

Koyana Education Society's
Balasaheb Desai College, Patan
Department of Chemistry
Monthly Teaching Plan Year-2023-2024
Jun – 2023 Semester- I

Name of the Teacher- Mr. Shivhar Balaji Ambegave

Date	Unit	Sub unit	Teaching Method Aids
B.Sc.-I			
21/06/2023	Unit III: Aromaticity	Introduction, Characteristics properties of aromatic compounds	Inductive & Deductive
28/06/2023		Meaning of terms: Aromatic, Non-aromatic, Antiaromatic, Pseudoaromatic	Lecture
B.Sc.-III			
22/06/2023	Unit I: Introduction to Spectroscopy	Meaning of spectroscopy, Nature of electromagnetic radiation: wavelength, frequency, energy, amplitude, wave number and their relationship.	Lecture
M.Sc.-I			
23/06/2023	Unit I: (A) Reaction Mechanism: Structure and Reactivity	Introduction and Types of reactions	Lecture
27/06/2023		Generation, structure, stability and reactivity of carbenes	Lecture
30/06/2023		Generation, structure, stability and reactivity of arynes	Lecture
M.Sc.-II			
19/06/2023	UNIT-I: Hyphenated Techniques	Introduction and Meaning of spectroscopy	Lecture
26/06/2023		UV-Visible Spectroscopy	Lecture
20/06/2023		Infrared Spectroscopy	Lecture
27/06/2023		¹ H-NMR (Recapitulation)	Lecture

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Department of Chemistry
Monthly Teaching Plan Year-2023-2024
July – 2023 Semester- I

Name of the Teacher- Mr. Shivhar Balaji Ambegave

Date	Unit	Sub unit	Teaching Method Aids
B.Sc.-I			
05/07/2023	Unit III: Aromaticity	Classification of aromatic compounds	Inductive & Deductive
12/07/2023		Structure of Benzene	Lecture
19/07/2023		Kekule structure Modern theory of Aromaticity	Lecture
26/07/2023		Resonance structure	Lecture
B.Sc.-III			
22/07/2023	Unit I: Introduction to Spectroscopy	Meaning of spectroscopy, Nature of electromagnetic radiation: wavelength, frequency, energy, amplitude, wave number and their relationship.	Lecture
06/07/2023		Different units of measurement of wavelength and frequency, Different regions of electromagnetic radiations, Interaction of radiation with matter: absorption, emission, fluorescence and scattering.	Lecture
13/07/2023		Types of spectroscopy and advantages of spectroscopic methods, Energy types and energy levels of atoms and molecules.	Lecture
20/07/2023	Unit 2. UV-visible Spectroscopy	Introduction	Lecture
27/07/2023		Beer-Lambert's law	Lecture
M.Sc.-I			
04/07/2023	Unit I: (A) Reaction Mechanism: Structure and Reactivity	Generation, structure, stability and reactivity of nitrenes.	Lecture
07/07/2023		Effect of structure on reactivity.	Lecture
11/07/2023		Resonance and field, steric effects.	Lecture
14/07/2023		Thermodynamic and Kinetic requirements	Lecture
18/07/2023		Introduction to Kinetic and Thermodynamic control reaction.	Lecture
21/07/2023	Unit I: (B) Aliphatic Nucleophilic substitutions	The SN ₂ , SN ₁ and SN _i reactions with respects to mechanism and stereochemistry	Lecture
25/07/2023		Nucleophilic substitutions at an allylic,	Lecture

28/07/2023		aliphatic trigonal, benzylic, and vinylic carbons	Lecture
M.Sc.-II			
03/07/2023	UNIT-I: Hyphenated Techniques	¹³ CNMR	Lecture
04/07/2023		¹³ CNMR	Lecture
10/07/2023		¹³ CNMR	Lecture
11/07/2023		¹³ CNMR	Lecture
17/07/2023		Mass spectrometry	Lecture
18/07/2023		Basic fundamentals of mass spectrometry	Lecture
24/07/2023		ionization	Lecture
25/07/2023		ionization	Lecture

Koyana Education Society's
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Department of Chemistry
Monthly Teaching Plan-Year-2023-2024
August – 2023 Semester I, III & V

