BHAGWANT UNIVERSITY
M.TECH IN PETROLEUM ENGINEERING MANAGEMENT
(REGULAR)

I SEMESTER

SUBJECT CODE	NAME OF SUBJECT	HOURS/WEEK			CREDIT POINTS
		L	T	P	
01MPE101	Well Completion Testing and Work over	3	2	0	5
01MPE102	Petroleum Refining and Petrochemicals	3	2	0	5
01MPE103	Optional 1– Reservoir Engineering Optional–2Methods in Petroleum Exploration	3	2	0	5
01MPE104	Surface Operations for Oil and Gas Production	3	2	0	5
01MPE201	Geology lab	0	0	5	3
01MPE301	Discipline & Co Curricular activities	0	0	4	1
total		12	8	4	24

II SEMESTER

SUBJECT CODE	NAME OF SUBJECT	HOURS/WEEK			CREDIT POINTS
		L	T	P	
02MPE101	Health Safety and Environment in Petroleum Industry (Sessional Theory paper)	3	2	0	5
02MPE102	Water flooding and enhanced oil recovery	3	2	0	5
02MPE103	Advanced Drilling Engineering	3	2	0	5
02MPE104	Advanced Petroleum Formation and Evaluation	3	2	0	5
02MPE201	Petroleum Engineering Practicals	0	0	5	3
02MPE301	Discipline & Co Curricular activities	0	0	4	1
	Total	12	8	4	24

III SEMESTER

SUBJECT CODE	NAME OF SUBJECT	HOURS/WEEK			CREDIT POINTS
		L	T	P	
03MPE101	Offshore Oil & Gas Technology	3	2	0	5
03MPE102	Optional–3Management and Automation in the Petroleum Industry Optional–4 Cost and Management Accounting	3	2	0	5
03MPE201	Seminar	5		0	5
03MPE202	Dissertation stage-1	5	0	0	5
03MPE301	Discipline & Co Curricular activities	0	0	4	1
TOTAL		16	4	1	21

IV SEMESTER

SUBJECT CODE	NAME OF SUBJECT	HOURS/WEEK			CREDIT POINTS
		L	T	P	
04MPE201	DISSERTATION-2 a) Continuous Evaluation b) Project Report c) Viva Voce	 5 5 6	0	0	 5 5 6
04MDC301	Discipline & Co Curricular activities	0	0	4	1
TOTAL		16	0	1	17

M. TECH. I-SEMESTER

01MPE101 Well Completion Testing and Work over

UNIT 1:Well design: Prediction of formation pore pressure and stress gradients. Determination of safety mud weight bounds for different in-situ stress conditions. Design and planning well trajectory. Surveying tools and methods.

UNIT 2: Design of drill string including bottom hole (BHA) assembly. Drilling methods and equipment for directional, horizontal and multilateral wells. Selection of casing shoes, material properties and design of casing program.

UNIT 3:Well Completion and Stimulations: Well completion design, types of completion, completion selection and design criteria. Interval selection and productivity considerations, effects of producing mechanisms. Inflow performance and multiple tubing performance analyses using commercial software.

UNIT 4: Well stimulation and workover planning. Tubing-packer movement and forces. Tubing design: graphical tubing design and simplified tensional strength design. Selection of down hole equipment, tubing accessories and wellhead equipment.

UNIT 5: Basics of perforation, selection of equipment and procedure for perforation oil and gas wells. Technology of sand control: gravel packing. Fundamentals of well stimulation technologies: acidization and hydraulic fracturing.

REFERENCE:

1. Standard Hand Book of Petroleum & Natural Gas Engineering" – 2nd Edition 2005-William C.Lyons & GaryJ.Plisga-Gulf professional publishing comp (Elsevier).
2. Wellsite Geological Techniques for Petroleum exploration by Sahay .B.etal
3. Petroleum Exploration Hand Book by Moody, G.B.

