

Scheme & Syllabus of

**UNDERGRADUATE DEGREE COURSE**

**B.Tech. VII & VIII Semester**

**PETROLEUM ENGINEERING**



Bikaner Technical University, Bikaner  
Effective from session: 2021– 2022



**BIKANER TECHNICAL UNIVERSITY, BIKANER**  
**Scheme & Syllabus**  
**IV Year- VII & VIII Semester: B. Tech. (Petroleum Engineering)**

**Teaching & Examination Scheme**  
**B.Tech.: Petroleum Engineering**  
**4<sup>th</sup>Year – VII Semester**

THEORY											
		Course		Contact hrs/week			Marks				Cr
SN	Category	Code	Title								
				L	T	P	Exm Hrs	IA	ETE	Total	
1	PCC	7PE4-01	Enhanced Oil Recovery Techniques	3	0	0	3	30	120	150	3
2	OE		Open Elective I: To be chosen from the bundle of open electives floated by other departments.	3	0	0	3	30	120	150	3
		Sub Total		6	0	0		60	240	300	6
PRACTICAL & SESSIONAL											
3	PCC	7PE4-21	Gas Testing Lab	0	0	2	0	30	20	50	1
4		7PE4-22	Energy & Geopolitics Sessional	0	0	2	0	30	20	50	1
5		7PE4-23	Minor Project	0	0	4	0	60	40	100	2
6	PSIT	7PE7-30	Industrial Training	1	0	0				125	2.5
7		7PE7-40	Seminar	2	0	0				100	2
8	SODE CA	7PE8-00	Social Outreach, Discipline & Extra Curricular Activities							25	0.5
		Sub- Total		3	0	8		120	80	450	9
		TOTAL OF VII SEMESTER		9	0	8		180	320	750	15

***L: Lecture, T: Tutorial, P: Practical, Cr: Credits***

***ETE: End Term Exam, IA: Internal Assessment***



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**B.Tech. : Petroleum Engineering**  
**4<sup>th</sup>Year – VIII Semester**

THEORY											
SN	Categ ory	Course		Contact hrs/week			Marks				Cr
		Code	Title	L	T	P	Exm Hrs	IA	ETE	Total	
1	PCC	8PE4-01	Reservoir Modelling& Simulation	3	0	0	3	30	120	150	3
2	OE		Open Elective-II: To be chosen from the bundle of open electives floated by other departments.	3	0	0	3	30	120	150	3
		Sub Total		6	0	0		60	240	300	6
PRACTICAL & SESSIONAL											
3	PCC	8PE4-21	Reservoir Modelling& Simulation Lab	0	0	2	0	30	20	50	1
4		8PE4-22	Comprehensive Study of Petroleum Engineering	0	0	2	0	30	20	50	1
5	PSIT	8PE7-50	Project	3	0	0	0	210	140	350	7
6	SODE CA	8PE8-00	Social Outreach, Discipline & Extra Curricular Activities							25	0.5
		Sub- Total		0	0	4		270	180	475	9.5
		TOTAL OF VIII SEMESTER		9	0	4		330	420	775	15.5