Name of the Teacher- Mr. Shivhar Balaji Ambegave

Dates	Unit	Sub unit	Teaching Method Aids
B.Sc.-I			
02/08/2023	Unit III: Aromaticity	M.O. picture	Lecture
09/08/2023		Mechanism of Electrophilic substitution reactions	Lecture
16/08/2023		Nitration	Lecture
23/08/2023		Sulphonation	Lecture
30/08/2023		Halogenation reaction	Lecture
B.Sc.-III			
03/08/2023	Unit 2. UV-visible Spectroscopy	absorption of UV radiation by organic molecules leading to different excitations.	Lecture using ICT
10/08/2023		Terms used in UV Spectroscopy: Chromophore	Lecture
17/08/2023		Auxochrome	Lecture
24/08/2023		Bathochromic shift, hypsochromic shift,	Lecture
31/08/2023		hyperchromic and hypochromic effect.	Lecture
M.Sc.-I			
01/08/2023	Unit I: (B) Aliphatic Nucleophilic Substitutions	Reactivity effect of substrate structure, effect of attacking nucleophiles,	Lecture
04/08/2023		leaving groups and reaction medium	Lecture
08/08/2023		SN reactions at bridge head carbon, competition between SN1 and SN2	Lecture
11/08/2023		Ambident nucleophiles, Neighbouring Group Participation	Lecture
18/08/2023	UNIT-III: (A) Elimination Reactions	The E1, E2 and E1cB mechanisms	Lecture
22/08/2023		Orientation in Elimination reactions.	Lecture
25/08/2023		Hofman versus Saytzeff elimination	Lecture
29/08/2023		Reactivity: effects of substrate structures, attacking base, the leaving group, the nature of medium on elimination reactions.	Lecture
M.Sc.-II			
01/08/2023		advanced organic analysis	Lecture
07/08/2023		advanced organic analysis	Lecture
08/08/2023		Problems related to structure determination	Lecture
14/08/2023		Problems related to structure determination	Lecture

21/08/2023		applications of spectroscopic techniques	Lecture
22/08/2023		applications of spectroscopic techniques	Lecture
28/08/2023		analytical tools	Lecture
29/08/2023		analytical tools	Lecture

Koyana Education Society's
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Department of Chemistry
Teaching Plan

September- 2023 Semester I , III & V

Name of the Teacher- Mr. shivhar Balaji Ambegave

Dates	Unit	Sub unit	Teaching Method Aids
B.Sc.-I			
06/09/2023		Friedel - Crafts reaction	Lecture
13/09/2023		Examples on nitration, Sulphonation	Lecture
20/09/2023		and halogenation reactions	Lecture
27/09/2023	Unit IV: Heterocyclic Compounds	Introduction	Lecture
B.Sc.-III			
07/09/2023	Unit 2. UV-visible Spectroscopy	Modes of electromagnetic transitions.	Lecture
14/09/2023		Modes of electromagnetic transitions.	Lecture
21/09/2023		Effect of conjugation on position of UV band	Lecture
M.Sc.-I			
01/09/2023	UNIT-III: (A) Elimination Reactions	Pyrolytic elimination reactions	Lecture
05/09/2023	UNIT-III: (B) Study of following reactions	Mechanism of condensation reaction involving enolates	Lecture
08/09/2023		Benzoin condensation reaction	Lecture
12/09/2023		Stobbe condensation reaction	Inductive, Deductive
15/09/2023		Robinson annulation reaction	Lecture
22/09/2023		Simon-Smith Reaction	Lecture
26/09/2023		Vilhmann Reaction	Lecture
29/09/2023		Mc-Murry Reaction	Lecture
M.Sc.-II			
04/09/2023	UNIT – III: (A) Clinical Analysis	Biological significance	Lecture
05/09/2023		analysis of assay of enzymes pepsin, monoamine, oxidase, tyrosinase	Lecture
11/09/2023			Lecture
12/09/2023			Lecture
18/09/2023		Composition and detection of abnormal level of certain constituents leading to diagnosis of diseases.	Lecture
25/09/2023			Lecture
26/09/2023			Lecture

