

PRE-REQUISITES: ENSC-205**LEARNING OUTCOMES**

- To identify potential areas of natural hazards, learn prevention strategies and disaster management.
- Describe common earth materials and their relationship to natural hazards
- Explain the causes and effects of Natural Hazards
- Use the above knowledge to discuss Natural Hazards and humans' activities

CONTENTS

Natural hazards and processes, disaster prediction, and risk assessment, Early warning, human response to hazards, avoiding and adjusting to hazards, population increase, land-use change, and natural hazards.

Unit-1: Disaster Management

- 1.1. Fundamentals of Disaster Management
- 1.2. Prevention and Mitigation
- 1.3. Preparation, Response, and Recovery
- 1.4. Disaster management cycle
- 1.5. Tools to assist Disaster management
- 1.6. Pak. Disaster Management Authority

Unit-2: Earthquake

- 2.1. Introduction to an earthquake
- 2.2. Faults and tectonic plates
- 2.3. Earthquake waves
- 2.4. Measurement of seismic waves
- 2.5. Earthquakes and humans
- 2.6. Earthquake prediction

Unit-3: River system and flooding

- 1.1. River Processes and flooding
- 1.2. Development of flooding
- 1.3. The nature and extent of flood hazards
- 1.4. The response to flood hazards
- 1.5. Floods causes and mitigation measure

Unit-4: Landslide

- 4.1. Introduction to landslides
- 4.2. Types of landslides
- 4.3. Human use and landslides
- 4.4. Minimizing the landslide hazard
- 4.5. Perception of the landslide hazard

Unit-5: Volcanism

- 5.1. Introduction to volcanic hazards
- 5.2. Volcanism and volcanoes
- 5.3. Volcanic hazards
- 5.4. Prediction of volcanic activity
- 5.5. Adjustment to and perception of the volcanic hazard

Unit-6: Atmospheric Hazards

- 1.1. Temperature Extremes
- 1.2. Severe Precipitation, Hailstorms, and Wind storms

- 1.3. Tornadoes and Hurricanes
- 1.4. Cyclones and Lightning

TEACHING – LEARNING STRATEGIES

- Lecture-based examination
- Presentation/seminars
- Class discussion
- Quizzes

ASSIGNMENTS – TYPE AND NUMBER WITH CALENDAR

It is a continuous assessment. The weightage of Assignments will be 25% before and after midterm assessment. It includes:

- classroom participation,
- attendance, assignments, and presentation,
- homework
- attitude and behavior,
- hands-on-activities,
- short tests, quizzes etc.

ASSESSMENT AND EXAMINATIONS:

Sr. No.	Elements	Weightage	Details
1.	Mid Term Assessment	35%	It takes place at the mid-point of the semester
2.	Formative Assessment	25%	It is a continuous assessment. It includes classroom participation, attendance, assignments, and presentation, homework, attitude and behavior, hands-on activities, short tests, quizzes, etc.
3.	Final Assessment	40%	It takes place at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on a term paper, research proposal development, fieldwork, and report writing, etc.

RECOMMENDED TEXT BOOKS / SUGGESTED READINGS

1. Reichard, J. (2021). *Environmental Geology*, (4th ed.), McGraw-Hill
2. Montgomery, C. (2020) *Environmental Geology*, 11th Edition, McGraw-Hill
3. Plummer, C., Carlson, D., & Hammersley, L. (2019). *Physical Geology*, 16th Edition, McGraw-Hill
4. Keller, E. A., & DeVecchio, D. E. (2016). *Natural hazards: earth's processes as hazards, disasters, and catastrophes*. Routledge.
5. Montz, B. E., Tobin, G. A., & Hagelman, R. R. (2017). *Natural hazards: explanation and integration*. Guilford Publications.
6. Davis, G. H., Reynolds, S. J., & Kluth, C. F. (2011). *Structural geology of rocks and regions*. John Wiley & Sons.

Further Reading: As suggested by the Instructor.