



EARTH SCIENCES FOR CIVIL ENGINEERING PART - I & II

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PRE-REQUISITES : Basic knowledge of geology is recommended.

INTENDED AUDIENCE : PG students of Science and Engineering (especially Earth Sciences). Advance UG students too can take this course.

COURSE OUTLINE :

The course introduces the student to basic principles of geosciences, geological hazards and their applications in civil engineering. The first 4-week modules of this course will help the student to have better understanding towards interior of the earth, earth system and its process. The next 4 week modules will cover geological hazards and environmental impact, active faults and its related hazard in India, importance of geological structures in dams and tunnels, fluvial geomorphology and ground water, tsunami, landslide and flood hazard, mapping, monitoring and management of hazards.

ABOUT INSTRUCTOR :

Prof. Javed Malik earned his Ph. D in 1998 from M. S. University Baroda, Vadodara, Gujarat (Geology), did Post-Doctorate (Japan Society for Promotion of Science) from (1999-2001) Hiroshima University, Japan. Joined IIT Kanpur in 2001. Area of Specialization: Active Tectonics, Paleoseismology and Paleo-tsunami, Current Areas of Research: Active fault mapping and Paleoseismological studies along NW Himalaya and Kachchh, Paleo-Tsunami studies in Andaman & Nicobar Islands Collaboration with Japan, US and France – related to earthquake and tsunami studies. Research Projects: Active tectonic investigation along northwestern Himalayan foothill zone, sponsored by DST, Active fault mapping and paleoseismic investigations in Kachchh region. Gujarat, by OYO International Japan. Active Tectonic investigations around South-Middle Andaman and Car Nicobar Islands, A&N Islands, sponsored by INCOIS, Hyderabad, MoES.

COURSE PLAN :

- Week 1 :** Introduction to Geosciences in Civil Engineering, Introduction to Geosciences in Civil Engineering, Plate Tectonics and Continental Drift, Plate Tectonics and Continental Drift, Rock-forming Minerals and their properties
- Week 2 :** Rock-forming Minerals and their properties, Rock types and their properties, Rock types and their properties, Rock types and their properties, Rock types and their properties
- Week 3 :** Seismology and the internal Structure of the Earth, Seismology and the internal Structure of the Earth, Geological Structure Geological Structures, Geological Structures
- Week 4 :** Introduction to Geological Hazards, Introduction to Geological Hazards, Introduction to Geological Hazards, Environmental impacts of Geological hazards, Environmental impacts of Geological hazards
- Week 5 :** Active faults and its related hazard in India, Active faults and its related hazard in India, Active faults and its related hazard in India, Active faults Mapping and Applications, Active faults Mapping and Applications
- Week 6 :** Tsunami and related hazard, Tsunami and related hazard, Tsunami and related hazard, Landslide and Subsidence Landslide and Subsidence
- Week 7 :** Landslide and Subsidence, Flood and related hazard, Flood and related hazard, Flood and related hazard, Groundwater
- Week 8 :** Applications of Earth Sciences in Civil Engineering, Applications of Earth Sciences in Civil Engineering, Civil Engineering applications – geological considerations in Rivers, Civil Engineering applications – geological considerations in Dams, Civil Engineering applications – geological considerations in Tunnels