Discipline: **Drilling Engineering**	Semester: **6th Semester**	Name of the Teaching Faculty: **Er. Brushabhanu Sahoo**	
Subject(Theory): **TUBE WELL DRILLING** Subject Code: **TH2**	No. of Periods /week : **04**	Session: **Summer 2022** No of weeks:**15**	
Week	Class Day	Theory Topics	Remarks
1st	1st	Introduction to Ground Water hydrology and water well drilling.	
	2nd	Define terms used in Ground water hydrology project- aquifer, confined aquifer, water table, static water table, perched water table, artesian well, porosity, permeability, void ratio, co-efficient permeability, radial flow, draw down, residual draw down, cone of depression, transmissibility, well yield, Sp. yield, Sp. retention, Safe Yield, over draft etc.	
	3rd	Define terms used in Ground water hydrology project- aquifer, confined aquifer, water table, static water table, perched water table, artesian well, porosity, permeability, void ratio, co-efficient permeability, radial flow, draw down, residual draw down, cone of depression, transmissibility, well yield, Sp. yield, Sp. retention, Safe Yield, over draft etc.	
	4th	Origin of water. Geological process produces the gigantic volume of water available today.	
2nd	1st	Definition of ground water. Explain the origin of ground water.	
	2nd	Occurrence of ground water.	
	3rd	Vertical distribution of ground water.	
	4th	Aquifers, good aquifers and classification of aquifers.	
3rd	1st	Explain perched water table and artesian well.	
	2nd	Classification of different types of water wells.	
	3rd	Define Darcy's Law and explain flow of water. Definition co-efficient of permeability and co-efficient of transmissibility.	
	4th	Derive a general expression for Darcy's law.	
4th	1st	Specify the different types of drills used for water well drilling.	
	2nd	Water well construction methods and applications.	
	3rd	Explain the basis for selection and application of drills.	
	4th	Various methods of drilling shallow wells like boring, driving, jetting, hydraulic percussion drilling.	
5th	1st	Various methods of drilling shallow wells like boring, driving, jetting, hydraulic percussion drilling.	
	2nd	Methods of drilling deep wells.	
	3rd	Methods of drilling deep wells.	
	4th	Compare & contrast a hydraulic percussive boring and manual rotary boring.	
6th	1st	Explain a D.T.H. drill respect to conventional rotary procedure of drilling.	
	2nd	Explain the hydraulic percussive drilling and earth auger drill	
	3rd	Principle of operation of hydraulic rotary drill.	

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	4th	State the need of flushing system for rotary drill.	
7th	1st	Various problems encountered during water well drilling.	
	2nd	Describe the various types of disturbed strata for water well drilling.	
	3rd	Drilling fluid problems during drilling.	
	4th	Explain grouting and sealing casing.	
8th	1st	Well completion process.	
	2nd	Well casings and cementing operation.	
	3rd	Well screens and gravel packing.	
	4th	Design the length of screen to be lowered in the water wells.	
9th	1st	Methods of installation of screen.	
	2nd	Procedure of fixing the screen by gravel packing.	
	3rd	Test hole and Well log.	
	4th	Well Development. Objective and requirement.	
10th	1st	Well development by pumping.	
	2nd	Well development by surging.	
	3rd	Well development by surging with air.	
	4th	Well development by back washing with air.	
11th	1st	Well development by hydraulic jetting.	
	2nd	Well development by using chemicals.	
	3rd	Well development by hydraulic fracturing.	
	4th	Well development by using explosives.	
12th	1st	Objectives of testing water wells.	
	2nd	Objectives of testing water wells.	
	3rd	Pumping rate.	
	4th	Water level measurement.	
13th	1st	Aquifer test.	
	2nd	Drawdown measurement.	
	3rd	Yield test.	
	4th	Estimate the quantity of flow following the above test.	
14th	1st	Calculations related to testing water wells.	
	2nd	Calculations related to testing water wells.	
	3rd	Causes of failures of wells and suggested remedial actions.	
	4th	Causes of failures of wells and suggested remedial actions.	
15th	1st	Causes of failures of wells and suggested remedial actions.	
	2nd	Causes of failures of wells and suggested remedial actions.	
	3rd	Causes of failures of wells and suggested remedial actions.	
	4th	Causes of failures of wells and suggested remedial actions.	

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