

DEPARTMENT OF MCHANICAL ENGINEERING
Program Outcomes Detail B.Tech. (Petroleum Engineering)

Sr. No.	Academic contents	Types of contents	Outcomes
1.	<u>Program Specific outcomes</u>	B.Tech. (Petroleum Engineering)	<p>Each student will attain at least the following specific outcomes from this B. tech degree course:</p> <p><u>1. Proper scientific and technical knowledge</u> Graduates shall make their way to the society with proper scientific and technical knowledge in Petroleum engineering.</p> <p><u>2. Strong fundamentals</u> Graduates shall work in design and analysis of mechanical systems with strong fundamentals and methods of Petroleum Exploration</p> <p><u>3. Ability of Designing and developing important components</u> Ability to design and develop components and processes of Petroleum Exploration to meet desired needs considering public health, safety, cultural, social, and environmental aspects.</p> <p><u>4. Ability of understanding</u> Ability to understand and investigate complex Petroleum engineering problems experimentally</p> <p><u>5. Ability of applications</u> Ability to apply modern engineering tools, techniques and resources to solve complex activities with an understanding of the limitations.</p> <p><u>6. Ability of analyzing and understanding</u> Ability to understand the effect of engineering solutions on legal, cultural, social, public health and safety aspects.</p> <p><u>7. Capability of sustainable solutions</u> Capable of developing sustainable solutions and create their long lasting effect on society and environment</p> <p><u>8. Capability of ethical principles</u> Capable to apply ethical principles to engineering practices and professional responsibilities.</p> <p><u>9. Capability of reporting</u> Capable to comprehend, design documentation, write effective reports, make effective presentations to the engineering community and society at large.</p> <p><u>10. Adoption of rapid changes</u> Graduates shall adapt to the rapidly changing environment in the areas of petroleum engineering</p> <p><u>12. Excellence in career</u> Graduates shall achieve excellence in career develop ability to work and communicate effectively as a team member and/or</p>

			<p>leader to complete the task with minimal resources, meeting deadlines.</p> <p>13. <u>Applications of Knowledge:</u> Shall be able to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.</p> <p>14. <u>Critical analyzing capability</u> Capability to share the responsibilities in planning and utilization analyzing the processes critically.</p> <p>15. <u>Problem Solving attitude :</u> An attitude of Designing exploration and other processes and systems to meet specific needs and solve problems.</p> <p>16. <u>Research attitude</u> Analyze and model the mechanical engineering more effectively and hence contribute towards research and solving complex problem.</p> <p>17 <u>Acquaintance of latest developments and techniques</u> The graduates shall readily grasp the latest developments and techniques in petroleum engineering and also capable of their applications</p> <p>18. <u>Capable of Collaborative and Multi disciplinary work:</u> Capable of Contributing in academics by multidisciplinary works involving social health, safety, legal, and consequent responsibility.</p> <p>19. <u>Understanding Environment and its Sustainability:</u> Appreciate the impact of industrial activities on global warming and finding the sustainable technical solutions through independent and reflective learning.</p> <p>20. <u>Having Strong moral Ethics:</u> Understand the importance of financial aspects in system infrastructure development with ethical principles and social responsibilities.</p> <p>21. <u>Individual and Team Work:</u> Undertake project in emerging areas to function effectively as an individual, and as a member or leader in diverse teams. Adequate knowledge and exposure to industry standard software and hardware to lead professional carrier in this field</p> <p>22. <u>Strong Communication:</u> Communicate effectively with diverse audiences and able to write/present effective reports and design technical documentation. Ability to communicate effectively and execute the work as a team.</p> <p>23. <u>Tendency of Life-long learning:</u></p>
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		<p>Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.</p>
		<p><u>24. Managing capability</u> Managing oil recovery from various reservoirs through diligent monitoring ensuring improved profitability and reduced operating costs</p>
		<p><u>25.Perform with due diligence</u> Perform with due diligence and reserve estimations in desert area of Rajasthan where the rich reserves of the fuel are available</p>
		<p><u>26.Strong inter-personal and technical skills</u> Strong inter-personal and technical skills through successful training of junior staff by integrating best practices of the industry.</p>
		<p><u>27.As a Piping Engineer</u> As a Chief Piping Engineer where the sound technical experience and prowess in installation of piping can help in executing projects at a faster pace through reduced costs.</p>
		<p><u>28.Turnkey project</u> Completing the fastest turnkey project within scheduled time period with available resources.</p>
		<p><u>29. Executing work</u> Responsibility for preparing and checking approval drawings for executing work adhering to applicable procedures and standards within specified budget.</p>
		<p><u>30.Supervising capacity</u> Supervising team of designers and engineers to execute work as well as checking various details related to materials and its applicability</p>
		<p><u>31.Managing numerous projects</u> Managing layout development of numerous projects in a way that would address cost concerns along with adequate safety and reliability.</p>
		<p><u>32.Exploration procedures,</u> Understanding procedures involved in exploration, extraction and transportation of Crude oil to begin with.</p>
		<p><u>33. Oil and gas Refining</u> covers details related to refining of this crude oil and producing the primary product- petroleum</p>
		<p><u>34. Oil and gas evaluation</u> Covers nearly all of the stages of oil and gas field evaluation, development and production.</p>
		<p><u>35. Maximizing hydrocarbon recovery</u></p>

