

## Natural Gas Engineering

- 1.1 Course Number: PE332
- 1.2 Contact Hours: 3- 0- 0 Credits: 9
- 1.3 Semester-offered: 3<sup>rd</sup> Year-Even
- 1.4 Prerequisite: Reservoir engineering, Production engineering, Engineering thermodynamics.
- 1.5 Syllabus Committee Member: Dr. Vishnu Chandrasekharan Nair, Dr. Tushar Sharma

**Objective:** To introduce different aspects related to natural gas production, processing and transportation.

### 2. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Introduction, Gas Production:	Upstream, Reservoir- Well Completion, Physical properties of natural gas and hydrocarbon liquids associated with Natural gas. Phase behavior studies of two phase hydrocarbon systems. Water and hydrocarbon system. Vapour liquid equilibrium, Compression calculations. Heat Transfer and Mass Transfer principles and applications in Natural Gas Engineering.	15
2	Natural Gas Processing	Field separation and oil absorption process. Refrigeration and low temperature processing. Liquefaction Process. Dehydration of Natural Gas sweetening of Natural gas and Sulphur recovery, Processing for LPG, LNG, CNG, system, Transportation of Natural Gas, Utilization of Natural Gas. Underground storage and conservation of Natural Gas.	15
3	Gas Distribution System	Overview of City Gas and CNG network in India & abroad, Technical standards and codes related to City Gas and CNG, Pipeline route selection and identification of locations for installations, Gas Pipeline design and construction specifications, Design for City Gas terminals and CNG Stations, Equipment Selection	10
		<b>Total</b>	<b>40</b>

### **3. Readings**

#### 4.1 Textbook:

- 4.1.1. Gas Processing, Janes A Speight
- 4.1.2. Gas Production Engineering, Sanjay Kumar

#### 4.2 Reference books:

- 4.2.1. Petroleum Production Handbook, Bradly HB
- 4.2.2. Petroleum Engineering, Drilling and Well Completion, Carl Gatlin
- 4.2.3. Introduction to Petroleum Production Volume 1 & 2, Dr. Skimmer
- 4.2.4. Practical Natural Gas Engineering, Smith RV
- 4.2.5. Natural Gas, Tiratsoo EN
- 4.2.6. Fundamentals of Gas Reservoir Engineering, Jacques Hogoort
- 4.2.7 Handbook of Natural Gas Engineering, Kat

### **5 Outcome of the Course:**

At the end of the course, the students will have gained advanced theoretical knowledge on thermodynamics, fluid flow, processes involved, heat transfer and energy conversion in relation to Natural Gas systems, processing, transportation and distribution.