

## **COURSE CONTENTS**

1. Crude assay using Physico-Chemical and Analytical Methods  
Basic Chemistry of crude oil: Composition and classification , crude assay short assay, mid assay and detailed assay of crude oil, Types & Objectives of evaluation, Dehydration of crude oil, Atmospheric, Vacuum and short path distillation, ASTM D-86, D-1160, inter conversion of data from ASTM to TBP to EFV
2. Petroleum Product Characterization  
Crude oil products viz NGL, LNG, LPG, gasoline, Naptha, Kerosene, Middle distillates, long residue, VGP, short residue, lube oil and bitumen, their characterization by ASTM/ UOP/ IP/ IS test methods
3. Latest specifications on LPG, Naphtha , MS, HSD, Kerosene, ATF (BIS, Defstan, ASTM), Furnace oil, bitumen, Pet Coke , sulfur Granules etc.
4. Analysis of MS  
Density, ASTM D-86 Distillation, Reid vapor pressure, vapour lock index, FIA, Total sulphur (ASTM D-4294 & 5453), Benzene content, Oxygenates, RON, MON, Copper Strip Corrosion, Existent gum, potential gum, Induction period , Lead Content
5. Kerosene/ ATF test  
Sp. Gravity, Aromatic contents, Olefinic content, kinematic viscosity, smoke point, Naphthalene %, freezing point, ASTM D-86, Water content, conductivity test, JFTOT (Jet fuel test), Total sulphur, Mercapton, H<sub>2</sub>S, Acidity, Colour Saybolt, Smoke Point, silver strip corrosion test, Burning Quality, Char value, Bloom on Chimney, FIA , Flash point ( Manual & Auto) , Water reaction , Existent Gum , Particle counter etc
6. Analysis of HSD  
Density, Kinematic viscosity, pour point, cloud point, CFPP, Cetane Number, Cetane index, Flash Pt./Abels, Aromatics contents, HFRR, Oxidation Stability , Particulate Contaminants , Moisture , ASTM Distillation , RCR , Ash Content , Acidity In organic & Total , Cupper Corr , etc
7. Furnace oil test  
Density, ash content, sulphur, water content, flash point, kinematic viscosity, calorific value, Micro carbon residue (MCR), Total Sediment (TSP), P-value , Pour point ,Metals ,etc.
8. Bitumen Analysis  
Penetration test, Softening Point, ductility, rheology, hardness, Rolling Thin Film Oven(RTFO) test, Frass Breaking point, Flash point (COC), TCE soluble matter , Wax Content , Specific Gravity , Water Content etc.
9. Other tests related to petroleum products  
ASTM D-1160 distillation, Foaming characteristics, TAN and TBN, Evaporation loss by Noacks Method, Emulsion characteristics and demulsification, Rust preventive characteristics, Air release value, Elemental analysis by chemical, carbon residue , cold cranking simulation, mini rotary viscometer, Total nitrogen (instrumental – Chemiluminiscence and Kjeldahls) , C & S on Catalyst , Calorific value by Bomb Calorimeter , etc..

10. Gasoline & Diesel Quality Parameters(RON, MON, CETANE No ) using CFR Engine Calibration & Standardization of RON, MON, CETANE No unit, as per ASTM test procedures Operation of RON, MON, CETANE Unit
11. Gas Chromatography Theory, Instrumental Setup, Qualitative and Quantitative Analysis, Application
12. Other Essential instrumental analysis technique :  
HPLC, SFC, NMR, IR, GS Mass FTIR, UV/ visible spectrometry, EDXRF (Sulfur and metals), ICP & AAS, etc: Theory, Instrumental Setup, Qualitative, Quantitative-Analysis, Application

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