

GANPAT UNIVERSITY									
FACULTY OF DIPLOMA ENGINEERING									
Programme	Diploma in Petrochemical Technology								
Semester	III					Version	1.0.0.0		
Effective from Academic Year	2026-27					Effective for the batch Admitted in	July 2025		
Subject code	1PCT3101					Subject Name	Petroleum Technology		

I. TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Type	Course Code	Learning Scheme						Assessment Scheme										Total Mark s
		Actual Contact Hrs./Week			SLH	NL H	Credits	Theory				Practical				Based on SL		
		CL	TL	LL				FA- TH	SA- TH	TOTAL		FA- PR	SA- PR	TOTAL		SLA		
										MAX	MIN			MAX	MIN	MA X	MI N	
DSC	1PCT3101	3	-	2	3	8	4	40	60	100	40	30	20	50	20	20	8	170

Abbreviation:	CL - Classroom Learning			TL - Tutorial Learning				LL - Laboratory Learning			
	SLH - Self Learning Hours			NLH - Notional Learning Hours				SLA - Self Learning Assessment			
	FA - Formative Assessment (Term work +Mid Sem Exam +Attendance)							SA - Summative Assessment			

II. PRE-REQUISITES

Basic knowledge of chemistry and introductory concepts of petroleum and hydrocarbons.

III.INDUSTRY /EMPLOYER EXPECTED OUTCOMES

The industry expects diploma engineers to possess fundamental knowledge of petroleum origin, geology, reservoir behaviour, and oil recovery mechanisms along with an understanding of storage systems and petroleum product evaluation. Students should be capable of interpreting reservoir data, understanding driving mechanisms, supporting improved recovery methods, and applying quality control tests for petroleum products.

IV. COURSE LEARNING OUTCOMES

At the end of the course, students will be able to achieve the following course learning outcomes:

- CO1:** Explain the origin, composition, and exploration of petroleum along with basic petroleum industry structure.
- CO2:** Describe petroleum geology concepts including reservoir rocks, porosity, permeability, traps, and accumulation of oil and gas.
- CO3:** Explain reservoir driving mechanisms and principles of primary and secondary oil recovery methods.
- CO4:** Understand storage systems and evaluate petroleum products using standard physical, chemical, and performance tests for quality control and safety purposes.

V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:

Name of Unit	Theory Learning outcomes(TLO's) aligned to CO's	Learning Content mapped with Theory Learning outcomes(TLO's)&CO's	Marks	Hours
Unit-1 Origin, Formation & Composition of Petroleum	TLO 1.1 Explain history, origin, and theories of petroleum formation. TLO 1.2 Identify types of petroleum reservoirs and traps. TLO 1.3 Describe world petroleum reserves and Indian petroleum industry. TLO 1.4 Explain composition and basic chemistry of petroleum. TLO 1.5 Describe methods of exploration, production, and transportation of crude oil.	1.1 History and origin of petroleum 1.2 Theories of petroleum formation 1.3 Petroleum reservoirs and traps, World petroleum reserves and Indian petroleum industry 1.4 Composition and chemistry of petroleum 1.5 Exploration, production, and transportation of petroleum, Evaluation of crude oil	12	09
Unit 2 Concepts of Petroleum geology and basic rock properties	TLO 2.1 Explain the origin and source of petroleum TLO 2.2 Describe migration and accumulation of oil and gas. TLO 2.3 Explain reservoir rock properties. TLO 2.4 Define and calculate porosity. TLO 2.5 Explain permeability and fluid saturation. TLO 2.6 Describe structural traps. TLO 2.7 Explain stratigraphic traps.	2.1 Source of petroleum 2.2 Migration and accumulation oil 2.3 Reservoir rock properties 2.4 Porosity 2.5 Permeability and fluid saturation 2.6 Traps-structural 2.7 Stratigraphic trap	18	12
Unit 3 Storage and Evaluation of Petroleum	TLO 3.1 Explain types and selection of petroleum storage tanks. TLO 3.2 Describe evaluation and classification methods of crude oil. TLO 3.3 Explain physical properties of petroleum and petroleum fractions. TLO 3.4 Explain combustion and performance characteristics of petroleum fuels. TLO 3.5 Describe chemical tests used for petroleum product evaluation. TLO 3.6 Interpret test results for quality control and storage safety purposes.	3.1 Storage of Petroleum 3.2 Evaluation and Classification of Petroleum 3.3 Physical Properties of Petroleum 3.4 Combustion and Performance Characteristics 3.5 Chemical Evaluation Tests 3.6 Significance and Interpretation of Tests	16	11
Unit-4 Reservoir Studies	TLO 4.1 Explain different reservoir driving mechanisms. TLO 4.2 Describe depletion drive and external gas drive mechanisms. TLO 4.3 Explain water drive and gravity segregation mechanisms. TLO 4.4 Describe the role of capillary forces and combination drives in oil recovery.	4.1 Reservoir Driving Mechanisms 4.2 Depletion Drive and External Gas Drive 4.3 Water Drive and Gravity Segregation 4.4 Capillary Forces and Combination Drives 4.5 Improving Oil Recovery by Fluid Injection – Water Flooding	14	13