			Maximizing hydrocarbon recovery at minimum cost while maintaining a strong emphasis on reducing environmental impact.
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Course Outcome
B.Tech. (Petroleum Engineering)

Sr. No.	Academic contents	Types of contents	Outcomes
2.	Course outcome	<u>1.MEL0202</u> Engineering Graphics (2 nd semester) Credits (2-1-2)4	CO1 Draw orthographic projections of lines, planes and solids. CO2 Construct isometric scale, isometric projections and views CO3 Draw sections of solids including cylinders, cones, prisms and pyramids CO4 Draw projections of lines, planes, solids, isometric projections and sections of solids CO5 Draw projections OF cylinders, cones, prisms and pyramids using Auto CAD 2 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester
		<u>2. MEL0101</u> Engineering Mechanics (1 st semester) Credits (3-1-2)5	CO1Determine the resultant force and moment for a given force system. Analyze planar and spatial systems to determine the forces in members of trusses, frames and problems related to friction. CO2Calculate the motion parameters for a body subjected to a given force system. CO3Determine the deformation of a shaft and understand the relationship between material constants CO4Determine the centroid and second moment of area CO5Determine the power transmission in belts 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester
		<u>3.MEP 0101</u> Mechanical Workshop (1 st semester) Credits (0-0-2)1	CO1Study and practice on machine tools and their operations CO2Practice on manufacturing of components using workshop trades including fitting carpentry, foundry and welding CO3Identify and apply suitable tools for machining processes including turning, facing thread cutting and tapping 2 Practical period of Fifty minutes per week over a semester
		<u>4. PTL 0301</u> Well Logging (3 rd semester)	CO1 drill cutting & return mud analysis of oil & gas CO2 horizontal well logging ,well logging equipment

		Credits (3-0-0)3	CO3 logging environment, the pressure environments of borehole logging and invasion, CO4 Principles and application of logging tools CO5 Determination with the Neutron Density, Darcy's Law CO6 Cement bond log, cement bond log interpretation models, 3 Theory period of Fifty minutes per week over a semester
		5. PTL 0302 Geology for Petroleum Engineers (3rdsemester) Credits (3-0-2)4	CO1 importance of geology in petroleum engineering, structure of the earth, CO2 convergent, seismic facies and sequence stratigraphy CO3 Petrology: origin, classification, texture and structure of igneous CO4 Structural geology: causes and classifications of faults CO5 Origin of Petroleum, migration and accumulation CO6 Remote sensing, application of GIS in petroleum exploration 3 Theory period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester
		6. PTL 0303 drilling technology and well completion (3rdsemester) Credits (4-0-0)4	CO1 Drilling rigs its types, components of drilling rig. CO2 Subsurface pressures: Pore pressure, abnormal pressure, subnormal pressure, logging while drilling (L.W.D). CO3 Bore hole problems: Identification of hole problem, differential sticking, freeing differentially stuck pipe. CO4 Drill Bit: Drill bit selection, roller cone bit, milled tooth bit, P.D.C. bit, diamond & T.S.P bit. CO5 Drilling Fluids (oil, water and pneumatic based): Drilling fluid types and its selection. CO6 Cementing: Functions of cement, cement, classes of cement, cementing additives, slurry testing. 4 Theory period of Fifty minutes per week over a semester
		7. PTL 0304 Health safety and environment (3rdsemester) Credits (2-0-2)3	CO1 Understanding to Health safety challenges in oil and gas industry, risks involved in oil and gas industry CO2 Understanding to Regulatory regime for oil & gas: Regulatory/statutory agencies (C.P.C.B, C.I.F, D.G.C.A, T.A.C, B.A.R.C, D.G.M.S , I.M.O, O.I.S.D); CO3 Understanding to Integrated HSE management system in business, HSE policy, HSE organization CO4 Understanding to H.S.E Audit, Types of audit, objectives of audits, audit agencies CO5 Understanding to Waste water treatment, oil spill its effect and management CO6 Understanding to gas flaring, effect of petroleum operation on environment. 2 Theory period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester

