

MGS 503: EXPLORATION AND ENGINEERING GEOLOGY

Skills, employability and entrepreneurship: These are similar to the above mentioned subjects with an emphasis on exploration techniques of earth resources processes taking place in the oceans, and their exploration. Students have chance to go on geological field work, visiting mining sites as well as ocean expedition. Students exit with course have skills to work as an exploration/mining geologists in organizations related to water resources, geological/ marine surveys, seismological stations and mining including the R & D labs. and educational institutions.

EXPLORATION GEOLOGY

Unit 1	Introduction: scope and objectives of exploration geology. General principles and applications of airborne, onshore and offshore exploration methods for understanding the structure of earth and in the exploration of water, fossil fuels and mineral deposits.	6 hrs
Unit 2	Geophysical Exploration: Principles, instrumentation, methodology and applications of onshore and offshore geophysical explorations - Gravity, magnetic, seismic, electrical and radioactive techniques. Well Logging Techniques: Electrical, Radioactive, Sonic and Miscellaneous. Echosounder and its uses.	6 hrs
Unit 3	Geological Exploration/Prospecting: Importance of geological and different types of maps. Various geological criteria for the identification of mineral deposits. Indications of ore body. Different methods of geological prospecting/exploration.	6 hrs
Unit 4	Geochemical and bio-geobotanical methods exploration: Geochemical and biogeochemical indicators of economically important ore deposits. Techniques of mineral exploration. Geobotanical prospecting: Importance of plants in identifying the ore deposits. Interactive sessions of teaching to enhance students-teacher interactions through hands-on demonstrations and exercises in the recent advancement of the subject related to the curriculum.	8 hrs

ENGINEERING GEOLOGY

Unit 5	Geological studies and evaluation in planning, design and construction of major civil structures. Engineering properties of rocks. Concepts of rock mechanics and soil mechanics. Physical characteristics of building materials.	6 hrs
Unit 6	Resource evaluation of construction materials. Geological investigations for dams, reservoirs and spillways, tunnels, underground caverns, bridges, highways and tunnels. Problems of groundwater in engg. projects. Remedial measures. Interactive sessions of teaching to enhance students-teacher interactions through hands-on demonstrations and exercises in the recent advancement of the subject related to the curriculum.	8 hrs

List of References:

1. Courses in Mining Geology – R.N.P. Arogyaswamy, Oxford and IBH Publ. Co. (1973)
2. Principles of Engineering Geology - McGraw Hill – Krynine, D.P. Judd, W.P. (1957)
3. Fundamentals of Engineering Geology - Butterworths – Bell F.G. (1983) Principles.
4. Engineering Hydrology – K. Subramaniam – Tata McGraw Hill Publishing Co. Ltd.
5. Anthony M. Evans (2006). Introduction to Mineral Exploration Blackwell II edition. (available in net)
6. Brain F. Windley (1977). The Evolving Continents John Wiley and Sons. 385p.
7. Burk, C.A. and Drake, C.L. The Geology of Continental Margins-Springler Verlag, NY (1974).
8. Condie, K.C. Plate tectonics and Crustal Evolution, Pergamon Press, 288p. (1989)
9. Christopherson, R. W. (1995). Elemental Geosystems A foundation in Physical Geography. Printice Hall Inc., 580p.
10. Vine, F. J., and Matthews, P. M. (1963). Magnetic anomalies over ocean ridges. Nature, 199, 947-949.
11. Bott, M.H.P., (1971). The Interior of the Earth. Arnold, London, 316p.
12. Khan, M. A., (1975). The Afro-Arabian Rift System.Sci. Prog.62, 207-236.
13. McElhinny, (1973). Palaeomagnetism and Plate Tectonics. Cambridge Univ. Press, 358p.
14. Ramachandra Rao, M. B (1975). Outlines of Geophysical Prospecting: A manual for Geologist E.B.D. Educational Pvt. Ltd., Dehra Dun.403p.
15. Parasnis, D. S. (1979). Principles of applied Geophysics. Chapman and Hall, - 275 p.
16. Dobrin, M.B. (1976). Introduction to Geophysical Prospecting. New York McGraw-Hill, 630p.
17. Introduction to Geophysical Prospecting - Milton B Dobrin (1981).
18. Exploration geophysics – Jakaosku J. J.
19. Outlines of geophysical prospecting - A manual for geologists – M B Ramachandra Rao.
20. Exploration Geophysics for Geologist and Engineers – Bhimasanakaran and Gaur
21. Geochemistry in mineral exploration Rose, A.W Hawkes, H.E and Webb J.S. 1979. Academic press.
22. Engineering and General Geology: P T Sawant- New India Publishers.