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October-2023 Semester I, III & V

Name of the Teacher- Mr. Shivhar Balaji Ambegave

Dates	Unit	Sub unit	Teaching Method Aids
B.Sc.-I			
04/10/2023	Unit IV: Heterocyclic Compounds	Classification and Nomenclature of heterocyclic compounds	Lecture
11/10/2023		Nitrogen Heterocycles	Lecture
18/10/2023		Pyrrrole: - Introduction	Lecture
25/10/2023		Synthesis, Physical and chemical properties	Lecture
B.Sc.-III			
05/10/2023	Unit 2. UV-visible Spectroscopy	Calculation of λ_{max}	Inductive & Deductive
12/10/2023		Woodward and Fischer rules for dienes and enones.	Lecture
19/10/2023		Colour and visible spectrum.	Lecture using ICT
26/10/2023		Applications of UV Spectroscopy.	Lecture
M.Sc.-I			
03/10/2023	UNIT-III: (B) Study of following reactions	Prins and Wurtz-Fittig reaction	Lecture
06/10/2023		Hunsdiecker reaction	Lecture
10/10/2023		Pummerer reaction	Lecture
13/10/2023		Rupe rearrngment	Lecture
17/10/2023		Gabriel–Colman Synthesis	Lecture
20/10/2023		Corey-Chaykovsky reaction	Lecture
27/10/2023		Nef reaction, Passerini reaction	Lecture
31/10/2023		Baylis-Hilman reaction, Mitsunobu Reaction	Lecture
M.Sc.-II			
03/10/2023	UNIT – III: (A) Clinical Analysis	Sample collection and preservation of physiological fluids,	Lecture
09/10/2023		analytical methods to the constituents of physiological fluids (blood, urine and serum) Blood- Estimation of glucose, cholesterol urea, hemoglobin and bilirubin	Lecture using ICT
10/10/2023		Urine- urea, uric acid, creatinine, calcium, phosphate, sodium potassium and chloride.	Lecture
16/10/2023	UNIT – III: (B) Body fluid analysis	Composition and detection of abnormal level of certain constituents leading to diagnosis	Lecture

		of diseases.	
17/10/2023		Sample collection and preservation of physiological fluids, analytical methods to the constituents of physiological fluids	Lecture
23/10/2023		(blood, urine and serum) Blood- Estimation of glucose	Lecture
30/10/2023		cholesterol, urea, hemoglobin and bilirubin Urine- urea, uric acid	Lecture
31/10/2023		creatinine, calcium, phosphate, sodium, potassium and chloride.	Lecture

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Monthly Teaching Plan-Year-2023-2024
December – 2023 Semester –II, IV & VI

Name of the Teacher- Mr. Shivhar Balaji Ambegave

Dates	Unit	Sub unit	Teaching Method Aids
B.Sc.-II			
06/12/2023	Unit 1: Carboxylic Acids and Their Derivatives	Monocarboxylic acid: Introduction, Methods of Formation from Alcohols, Aldehydes, Ketones, Nitriles and Alkyl benzenes.	Inductive & Deductive
13/12/2023		1.2 Halo acids: a) Synthesis of halo acids- Mono, Di, Tri- chloro acetic acid by HVZ reaction b) Reactions - Substitution reaction of Monochloro acetic acid by Nucleophile OH ⁻ , I ⁻ , CN ⁻ and NH ₃	Lecture
20/12/2023		1.3 Hydroxy acids: Citric acid a) Methods of formation of Citric acid from glycerol.	Lecture
27/12/2023		b) Chemical Reactions: Reaction of citric acid: acetylation by acetic anhydride, reduction by HI, action of heat.	Lecture
B.Sc.-III			
07/12/2023	Unit 1. Reagents and Reactions in Organic Synthesis	I] Reagents Preparation and Applications of following reagents.	Inductive & Deductive
14/12/2023		A) Oxidizing reagents a) Osmium tetroxide. b) Selenium dioxide (SeO ₂).	Lecture using ICT
21/12/2023		B) Reducing reagents a) Lithium Aluminum Hydride LiAlH ₄ .	Lecture
28/12/2023		b) Raney Nickel.	Lecture
M.Sc.-I			
1/12/2023	UNIT-II: A) Hydroboration	Various hydroborating agents their mechanism and synthetic applications	Lecture
05/12/2023		viz 9-borabicyclo- [3.3.1]nonane (9-BBN),	Lecture
08/12/2023		thexylborane, H B diisoamylborane.	Lecture
12/12/2023		(Sia ₂ BH) BH ₃ •SMe ₂ . (BMS)	Lecture
15/12/2023		Borane as reducing agent.	Lecture using ICT

