Birla Institute of Technology & Science Pilani, Hyderabad Campus
First Semester 2016-2017
Course Handouts

Date: 01/08/2016

Course No. : CHE G617
Course Title: Petroleum Refinery Engineering
Instructor-in-Charge: Srikanta Dinda
Instructor: Srikanta Dinda

Course Description :

Origin, formation and composition of petroleum; Indian and world scenario about crude oil and its processing capacity, demand & supply of petroleum Fractions; refinery products properties and test methods; classification and evaluation of oil stocks, fractionation of petroleum; treatment of important products, thermal and catalytic processes.

Scope and Objectives

This course introduces the student to develop / increase their knowledge about the petroleum, refinery and provides an insight of various aspects of refinery operation. This course mainly deals with the raw material of refinery, refinery process and raw products of refinery and treatment of raw product to make finished product. Furthermore, the experimental part of this course will also give an exposure on hands-on experience on crude & product property analysis.

Prescribed Text Book

Text Book:
T1. J. H. Gary, G. E. Handwerk, Petroleum Refining – Technology and Economics, 4th Ed.
T2. B. K. Bhaskara Rao, Modern Petroleum Refining Processes -5th Ed.

References Books:
R1. R.A. Meyers, Handbook of Petroleum refining Processes, McGraw Hill, 3nd Ed.
R2. W.L. Nelson, "Petroleum Refinery Engineering", McGraw Hill, 4th Ed.

Course Plan for lecture:

Lect. No.	Learning Objectives	Topics to be covered	Ref. Chap. (Book)
1-3	Introduction	History and Development of refining, Indian petroleum industry	T1, 1(T2), other sources
4-7	Composition and tests	Composition of petroleum, laboratory tests, refinery products	2(T1), 1,4(T2),
8-10	Classification and characterization	Classification, Characterization and evaluation of crude oil, Trends of petroleum products	3 (T1), 3 (T2),
12-16	Distillation column	Atmospheric and vacuum distillation, Design of crude distillation column,	4 (T1), 3(T2)
17-20	Thermal processes	Description about vis-braking, Coking	5(T1), 5(T2)
21-23	Catalytic processes	Description about FCC	6(T1), 5(T2)
24-26	Catalytic processes	Hydrocracking, Hydrotreating	7,9(T1), 5(T2)

27-30	Catalytic processes	Isomerization, Catalytic reforming	10(T1), 5(T2)
30-34	Catalytic processes	Description about alkalization, polymerization	11(T1), 5(T2)
35-37	Treatment of products	Removal of chemical impurities, Treatment of LPG, Gasoline, Treatment of diesel	T1, 4 (T2)
38-39	Lube oil	Lube oil manufacturing	14 (T1)
40-42	Environmental aspects	Environmental aspects of refining	T1, other sources

Plan for Lab experiments

Experiment No	Lab	Experiment Name
Expt-1	petroleum	Determination of pour point of diesel
Expt-2	petroleum	Determination of pour point of kerosene
Expt-3	petroleum	Determination of cloud point of diesel
Expt-4	petroleum	Determination of cloud point of kerosene
Expt-5	petroleum	Determination of flash point of diesel
Expt-6	petroleum	Determination of flash point of kerosene
Expt-7	petroleum	Determination of Reid vapour pressure of gasoline
Expt-8	petroleum	Determination of KV of engine oil using Redwood Viscometer
Expt-9	petroleum	Determination of calorific value of diesel using bomb calorimeter
Expt-10	petroleum	Determination of aniline point of diesel
Expt-11	petroleum	Determination of aniline point of kerosene
Expt-12	petroleum	Distillation characteristics of kerosene
Expt-13	petroleum	Distillation characteristics of diesel
Expt-14	petroleum	Distillation characteristics of crude oil
Expt-15	petroleum	Determination of Reid vapour pressure of naphtha

Evaluation Scheme:

EC No.	Evaluation Component	Duration	Marks (%)	Nature of Component	Date of Exam
EC-1	Test-1	1 hr	15	Closed Book	9/9, 2.30--3.30PM
EC-2	Test-2	1 hr	15	Closed Book	24/10, 2.30--3.30PM
EC-3	Seminars	-	5	**Open** Book	
EC-4	Lab experiments		35	**Open book**	
EC-5	Comprehensive Exam	3 hrs	30	Closed Book	05/12 FN

- **Closed Book Test:** No reference material of any kind will be permitted inside the exam hall.
- **Open Book Exam:** Any printed material will be permitted. Loose sheets will not be permitted. No exchange of any material will be allowed.
- **Chamber Consultation Hour:** To be announced in the class.
- **Notices:** All notices concerning this course will be displayed in Chem. Engg. Notice Board or CMS
- **Make-up Policy:** Make-up for the test may be granted with prior permission from Instructor-in-charge.

Srikanta Dinda

Instructor-in-Charge of CHE G617