MANGALORE UNIVERSITY

DEPARTMENT OF MARINE GEOLOGY

MGH 451: STRUCTURAL GEOLOGY & HYDROGEOLOGY

Course Outcome:

CO1: Earth's Hydrologic cycle is understood.

CO2: Understand the occurrence movement and distribution of water that is a prime resource for development of a civilization..

CO3: Able to understand components of groundwater system, artificial groundwater recharge methods etc.

CO4: Students will be able to use various ground water exploration techniques.

CO5: Identifying zones of mineral concentrations, water resources and harvesting, and mining

Structural Geology

Unit 1	**Introduction:** Importance ofstructural geology and its relationship with other branches of geology. Dip and strike. **Force, stress and strain:** Force and acceleration, composition and resolution of forces. Concept of stress and strain; strain analysis using deformation objects.	6 hrs
Unit 2	**Folds:** Parts of a fold. Geometrical classification of folds. Mechanics and causes of folding. Criteria for recognition of folds in the field.	6 hrs
Unit 3	**Faults**: General characteristics, nature of movement along faults. Geometric and genetic classification of faults. Mechanics of faulting. Criteria for recognition of faults in the field.	6 hrs
Unit 4	**Joints:** Geometry and classification. Field studies, importance of joints in geological, structural/civil engineering studies. **Unconformities:** Different types of unconformities. Recognition of unconformities in the field. Criteria to differentiate between faults and unconformities.	8 hrs

Hydrogeology

Unit 5	**Introduction:** Origin of water, hydrological cycle and its components – precipitation, interception, runoff, evaporation and evapotranspiration. types, importance, occurrence, movement and vertical distribution of ground water; Water bearing geological formations; Springs, classification of aquifers, hydrologic properties of rocks: porosity; permeability; specific yield; specific retention, hydraulic conductivity, transmissivity, storage coefficient. Darcy's law and its applications.	10 hrs
Unit 6	**Groundwater quality:** Physical and chemical properties of water, quality criteria for different uses, groundwater quality provinces of India, Groundwater contamination; water table fluctuation, water table contour maps; hydrostratigraphic units.	6 hrs
Unit 7	**Wells:** Types, drilling methods, construction, design, development and maintenance. Salt water intrusion in coastal and island aquifers; groundwater legislation in rural and urban areas.	4 hrs
Unit 8	Groundwater development and management: 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.	6 hrs

List of References:

1. Field Geology – McGraw Hill Book Co. - Lahee, F. H. (1961)
2. Folding and Fracturing of Rocks - McGraw Hill Book Co. - Ramsay, J.G. (1967)
3. Structural Geology – 3rd edition, Prentice Hall - Billings M.P. (1977)
4. Structural Geology of Rocks and Regions - John Wiley & Sons - Davis, G.H. (1984)
5. Structural Geology Principles, Concepts and Problems, 2nd Edition, New Jersey Prentice Hall - Hatcher, Robert D. (1995)
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8. Knighton, D. (1998). Fluvial forms and processes: A new Perspective, Arnold, London, 385p.
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10. Murthy, K.S. 1998. Watershed management in India, 3rd edition, Wiley Eastern Ltd. New Age International Ltd, New Delhi, 198 p.
11. Groundwater – C. F. Tolman – McGraw-Hill Book Co. Inc.
12. Groundwater Hydrology (2nd Ed.) – D. K. Todd, John Wiley and Sons Inc. New York
13. Hydrology – S. N. Davis and R. J. M. Dewiest – John Wiley and Sons Inc. New York.
14. Groundwater Resources Evaluation - W.C. Walton - McGraw-Hill Book Co. New York
15. Hydrogeology (2nd ed.) – C.W. Fetter – Merrill Publishing Co. U.S.A.
16. Handbook of Applied Hydrology - V.T. Chow (Ed) – McGraw-Hill Book Co. New York
17. Hydrogeology – K. R. Karanth – Tata McGraw Hill Publishing Co. Ltd.
18. Ground Water Assessment, Development and Management – K. R. Karanath – Tata
19. McGraw Hill Publishing Co. Ltd.
20. Groundwater – H. M. Raghunath – Wiley Eastern Limited
21. Hydrology – H. M. Raghunath – Wiley Eastern Limited
22. Elements of Hydrology – V. P. Singh
23. Engineering Hydrology – K. Subramaniam – Tata McGraw Hill Publishing Co. Ltd.
24. Introduction to Hydrology – Viessman, W., Lewis, G. L. and Knapp, J. W. (3rd ed.) Harper and Row, New York
25. Applied Hydrology – Mutreja, K. N. – Tata McGraw Hill Publishing Co. Ltd.
26. Global Groundwater Resources & Management: Paliwal - Scientific publishers.
27. Exploitation of Groundwater and their effects: Noor M. - Cyber Tech Publishers
28. Hydrology: Gautam Mahajan - Ashish publishers.