

DEPARTMENT OF CHEMICAL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I						
Course Title	PETROLEUM AND PETROCHEMICAL ENGINEERING					
Course Code	CLPE10	No. of Credits	L	T	P	C
			3	0	0	3
Course Code of Pre-requisite subject(s)	NONE					
Session	JULY 2018	Section	Vth Semester B.Tech., Chemical Engineering			
Name of Faculty	Dr.P.Kalaichelvi and DR.T.Sivasankar	Department	Chemical Engineering			
Email	kalai@nitt.edu and ssankar@nitt.edu	Telephone No.	0431-2503110 and 2503131			
Name of other Coordinator(s) (if, applicable)	--					
E-mail	--	Telephone No.	--			
Course Type	Programme Elective					
Syllabus (approved in BoS)						
<p style="text-align: center;">Syllabus approved in BOS for students admitted from 2015-16 onwards.</p> <p>Introduction & primary processing: Origin & formation of crude oil, Classification of crude, Characterization of crude, Distillation practise, Atmospheric distillation, Vacuum distillation.</p> <p>Secondary Processing: FCCU, Hydro cracking, Visbreaking, Coking, Reforming, Alkylation, Isomerisation and polymerization processes.</p> <p>Treatment Techniques: Physical & chemical impurities in petroleum fractions, General mechanisms for removal of Sulphur, Treatment of LPG, Gasoline, Kerosene, Diesel and Lube oils. Properties of ATF and Bitumen.</p> <p>Petrochemical: Building blocks, intermediates, major petrochemicals and their applications, Chemicals from methane and synthesis gas, Chemicals from olefins, Chemicals from aromatics, Synthetic fibres, plastics and rubber.</p> <p>Environment and safety: Gaseous contaminants in refinery - sources & treatment, Process waste water - sources and treatment, Fire hazards –active & passive prevention, Occupational diseases and personal protective equipment, Site selection & plant layout.</p>						
COURSE OBJECTIVES						
(i) To provide introductory knowledge of petroleum refining and corresponding processes. (ii) To provide an insight into petrochemical industry						

COURSE OUTCOMES (CO)	
Course Outcomes (CO)	Aligned Programme Outcomes (PO)
Upon completion of the course, the students will be able to	
1. develop overview of petroleum industry and know about origin, formation, composition and characterization of crude oil	1,2,8,10
2. comprehend primary processing mechanisms of crude to obtain various petroleum cuts	1,3,5,11,12
3. know about secondary conversion techniques and treatment processes in petroleum refinery to get products of desired yield and quality	1,3,5,8,9,10,11,12
4. understand manufacturing processes and applications of various petrochemicals	1,3,5,10,11,12
5. grasp environmental and safety aspects in petroleum refinery and petrochemical industries	1,3,4,5,6,8,10,11,12

COURSE PLAN – PART II

COURSE OVERVIEW

This course provide details on composition, classification of crude oil and recovery of various value added petroleum products and their treatment methods. It also focuses on contaminants generated from petroleum industries and their treatments. Outcome of this course will enable a student to analyze their roll in petroleum based industries.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1.	Week 1	Introduction on crude and origin	Chalk and Talk
2.	Week 1	Formation and drilling methods	Chalk and Talk
3.	Week 1	Classification of crude	Chalk and Talk
4.	Week 2	Characterization of crude	Chalk and Talk
5.	Week 2	Distillation of crude and ADU	Chalk and Talk
6.	Week 2	Vacuum Distillation	Chalk and Talk
7.	Week 3	Need for secondary processing	Chalk and Talk
8.	Week 3	FCCU and Hydrocracking	Chalk and Talk
9.	Week 3	Visbreaking and Coking	Chalk and Talk
10.	Week 4	Reforming and Alkyltion	Chalk and Talk
11.	Week 4	Isomerization and Polymerisation	Chalk and Talk
12.	Week 4	Assignment evaluation – Batch - A	Titles selection

