COURSE TITLE	**ENGINEERING CHEMISTRY II**
COURSE CODE	**01CH1306**
COURSE CREDITS	**4**

Objective:

1 To learn various reaction mechanisms, preparation and properties of organic compounds that will be a precursor for the study on Chemical Reaction Engineering.

Course Outcomes: After completion of this course, student will be able to:

1 Understand the basic chemistry of organic compound.

2 Compare the physical and chemical properties of various organic compound and their derivatives.

3 Learn the laboratory scale preparation method of various organic compound and their derivatives.

4 Apply the various concepts in processing of chemical industries viz., food, oils, fats, waxes and dyes

Pre-requisite of course: None

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Basic introduction to organic chemistry** Reactive intermediates– carbocations,, carbanions, carbon radicals, carbenes; their generation, Structure activity relationship in organic molecules: Use of bond length and bond energies to explain the reactivity of functional groups. , Acidity & basicity values for organic molecules such as alkynes, alcohols, acids, ketones, amines	9
2	**Introduction, Preparation and Properties of Aliphatic compound:** Aliphatic compounds, Alkane, Alkene, Alkyne, Aliphatic alcohol, Aliphatic halides, Aliphatic carboxylic acid and its derivatives	10
3	**Introduction, Preparation and Properties of Aromatic compound** Aromatic hydrocarbons,, Aromatic halogen compounds, Phenol, Nitro and amino aromatic compound, Heteroaromatic compounds	10

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Contents : Unit	Topics	Contact Hours
4	**Oils, Fats, Waxes and Dyes** Introduction to Lipids Fatty Acids, Saturated and Unsaturated Fatty Acids, Cis and Trans Unsaturated Fatty Acids Waxes: Introduction, Extraction of Oils, Fats and Waxes Physical and Chemical Reactions of Oils, Fats and Waxes Analysis of Oils, Fats and Waxes Uses of Oils, Fats and Waxes, Dyes: Color Sensation Color and Chemical Constitution: Chromophore- Auxochrome Theory, Nomenclature, Classification and Synthesis of Dyes	9
Total Hours		**38**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Experiment 1** Qualitative analysis of Primary and secondary alcohol.	2
2	**Experiment 2** Qualitative analysis of carboxylic acid group.	2
3	**Experiment 3** Qualitative analysis of halides.	2
4	**Experiment 4** Determination of unsaturated aliphatic hydrocarbon	2
5	**Experiment 5** Determination of aldehydes and ketones	2
6	**Experiment 6** Qualitative analysis of phenol	2
7	**Experiment 7** Analysis of oils	2
8	**Experiment 8** Analysis of fats	2
9	**Experiment 9** Preparation of any dye	2
10	**Experiment 10** Separation of volatile liquid components by distillation	2
11	**Experiment 11** Separation of two immiscible liquid by separating funnel	2
12	**Experiment 12** Determination of sulfur content in organic compound	2
13	**Experiment 13** Determination of nitrogen content in organic compound	2
14	**Experiment 14** Determination of distribution coefficient of benzoic acid between water and toluene	2
Total Hours		**28**

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Textbook :

1 “A textbook of organic chemistry”, Tewari, K. S., & Vishnoi, N. K,, Vikas Publishing House,, 1976

2 “Textbook of organic chemistry”, , Soni, P. L.,, Sultan Chand, ., 1983

References:

1 “Practical organic chemistry”, “Practical organic chemistry”, Vogel, A. I., Longmans,, 1956

2 “Organic Chemistry”, “Organic Chemistry”, J. E., & Learning, C., Brooks/Cole, 2012

Suggested Theory Distribution:

The suggested theory distribution as per Bloom’s taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking / Creative**
20.00	30.00	25.00	15.00	10.00	0.00

Instructional Method:

1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

1 https://nptel.ac.in/courses/104106119

2 https://nptel.ac.in/courses/104103071

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