerability and capacity. [L5; CLO1] 03
   b) Mention the various components of risk. [L4; CLO2] 03
   c) Discuss the various assessment procedures for risk assessment. [L6; CLO2] 04

3. a) State the landslide hazard. [L2; CLO3] 02
   b) Narrate the different factors involved in landslide hazards with examples. [L5; CLO3] 04
   c) Discuss in details the control mechanisms for landslide hazards and related phenomenon. [L6; CLO3] 04

4. a) State flood. [L2; CLO3] 02
   b) Narrate the different types of flood. [L3; CLO3] 03
   c) Discuss the pre-, during-, and post- devastating flood management strategies. [L6; CLO3] 05

Section B

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

5. a) What is an Earthquake? [L1; CLO1,2] 02
   b) Describe the 'Elastic Rebound' theory. [L2; CLO1,2] 04
   c) Discuss why have seismologists shifted from the Richter Scale to the Moment Magnitude Scale for measuring earthquakes. [L5; CLO1,2] 04

6.	a)	What is the Ring of Fire? [L1; CLO1,2]	02
	b)	Illustrate a diagram of a Volcano with its main components. [L2; CLO1,2]	03
	c)	Analyze how tectonic settings influence magma composition and eruption style. [L4; CLO2]	05
7	a)	Discuss the major responsibilities of Bangladesh Meteorological Department during a Disaster. [L6; CLO4]	05
	b)	Explain the roles and responsibilities of Inter-Ministerial Disaster Management Coordination Committee (IMDMCC). [L5; CLO4]	05
8.	a)	Define the PAR model. [L1; CLO1,2]	02
	b)	Explain the PAR model with a suitable diagram [L2; CLO1,2]	04
	c)	A coastal village of Bangladesh experiences repeated cyclone damage because houses are weak and people live near the shoreline. Identify root causes, dynamic pressures, and unsafe conditions. [L3; CLO2,4]	04

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School: Life Science **Discipline: Environmental Science** **Program: B.Sc in Env. Sci.**

Year: 3rd **Term: 2nd** **ExaminationYear: 2026** **Session: 2024-2025**

Course Code: 052110 ES 3223 **Course Title: Natural Resource Management**

Total Marks: 60 **Time:** 03 Hours **Credit: 02**

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate sheet for each section.

Section A

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

1. a) What are natural resources? Classify them with examples. [L1; CLO1] 03
   b) Explain the concept of sustainable natural resource management. [L2; CLO2] 03
   c) Critically evaluate the challenges of implementing sustainability in developing countries. [L5; CLO2] 04

2. a) Describe the key components of natural resource management. [L2; CLO2] 03
   b) Explain the transition from early human interactions to industrial resource use. [L4; CLO3] 03
   c) Evaluate the role of globalization in accelerating natural resource exploitation. [L6; CLO4] 04

3. a) What are the major drivers of environmental change? [L1; CLO5] 02
   b) Explain how population growth and economic development act as drivers of resource depletion. [L3; CLO4] 04
   c) Assess the impact of climate change on natural resources in coastal Bangladesh. [L5; CLO5] 04

4. a) Explore the importance of regulating services in NRM. [L2; CLO5] 05
   b) What are the key principles in evaluating an NRM-related policy? [L2; CLO8] 05

Section B

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

5. a) How is the "Tragedy of the Commons" concept relevant to the Natural Resources Management (NRM)? [L2; CLO9] 03
   b) Why is transdisciplinary research necessary for addressing Natural Resources Management (NRM) issues? Discuss with examples. [L4; CLO10] 03
   c) Do you consider administrative fragmentation to be a core characteristic of NRM-related problems? Justify your answer. [L4; CLO10] 04

6. a) How does the DPSIR (Drivers–Pressures–State–Impact–Response) framework help in analyzing NRM issues? [L3; CLO9] 03

b) Why is the adaptive management cycle framework important for dealing with dynamic NRM issues? [L4; CLO9] 04

c) Explain the significance of the Social–Ecological Systems (SES) perspective in NRM. [L4; CLO10] 03

7 a) Discuss the major approaches used to solve Natural Resources Management (NRM) issues. [L2; CLO9] 05

b) How relevant is the Community-Based Management approach for solving coastal NRM issues in Bangladesh? [L5; CLO11] 05

8. a) Discuss the importance of Resilience Theory in Natural Resources Management (NRM). [L2; CLO10] 05

b) Describe the common ecological principles applied in Natural Resources Management (NRM). [L2; CLO10] 05

Khulna University, Khulna

School: Life Science **Discipline: Environmental Science** **Program:** B.Sc in Env. Sci.

Year: 3rd **Term: 2nd** **ExaminationYear: 2026** **Session: 2024-2025**

Course Code: 073110 Arch 3251 **Course Title: Landscape Ecology and Planning**

Total Marks: 60 **Time:** 03 Hours **Credit: 03**

- The figures in the margin indicate full marks. The questions are of equal value.
- Use separate sheet for each section.

Section A

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

1. Discuss the importance of human–environment interaction in landscape design. How can an understanding of social needs, environmental processes, and spatial experience inform the creation of sustainable and inclusive outdoor environments? [L2; CLO2] 10

2. How does the integration of ecological principles in landscape design contribute to achieving environmental sustainability goals? Discuss both opportunities and challenges in implementing such approaches. [L4; CLO5] 10

3. Explain the concept of biological conservation and discuss its significance in the protection and management of ecosystems through landscape design. [L3; CLO1] 10

4. Evaluate the significance of Ecosystem Services in guiding the aesthetic and functional dimensions of landscape and architectural planning. How can design strategies enhance both experiential quality and the delivery of ecological services? [L5; CLO1] 10

Section B

There are **4** (**four**) questions in this section. Answer any **3** (**three**) questions.

5. a) Evaluate the failure machanisms of green blue infrastructure during climate extremes. [L5; CLO3] 05

   b) To what extent conventional grey infrastructure remains a functional necessity for urban resilience. [L5; CLO5] 05

6. Examine how an understanding of physical realities, including landform, soil conditions, water systems, and vegetation, informs site planning and landscape design decisions. [L4; CLO4] 10

7 How does converting wetlands into residential zones impact regulating and provisioning ecosystem services? Propose one green infrastructure strategy to restore these services while allowing for urban growth. [L2; CLO3] 10

8. Create a concept for a multi-functional urban park that integrates recreation, habitat conservation, and pedestrian comfort. Justify your choices of plants, materials, and spatial layout. [L6; CLO3] 10