**L:** Lecture, **T:** Tutorial, **P:** Practical, **Cr:** Credits

**ETE:** End Term Exam, **IA:** Internal Assessment



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<b>List of Open Electives for Petroleum Engineering</b>			
<b>Subject Code</b>	<b>Title</b>	<b>Subject Code</b>	<b>Title</b>
<b>Open Elective - I</b>		<b>Open Elective - II</b>	
7AG6-60.1	Human Engineering and Safety	8AG6-60.1	Energy Management
7AG6-60.2	Environmental Engineering and Disaster Management	8AG6-60.2	Waste and By-product Utilization
7AN6-60.1	Aircraft Avionic System	8AN6-60.1	Finite Element Methods
7AN6-60.2	Non-Destructive Testing	8AN6-60.2	Factor of Human Interactions
7CH6-60.1	Optimization Techniques	8CH6-60.1	Refinery Engineering Design
7CH6-60.2	Sustainable Engineering	8CH6-60.2	Fertilizer Technology
7CR6-60.1	Introduction to Ceramic Science & Technology	8CR6-60.1	Electrical and Electronic Ceramics
7CR6-60.2	Plant, Equipment and Furnace Design	8CR6-60.2	Biomaterials
7CE6-60.1	Environmental Impact Analysis	8CE6-60.1	Composite Materials
7CE6-60.2	Disaster Management	8CE6-60.2	Fire and Safety Engineering
7CS6-60.1	Quality Management/ISO 9000	8CS6-60.1	Big Data Analytics
7CS6-60.2	Cyber Security	8CS6-60.2	IPR, Copyright and Cyber Law of India
7EE6-60.1	Electrical Machines and Drives	8EE6-60.1	Energy Audit and Demand side Management
7EE6-60.2	Power Generation Sources.	8EE6-60.2	Soft Computing
7EC6-60.1	Principle of Electronic communication	8EC6-60.1	Industrial and Biomedical applications of RF Energy
7EC6-60.2	Micro and Smart System Technology	8EC6-60.2	Robotics and control
7ME6-60.1	Finite Element Analysis	8ME6-60.1	Operations Research
7ME6-60.2	Quality Management	8ME6-60.2	Simulation Modeling and Analysis
7MI6-60.1	Rock Engineering	8MI6-60.1	Experimental Stress Analysis
7MI6-60.2	Mineral Processing	8MI6-60.2	Maintenance Management
7TT6-60.1	Technical Textiles	8TT6-60.1	Material and Human Resource Management
7TT6-60.2	Garment Manufacturing Technology	8TT6-60.2	Disaster Management



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**IV Year- VII & VIII Semester: B. Tech. (Petroleum Engineering)**

**7PE4-01: Enhanced Oil Recovery Techniques**

**Credit: 3**

**Max. Marks: 150(IA:30, ETE:120)**

**3L+0T+0P**

**End Term Exam: 3 Hours**

SN	Contents	Hours
1	Introduction: Objective, scope and outcome of the course.	01
2	<b>Review of primary and secondary recovery:</b> Injection rate and pressures in secondary recovery. Flood Patterns and Coverage. Areal sweep efficiency	10
3	<b>Flow of immiscible fluids through porous media.</b> Continuity equation, equation of motion, solution methods Water flooding, Fractional flow equation <b>Water flooding performance calculations:</b> Frontal advance method, viscous fingering method, Stiles method, Dykstra-Parsons Method, Water for water flooding	10
4	<b>Chemical Flooding:</b> Polymer flooding and mobility control processes, Micellar/ polymer flooding, phase behavior of micro-emulsions, phase behavior and IFT, wettability alterations, Alkali flooding. <b>Miscible Displacement Processes:</b> Mechanism of miscible displacement, phase behaviour related to miscibility, high pressure gas injection, enriched gas injection, LPG flooding, Carbon dioxide flooding, alcohol flooding.	10
5	<b>Thermal Recovery Processes:</b> mechanism of thermal flooding, hot water flooding, cyclic steam injection, estimation of oil recovery from steam drive, in-situ combustion, air requirement for in-situ combustion. <b>Microbial Enhanced oil recovery</b>	9
	<b>Total</b>	<b>40</b>

**Open Elective-I:** To be chosen from the bundle of open electives floated by other departments.



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**IV Year- VII & VIII Semester: B. Tech. (Petroleum Engineering)**

**7PE4-21: Gas Testing Lab**

**Credit: 1**

**Max. Marks: 50(IA:30, ETE:20)**

**0L+0T+2P**

<b>Contents</b>
<ol style="list-style-type: none"><li>1. Determination of compositions of Gas with Gas Chromatography.</li><li>2. Determination of Reid Vapour Pressure.</li><li>3. Determination of % reserve of gas.</li><li>4. Determination of Gas gravity.</li><li>5. CO<sub>2</sub> detection.</li></ol>