		<p><u>7. PTL 0401</u> production engineering (4thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding Reservoir Performance, G.O.R behavior, W.O.R behavior, Reservoir performance curves CO2 Understanding Vertical Lift Performance: Flow regimes in vertical two phase flow. CO3 Understanding Principles of Gas Lift, compressor horse power requirement and it's optimization. CO4 Understanding Sucker rod pumping, surface & subsurface equipment, perforation, perforating guns CO5 Understanding effect of water & gas coning on well performance, SARA analysis CO6 Understanding Petroleum Economics, N.P.V., effect of inflation, effect of N.P.V on project analysis 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
		<p><u>PTL 0402</u> reservoir engineering (4thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding to pressure-temperature diagram, oil reservoirs, gas reservoirs. Properties of natural gases, behavior of ideal and real gas CO2 Understanding to Types of reservoir fluids, flow regimes CO3 Understanding to Porosity, Permeability, relative permeability, saturation, wettability CO4 Understanding to Coning in oil and gas wells, vertical and horizontal oil well performance CO5 Understanding to Primary recovery mechanism, depletion drive mechanism 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
		<p><u>12.MEL 0410</u> Mechanics of Solid (4th semester)</p> <p>Credits (3-1-2)5</p>	<p>CO1 Understanding Stress and strain; normal, shear and bearing stresses; CO2 Understanding Strain energy CO3 Understanding State of stress, Generalized Hook's Law, stress transformation CO4 Understanding Mohr's Circle representation for stress and strains CO5 Understanding Bending of beams: CO6 Understanding Torsion of Shafts CO7 Understanding Pressure Vessels: 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester</p>

	<p><u>PTL 0403</u> petroleum and natural gas rules (4thsemester)</p> <p>Credits (2-0-0)2</p>	<p>CO1 Understanding to Introduction of petroleum and natural gas rules, grant of license and lease CO2 Understanding to Oil field regulations and development acts CO3 Understanding to New exploration licensing policy (N.E.L.P), features and objective of N.E.L.P., Pre-N.E.L.P era, Pre N.E.L.P joint venture CO4 Understanding to Joint Operating Agreement (J.O.A), license, joint venture CO5 Understanding to Notice Inviting offers, format for submission for bids, model production sharing contract (M.P.S.C), Main featured of M.P.S.C 2 Theory period of Fifty minutes per week over a semester</p>
	<p><u>PTL 0501</u> Production Engineering-II (5thsemester)</p> <p>Credits (3-1-2)5</p>	<p>CO1 Understanding to Extraneous Gas and water entry into well bore CO2 Understanding to Sand production and control CO3 Understanding to Wall work-over problems,rigs election CO4 Understanding to Oil and gas separation process optimization CO5 Understanding to Crude oil storage;under ground gas storage 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester</p>
	<p><u>PTL 0502</u> Applied petroleum reservoir engineering (5thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding to Gas, gas-condensate and oil reserves CO2 Understanding to Material balance equation: generalized and specific form for different drive systems CO3 Understanding to Performance prediction; water influx estimation CO4 Understanding to reservoir pressure maintenance CO5 Understanding to Oil and gas field development 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
	<p><u>PTL 0503</u> Applied geology (5thsemester)</p> <p>Credits (3-1-2)5</p>	<p>CO1 Understanding Sedimentary process & their products CO2 Understanding Sedimentary environment reconstruction CO3 Understanding Sedimentology and petroleum exploration CO4 Understanding Origin of Oil & gas source rock and maturation process CO5 Understanding Petroleum entrapment 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester</p>