19/12/2023	B) Enamins	Formation, reactivity and synthetic applications of enamines	Lecture
22/12/2023	C) Oxidation	Applications of oxidizing agents like chromium trioxide,	Lecture
26/12/2023		manganese dioxide,	Lecture
29/12/2023		Woodward- Prevost hydroxylation,	Lecture
M.Sc.-II			
04/12/2023	UNIT-II: Advanced Liquid Chromatographic Techniques	High Performance Liquid Chromatography (HPLC)	Inductive & Deductive
05/12/2023		Ultra Performance Liquid Chromatography (UPLC)-Principle	Lecture
11/12/2023		instrumentation, mobile phase	Lecture
12/12/2023		Stationary support in HPLC	Lecture
18/12/2023		detectors and applications	Lecture
19/12/2023		Super critical fluid chromatography (SCFC),	Lecture using ICT
25/12/2023		characteristics, instrumentation and applications.	Lecture
26/12/2023		Comparison of HPLC and GLC with SCFC.	Lecture

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Monthly Teaching Plan-Year-2023-2024
January – 2024 Semester – IV & VI

Name of the Teacher- Mr. Shivhar Balaji Ambegave

Dates	Unit	Sub unit	Teaching Method Aids
B.Sc.-II			
03/01/2024	Unit 1: Carboxylic Acids and Their Derivatives	1.4 Di carboxylic acids: a) Introduction b) Method of formation of succinic acid from ethylene dibromide, maleic acid c) Chemical Reactions: Action of heat, Action of NaHCO3, C2H5OH in presence of acid.	Lecture
10/01/2024		d) Method of formation Phthalic acid from o-xylene and Naphthalene e) Chemical Reactions of Phthalic acid: Action of heat, reaction with sodalime, ammonia.	Lecture
17/01/2024		1.5 Carboxylic acid derivatives: a) Introduction b) Acid halide derivative: Acetyl chloride: i) Synthesis from acid, by action with PCl3 and SOCl2.	Lecture
24/01/2024		ii) Reaction with water, alcohol (Mechanism of esterification is expected) and ammonia.	Lecture
31/01/2024		c) Acid anhydride derivative: i) Synthesis of acetic anhydride by dehydration of acetic acid. ii) Reactions with water, alcohol and ammonia.	Lecture Using ICT
B.Sc.-III			
04/01/2024	Unit 1. Reagents and Reactions in Organic Synthesis	II] Name Reactions Statement, General Reaction, Mechanism and Synthetic applications of following reactions....	Lecture
11/01/2024		Diels -Alder reaction.	Lecture
18/01/2024		Meerwein –Pondorff-Verley reduction. Hofmann rearrangement	Lecture
25/01/2024		Wittig reaction. Wagner- Meerwein rearrangement. Baeyer Villiger oxidation	Lecture
M.Sc.-I			
02/01/2024	UNIT-II:	Chloranil,	Lecture