01MPE102 PETROLEUM REFINING AND PETROCHEMICALS

Unit-I Introduction of mineral oils, their origin and mode of occurrence. Oil resources and refineries in India.Composition of petroleum Refinery products and their test methods.

Unit-II Evaluation of oil stocks introduction to processing of petroleum; general processing and crude distillation, refinery products and their applications, natural gas, gasoline, naphtha kerosene, fuel oils and gas oils, petroleum waxes, lubricating oils, tar and asphalt.

Unit-III Petroleum refining processes and operation: Thermal cracking, catalytic cracking, hydro forming, catalytic forming, alkylation's, polymerization, isomerisation and other auxiliary process e.g. vis-breaking, de-waxing and de-asphalting operations. Manufacture of paraffin wax and microcrystalline waxes.

Unit-IV Introduction to lubricants: Liquid, Solid and gas lubricants and their applications.

Lubricating oils:Liquid mineral lubricants ,Synthetic liquid lubricants. Physical properties, additives , manufacture of lubricating oils. Analysis of lubricating oils.

Lubricating Greases: Properties, types, ingredients, additives, analysis of lubricating greases as per BIS test methods. Manufacture of lubricating Greases-Processes and equipments.

Unit-V Introduction to petrochemicals; manufacture of alkyl aryl compounds, ethylene oxide condensation products benzene, toluene, xylem, butadiene's, vinyl chloride and styrene etc.

REFERENCES

1. Petroleum Products Hand Book By V. B. Guthrie
2. Petroleum Products Handbook McGraw-Hill Education (December 1960) ISBN-10: 0070252955 ,ISBN-13: 978-0070252950
3. Handbook Of Petroleum Product Analysis ,James G. Speight. Publisher: Wiley-interscience
4. Petroleum Fuels Manufacturing Handbook: Surinder Parkash. ISBN,0071632409 / 9780071632409

01MPE103 OPTIONAL 1: RESERVOIR ENGINEERING

UNIT 1: Fluid characteristics. Introduction to the production system. Characteristics of the reservoir rocks-Porosity,Permeability,cross plots. Fluid saturation, capillary pressure.

UNIT 2: Multi phase flow: Relative permeability-fractional flow. Well performance – inflow performance, tubing performance.

UNIT 3:Well testing:Basic well testing theory,oil well testing,gas well testing,Practical well testing. Gas field reservoir engineering, Fluid phase behavior, Gas in place volumes and recovery estimations. Reservoir testing and performance analysis: well test, drillstem tests (DST), production tests, pressure tests on gas wells, formation interval testing and other well testing techniques. Coning of water and gas, effects of partial penetration.

UNIT 4:Material balance techniques: Production forecasting, Gas condensate reservoir engineering, Fluid phase behaviour development options.

UNIT 5:Well performance, Reservoir management and simulation, reservoir data acquisition, reservoir simulation. Mathematical basis of bottom hole analysis,differential equations for radial flow in a porous medium. Pressure draw down and build up analysis.

REFERENCE:

1. Hobson, J.D. and Tirastoo, E.N. 1975. Introduction to Petroleum Geology, Scientific Pub; Becons Field.
2. Levorsen, A.I. Geology of Petroleum, 1967, 2nd Edn. W.H. Freeman C. San Francisco.
3. Hunt, J.M., Petroleum Geochemistry and Geology, 1996, 2nd Edn. W. H. Freeman, San Francisco.
4. Applied Reservoir Engineering Second edition :craft B.C. and Hawkins M.F. Prentice Hall 1991
5. Reservoir Simulation : Mattex CC and Dalton R.L ,SPE textbook Series 1984

OPTIONAL 2: METHODS IN PETROLEUM EXPLORATION

Basic concepts of magnetic survey : The geomagnetic field. Magnetic anomalies. Magnetic survey-instruments. Field method of magnetic surveys. Reduction of magnetic data. Diurnal correction and geomagnetic correction. Interpretation of magnetic anomaly. Response ofmagnetic method for different type of bodies and geological structure. Application of magnetic survey.