	<p><u>PTL 0504</u> Petroleum Process Unit Operations (5thsemester)</p> <p>Credits (3-1-2)5</p>	<p>CO1 Understanding To design and conduct experiments and analyze and interpret data CO2 Understanding Momentum,heat and mass balance in multi-component system CO3 Understanding Phase equilibrium CO4 Understanding Extraction: liquid-liquid extraction CO5UnderstandingAbsorption,drying,crystallization,and humidification</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester</p>
	<p><u>PTL 0505</u> Natural Gas Engineering (5thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding Sources of Natural gas, Natural Gas industry: Size and direction of development CO2 Understanding Flow of gas in well tubing, Pws, Pwf ,and Pwh equations CO3 Understanding Estimation of gas reserves by volumetric method – Natural Gas processing CO4 Understanding Solid bed adsorption and membrane separation process – NGL fractionation. Process, system, storage, transportation and utilization CO5 Understanding Underground storage; system and production performance</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
	<p><u>PTH 0501</u> Mass transfer (5thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding Students will learn PVT behavior of fluids, laws of thermodynamics CO2Understanding Definitions and Concepts, Property, Thermodynamic State Equilibrium, Energy CO3 Understanding Application of I Law of Thermodynamics for Flow Process. CO4 Understanding Power and Refrigeration Cycles, Thermodynamic Potentials Maxwell relations CO5 Understanding Thermodynamic equilibrium distribution – thermodynamic distribution function</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
	<p><u>PTH 0502</u> Hydrocarbon Based Fertilizer Industry (5thsemester)</p>	<p>CO1 Understanding Introduction to Fertilizer Industry, Definition, Types, Consumption CO2 Understanding Natural gas demand, Petrochemicals requirement CO3 Understanding Different Unit involved in fertilizer process, Fluidized catalytic cracking unit CO4 Understanding Key Fertilizer Product and process involved in making including multi nutrient fertilizer CO5 Understanding Challenges faced by fertilizer Industry, Different types of challenges</p>

		Credits (3-1-0)4	3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester
		<u>PTL 0601</u> Petroleum Exploration methods (6thsemester) Credits (3-1-0)4	CO1 Understanding Geochemical methods of prospecting: Soil-chemical survey, CO2 Understanding Geological exploration processes: Sequence of operation CO3 Understanding Survey instruments CO4 Understanding Units, Measuring instruments CO5 Understanding Type Methodology of refraction profiling 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester
		<u>PTL 0602</u> Oil and Gas well testing (6thsemester) Credits (3-1-0)4	CO1 Understanding Introduction to Oil and Gas well testing CO2 Understanding Flow of compressible fluid through porous media, unsteady state, CO3 Understanding Pressure-transient tests: pressure draw-down, CO4 Understanding Multi-rate test, Reservoir limit test, Injection and fall-off test CO5 Understanding Type curves: generation and interpretation, Gas well testing 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester
		<u>PTL 0603</u> Enhanced Oil Recovery Methods (6thsemester) Credits (3-1-0)4	CO1 Understanding Introduction to EOR, Reservoir Engineering aspects of enhanced recovery methods CO2 Understanding Water flooding, Fractional flow equation, Frontal advance theory CO3 Understanding Flow of miscible fluids, Conditions of miscibility, miscible displacement processes. CO4 Understanding Miscible displacement processes – miscibility condition CO5 Understanding Thermal flooding processes: Hot water flooding, Steam flooding 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester

