KOTSHILA MAHAVIDYALAYA

Department of Geography

Syllabus

Course Type: **MAJ-6**
Semester: **5**
Course Code: **BGEOMAJ06T**
Course Title: **Hydrology and Oceanography**
(L-P-Tu): **5-0-1**
Credit: **6**
Practical/Theory: **Theory**

Course Objectives:

- *Introduce the scope, significance, and development of hydrology as a scientific discipline.*
- *Explore the processes and factors controlling surface and sub-surface water movement, storage, and distribution.*
- *Introducing water harvesting techniques and their relevance in modern water conservation.*
- *Understanding causes, impacts, and solutions related to groundwater contamination and its sustainable management.*
- *Provide an understanding of the ocean floor's structure and the geological processes that shape it.*
- *Explore the physical and chemical characteristics of ocean water and dynamic oceanic movements.*

Course Outcomes:

- *Define hydrology and describe its scope, components, and historical evolution.*
- *Analyze the processes of interception, depression storage, infiltration, and runoff, and explain the factors controlling them.*
- *Define and differentiate various types of water harvesting methods and explain their significance in water conservation.*
- *Identify sources and effects of groundwater contamination and evaluate effective groundwater management strategies.*
- *Describe the major relief features of the ocean floor and explain the origin of oceans through theories like seafloor spreading and plate tectonics.*
- *Understand and analyze the physical and chemical properties of ocean water, and explain the nature and causes of oceanic movements like waves and tides.*

Unit I: Fundamentals of Hydrology [26 Hours]

1.1 Definition, scope, content and evolution of hydrology. (4 lectures)
1.2 Surface and sub-surface hydrology: Interception, depression storage, infiltration and runoff -controlling factors; Runoff cycle. (8 lectures)
1.3 Drainage basin as a hydrological unit; Inter-basin water transfer. (6 lectures)
1.4 Groundwater: Occurrence, storage and movement; factors controlling recharge and discharge; aquifer properties (8 lectures)

Unit II: Applied Hydrology [26 Hours]

2.1 Concept and types of water harvesting. (6 lectures

2.2 Groundwater contamination and management. 6 lectures
2.3 Principles of micro-watershed management. 6 lectures
2.4 Water resource crisis, conflict and management. 8 lectures

Unit II: Fundamentals of Oceanography [26 Hours]

3.1 Major relief features of the ocean floor; Origin of oceans: seafloor spreading and plate tectonics. (6 lectures)
3.2 Physical and chemical properties of ocean water. Movements of ocean water: waves and tides (6 lectures)
3.3 Marine resources: Classification and sustainable utilization. Marine pollution: Causes, types & mitigation. (6 lectures)
3.4 Coral reefs: Theories of formation (Darwin and Daly), classification and threats. (8 lectures)

Selected References:

1. Dingman, S.L. 2015. Physical Hydrology, 3rd ed, Macmillan Publishing Co.
2. Garrison, T. 2016. Oceanography: An Invitation to Marine Science, 9th ed, Cengage Learning.
3. Karanth, K.R., 1988. Ground Water: Exploration, Assessment and Development, Tata-McGraw Hill.
4. Raghunath, H.M. 2006. Hydrology: Principles, Analysis, Design, 3rd ed, New Age International Publishers.
5. Reddy, P.J.R. 2014. A Textbook of Hydrology, University of Science Press.
6. Subramanya, K. 2013. Engineering Hydrology, McGraw Hill Education.
7. Todd, D.K., Larry, W.M. 2004. Groundwater Hydrology, John Wiley & Sons.