Paper No-16: Engineering Geology

Topic

Geology vs. Engineering. Role of Engineering geologists in planning, design and construction
of major man-made structural features, Site investigation, characterization, foundation treatment and problems related to civil engineering projects: (5 lectures)

Engineering Properties of Soils & Soil mechanics, Elementary concepts of rock mechanics and rock engineering, Engineering Properties of Rocks (7 lectures)

Rock Mass Classification (6 lectures)

Geological and geotechnical investigations for dams, reservoirs, spillways, tunnels & other underground caverns (6 lectures)

Environmental considerations related to civil engineering projects, Geological hazards (Landslides and earthquakes) their significance, causes and preventive/remedial measures (6 lectures)

Construction materials & Rock aggregates, their properties and use
(3lectures)

Case histories and Indian examples (3lectures)

12 rounds of student presentations will be arranged in Groups on different topics covered under Theory

Practicals (12 lectures)

1. Selection of sites using topographic maps for dams & tunnels
2. Computation of reservoir area, catchment area, reservoir capacity and reservoir life.
3. Merits, demerits & remedial measures based upon geological cross sections of project sites.
4. Index Tests for foundation strength evaluation.
5. Use of softwares for solving various geotechnical problems.
6. Evaluation of Atterberg limits.

Proposed projects (Extendable)

1. Reservoir associated seismic studies of Tehrihydroelectic project
2. Geological investigation of Tipaimukhhydro electric project, Manipur
3. Environmental appraisal of hydroelectric projects of upper Ganges Valley
4. Landslide studies of Sutlej Valley, Himachal Pradesh

Suggested Readings

1. Krynin, D.P. and Judd W.R. 1957. Principles of Engineering Geology and Geotechnique, McGrawHill (CBS Publ).
2. Johnson, R.B. and DeGraf, J.V. 1988. Principles of Engineering Geology, John Wiley.
3. Goodman, R.E., 1993. Engineering Geology: Rock in Engineering constructions. Jonh Wiley & Sons, N.Y.
4. Waltham, T., 2009. Foundations of Engineering Geology (3rd Edn.) Taylor & Francis.