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**7PE4-22: Energy and Geopolitics Sessional**

**Credit: 1**

**Max. Marks: 50(IA:30, ETE:20)**

**0L+0T+2P**

<b>Contents</b>
<ol style="list-style-type: none"><li>1. Basic concepts of demand, supply and pricing; price and output determination under perfect competition, derivation of the supply function, price and output determination under monopoly, oligopoly, and monopolistic competition.</li><li>2. Energy and society: Social, economic, political and environmental dimensions of energy.</li><li>3. Major types and sources of energy at the global and at the national level.</li><li>4. Reserves and resources of petroleum, coal and nuclear minerals: Globally and in India.</li><li>5. Other resources of energy: Hydroelectric power, solar energy, wind, wave, and biomass based energy.</li><li>6. Energy sources and power generation: Thermal, nuclear, hydroelectric, solar, wind and wave; relative merits and demerits including conversion efficiency, generation cost and environmental impact, clean coal initiatives.</li><li>7. Power transmission and distribution.</li><li>8. Carbon sequestration, coal gasification, CBM, Shale gas, gas hydrates: current status and future prospects.</li><li>9. Solar energy, hydrogen energy, and fuel cells: current status and future prospects.</li><li>10. Carbon credits and its impact on hydrocarbon business.</li><li>11. International oil markets, developments of Indian oil industry.</li><li>12. NELP (New Exploration Licensing Policy), Mines rules and regulations.</li><li>13. Pipelines: Current status and future prospects.</li><li>14. LNG, CNG and other forms of natural gas: global and Indian scenario.</li><li>15. Global energy politics.</li></ol>

**7PE4-23: Minor Project**

**7PE7-30: Industrial Training**

**7PE7-40: Seminar**

**7PE8-00: Social Outreach, Discipline & Extra Curricular Activities**



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**8PE4-01: Reservoir Modelling and Simulation**

**Credit: 3**

**Max. Marks: 150(IA:30, ETE:120)**

**3L+0T+0P**

**End Term Exam: 3 Hours**

SN	Contents	Hours
1	Introduction: Objective, scope and outcome of the course.	01
2	<b>Overview:</b> Geological model and flow model and transition Introduction, Historical background, application of simulator, Types of model and designing of various models depending on reservoir complexities, rock properties, fluid properties – concept of black oil model, compositional model.	10
3	<b>Flow Conditions:</b> Single phase, two phase and multiphase flow equations for one, two and three dimension models, Mass balance equations. <b>Discretization and solution of Equations</b> Special Concept: Explicit and implicit, grid system, finite difference & finite element method, matrix solution, iterative method, stability	10
4	<b>Reservoir model Solution Techniques:</b> Implicit Pressure and Explicit Saturation, Pseudo-functions. Implicit pressure and implicit saturation (IMPIS). Preview of numerical solution methods: Direct process, iterative process. <b>History matching</b> History matching, data preparation, Mechanics and parameters of match	10
5	<b>Streamline simulation</b> Introduction to streamline simulation & comparison of conventional/Streamline simulation <b>Integration with Economics</b> Special Concept on Coning and Compositional Models simulation. Optimization using Economic and Techno-economic evaluation, Computation of economic indices viz.	9
	<b>Total</b>	<b>40</b>

**Open Elective-II:** To be chosen from the bundle of open electives floated by other departments.





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**8PE4-21: Reservoir Modelling and Simulation Lab**

**Credit: 1**

**Max. Marks: 50(IA:30, ETE:20)**

**0L+0T+2P**

<b>Contents</b>
Practical and exercises related to application of oil field Simulator

**8PE4-22: Comprehensive Study of Petroleum Engineering**

**Credit: 1**

**Max. Marks: 50(IA:30, ETE:20)**

**0L+0T+2P**

<b>Contents</b>
Viva voce to assess the knowledge of all the courses of the curriculum

**8PE7-50: Project**

**8PE8-00: Social Outreach, Discipline & Extra Curricular Activities**