Scheme & Syllabus of

UNDERGRADUATE DEGREE COURSE

B.Tech. VII & VIII Semester

PETROLEUM ENGINEERING

Rajasthan Technical University, Kota

Effective from session: 2020 – 2021

Teaching & Examination Scheme
B.Tech.: Petroleum Engineering
4thYear – 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	SODECA	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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Teaching & Examination Scheme
B.Tech. : Petroleum Engineering
4thYear – VIII Semester

THEORY											
		Course		Contact hrs/week			Marks				Cr
SN	Category	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	SODECA	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**

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List of Open Electives for Petroleum Engineering

Subject Code	Title		Subject Code	Title
Open Elective - I			**Open Elective - II**	
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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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	**Review of primary and secondary recovery:** Injection rate and pressures in secondary recovery. Flood Patterns and Coverage. Areal sweep efficiency	10
3	**Flow of immiscible fluids through porous media.** Continuity equation, equation of motion,solution methods Water flooding, Fractional flow equation **Water flooding performance calculations:** Frontal advance method, viscous fingeringmethod, Stiles method, Dykstra-Parsons Method, Water for water flooding	10
4	**Chemical Flooding:** Polymer flooding and mobility control processes, Micellar/ polymerflooding, phase behavior of micro-emulsions, phase behavior and IFT, wettability alterations,Alkali flooding. **Miscible Displacement Processes:** 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	**Thermal Recovery Processes:** mechanism of thermal flooding, hot water flooding, cyclicsteam injection, estimation of oil recovery from steam drive, in-situ combustion, airrequirement for in-situ combustion. **Microbial Enhanced oil recovery**	9
	Total	40

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

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7PE4-21: Gas Testing Lab

Credit: 1 **Max. Marks: 50(IA:30, ETE:20)**

0L+0T+2P

Contents
1. Determination of compositions of Gas with Gas Chromatography. 2. Determination of Reid Vapour Pressure. 3. Determination of % reserve of gas. 4. Determination of Gas gravity. 5. CO2 detection.

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7PE4-22: Energy and Geopolitics Sessional

Credit: 1 **Max. Marks: 50(IA:30, ETE:20)**

0L+0T+2P

Contents
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. 2. Energy and society: Social, economic, political and environmental dimensions of energy. 3. Major types and sources of energy at the global and at the national level. 4. Reserves and resources of petroleum, coal and nuclear minerals: Globally and in India. 5. Other resources of energy: Hydroelectric power, solar energy, wind, wave, and biomass based energy. 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. 7. Power transmission and distribution. 8. Carbon sequestration, coal gasification, CBM, Shale gas, gas hydrates: current status and future prospects. 9. Solar energy, hydrogen energy, and fuel cells: current status and future prospects. 10. Carbon credits and its impact on hydrocarbon business. 11. International oil markets, developments of Indian oil industry. 12. NELP (New Exploration Licensing Policy), Mines rules and regulations. 13. Pipelines: Current status and future prospects. 14. LNG, CNG and other forms of natural gas: global and Indian scenario. 15. Global energy politics.

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	**Overview:** 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	**Flow Conditions**: Single phase, two phase and multiphase flow equations for one, two and three dimension models, Mass balance equations. **Discretization and solution of Equations** Special Concept: Explicit and implicit, grid system, finite difference& finite element method, matrix solution, iterative method, stability	10
4	**Reservoir model Solution Techniques**: Implicit Pressure and Explicit Saturation, Pseudo-functions. Implicit pressure and implicit saturation (IMPIS). Preview of numerical solution methods: Direct process, iterative process. **History matching** History matching, data preparation, Mechanics and parameters of match	10
5	**Streamline simulation** Introduction to streamline simulation& comparison of conventional/Streamline simulation **Integration with Economics** Special Concept on Coning and Compositional Models simulation. Optimization using Economic and Techno-economic evaluation, Computation of economic indices viz.	9
	Total	**40**

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

Contents
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

Contents
Viva voce to assess the knowledge of all the courses of the curriculum

8PE7-50: Project

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

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