

PE 419 Management in Hydrocarbon Industry

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	30	60	10			100

Unit I

Hours: 10

Personnel Function: Scope and Organization; Wage and Salary Administration; Recruitment, Selection, Induction, Promotion, Transfer and Separation. Industrial Relations: Concept and importance; Trade Unions: Their growth and role, Problem of Multiplicity of Trade Unions; Industrial Dispute: Definition, Prevention and Settlement. Various legislations regarding labour issues: Wage & Bonus, social security, industrial relations. Workers participation in Management. Conflict Resolution & Employee Discipline. Welfare schemes for Employees and its Importance in the Changed Scenario.

Unit II

Hours: 8

Introduction to accounting; Accounting equation; Preparation of financial statements & Analysis; Accounts for Joint Stock Companies; Introduction to International Accounting standards; GAAP; Annual reports; Cash flow reporting; Cost concepts: Absorption & Marginal Costing, CVP Analysis, Standard Costing and Variance analysis.

Unit III

Hours: 12

Supply Chain Management – genesis, definitions and basic structure; Value Chain concept; Relevant issues in supply chain; Strategy formulation; Product type- Supply Chain Matrix; Strategic sourcing and management of supply, Suppliers evaluation and development, Outsourcing strategy. Logistic Management – functions and basic issues, Indian Scenario; Areas of logistical decision making, Design of transportation network; Warehousing; Introduction to e-commerce; Performance measurement of Supply Chain Management.

Unit IV

Hours: 12

Introduction to Operations Management; Production Systems, Capacity Planning, Forecasting Models, Facilities Management; Operations Planning and Control – Job Shop scheduling and Aggregate Planning; Line Balancing, Production scheduling and sequencing.

Texts and References:

1. David Jacob (2012) Optimal supply chain management in oil, gas and power generation, Penn Well Pub. Company
2. Barry Richards (1993) Management of International oil operation, Penn Well Publishing Company.
3. Wright, C. J and Gallum, R. A (2008) Fundamentals of Oil and gas accounting, Penn Well Pub. Company

PE 421T Safety, Health and Environment

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	30	60	10	--	--	100

Unit I : Health, Occupational Hazards in Oil & Gas Industry

Hours: 12

Physical Hazards Noise, Heat, Vibration, Illumination, Radiation, extreme climatic conditions etc. Chemical Hazards Hydrogen sulfide gas, Hydrocarbons, Ammonia, Chlorine, Formaldehyde, Hydrochloric Acid, Methanol, Sulphur, Sulphuric acid, Sodium Hydroxide, etc., Biological Hazards, Psychological Hazards, Ergonomic Hazards, Injuries, Burns, Prevention & Remedial controls of Occupational Hazards In Oil & Gas Industry for each type of Hazards Engineering Control, Administrative Control, Medical Control, Use of Personal Protective Equipment (PPE) Understanding Fire: Fire triangle/tetrahedron, Stages of development of fire Flammability, Concept of flash / Fire point, volatility, Flammable Limits, Fire Detection; Fire signature, Smoke, Heat, Flame, Combustible Gas Detection Fire Prevention, Fire suppression, Process Safety: Safety Analysis Table, Safety Analysis Checklist & SAFE Chart (ref API 14 C)

Unit II : Hazard & Risk Analysis,

Hours: 10

Risk Matrix, HAZID, HAZOP, QRA (API 14 J, OISD), Safe Work Practices: PTW, MOC, SIMOPS etc (ref API RP 75, OISD, OMR), Electrical Safety; Classification of Hazardous locations, use of electricity I Hazardous area (Ref IER, OISD, OMR, API RP 500 & 14 F) Accident Investigations: Study of major accidents like Piper Alpha, Flixborough, Bhopal etc., Investigation techniques Emergency Response planning Audits & Inspection. Audit methodology, protocol, typical check lists for Drilling rigs, Work over activities, logging, etc (ref OISD Standards)

Unit III : HSE Management system

Hours: 10

OISD, API RP 75, ISO 14000, ISO 9000, OSHAS 18000 Standards

Unit IV : Environment

Hours: 10

Environment Concepts:- Effect on eco-system; Air, Water, & Soil of HC's. Impact of Exploration & Exploitation of Hydrocarbon on Environment Environmental studies (Off shore & On Shore) - Environmental Impact Assessment Oil Spills Control and their management. State, Government of India and international Maritime Environmental Rules & Regulations. Drilling / Oil Storage / Effluent water / waste (solid & sludge) treatments their disposal and remediation of soil.

Total Hours: 42

Texts and References:

1. Less, F. P., Loss Prevention in the Process Industries, 2nd ed., Butterworth Heinemann, UK.
2. Peavy, H. S., Rowe, D. R. and Tchobanoglous, G., Environmental Engineering, McGraw Hill, New York.
3. Sanders, R. E., Chemical Process Safety, Butterworth Heinemann, UK, Year.
4. NFPA, API 14 G & OISD Standards.
5. Marchell, V. and Ruchemann, S., Fundamentals of Process Safety, Institution of Chemical Engineers, Warwickshire, UK.

PE 421P Safety, Health and Environment Laboratory

Teaching Scheme					Examination Scheme		
L	T	P	C	Hrs/Week	LW	LE/Viva	Total
0	0	2	1	2	25	25	50

Aim: To get exposure on day- to-day Safety, Health and Environmental activities of various segments of hydrocarbon industries.

