Course Type	Course Code	Name of Course	L	T	P	Credit
DC3	PEC203	Drilling Fluids and Cements	3	0	0	9

Course Objective
To provide basic knowledge about different types of drilling fluids and their applications. To provide the basic knowledge of oil and gas well cementing procedure.
Learning Outcomes
Ability to select the proper drilling fluid compatible to the well. Ability to design and selection of proper cement slurry compatible to an oil and gas well.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
	Drilling Fluids:		
1	Overview of Drilling Fluids: Drilling Fluid Characteristics: Basic functions, properties, maintenance, additives and treatments of drilling fluids	5	Students will be able to understand the basic functions of drilling fluids, which properties are responsible to achieve these functions and how to get that that properties of mud.
2	Classification, Types and applications of Drilling Fluids: Water based, oil based, emulsion based, polymer based, Surfactant based, Foam based and Aerated drilling fluids. Synthetic oil based drilling fluid (SOBM). Non damaging drilling fluids	5	Students will understand about different types of drilling fluids, there advantages and disadvantages and different key factors that drive decisions about the selecting types of drilling fluids for a specific well.
3	Clay chemistry and its application to drilling fluids, types of clays, hydration, flocculation, aggregation and dispersion.	5	Students will be able to understand the phisico-chemical behavior of clay minerals, from which drilling fluid is made up of.
4	Rheology of drilling fluids. Drilling fluid calculations: Slip Velocity, mud weight, additives.	5	The aspects of drilling fluid rheology and its role in drilling will be explained to the students.
5	Advancement in drilling fluid technology- New generation drilling fluids.	5	Modern drilling fluid and advancement in drilling will be explained to the students.
	Cements:		
6	**Cementing, Cements & cement slurry:** Objectives of cementing, oil well cements, Classification of cement, Slurry design, Slurry additives, Factors influencing cement slurry design, Cementing equipment.	6	The student will learn about different well cementing practices and their role in oil and gas well.
7	**Cementing Methods**: Primary cementing, Stage cementing, Liner cementing, Plugging, Squeeze Cementing techniques in practice. Deep well cementing, Characteristics of good quality cementation. HPHT and Deep water Cementing.	6	The detail mechanism of well cementing and design procedure will be explained to the students.
8	**Cementing Calculations**	5	The student will be able to calculate cement slurry, surface power and other requirements.
	Total contact hours:	**42**	

Text Books:

i. Petroleum Engineering: Drilling and Well Completion: Carl Gatlin
ii. Oil Well Drilling Technology : Mc. Gray& Cole
iii. Composition and Properties of Drilling and completion fluid: H. C. H. Darley and G. R. Gray, 5th Edition, Gulf professional Publishing.

Reference Books:

i. Applied Drilling Engineering: A. T. Bourgoyne Jr., K. K. Millheim, M. E. Chenvert and F. S. Yong Jr. Society of Petroleum Engineers.