

20PEM140 (Audit)					Reservoir Modelling and Simulation/ Petroleum Software					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hours/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/VIVA	
1	0	1	0	2	--	--	--	50	50	Pass/Non Pass

### **COURSE OBJECTIVE:**

1.	To provide an in-depth knowledge on central role of reservoir simulation in petroleum industry
2.	To get acquainted to the basic reservoir simulation work flow in terms of development of geostatic model, upscaling to dynamic model.
3.	To provide hands-on training to CMG/tNavigator/other simulation software.

### **PRE-REQUISITES**

Petroleum Geology; Petroleum Exploration; Reservoir Engineering; Well Logging and Formation Evaluation; Numerical Methods.

### **SYLLABUS**

#### **Unit -1: Geomodelling for reservoir Engineers Hours: 06**

Exposure to reservoir simulation software; Integration of data sets into geo-static model; petrophysical property modelling; Up-scaling to Reservoir simulation model.

#### **Unit –2: Numerical Modelling Core Flood Setup Hours: 06**

Introduction to analytical/numerical models, Mathematical & numerical modelling of 1D flow model; validation / verification of simulation models, Buckley Leverett Solution.

#### **Unit –3: History Matching Hours: 06**

Developing simulation model using CMG/tNavigator software, Training of models into representative reservoir simulation model, Simulation study, developing and simulation of SPE First Comparative Solutions Project (<https://doi.org/10.2118/9723-PA>).

#### **Unit –4: Water Flooding/EOR Simulation Hours: 06**

Conceptualizing and developing reservoir simulation model for water flooding/EOR scenario, Numerical sensitivity study and field scale investigations.

### **Text & Reference Books:**

1. John R. Fanchi - Principles of Applied Reservoir Simulation. 4-Gulf Professional Publishing (2018)
2. Khalid Aziz and Antonin Settari - Petroleum Reservoir Simulation. Applied Science Publishers (1979)
3. Donald W. Peaceman (Eds.) - Fundamentals of Numerical Reservoir Simulation-Elsevier (1977)
4. CMG Software Training Manuals.
5. Odeh, Aziz S.. "Comparison of Solutions to a Three-Dimensional Black-Oil Reservoir Simulation Problem (includes associated paper 9741 )." *J Pet Technol* 33 (1981): 13–25. doi: <https://doi.org/10.2118/9723-PA>