Petroleum Refining Engineering

1.1 Course Number: CH281
1.2 Contact Hours: 3-0-0 Credits: 9
1.3 Semester -offered: 2nd Year-Even
1.4 Prerequisite: Not Required
1.5 Syllabus Committee Member: Dr M S Balathanigaimani, Dr Vivek Kumar

2. Objective: The course on Petroleum Refining Engineering is to deal various refinery activities starting from the crude pretreatment to the bottom of the barrel upgradation. The concept of straight-run and blended products and their respective production procedures will be discussed at a length.

3. Course Content:

Unit wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Crude Oil: Pretreatment & separation	Crude oil properties, Crude desalting, Crude oil distillation processes	5
2	Refining Processes	Thermal Cracking Processes, Thermal conversion processes, Visbreaking and design variables of visbreaking, Coking: fluid coking, flexicoking, delayed coking and hardware Considerations	8
3	Catalytic Cracking	Caltalytic cracking processes, Catalytic conversion processes, Fluid catalytic cracking with special reference to catalyst and reactor design configurations, Residual FCC	6
4	Hydro-Processes	Hydroconversion processes, Hydrocracking: catalyst and reactor design configurations, Hydrogen production, purification and management, Hydrotreating and hydrodesulphurization processes, catalyst, reactor design configuration	10
5	Light-end upgradation processes	Reforming: catalysts and processes, Alkylation, Isomerization, Etherification	8
6	Auxiliary processes & Additives	Gas treating and sulfur recovery, Blending and additives	4

4. Readings

4.1 Text Books:

1. Gary, J. H., Handwerk, G. H. and Kaiser, M. J., *Petroleum Refining Technology and Economics*, 5th Ed., CRC Press, New York, 2007.
2. Jones, D. S. J. and Pujado, P. P., *Handbook of Petroleum Processing*, Springer, New York, 2006.

4.2 Reference Books:

1. Meyers, R. A., *Handbook of Petroleum Refining Processes*, 2nd Ed., McGraw Hill, New York, 1996.
2. Mark, H., Othmer, D. F., Overberger, C. G. and Seaborg, G. T. (Eds.), *Kirk-Othmer's Encyclopedia of Chemical Technology*, *Petroleum Technology*, Vol. 17, 3rd Ed., Wiley, New York, 1982.

5. Outcome of the Course:

The students will have a deep understanding about handling of straight-run products from a crude distillation tower, various products which can be produced from a refinery along with their respective properties, separation, conversion and upgradation processes involved in the refinery.