Basic theory of gravity method : Units of gravity. Gravity measuring instruments. Gravity survey, Gravity anomalies. Gravity data reduction Drift, latitude, Elevation and, Free-air correction. Free air & Bouguer anomalies. Gravity response of simple shapes. Interpretation of gravity anomalies. Application of gravity methods.

Basic aspects of seismic methods : Seismic refraction surveys. Geometry of refracted path,planar interface. Two layer case with horizontal interface. Methodology of refraction profiling.Field surveys arrangements. Recording instruments & energy sources. Corrections applied tore fraction data. Other methods of refraction shooting such as Fan shooting and Board side shooting. Interpretation of refraction data. Application of seismic refraction method.

Geometry of reflected ray path : Single horizontal reflector, The reflection seismograph and seismogram (Seismic traces). Importance of seismic reflection survey over seismic refraction survey technique. Common depth point (CDP) profiling & stacking. Time corrections applied to seismic data.Well seismic shooting for velocity determination and Vertical Seismic Profiling(VSP). Data processing. Interpretation of reflection data. Introduction to 3D data acquisition &interpretation.Application of seismic reflection survey over.Applications of various geophysical methods in oil exploration.

REFERENCE:

1. Domenico, S.N. 1983. Modern Seismic Exploration concepts. Tulsa, Oklahoma.
2. Macquillin, R. Bacon, M.(eds). 1984. An introduction to seismic interpretation, reflection seismics in petroleum exploration, Grahmam, Trotman.
3. Coffeen, J.A. 1986. Seismic exploration fundamentals and seismic techniques for finding oil, 2nd Edn. Pennwell Pub. Co., Tulsa, Oklahoma

01MPE104 SURFACE OPERATIONS FOR OIL AND GAS PRODUCTION

Field Processing of Oil & Gas : Flash and stage separation of oil & gas; oil & gas separators, mist extractor, fluid level and pressure control system. Vertical and horizontal
separators, metering separators. Working pressure and safety feature in oil & gas

separators. Special problems in oil and gas separation. Removal of suspended solid & water from oil & gas. Scrubbers and wash tank. Demulsification and desalting.

Storage & Transport : Types & features of storage tanks Fixed roof and floating roof tanks. Specification, maintenance and operation of tank batteries, Vapour control and gravity conservation measures. Vapour recovery system. Metering of oil & gas, Sampling and Testing of crude oil. Gauging equipment and methods. Water and sediment determination. Orifice and other metering devices and their characteristics.

EOR Processes (Surface facilities) : Treatment of water for reservoir compatibility. Design consideration for water handling and injection system. Pumps types & sizing, Injectivity problems. Gas compression for injection, gas compressors. Design consideration for gas collection and distribution system for injection.

REFERENCE:

1. Gas Production Engineering : S.Kumar-Gulf Publishing co,1987
2. Production Operations :: T.O. Alen and A.P. Roberts , SPE volume 14 edition
3. Petroleum Engineering Drilling & well Completion: Gatlin C. ,Prentice Hall Inc1960
4. Slandered Hand Book of Petroleum & Gas engineering : William C. Lyons J Plsga, Gulf Professional Publishing comp (Elsevier)
5. Surface Production Operations, Volume 2:, Second Edition:KenArnoldhttp://www.amazon.com/Surface-Production-Operations-Gas-Handling-Facilities/dp/0884158225 - # Maurice Stewart ,Gulf Professional Publishing; 2 edition-1999,ISBN-10: 0884158225 ,ISBN-13: 978-0884158226

01MPE201 GEOLOGY LABORATORY

OBJECTIVE:

To demonstrate various methods involved in the preparation of structural maps and interpretation and calculation the thickness of the beds, studying depositional environment using grain size analysis and find out sediment types using Sand – Silt – Clay ratio.