PE 422 Pipeline Engineering

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
2	1	0	3	3	30	60	10	--	--	100

Unit I : Introduction

Hours: 7

Introduction to Pipelines, Responsibilities of pipeline engineers and designers, scope of pipeline, inputs and outputs, process diagram (PFD, PNID), course and standards, oil and gas terminology, types of platforms, pipeline elements, pipeline materials, material takeoff for onshore and offshore pipelines

Unit II : Pipeline Drawings

Hours: 7

Field layouts, alignment sheet, riser and spool, GAD'S, crossing details, trench details, anode details, monel sheathing

Unit III : Pipeline Specification

Hours: 7

Pipeline valve thickness calculations, cathodic protection, valves specifications & specialties, pipeline supports, clamps, configuration of equipments, pipeline installation methods, on bottom stability, free span calculations

Unit IV : Stress Calculation

Hours: 7

Pipe stress Requirements, fatigue failure, stress intensification factor, code compliance, pipe support span calculations, piping design for leading types (sustain load – pressure, weight, expansion loads, hanger design, occasional loads), piping configuration, loops – types and sizing, cold spring, underground pipe, flange leak analysis, thrust force calculations, code compliances

Total Hours: 28

Texts and References:

1. Alkazraji Duraid, (2008) A quick guide to pipeline engineering WOODHEAD Publishing Limited
2. Vincent, Jecques (2010) Fundamentals of Pipeline Engineering, Gulf Publishing
3. Antaki, G. A. (2003) Piping and Pipeline Engineering, Marcell Dekker.

PE 423 Process Dynamics and Control										
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	30	60	10	--	--	100
<p>Unit I Hours: 10</p> <p>Introduction to process control, classification of process control strategy, overview of control system design, degree of freedom analysis, dynamic model of representation, digital simulators.</p> <p>Unit II Hours: 12</p> <p>Dynamic behaviour of first order processes, response of second order processes, response of integrated processes, poles and zero and their process and response, multi input and multi out processes.</p> <p>Unit III Hours: 10</p> <p>Feed forward and feed backward system, basic control modes, features of PID controller, control system instrumentation, dynamic behaviour and stability and closed loop control system, PID control design, tuning and trouble shooting, frequency response analysis, feed forward and ratio control, Bode plot and inverse bode plot.</p> <p>Unit IV Hours: 10</p> <p>Enhance single loop strategy, digital sampling, filtering and control, multi loop and multi variable control, model predicting control, prediction for SISO model and MIMO model.</p> <p style="text-align: right;">Total Hours: 42</p>										
<p>Texts and References:</p> <ol style="list-style-type: none"> 1. Scborg, D.E, Edcord D.F and Mellichamb, D.A, Process dynamics and Control, John Willey and sons. 2. Ogunnaike, B. A., and Ray, W. H., Process Dynamnics, Modelling and Control, Oxford University. Press, New York, 1994 3. Stephanopolus, G., Chemical Process Control: An Introduction to Theory & Practice, Prentice Hall, New Jersey, 1984 										

PE 424 Major Industrial Project Work

Teaching Scheme					Examination Scheme		
L	T	P	C	Hrs/Week	Report writing	V/V	Total
0	6	4	8	10	80	20	100

Aim: To address specific industry and research related problems.

Unit 1: Experimentation and data analysis and Synthesis

Unit 2: Outcome, discussion and conclusion

Unit 3: Report Writing, Presentation and Viva-Voce

Text Books & Recommended Software:

1. Kothari, C. R. (2008) Research Methodology: Methods and techniques,
2. Murray, R (2002) How to write a thesis, McGrawal Hill Publication
3. Recent ENDNOTE Software for referencing
4. JABREF for Referencing.

PE 427 Petroleum Refining and Petrochemicals

Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
2	0	0	2	2	30	60	10	--	--	100

Unit I **Hours: 6**

Thermal conversion processes like Visbreaking, Delayed Coking, Fluid coking, Flexicoking, Catalytic conversion processes - fluid catalytic cracking, RFCC, DCC, Hydrocracking, Hydrotreating processes, etc.

Unit II **Hours: 7**

Reforming Process, hydrogen production, Alkylation, Polymerization, Isomerisation, Evaluation of crude for LOBS, Production of lubes and waxes.

Unit III **Hours: 8**

History and importance of Petrochemical industry, growth in India, Classification of Petrochemicals, Feedstock of the Petrochemicals, Preparation of feedstock from ethane / propane and naphtha / gas oil cracking, syngas, Petrochemicals from C1, C2, C3, C4, Syn-gas & aromatics.

Unit IV **Hours: 7**

Chemistry and technology for the production of Methanol formaldehyde, Ethylene oxide, glycol and Vinyl Chloride, Chemistry and Technology for the Production of Acetone, Cumene, Acrylonitrile, Linear alkyl benzene etc

Total Hours: 28

Texts and References:

1. Waddams, A.L. (1980) 'Chemicals from Petroleum', 4th edition, Gulf Publishing Company, London,
2. Hatch, L. F., and Matar, S (1981) From Hydrocarbon to Petrochemicals, Gulf Pub. Co.
3. Chauvel and B. Lefebvre, Petrochemical Processes 1 & 2; Gulf Publishing Co. Houston, Texas, USA.
4. Speight, J.G. and Ozum, B. "Petroleum Refining Processes", Marcel Dekker Inc, New York, 2002.
5. Gary, J.H. and Handiwerk, G.E., "Petroleum Refining Technology and Economics", Marcel Dekker, Inc., New York, 2001.
6. Hobson, G.D., "Modern Petroleum Technology" Vol I & II, John Wiley & Sons, New York, 5/e, 1984
7. Rao, B.K.B., "Modern Petroleum Refining Processes", Oxford & IBH Co. Pvt. Ltd., New Delhi, 4/e, 2002,
8. Prasad, R., "Petroleum Refining Technology", Khanna Publishers, New Delhi, 2000