	TLO 4.5 Explain principles of improved oil recovery by water flooding.			
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VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICAL

SR. NO	PRACTICAL/LABORATORY LEARNING OUTCOME(LLO)	PRACTICAL TITLES	RELEVANT COs
1	LLO 1.1 Determination of API Gravity of petroleum products.	To study API Gravity of petroleum products.	CO1
2	LLO 2.1 Determination of Viscosity and calculation of Viscosity Index	To study about Viscosity and calculation of Viscosity Index	CO1
3	LLO 3.1 Determination of Flash Point and Fire Point.	To study about carbon residue using Conradson method.	CO2
4	LLO 4.1 Determination of Cloud Point and Pour Point	To study about Cloud Point and Pour Point.	CO1
5	LLO 5.1 Measure Reid vapour pressure.	To study about Reid vapour pressure.	CO4
6	LLO 6.1 Determination of Copper Strip Corrosion Test	To study about Copper Strip Corrosion Test	CO4
7	LLO 7.1 Determine smoke point	To study about smoke point	CO4

VII. LIST OF INSTRUMENTS / EQUIPMENT / TRAINER BOARD

1	API Gravity Hydrometer Set with Measuring Cylinder
2	Redwood / Saybolt Viscometer
3	Pensky–Martens Flash and Fire Point Apparatus
4	Cloud and Pour Point Apparatus
5	Smoke Point Apparatus
6	Aniline Point Apparatus

VIII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

- Prepare a report on Indian petroleum industry and major refineries.
- Study and explain reservoir driving mechanisms and water flooding with diagrams.
- Compare floating roof and fixed roof storage tanks with applications.
- Analyze a sample crude oil test report and classify it using API gravity and other parameters.
- Prepare a chart of properties and specifications of LPG, gasoline, diesel, kerosene, lube oil, and bitumen.
- Draw and explain structural and stratigraphic traps.
- Study standard petroleum product testing methods (BIS/ASTM).

IX. LIST OF REFERENCE BOOKS

SR.NO	TITLE	AUTHOR	PUBLICATION
1	Petroleum Refining	B. K. Bhaskar Rao	CBS Publishers
2	Petroleum Refining	G. N. Sarkar	Khanna Publishers
3	Elements of Petroleum Geology	Richard C. Selley	Academic Press.
4	Petroleum Production Engineering	L.C. Uren	McGraw Hill.

X.LINK OF LEARNING WEB RESOURCE

1	https://nptel.ac.in/
2	http://www.vlab.co.in/
3	https://www.oisd.gov.in/
4	https://www.ppac.gov.in

XI. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE

Unit	Unit Title	Aligned COs	Learning Hours	R-Level	U-Level	A-Level	Total Marks
1	Origin, Formation & Composition of Petroleum	CO1	09	05	04	03	12
2	Concepts of Petroleum geology and basic rock properties	CO2	12	07	06	05	18
3	Storage and Evaluation of Petroleum	CO3	11	05	06	05	16
4	Reservoir Studies	CO4	13	04	05	05	14
	Grand Total		45	21	21	18	60

XII.CO_s AND PO_s AND PSO_s MAPPING

Course outcome (Cos)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	1	1	1	1	1	2	1	2
CO2	3	3	2	2	1	1	1	3	2	2
CO3	2	3	3	2	1	1	1	3	2	3
CO4	3	2	3	2	2	1	2	3	3	2
Legends: -3- High 2-Moderate/Medium 1-Slight/Low 0-None										