13.	Week 5	Assignment evaluation – Batch - A	Titles selection
14.	Week 5	Assignment evaluation – Batch - A	Titles selection
15.	Week 5	Assignment evaluation – Batch - A	Allotment
		Assessment I	
16.	Week 6	Impurities and Treatment Techniques	Chalk and Talk
17.	Week 6	removal of Sulphur and Treatment of LPG	Chalk and Talk
18.	Week 6	Gasoline, Diesel treatment	Chalk and Talk
19.	Week 7	Lube oil and Kerosene treatment	Chalk and Talk
20.	Week 7	Properties of ATF and Bitumen.	Chalk and Talk
21.	Week 7	Petrochemical intermediates, Review of Chemicals from methane and synthesis gas	Chalk and Talk
22.	Week 8	Chemicals from olefins and aromatics	Chalk and Talk
23.	Week 8	Synthetic fibres, plastics and rubber.	Chalk and Talk
24.	Week 8	Assignment evaluation – Batch B	Hard copy
25.	Week 9	Assignment evaluation – Batch B	Hard copy
26.	Week 9	Assignment evaluation – Batch B	Hard copy
27.	Week 9	Assignment evaluation – Batch B	Hard copy
		Assessment II	
28.	Week 10	Gaseous contaminants in refinery and sources	Chalk and Talk
29.	Week 10	Treatment of gaseous contaminants	Chalk and Talk
30.	Week 10	Water contaminants and sources	Chalk and Talk
31.	Week 11	Treatment methods of waste water	Chalk and Talk
32.	Week 11	Research on Treatment of waste water	Chalk and Talk
33.	Week 11	Research on Renewable energy	Chalk and Talk
34.	Week 12	Review of course content	Chalk and Talk
35.	Week 12	Discussion on Assignment topics	Chalk and Talk

36.	Week 12	Overall discussion and Feed back collection	Chalk and Talk
		Compensation Assessment	
		Final Assessment	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No	Mode of Assessment	Week/Date	Duration	% Weight age
1	Assessment I	End of 5 th week since commencement	1 hour	20%
2	Assessment II	End of 9 th week since commencement	1 hour	20%
3	Assessment III – (Assignment)	In between the course as mentioned in the course plan	Hard copy submission	20 % (Average)
4	CPA Compensation Assessment	After 12 th week	1 hour	20%
5	Final Assessment*	At the end of Course	3 hours	40%

*mandatory; refer to guidelines on page 4

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc
REFERENCE BOOKS

1. W.L. Nelson, "Petroleum Refinery Engineering", 4th Edn., McGraw Hill, New York, 1985
2. B. K. Bhaskara Rao, "Modern Petroleum Refining Processes", 5th Edn., Oxford and IBH Publishing Company, New Delhi, 2012.
3. G. D. Hobson and W. Pohl., "Modern Petroleum Technology", John Wiley & sons Pblishers, 4th Edn. 2004.
4. R. A. Meyers, "Hand book of Petroleum Refining Processes", McGraw Hill, 3rd Edn. 2003.

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

- 1) Feed back is planned to be collected thrice; At class committee meetings during the assessment period and one at the end of course as soon as classes are over.
- 2) The academic performance of the students will be assessed based on **Two** assessments by written test (each 20 marks), Assignment Presentation (10 marks) during the course and **One** final assessment (50 marks) at the end of course.
- 3) Suitable mapping of COs with POs will be made and attainment will be calculated.

COURSE POLICY (preferred mode of correspondence with students, policy on attendance, compensation assessment, academic honesty and plagiarism etc.)
MODE OF CORRESPONDENCE (email/ phone etc)

Email: kalai@@nitt.edu

ATTENDANCE

➤ A uniform attendance policy for all courses is recommended. **At least 75% attendance in**

each course is mandatory.

- [Faint text]
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

COMPENSATION ASSESSMENT

One Compensation assessment will be conducted only for absentees in either the Assessments or Assignment tests under Medical or Institute related activities.

ACADEMIC HONESTY & PLAGIARISM

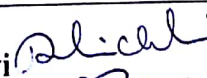
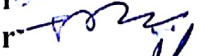
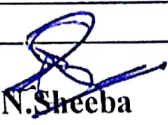
- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee constituted with the faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

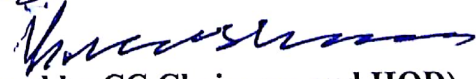
The policy against academic dishonesty shall be applicable for the current batches also.

ADDITIONAL INFORMATION

The Course Coordinator is available for consultation and Queries may also be emailed to the Course Coordinator directly at kalai@nitt.edu and ssankar@nitt.edu

FOR APPROVAL

Course Faculty: Dr.P.Kalaichelvi 
Dr.T.Sivasankar  CC-Chairperson: Dr.K.N.Sheeba 

HOD: Dr.P.Sivashanmugam  (Approved by CC Chairman and HOD)