

Year & Sem	Course Code: CE4507	Course Name: Ground Water Hydrology	No. of Credits: 4	L 2	T&PS 2	P 0
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UNIT-I:Introduction:

Ground water utilization & historical background, ground water in hydrologic cycle, ground water budget, and ground water level fluctuations & environmental influence, literature/ data/ internet resources.

Origin & age of ground water, rock properties affecting groundwater, groundwater column, zones of aeration & saturation, aquifers and their characteristics/classification, groundwater basins & springs, Darcy's Law, permeability & its determination, Dupuit assumptions, heterogeneity & anisotropy, Ground water flow rates & flow directions, general flow equations through porous media

UNIT-II:Advanced Well Hydraulics:

steady/ unsteady, uniform/ radial flow to a well in a confined/ unconfined /leaky aquifer, well flow near aquifer boundaries/ for special conditions, partially penetrating/horizontal wells & multiple well systems, well completion/ development/ protection/ rehabilitation/ testing for yield

UNIT-III:Pollution And Quality Analysis Of Ground Water:

Municipal/industrial /agricultural /miscellaneous sources & causes of pollution, attenuation/ underground distribution / potential evaluation of pollution, physical /chemical /biological analysis of ground water quality, criteria & measures of ground water quality, ground water salinity & samples, graphical representations of ground water quality

UNIT-IV:Surface/ Sub-Surface Investigation Of Ground Water:

Geological /geophysical exploration/ remote sensing / electric resistivity /seismic refraction based methods for surface investigation of ground water, test drilling & ground water level measurement, sub-surface ground water investigation through geophysical / resistivity /spontaneous potential /radiation / temperature / caliper / fluid conductivity / fluid velocity /miscellaneous logging.Concept& methods of artificial ground water recharge, recharge mounds & induced recharge, wastewater recharge for reuse, water spreading.

UNIT-V: Saline Water Intrusion in Aquifers:

Ghyben-Herzberg relation between fresh & saline waters, shape & structure of the fresh & saline water interface, upconing of saline water, fresh-saline water relations on oceanic islands, seawater intrusion in Karst terrains, saline water intrusion control.

UNIT-VI:Modeling and Management of Ground Water:

Ground water modeling through porous media /analog / electric analog / digital computer models, ground water basin management concept, hydrologic equilibrium equation, ground water basin investigations, data collection & field work, dynamic equilibrium in natural aquifers, management potential & safe yield of aquifers, stream-aquifer interaction

References/Text Books:

1. D. K. Todd and L. F. Mays, "Groundwater Hydrology", John Wiley and sons.
2. K. R. Karanth, "Hydrogeology", TataMcGraw Hill Publishing Company.
3. K.C. Patra, "Hydrology and water process Engg

Lecture Plan: Unit-I & -II syllabus for MID-I, Unit-III & -IV syllabus for MID-II and Unit-V & -VI syllabus for MID-III examinations.

Video Lectures (Web Links):

1. <http://nptel.ac.in/courses/105105042/>
- 2.
- 3.

Study Materials (Web Links):

- 1.
- 2.
- 3.

Problems & Solutions (Web Links):

- 1.
- 2.
- 3.

Assignments (Web Links):

- 1.
- 2.
- 3.