

SRM Institute of Science and Technology

Faculty of Engineering and Technology

Department of Chemical Engineering

Course Code & Title: **15CH201 Industrial Organic Chemistry**

Course Strategy Description

Course description:

This course aims to acquire basic knowledge of the chemistry of important organic compounds that will provide the basis for their industrial production methods

Compulsory/Elective course: Compulsory for B.Tech. Chemical Engineering

Credit hours: 3 credits

Course coordinator(s): Dr.A.Sowmya, Research Associate, Department of Chemical Engineering

Instructor(s):

Name of the instructor	Room number	Email (@ktr.srmuniv.ac.in)	Consultations (day order/periods)
Dr. A. Sowmya	B301	sowmya.a	Day – 1 and 3

Relationship to other courses

Course category: Professional core

Prerequisite: Nil

Co-requisites: Nil

Text book(s) and/or required materials:

1. Tewari K.S., Vishnoi N.K., A Text Book of Organic Chemistry, Vikas Publishing House Pvt. Ltd., New Delhi, 3rd Edition, 2006, ISBN-13: 9788125918578

Reference book(s):

2. Morrison R.T., and Boyd R, “Organic Chemistry” 7thEdn., Pearson Education, 2010, ISBN-13: 9788131704813

Class schedule: F Slot; Three 50 minutes lecture sessions per week, for 15 – 16 weeks

DAY ORDER: HOUR	TIMING
DAY – 1	9.45 AM – 11.30 AM (Batch 1) 2.20 PM – 4.05 PM (Batch 2)
DAY – 3	10.40 AM – 11.30 AM (Batch 1) 3.15 PM – 4.05 PM (Batch 2)

Instructional Objectives (IOs) and Student Outcomes (SOs)

S.No.	Instructional Objectives	Student Outcomes				
		a				
1.	Organometallic Compounds: Understand the significance of these compounds and devise reactions for synthesis of various organic compounds	a				
2.	Understand the structure, classification and chemistry of an important class of organic compounds which find application in chemical processing industries: food, oils, fats and waxes	a				
3.	Understand the structure, classification and chemistry of an important class of organic compounds which find application in chemical processing industries: dyes and heterocyclic compounds used in pharmaceutical industries.	a				

Teaching plan

Section	Topics	L / T	Text book/chapter	IOs	SOs	Problem solving (Y/N)
Unit – I: REACTIONS AND REAGENTS		9				
1.	Organometallic compounds – Introduction, Nature and Properties	1	[1] Unit XVII Chapter 27	1	a	N
2.	Grignard reagents: Synthesis, Properties and Structure	2	[1] Unit XVII Chapter 27	1	a	N

3.	Nucleophilic Substitution and Addition Reactions	3	[1] Unit XVII Chapter 27	1	a	N
4.	Reactive Methylene Compounds: Acetoacetic Acid Ester and Malonic Acid Ester	3	[1] Unit XX Chapter 32	1	a	N
UNIT II: CARBOHYDRATES		9				
5.	Carbohydrates I: Introduction, Classification, Monosaccharides Oligosaccharides, D and L notation, Configuration of Aldoses and Ketoses, Epimers, Fisher Projection, Haworth Projection of Monosaccharides, Anomers	3	[1,2]	2	a	Y
6.	Carbohydrates II: Reactions - Alkylation, Acylation, Glycosides Anomeric Effect, Mutarotation, Ring Size Determination, Reducing and Non-Reducing Sugars, Types of Glycosidic linkages Polysaccharides: Starch and Cellulose	3	[1,2]	2	a	Y
7.	Carbohydrates III: Reactions - Epimerization, Ene-diol Rearrangement, Reduction, Oxidation, Osazone Formation, Ruff's degradation, Killiani Fisher Synthesis	3	[1,2]	2	a	Y
UNIT III: AMINO ACIDS, PEPTIDES AND PROTEINS		9				
8.	Introduction to Amino Acids, Peptides and Proteins Classification of Amino Acids: Proteogenic Alpha-Amino Acid Structure, Beta-Amino Acids etc. Acid-Base Properties: Zwitterionic Properties, Isoelectric Point, Separations: Electrophoresis, Ion-Exchange Chromatography, Reactions: Amino and Carboxylic Acid Groups Synthesis of Alpha- Amino Acids: Methods	6	[1,2]	2	a	N
9.	Peptides: Peptide Bond Structural of Peptides: Classification based on Primary, Secondary etc, Planarity of Peptide Bond Peptide Sequencing: Sanger, Edman, C-terminus Enzyme Based	2	[1,2]	2	a	N
10.	Proteins: Structure-Property Relationship: Fibrous and Globular Peptides etc. Synthesis of Peptides and Proteins: Protection of Groups, Merrifield Solid-Phase Synthesis Method Denaturation of Proteins	1	[1,2]	2	a	N
UNIT IV: OILS, FATS, WAXES AND DYES		9				
11.	Introduction to Lipids Fatty Acids, Saturated and Unsaturated Fatty Acids, Cis and Trans Unsaturated Fatty Acids Waxes: Introduction	1	[1,2]	2	a	N

12.	Soaps, Detergents and Micelles Occurrence and 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	2	[1,2]	2	a	N
13.	Dyes: Color Sensation Color and Chemical Constitution: Chromophore- Auxochrome Theory etc.	2	[1]	2,3	a	N
14.	Nomenclature, Classification and Synthesis of Dyes	4	[1]	2,3	a	N
UNIT V: HETEROCYCLIC COMPOUNDS AND PHARMACEUTICAL CHEMISTRY		9				
15.	Heterocyclic Compounds: Introduction and Nomenclature Structure-Activity and nomenclature: Definition of Heteroatom and Heterocyclic Compound	2	[1]	3	a	N
16.	Classification, Preparation and Properties of Heterocyclic compounds: Five member – Furan, Thiophene and Pyrrole Six member – Pyridine, Pyrimidine Fused Heterocyclic Compounds – Indole, Quinoline	5	[1]	3	a	N
17.	Synthesis of Antimalarial Drugs (Quinine, Primaquine, Chloroquine) and Antibacterial Drugs (Sulfanilamide, Sulphapyridine)	2	[1]	3	a	N

Evaluation methods

S.NO.	Test	Topics covered	Marks	Test/Exam duration (min)
1.	Cycle test – I	Unit I and II	15	100
2.	Cycle test – II	Unit III, IV and V	25	180
3.	Surprise test	Questions from any units	5	20
4.	Assignment	Questions from any units	5	-
5.	Final exam	All the units	50	180

Surprise test

The surprise test will not be announced. The questions for this test will be covered until the previous class.

Home assignments

A few units will have home assignment. All the assignments should be submitted on or before the last date of submission.

Teaching Methodology

Chalk and talk for the entire course

Prepared by: Dr. M. P. Rajesh, Professor & Head, Department of Chemical Engineering

Dated:

Revision no.: 0

Date of revision:

Revised by:-

Course Coordinator

Academic Coordinator

HoD/Chemical