Third Semester

Course Title: Applied Geology

Course Code: PE 201

Course Duration: One semester

Marks (University Exam): 100 marks (total)

Progressive Assessment: 50 marks

Practical: Yes

Time of examination: 2 hours and 30 mins

Note for Examiner: The course schedule includes 2 lectures, 1tutorial and 1 practical.

Objective: To impart sound knowledge on nature and properties of rocks and minerals, their sedimentation pattern, sedimentary basins and geological methods in search of hydrocarbons and well site geological methods.

SN	Topic	No. of Lectures
PTE 301	UNIT I: Introduction: Age and origin of earth, interior of earth, plate tectonics, and geologic times. Sedimentary geology, Basins and Margins. Origin, accumulation and migration of petroleum. Properties of subsurface fluids. Petroleum Chemistry UNIT II: Rocks: Type of rocks and their formation, texture, minerals and properties, clay minerals, Sedimentary rocks – classification of rocks, types of sedimentary rocks, properties, sedimentation process, sedimentary environments. . UNIT III: Geomorphology: Geomorphology – concepts, processes, stratigraphy – principles, order of superposition, palaeontology and index fossils structural geology – principles, folds, faults, joints and unconformities; Geology of India. UNIT IV: Origin and distribution of petroleum -Sedimentary basins – types, origin and classifications petroleum system – Generation, Migration, Accumulations of hydrocarbons. Description of some Indian petroliferous basin. UNIT V: Testing and Analysis :Well site geological methods – sample collection & description, fluorescence, cores & core analysis,	48

	correlation and introduction to various geological maps	

Outcome:

- Students able to understand how geologists conduct the search for petroleum resources through the value chain or the life cycle of a petroleum resource.
- Have basic understanding of broad array of tools used in the search for and production of hydrocarbon reserves
- Learn the principles of mapping a subsurface reservoir and estimating the volumetric.

Books

- F. J. Pettijohn, Sedimentary Rocks, CBS publishers, INR 338
- Jain, S. Fundamentals of Physical Geology, Springer, 2013, INR 7,696
- Winter J D. Principles of Igneous and Metamorphic Petrology, PHI publisher. INR510
- Boggs, S. 2006. Principles of Sedimentology & Stratigraphy. Pearson Prentice Hall, INR 720
- Cox, P.A., "The Elements on Earth", Oxford University Press, Oxford 1995.

Course Title: Fundamentals of heat transfer

Course Code: PTE 302

Course Duration: One semester

Marks (University Exam): 100 marks (total)

Progressive Assessment: 50 marks

Practical: Yes

Time of examination: 2 hours and 30 mins

Note for Examiner: The course schedule includes 2 lectures, 1 tutorial and 1 practical.

Objective: Analyze problems involving steady state and transient heat transfer in simple and composite geometries. Obtain numerical solutions for these heat transfer problems.

SN	Topic	No. of Lectures
PTE 302	Fundamentals of heat transfer Unit I Modes of heat transfer: Conduction, convection, radiation; Fourier's law of heat conduction, One dimensional steady state heat conduction equation for flat plate and hollow cylinder; Heat conduction through a series of resistances; Thermal conductivity – effect of temperature on thermal conductivity. Unit II Concepts of heat transfer by convection - Natural and forced convection, Dimensional analysis in heat transfer, Reynold's analogy, Prandtl and Coulburn analogy; Heat transfer coefficient for flow through pipe; Nusselt equation for vertical and horizontal tubes; Condensation – film wise and drop wise. Unit III. Theory of evaporation – single effect and multiple effect evaporation, Design calculation for single and multiple effect evaporation; Radiation heat transfer – black body radiation, Emissivity, Stefan – Boltzman law. Unit IV Types of Heat exchangers – single and multi-pass heat exchangers, Log mean temperature difference, Effectiveness of heat exchangers, Number of transfer units, fouling factors.	48

Outcome:

- Students gain knowledge in various heat transfer methodology in process engineering and to design heat transfer equipment's such as furnace, boilers and heat exchangers.
- To impart knowledge on how certain substances undergo go the change in composition, change in phases and exhibit the properties according to the changed environment.

Books

- Process Heat Transfer- Kern, McGraw Hill & Kogakusha Company.
- Unit Operations of Chemical Engineering - W L McCabe, J C Smith and P Harriott, McGrawhill.
- Chemical Engineering vol 1, 6th Ed – J M Coulson and J F Richardson with J r Backhurst and J H Harker, Elsevier.

Course Title: Introduction to Petroleum Operations
Course Code: PTE 303
Course Duration: One semester

Marks (University Exam): 100 marks (total)

Progressive Assessment: 50 marks

Practical: - No

Time of examination: 2 hours and 30 mins.

Note for Examiner: The course schedule includes 3 lectures, 1 tutorial.

Objective: The course will provide deep knowledge on different Petroleum engineering basics and Operation techniques carried out in industry.

SN	Topic	No. of Lectures
PTE 303	Introduction To Petroleum Operations Search and Prospecting Pool: Geological and Geophysical Methods Chemistry of petroleum - Structure of petroleum compounds, Types – alkanes, Napthenes, paraffin, aromatics. Physical and chemical properties of oil, gas and formation water. Drilling and Petroleum: Drilling Rig, Power System, Drilling Fluid and Circulation System, Bits, Drill Pipe, Directional Drilling Well Logging, DST Casing and Cementation Perforation and Well Activation Production Tubing and Well Head Assembly Self-Flow and Artificial Methods of Production of Oil/Gas Separation and Storage Transportation, Field Processing and Refining Marketing and Distribution	**48**

Outcome: To impart basic knowledge about the various facts of Petroleum Engineering, Structure of petroleum compounds, Drilling, Formation Evaluation, Well Testing and Well site operations - Also to understand the basic Principles of Petroleum Engineering**.**

Books:

- J.CH Garry, Hardward G.E and M.J.Kaiser, Petroleum Refining: Technology and economics, CRC Press ,V Edition, 2007
- A.G.Lucas Hurley ,Modern Petroleum Technology Upstream, Edition 2002.
- A.LucasHurley, Modern Petroleum Technology Downstream, Vol II, VI Edition, 2002.