	<p><u>PTL 0604</u> Process Equipment Design and Drawing (6thsemester)</p> <p>Credits (3-1-2)5</p>	<p>CO1 Understanding Design of pipe fittings and joints CO2 Understanding Design of reaction vessel and storage tank CO3 Understanding Design of high pressure vessels and reactors CO4 Understanding Design of physical separation equipments such as cyclones CO5 Understanding Distillation columns and reactors 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester</p>
	<p><u>PTL 0605</u> Chemical Reaction Engineering (6thsemester)</p> <p>Credits (3-1-2)5</p>	<p>CO1 Understanding To enable the students to gain knowledge on different types of chemical reactors CO2 Understanding Design of continuous reactors - stirred tank and tubular flow reactor CO3 Understanding Design of reactors for multiple reactions CO4 Understanding Non-isothermal homogeneous reactor systems, adiabatic reactors, CO5 Understanding The residence time distribution as a factor of performance 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester</p>
	<p><u>PTH 0601</u> Formation Evaluation (6thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding Direct methods: core evaluation CO2 Understanding Indirect Methods: SP log: principles and application CO3 Understanding Resistivity departure curves: Origin and application CO4 Understanding Radioactivity Logs: Natural gamma-ray CO5 Understanding Interpretation and analysis: Formation 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
	<p><u>PTH 0602</u> City Gas Distribution (6thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding City Gas Distribution CO2 Understanding Petroleum and Natural Gas Regulatory Board CO3 Understanding Gas Transmission and Distribution System CO4 Understanding Annual O&M Plan; Steel Pipeline O&M CO5 Understanding CGD Business Scenario – India and Abroad; Profile of Major Players 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>

	<p><u>PTL 0701</u> Elective – 2 Drilling Fluids and Cementation (7thsemester)</p> <p>Credits (3-1-2)5</p>	<p>CO1 Understanding to Functions of drilling fluid, Classification of drilling fluids, Properties of drilling fluids, Nature of drilling fluid</p> <p>CO2 Understanding to Inhibitive and Non-inhibitive drilling fluids, synthetic oil based drilling fluids. Composition, functions and general nature of rotary drilling fluid,</p> <p>CO3 Understanding to Advanced mud Technology, Safety and Environmental Impact of Drilling fluid, Waste management, classification of drilling waste</p> <p>CO4 Understanding to Cementing, Cements & cement slurry: Objectives of cementing, oil well cements, Classification of cement, Slurry design, Slurry additives</p> <p>CO5 Understanding to Primary cementing, Stage cementing, Liner cementing, Plugging, Squeeze Cementing techniques in practice</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester</p>
	<p><u>PTL 0702</u> Artificial Lift Methods (7thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding to Gas lift-continuous and intermittent, chamber lift, plunger lift/sucker rod pumping</p> <p>CO2 Understanding to Graphical and analytical methods, intermittent gas lift system; Single point injection</p> <p>CO3 Understanding to Rod Pumping system (SRP and PSP) design and related calculations</p> <p>CO4 Understanding to Centrifugal electric submersible pumping system, Hydraulic pumping, piston and jet, related equipment and accessories</p> <p>CO5 Understanding to, Nodal System Analysis and its application to artificial lift optimization, Artificial lift selection criteria.</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
	<p><u>PTL 0703</u> Pipeline Transportation of oil and gas (7thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding to Tanker design, safety features. Oceanic transport of oil and liquefied natural gas</p> <p>CO2 Understanding Route selection, pipe line construction process and equipment: trenching, aligning, connecting pipes</p> <p>CO3 Understanding Pressure drop calculation, types, sizing and location of pumps and compressor, Instrumentation and control</p> <p>CO4 Understanding to Gas distribution control. Offshore pipe line: Sag and over-bend; stinger and riser, under-water welding</p> <p>CO5 Understanding Codes and standards for design, supply and construction of Crude oil and Natural gas pipeline</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>

