



**MANGALORE UNIVERSITY**

**DEPARTMENT OF MARINE GEOLOGY**

**MSc GEOINFORMATICS**

**GIH 501: WATER RESOURCES**

<b>Unit 1</b>	<p><b>Water Resources.</b></p> <p>Introduction- Concepts of Surface Water, Hydrological Cycle. World water distribution, watershed management.</p>	06 hrs
<b>Unit 2</b>	<p><b>Remote sensing and GIS in Water Resources.</b></p> <p>Application of Remote sensing and GIS in the study of Water Resources.</p> <p>Visual and Digital techniques in Water Resources Investigations.</p> <p>Selection of appropriate software and Data products useful in Water Resource</p>	06 hrs
<b>Unit 3</b>	<p><b>Hydrogeomorphic studies in Water Resources</b></p> <p>Theory of Geomorphic Controls of Water Resources, Concept of Basin Network Analysis.</p> <p>Surface Runoff, Slope Analysis, Application of DEM in Water Resources, Flood mapping, Quantitative studies of drainage basins.</p>	06 hrs
<b>Unit 4</b>	<p><b>Groundwater</b></p> <p>Concepts of Ground water, Vertical Distribution of Groundwater, Types of Aquifers, Rock Properties Affecting Groundwater Resources, Lineament studies in Water Resources</p> <p>Groundwater Resources of India, Groundwater Resources of Karnataka</p>	06 hrs
<b>Unit 5</b>	<p>Theory of Groundwater flow- Darcy's law and its applications.</p> <p>Groundwater potential assessment, groundwater prospect zones mapping and groundwater information system.</p>	06 hrs
<b>Unit 6</b>	<p><b>Water Resources and Watershed Management</b></p> <p>Concept of River Basin Management, GIS applications in water resources development and management. Concept of Natural Recharge, Concepts in Artificial Recharge, Use of DEM in Recharge.</p>	06 hrs

<b>Unit 7</b>	<b>Groundwater development and management:</b> Planning and management of groundwater. Methods of artificial groundwater recharge; rainwater harvesting, problems of over-exploitation of groundwater; water management in rural and urban areas, geological and geophysical methods of groundwater exploration	06 hrs
<b>Unit 8</b>	<b>Water Quality</b> Physical and chemical properties of water, quality criteria for different uses, groundwater quality provinces of India, Groundwater contamination.	06 hrs

### References

1. David K. Todd, 1980, *Groundwater Hydrology*, John Wiley & Sons, 5-85.
2. Keith, P. B, 1973. Thompson *et al* (ed) *Remote Sensing Water Resources Association*, Urban Illineis, 27-86.
3. Linsley, Kohler and Paulhus, 1956, *Hydrology for Engineers*, Mc Graw-Hill, 56-74.
4. Ragunath, H. M. 1987, *Ground Water 2<sup>nd</sup>* ,Wiley Eastern, 23-65.
5. Subramanian, V. 2002, *Water: Quantity-Quality Perspectives, in South Asia*. Kingston Intl. Publishers, 34-57.
6. T. M. Lillesand and R. W. Kiefer, 2000, *Remote Sensing and Image Interpretation*J.Wiley& Sons, 37-66.
7. Thomas G. Lane, 2000, *Arc View 3D Analyst*, ESRI, Press, 12-43.
8. Murthy, K.S. 1998. *Watershed management in India*, 3<sup>rd</sup> edition, Wiley Eastern Ltd.New Age International Ltd, New Delhi, 198 p.
9. *Groundwater – C. F. Tolman – McGraw-Hill Book Co. Inc.*
10. *Groundwater Hydrology (2<sup>nd</sup> Ed.) – D. K. Todd, John Wiley and Sons Inc. New York*
11. *Hydrology – S. N. Davis and R. J. M. Dewiest – John Wiley and Sons Inc. New York.*
12. *Groundwater Resources Evaluation-W.C. Walton- McGraw-Hill Book Co. New York*
13. *Hydrogeology (2<sup>nd</sup> ed.) – C.W. Fetter – Merrill Publishing Co. U.S.A.*
14. *Handbook of Applied Hydrology-V.T.Chow (Ed) – McGraw-Hill Book Co. New York*
15. *Hydrogeology – K. R. Karanth – Tata McGraw Hill Publishing Co. Ltd.*
16. *Ground Water Assessment, Development and Management – K. R. Karanath – Tata McGraw Hill Publishing Co. Ltd.*
17. *Groundwater – H. M. Raghunath – Wiley Eastern Limited*
18. *Hydrology – H. M. Raghunath – Wiley Eastern Limited*
19. *Elements of Hydrology – V. P. Singh*
20. *Engineering Hydrology – K. Subramaniam – Tata McGraw Hill Publishing Co. Ltd.*
21. *Introduction to Hydrology – Viessman, W., Lewis, G. L. and Knapp, J. W. (3<sup>rd</sup> ed.) Harper and Row, New York*