COURSE TITLE	**NATURAL GAS ENGINEERING**
COURSE CODE	**01CH0615**
COURSE CREDITS	**3**

Objective:

1 The student would be able to describe the basic components of processing equipment and explain various gas plant operational procedures.

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

1 Understand physical and chemical properties of LNG with processing techniques.

2 Analyze the processing equipment involved in the Natural Gas production.

3 Examine the process involved in Gas Treatment and Dehydration.

4 Practice employee health and safety as well as adherence to required standards for safety and operations.

Pre-requisite of course: Reservoir Engineering, Petroleum Exploration.

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** Introduction to Gas processing, Natural Gas in India,, Natural gas compositions, Classification, Combustion characteristics, Overview of gas plant processing, Roles of gas plants, Field operations and inlet receiving.	6
2	**Gas Treatment and Dehydration** Introduction, Solvent absorption processes, Physical absorption,, Adsorption, Cryogenic fractionation, Membranes, Non-regenerable hydrogen Sulfide scavengers, Biological processes, Safety and environmental considerations,, Introduction to Gas dehydration, Water content of hydrocarbons,, Gas dehydration processes, Safety and environmental considerations.	12

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Contents : Unit	Topics	Contact Hours
3	**Natural Gas Processes** Hydrocarbon recovery: Introduction, Process components, Recovery processes - Safety and environmental considerations., Nitrogen rejection: Introduction, Nitrogen rejection for gas upgrading, Nitrogen rejection for enhanced oil recovery, Safety and environmental considerations, Trace component recovery or removal: Introduction, Recovery and removal of trace components like Helium, Mercury, Benzene, Toluene, Ethylbenzene, and Xylene., Liquids processing: Introduction, Condensate processing, Natural Gas Processing (NGL) processing, Safety and environmental considerations., Sulfur recovery: Introduction, Properties of sulfur, Sulfur recovery, Sulfur storage, Safety and environmental considerations.	14
4	**LNG Production** Gas processing for LNG Production (limits of Water, CO2, H2S and Mercury contents etc.),, LNG Production process, LNG Storage, LNG Transportation & Regasification,, Safety and Environmental Consideration.	10
Total Hours		**42**

Textbook :

1 Gas production engineering: Volume 4., Kumar, S., Gulf Professional Publishing, 1987

2 Handbook of natural gas transmission and processing: principles and practices, Mokhatab, S., Poe, W. A., & Mak, J. Y. , Gulf professional publishing, 2018

References:

1 Fundamentals of natural gas processing, Fundamentals of natural gas processing, Kidnay, A. J., Parrish, W. R., & McCartney, D. G., CRC press, 1987

2 Gas conditioning and processing (Vol. 2, 7th edition). , Gas conditioning and processing (Vol. 2, 7th edition). , Campbell, J. M., Maddox, R. N., Lilly, L. L., & Hubbard, R. A., Norman, Oklahoma: Campbell Petroleum Series, 1992

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://archive.nptel.ac.in/courses/103/103/103103140/

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