LIST OF EXPERIMENTS

1. Calculation of True and Apparent Dip.
2. Estimation of Thickness, Distance and Depth of the ore body.
3. Estimation of Throw and Nature of the fault.
4. Interpretation of surface Geology using contour maps.
5. Sand – Silt – Clay ratio estimation.
6. Grain – Size analysis.
7. Identification of important sedimentary rocks in hand specimen.
8. Identification of important sedimentary rocks in microscopic level

LIST OF EQUIPMENT

1. Sieve Shakers
2. Sieves set.
3. Petrological Microscopes
4. Hot oven
5. 1000 ml and 50 ml beakers

M. TECH. II- SEMESTER

02MPE101 Health Safety and Environment in Petroleum Industry

Health Hazards in Petroleum Production Refining and Utilization:

1.Toxicity, Physiological, Asphyxiation, respiratory and skin effect of Petroleum Hydrocarbons (including mixtures), sour gases (eg Hydrogen sulphide and carbon monoxide etc) with their thresh-hold limits.

2.Effect of corrosive atmosphere and additives during acidizing, sand control and fracturing jobs etc.Hazards analysis, developing a safe process, failure mode analysis, safety analysis (API-14C) safety analysis function evaluation chart (synergic approach).

3. Manual & atmospheric shut down system, blow down systems.Gas detection system,Fire detection and suppression systems, Personal protection systems & measures.
4. HSE Policies, standards & specifications, Disaster & crisis management.
Environment:1. Environment concepts, impact on eco-system, air, water and soil. Air & noise pollution, The impact of drilling & production operations on environment, Environmental transport of petroleum wastes.
5. Offshore environmental studies, offshore oil spill and oil spill control,Oil mines regulations and other environmental legislations, Environmental impact assessment. Waste treatment methods, waste disposal method,remediation of contaminated sites.

REFERENCE:

1. Gilbert.M.Masters, 'Introduction to Environmental Engineering and Science, 2nd Edition Pearson Education 2004.
2. T.G.Miller, 'Environmental Science' Wads Worth publishing Co.
3. C.Townsend.J.Harper and Michael Bgon, Essentials of Ecology' Blackwell Science.
4. R.K.Trivedi and P.K. Goel' Introduction to Air pollution Techno science publications

02MPE102 Water flooding and enhanced oil recovery

UNIT 1:Enhanced oil recovery methods: Definition, Schematic representation of enhanced oil recovery,Techniques involved in EOR, Chemical flooding,Hydrocarbon or Gas injection, thermal recovery methods.
UNIT 2:Chemical oil recovery methods: Polymer, surfactant/polymer and alkaline flooding, Carbondioxide (CO2) flooding.
UNIT 3:Thermal recovery: fire flooding,steam flooding,mechanism of hydrocarbon miscible flooding, mechanism of nitrogen and flue gas flooding,mechanism of CO2 flooding, mechanism of surfactant/polymer flooding, Mechanism of alkaline flooding, Mechanism of steam flooding.
UNIT 4:Criteria for gas injection, Criteria for chemical methods, criteria for thermal methods. Microbial EOR methods (MEOR).
UNIT 5:Laboratory design for EOR, Preliminary test,Water analysis, Oil analysis, Core testing, Viscosity testing.

REFERENCE:

1. Standard Hand Book of Petroleum & Natural Gas Engineering" – 2nd Edition 2005-William C.Lyons and Gary J.Plisga-Gulf professional publishing comp (Elsevier).
2. API Gas Lift Manual : American Petroleum Institute, Third Edition 1994
3. Technology of Artificial Lift : Brown K ,Penwell Publishing Co Tulsa 1984
4. Enhanced Oil Recovery : Lake L ,Penwell publishers1991
5. Latil. M. et al., "Enhanced oil recovery" – Gulf publishing co. Houston (1980)
6. Enhanced Oil Recovery : Green W.W. and Willhite G.P., SPE2003