		<p><u>PTL 0704</u> UN-Conventional Petroleum Resources(7thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding to Energy resources; Conventional Energy Resources; Un-Conventional Energy Resources; Difference between Conventional and un Conventional</p> <p>CO2 Understanding to) CBM – formation; Resource potential Mapping; Seismic analysis and other methods for assessing the potential</p> <p>CO3 Understanding to Shale Rock formation; History of Shale Gas; US success Story; Replication possibilities US experience in India</p> <p>CO4 Understanding to Estimation of Unconventional Energy Resources Methods of estimation, Indian scenario’ potential of various unconventional sources</p> <p>CO5 Understanding to CBM and Shale Gas Exploration, Technology, Land and water requirement, Environmental issues</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
		<p><u>PTE 0705</u> Directional Drilling (7thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding to Tool orientation, Directional well profiles, Well path deflection & correction</p> <p>CO2 Understanding of Turbo-drills, motor description, Power calculation and applications. Auto-track and verti-track system, Rotary Steerable motors</p> <p>CO3 Understanding of Different profiles, Drilling techniques, Mud requirements & characteristics, casing and drill string requirements</p> <p>CO4 Understanding of Down the Hole Well Surveying: Well surveying objectives, surveying methods, Surveying Analysis methods</p> <p>CO5 Understanding to MWD/ LWD, MWD tools, Telemetry system and data interpretation. Directional Drilling Problems and Their Remedies</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
		<p><u>PTE 0702</u> Elective –1, Basic Instrumentation Sensors and Control (7thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding to Accuracy; Precision; Repeatability; Least Count; Zero Error; Sensitivity</p> <p>CO2 Understanding to Digital measurements; Primary measurement; Secondary Measurement, Measuring Instruments- Pressure Measurement; Temperature Measurement</p> <p>CO3 Understanding to Open loop control; Close loop Control; Feedback Control; Surge control</p> <p>CO4 Understanding to DIDC Based Control System; Telemetry; SCADA ; system; Remote Transmitting Units</p> <p>CO5 Understanding Magnetic flux measurement system; Virtual Drilling; Controlling Well Drilling operation</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>

		<p><u>PTE 0705</u> Elective-1, Polymer Technology (7thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding Polymer science Classification of polymer structure Molecular weight, Chemical structure & Thermal transition</p> <p>CO2 Understanding Chain growth polymerization, Polymerization techniques, Reactions of synthetic polymers</p> <p>CO3 Understanding Solution & solid-state properties, Viscosity & Rubber elasticity</p> <p>CO4 Understanding Degradation, stability & environmental issues, polymer additives</p> <p>CO5 Understanding Commodity thermoplastics & fibers elastomers & thermo sets engineering & specialty polymers.</p> <p>3 Theory period of Fifty minutes per week over a semester</p> <p>1 Tutorial period of Fifty minutes per week over a semester</p>
		<p><u>PTL 0801</u> Modeling and Simulation (8thsemester)</p> <p>Credits (3-1-2)5</p>	<p>CO1 Understanding Monte Carlo simulation. Nature of computer- modeling and simulation. Limitations of simulation, areas of applications</p> <p>CO2 Understanding Concepts in discrete event simulation, manual simulation using event scheduling, single channel queue, two server queue</p> <p>CO3 Understanding Techniques for generating random numbers- Mid square method -the mod product method</p> <p>CO4 Understanding Discrete uniform -distribution poisson distribution -geometric distribution</p> <p>CO5 Understanding variance reduction techniques -antithetic variables, variables verification and validation of simulation models</p> <p>3 Theory period of Fifty minutes per week over a semester</p> <p>1 Tutorial period of Fifty minutes per week over a semester</p> <p>2 Practical period of Fifty minutes per week over a semester</p>
		<p><u>PTL 0802</u> Petroleum Refining and Petrochemicals (8thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding Origin and Formation of Petroleum, Production Statistics, Reserves and Raw Materials,</p> <p>CO2 Understanding Evaluation of Petroleum, Thermal Properties of Petroleum Fractions, Important products- Properties and Test Methods</p> <p>CO3 Understanding Other refining processes: Cracking, reforming, alkylation, isomerization</p> <p>CO4 Understanding Specialty products: Lube oil production, propane de-asphalting</p> <p>CO5 Understanding Petro-chemical feed stock: BTX, olefins: method ethane and butane treated products from natural gas. Storage and safety measures</p> <p>3 Theory period of Fifty minutes per week over a semester</p> <p>1 Tutorial period of Fifty minutes per week over a semester</p>

