

**MODULE I**

Heating of crude oil through exchangers. Pipe still heaters, their types and constructional features, estimation of heat duty, combustion calculation and heat transfer area in different parts in pipe still heater. Calculation of pressure drop and stack height.

**MODULE II**

Flash distillation, Dew point and Bubble point calculations, temperature and concentration profile in a distillation column, Multicomponent distillation, Calculation of number of stages in distillation, Key component concept, Comparison between multicomponent distillation and petroleum distillation.

**MODULE III**

Distillation curves and their interconversion at atmospheric, subatmospheric and superatmospheric pressure, Collection and data for distillation column design and operation etc. Atmospheric distillation, principles and mode of excess heat removal, Flash zone calculation and estimation of side draw tray temperatures, Design aspects, Post treatment of straight run products

**MODULE IV**

Vacuum distillation column internals and operational aspects for lubes, asphalt, cracking feedstock, Pressure distillation and gas fractionation units, Difference between various types distillation regaining products of pressure distillation.

**REFERENCE BOOKS:**

- *B.K. Bhaskar Rao, Modern Petroleum Refining Processes, Oxford & IBH (2006).*
- *W.L. Nelson, Petroleum Refinery Engineering, McGraw-Hill, 1964.*
- *3 M. Vanwinkle, Distillation, McGraw-Hill, 1961.*