02MPE103 Advanced Drilling Engineering

UNIT 1:Drilling and Well Servicing structures, Definitions, Design specifications, Maintenance and use of Drilling and wall servicing structures.
UNIT 2:Hoisting Systems, Design, Rating and Testing, Inspections, Supplementary and Requirements, Manufacture and Tolerances.
UNIT 3:Rotary Equipments, Swivel and Rotary Hose, Rotary Table and Bushing, Bits and Down hole tools.
UNIT 4: Mud Pumps, Pump installations, Pump operations, Drilling Muds and Completion fluids, Suspended solids and Transport Cuttings, Nonaqueous fluids: Oil base and synthetic base Muds, Drilling fluids activities, Clay chemistry.
UNIT 5: Drill strings, compositions and design, Drill Collar, Drill Pipe, Tools Joints, Drill String Design.

REFERENCE:

1. Mc.Cray.A.W and Cole.F.W. Oil Well Drilling Technology' University of Oklahoma Press, Norman 1959.
2. Turaga, S.P., 2006. Drilling Fluids, their composition, function and properties, Centre for Rural Development and Environmental Studies (Pub.), Secunderabad

3. Sahay, B. Rai, A. and Ghosh, M.K. 1991. Well site geological techniques for petroleum exploration, Oxford – IBH, New Delhi.
4. Craft, B.C. Holden, W.R. and Graves, E.D. (Jr.). 1962. Well design, drilling and production, Printice Hall, New Jersey.

02MPE104 ADVANCED PETROLEUM FORMATION VALUATION

UNIT 1: Direct Methods : Mud logging, coring – conventional and Sidewall coring, Core analysis and its importance.

UNT 2: Indirect Methods : SP and resistivity logs, radioactive logs, acoustic logs (principles, types of tools, limitation and applications). Evaluation of CBL/ VDL

UNIT 3: Production Logging : Introduction, type of tools, principles, limitations and applications.

UNIT 4: Special Type of Logging Tools : Casing inspection tools (principles, application and limitation), Formation micro scanner (FMS), NMR logging principles. Logging in highangle wells. USIT, SFT, RFT.

UNIT 5: Log Interpretation and Analysis Techniques:

a) Standard log interpretation methods.

b) Cross-plotting methods : neutron-density , sonic-density and sonic-neutron etc.

c) Clean sand interpretation.

d) Concepts of invasion – RXO, Tornado charts.

e) Shaly sand interpretation.

REFERENCE:

1. Serra, O. and Serra, L. 2003. Well logging and geology, Serralog (Pub.), Paris.
2. Bossiouni, Z. 1994. Theory, measurement and interpretation of well logs. SPE Text Book Series, Louisiana, USA.
3. Bateman, R.M. 1985. Open-hole log analysis and formation evaluation, IHRDC, Boston.
4. James Brock, 1986. Applied open-hole log analysis, Vol.2 Gulf Pub. Co., Huston, Texas.

02MPE201 PETROLEUM ENGINEERING PRACTICALS

Practical's related to the design & selection of drilling fluids, Petro-physical properties of rocks, Well testing, formation evaluation and testing of Petroleum products.

M. TECH. III - SEMESTER

03MPE101 Offshore Oil & Gas Technology

UNIT 1: Introduction to offshore oil and gas operations. Sea States and Weather, Offshore Fixed and mobile Units, Offshore Drilling, Difference in drilling from land, from fixed platform, jack up, ships and semi submersibles. Offshore Well Completion, Offshore Production systems, Deep-water technology, Divers and Safety, Offshore Environment.

UNIT 2: Introduction; classification, properties of marine sediments. Consolidation and shear strength, characteristics of marine sediments. Planning and site exploration.

UNIT 3: Drilling, Sampling techniques, Laboratory testing, In situ testing methods and geophysical methods. Current design practices of pile supported and gravity offshore structures.