	<p><u>PTL 0803</u> Well Stimulation (8thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding Basic concept, various stimulation methods, matrix Acidization, Coiled Tubing, CO2 Understanding Physical properties of formation materials: Mechanical properties and Thermal properties, CO3 Understanding Hydraulic Fracturing: Dynamic fracture Geometry: Orientation, vertical, horizontal CO4 Understanding Well Productivity; design and optimization of fracturing processes. Acidization: Methods CO5 Understanding Designing Matrix acidizing in carbonates. Acid additives, Sand Control</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
	<p><u>PTE0802</u> Elective – 1Offshore Drilling and Production Operations (8thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding Sea states and weather: Meteorology, oceanography. Sea-bed soil condition, CO2 Understanding Off-shore structures: Fixed platform, jack-up rig; design and operational features mobile units; semi-submersible, CO3 Understanding Off-shore drilling: Well head and sea floor connection; conductor and riser. CO4 Understanding Sub-sea technology in deep water – use of divers and robots, Off-shore production CO5 Understanding Storage for oil; SPM & SBM system, Deep water technology: use of remote operating</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
	<p><u>PTE0802</u> Elective – 2 Fuel Technology (8thsemester)</p> <p>Credits (3-1-0)4</p>	<p>CO1 Understanding Classification of Fuel- Solid Fuels, Liquid Fuels, Gaseous Fuels, and Various Terms Related to the Study of Fuels and Combustion CO2 Understanding Coal Preparation, Coal Storage, Coal Carbonization and by-product Recovery CO3 Understanding Coal: A Source of Energy- Gasification of Coal. Fixed Bed Gasification Fluidized Bed Gasification CO4 Understanding Gaseous and Liquid Fuels- Natural gas, Producer gas, Water gas, Carbureted Water gas CO5 Understanding Combustion: General Principle of Combustion. Combustion of Solid Fuels – Grate Firing and Pulverized Fuel Firing System</p> <p>3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester</p>
<p>BOS 09/05/2020 REVISIONS</p>	<p>PTL0301 Introduction to Petroleum Operations (3-0-2)4 3rd Semester</p>	<p>CO1 Nature of Petroleum CO2 Petroleum Exploration Methods CO3 Concept of Drilling Fluids CO4 Well Completion</p>

			CO5 Petroleum Transportation 3 Theory period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester
		PTL0302 Applied Sedimentology (3-0-2)4	CO1 Introduction to Geology CO2 Petrology CO3 Structural Geology CO4 Origin of Petroleum CO5 Measurement System 3 Theory period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester
		CEL0307 Geomatics (3-0-2)4	CO1 Principles and classifications of surveying CO2 Equipment of surveying CO3 Tachometry: CO4 Curves CO5 Control Surveys 3 Theory period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester
		MEL 0310 Mechanics of Solid Credits (3-1-2)	CO1 Understanding Stress and strain; normal, shear and bearing stresses; CO2 Understanding Strain energy CO3 Understanding State of stress, Generalized Hook's Law, stress transformation CO4 Understanding Mohr's Circle representation for stress and strains CO5 Understanding Bending of beams: CO6 Understanding Torsion of Shafts CO7 Understanding Pressure Vessels: 3 Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester

		PTL 0401 Petroleum Exploration Methods (3-1-0)4	CO1 Surface characteristics and Geochemical Methods CO2 Geological Methods CO3 Magnetic- Survey CO4 Gravity Method: CO5 Seismic Methods: 3Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester
		PTL 0402 Applied petroleum reservoir engineering (3-1-0)4	CO1 Gas, gas-condensate, and oil reserves CO2 Material balance equation CO3 Performance prediction; CO4 Immiscible displacement process CO 5 Oil and gas field development 3Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester
		PTL 0403 Petroleum Geology (3-1-2)5	CO1 Sedimentary process & their products CO2 Sedimentary environment reconstruction CO3 Sedimentology and petroleum exploration CO4 Origin of Oil & gas source CO1 Petroleum entrapment 3Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester
		PTL 0404 Drilling Technology-1 (4-0-0)4	CO1 Drilling: Introduction, Drilling rigs its types CO1 Subsurface pressures CO1 Bore hole problems: CO1 Drill Bit: CO1 Drilling Fluids 4Theory period of Fifty minutes per week over a semester
		MEL 0407 Fluid Mechanics (3-1-2)5	CO1 Definitions, Types, Properties of Fluid, Fluid Statics CO2 Kinematics and conservation of Mass: CO1 The Boundary Layer CO1 Flow Through Pipes: Reynold's experiment CO1 Laminar Flow, Turbulent Flow, Dimensional Analysis: 3Theory period of Fifty minutes per week over a semester 1 Tutorial period of Fifty minutes per week over a semester 2 Practical period of Fifty minutes per week over a semester

