COURSE TITLE	**PETROLEUM PRODUCTION ENGINEERING**
COURSE CODE	**01CH0614**
COURSE CREDITS	**3**

Objective:

1 To develop the understanding of fundamental concepts in petroleum production engineering, reservoir fluids, and well Equipments.

Course Outcomes: After completion of this course, student will be able to:

1 Understand the role of production engineer and fundamentals of well management

2 Analyze the role of various production approaches and Equipments

3 Explore the artificial lift methods for petroleum extraction

4 Contribute to reservoir management as production engineers to prolong the reservoir life with optimum production

Pre-requisite of course: Fluid Mechanics, Reservoir Engineering

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	**Introduction** Role of Production Engineer, Petroleum Production System -Well Head Equipment, Christmas tree, flow control devices, Various types of reservoirs, Properties of Oil, Gas to oil ratio, Production enhancement techniques, Factors affecting low productivity, Excessive Production of unwanted fluid, Water Control, Sand Control - identification and control techniques	8
2	**Well design and analysis** Well Completion Methods, Different types/designs of well completion, Conventional and unconventional tubular configurations, Conventional & periodic production testing, perforating oil& gas wells-conventional and unconventional techniques, well activation, Reservoir deliverability, flow regimes, well bore performance, Choke performance, single & multiphase flow in oil & gas wells, well deliverability nodal analysis, well decline analysis	12

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Contents : Unit	Topics	Contact Hours
3	**Artificial Lift Methods** Sucker rod pumping system- selection of unit and types of units, Load & power requirements, performance analysis dynagraph,, other lift systems- electrical submersible pumps principles design & operation, hydraulic piston pumping, progressive cavity pumping, plunger lift, hydraulic jet pumping, Gas lift system evaluation of potential compression requirements, selection of gas lift valves, types of valves, principles of valve operation, setting & testing, design installations	12
4	**Instruments, simulation, and Optimization** Well Perforations instruments and techniques, Design of Equipments – Separators, Treaters, Producer Water Disposal Systems, Heat Exchangers, Pumping Systems, Metering Systems, Pipeline Design, Type & description of stimulation techniques to mitigate formation damage problem and address issues of low productivity, Production optimization- Productivity index, Formation damage diagnosis, Skin effect, Vogel IPR equation. Choke performance, sick well analysis, Nodal system Analysis	10
Total Hours		**42**

Textbook :

1 Petroleum production systems, Economides, M. J., Pearson education, 2013

2 Petroleum production engineering, Liu, X., Guo, B., & Tan, X., Gulf Professional Publishing, 2017

References:

1 Technology of artificial lift methods, Technology of artificial lift methods, Brown, K. E., PennWell Books, 1983

2 Petroleum production engineering, a computer-assisted approach, Petroleum production engineering, a computer-assisted approach, Guo, B. , Elsevier Publications, 2011

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
10.00	20.00	25.00	25.00	10.00	10.00

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Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

1 https://onlinecourses.nptel.ac.in/noc23_ch77/preview

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