UNIT 4: Dynamic analysis of offshore structures, Centrifugal modeling, Anchor design, Break out resistance analysis and geotechnical aspects of offshore pipeline and cable design, Field instrumentation and performance observation.

UNIT 5: Offshore soil mechanics, Offshore pile foundations and caissons, Design of breakwaters, Buoy design and mooring systems, Offshore drilling systems and types of platforms, Ocean mining and energy systems, Onshore drilling, onshore oil rigs, onshore drilling equipments, onshore rig structures, hydraulics applied in onshore rigs.

REFERENCE:

1. Offshore Drilling completion and production: MazurkiewiezB.K.,Eta offshore seminar , Penwell Publishers

2. Offshore platforms and PBMDlines : Mazurkiewiez B.K,TransTech Publication 1987
3. Petroleum Exploration Hand Book by Moody, G.B.

03MPE102

Optional–3: Management and Automation in the Petroleum Industry

The management role in automation, Use of automation and computation in exploration and production fields & refineries, Control of crude oil pipelines, Automation of product pipelines and its economic considerations, Automation in supply program planning and operation, Automation in direct automotive marketing conditions, Automation in petroleum installation, retail outlet, oil tankers, road and rail loading & transportations, On-line computer control system.

REFERENCE:

1. Reservoir Management: Dallas , SPE Reprint series 1998
2. Applied Reservoir Engineering Second edition :craft B.C. and Hawkins M.F. Prentice Hall 1991
3. Mathematical Methods and modeling in Hydrocarbon exploration and production Part I and II : Amin Iske and Trygve Randen ,Springer 2004

Optional–4: Cost and Management Accounting

Introduction, Cost classification and elements; Cost Accounting methods; Job and Batch costing; Contract costing; Process costing; Joint and By-products; Service costing;

Activity based costing; target costing; Life cycle costing; Transfer Pricing. Profit and loss accounts, Taxation, Royalties, excise, and petroleum resource rent (PTRR) tax, Goods and services tax (GST), zonal of corporation area A (ZOCA) Balance sheet, Accounting standards, Management Information and Reporting System – Importance and Considerations in Developing Annual report, Audits, interpretation of financial statements Management Reporting Structure, Reporting of accounts: to management, to share

holders, to stock exchange, to lenders and financial institutions.

REFERENCE:

1. Reservoir Management: Dallas , SPE Reprint series 1998
2. Integrated Petroleum Reservoir Management : Satter A. and Thakur G.C , Penwell Pubs 1994

SEMINAR

Course/Paper: 03MPE-201

MPE Semester-III

OBJECTIVE

The students are to select one technical topic related its branch for Seminar. The student is to submit the synopsis for assessment and approval. Progress for preparation of the seminar topic would be continuously assessed from time to time. Two periods per week are to be allotted and students are expected to present the seminar Progress. A faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain the attendance. Students have to give a final presentation for 15 minutes on his topic. Students are encouraged to use various teaching aids such as over head projectors, power point presentation and demonstrative models. This will enable them to gain confidence in facing the placement interviews

PROJECT

Course/Paper: 03MPE-202

MPE Semester-III

OBJECTIVE

The objective of the project work is to enable the students in convenient groups of not more than 3 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution.

The student should select any one of the topics offered from the department or select one on his own duly approved from the department. Candidate is required to submit the detailed synopsis of the work that he would complete in the part-II

Each student shall finally produce a comprehensive report covering back ground information, literature survey, problem statement, project work details and conclusion. This final report shall be typewritten form as specified in the guidelines.

Semester IV

DISSERTATION

Course/Paper: 04MPE-201

MPE Semester-IV

The student will submit a synopsis at the beginning of the semester for the approval from the University project committee in a specified format. Synopsis must be submitted within a two weeks. The first defense, for the dissertation work, should be held within a one month. Dissertation Report must be submitted in a specified format to the University for evaluation purpose.

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