

Course Title: SEC-Fuel chemistry <i>w.e.f. the session 2024-25 and onwards</i>	
Class: B.Sc. Pt.-III / Semester-VI	Course code: BCH-S-601
Lectures: 30	Credits: 04
MM:70	Exam Hrs:03

NOTE: The question paper shall consist of Two sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer (about 150 words) type questions of SIX marks each and student shall be required to attempt any five questions. Sec.-B shall contain 08 descriptive type questions of TEN marks each and student shall be required to attempt any four questions. Both sections shall have questions from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Note: Review part is for refreshing the student about the basic concept, No question should be asked from this portion.

Course Contents:

Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value.

Coal: Uses of coal (fuel and non-fuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water gas—composition and uses. Fractionation of coal tar, uses of coal tar based chemicals, requisites of a good metallurgical coke, Coal gasification (Hydrogasification and Catalytic gasification), Coal liquefaction and Solvent Refining.

Petroleum and Petrochemical Industry: Composition of crude petroleum, Refining and different types of petroleum products and their applications.

Fractional Distillation (Principle and process), Cracking (Thermal and catalytic cracking), Reforming Petroleum and non-petroleum fuels (LPG, CNG, LNG, bio-gas, fuels derived from biomass), fuel from waste, synthetic fuels (gaseous and liquids), clean fuels. Petrochemicals: Vinyl acetate, Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene (only structure and use).

Lubricants: Classification of lubricants, lubricating oils (conducting and non-conducting) Solid and semisolid lubricants, synthetic lubricants.

Properties of lubricants (viscosity index, cloud point, pour point) and their determination.

Reference Books:

- E. Stocchi: Industrial Chemistry, Vol -I, Ellis Horwood Ltd. UK.
- P.C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi.
- B.K. Sharma: Industrial Chemistry, Goel Publishing House, Meerut.

Course Objectives:

1. To deliver the knowledge on the classification of fuels from fossil, natural and synthetic origin and their uses.
2. To deliver knowledge about the carbonization process, formation of coke/charcoal.
3. To provide knowledge about Petroleum and Petrochemical Industry
4. To provide knowledge about fuel from waste, synthetic fuels and clean fuels.
5. To impart the knowledge on the lubricants and their type.

Course Outcomes (COs):

CO1. Students would be able to understand the different types of fuels obtained from renewable, non-renewable and synthetic sources.

CO2. Classify the various types of fuels like liquid, solid and gaseous fuels available.

CO3. After gaining the knowledge about the fuels, the students will be able to aware the society about the importance of fuels in their lives and prompt them to limit the uses of fuel.

CO4. Importance of fuels from the renewable sources and more utilization of them will be a better way to save the non-renewable fuel sources and this was clearly understood by the students after the study of the course.

CO5. Knowledge on various types of fuels such as coal, petroleum and non-petroleum could be gained by the students and also the knowledge about the petrochemicals and their uses was also enhanced after studying the course.

CO6. Knowledge on lubricants and their applications and properties was also imparted between the students.

CO7. The various properties of lubricants such as pore point, viscosity index etc. and their determination can be understood by the students after the completion of the course.

Mapping of course Outcomes (COs) with program outcomes (POs)

Course Outcomes/Program outcomes	1	2	3	4	5	6	7	8
CO1	X			X				
CO2	X				X			X
CO3				X				
CO4		X		X	X			
CO5	X			X				X
CO6	X	X						X
CO7	X	X						X

Note: put 'X' in relevant column of the mapping