05/01/2024		hydrogen peroxide	Lecture
09/01/2024		Swern oxidation. PCC (Corey’s reagent),	Lecture
12/01/2024		PDC (Cornforth reagent)	Lecture
16/01/2024		Baeyer-Villiger oxidation.	Lecture
19/01/2024	UNIT-III: A) Reductions	Study of following reductions- Catalytic hydrogenation using homogeneous and heterogeneous catalysts.	Lecture
23/01/2024			Lecture
30/01/2024			Lecture
M.Sc.-II			
02/01/2024	UNIT-II: Advanced Liquid Chromatographic Techniques	Liquid Chromatography-Mass Spectrometry interface	Lecture
08/01/2024		instrumentation, advantages and applications.	Lecture
09/01/2024		Practical applications and examples in analytical chemistry and research.	Lecture
15/01/2024	UNIT – II: Food and Food Additive Analysis	Food flavors, food colors,	Lecture
16/01/2024	A) Food Analysis	food preservatives	Lecture
22/01/2024		analysis of milk and milk products, adulterants in milk and their identification, analysis of honey, jam and their major component	Lecture
23/01/2024		Practical applications and examples in analytical chemistry and research.	Lecture
29/01/2024	B) Food Additive Analysis	Additives in animal food stuff:	Lecture
30/01/2024		Antibiotics: penicillin, chlorotetracyclin,	Lecture

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Monthly Teaching Plan-Year-2023-2024

February – 2024 Semester – II , IV & VI

Name of the Teacher- Mr. Shivhar Balaji Ambegave

Dates	Unit	Sub unit	Teaching Method Aids
B.Sc.-II			
07/02/2024	Unit 4: Carbonyl Compounds- Aldehydes and Ketones	4.1 Introduction, Nomenclature of aliphatic and aromatic aldehydes and ketones. 4.2 Structure and reactivity of Carbonyl group.	Lecture
14/02/2024		4.3 Reactions of Carbonyl Compounds- Mechanism and applications of ----- i) Aldol condensation, ii) Claisen and Benzoin Condensation	Lecture
20/02/2024		iii) Perkins reaction, iv) Cannizaros reaction,	Lecture
28/02/2024		v) Knoevenagel condensation and vi) Reformatsky reaction.	Lecture
B.Sc.-III			
01/02/2024	Unit 3. Electrophilic addition to $>C=C<$ and $-C\equiv C-$ bonds	A. Addition to Carbon-Carbon double ($>C=C<$) bond: 3.1 Introduction. 3.2 Examples of addition reactions. 3.3 Mechanism of electrophilic addition to $>C=C<$ bond, orientation & reactivity, i. Hydrohalogenation. ii. Anti-Markovnikoff's addition (peroxide effect). iii. Rearrangements (support for formation of carbocation).	Lecture
08/02/2024		iv. Addition of halogens. v. Addition of water. vi. Addition of hypohalous acids ($HO-X$). vii. Hydroxylation (formation of 1,2-diols). viii. Hydroboration-oxidation (formation of alcohol). ix. Hydrogenation (formation of alkane).	Lecture

		x. Ozonolysis (formation of aldehydes & ketones).	
15/02/2024	B. Addition to Carbon-Carbon triple ($-C\equiv C-$) bond:	3.4 Introduction. 3.5 Examples of addition reactions. 3.6 Mechanism of electrophilic addition to $-C\equiv C-$ bond.	Lecture using ICT
22/02/2024		i. Addition of halogens. ii. Addition of halogen acids. iii. Addition of hydrogen.	Lecture
29/02/2024		iv. Addition of water. v. Formation of metal acetylides.	
M.Sc.-I			
02/02/2024	UNIT-III: A) Reductions	Study of following reducing reagents and reactions:	Lecture
06/02/2024		Wolff-Kishner	Lecture
09/02/2024		Birch	Lecture
13/02/2024		Sodium cyano borohydride	Lecture
16/02/2024		Sodium in alcohol, Fe in HCl	Lecture
20/02/2024		Adam's catalyst, Lindlar catalyst, TBTH	Lecture
23/02/2024	B) Protection of functional group	Principle of protection of alcohol, amine	Lecture
27/02/2024		carbonyl and carboxyl groups.	Problem Solving
M.Sc.-II			
05/02/2024	B) Food Additive Analysis	oxytetracyclin in diet supplements	Inductive & Deductive
06/02/2024		Identification and estimation of growth promoting drugs	Lecture
12/02/2024		such as. sulfaquinoxaline, methyl benzoquate	Lecture
13/02/2024		sulfanitran	Lecture
20/02/2024		pyrimethamine	Lecture
26/02/2024		nitrovin	Lecture using ICT
27/02/2024		Nitrofurazone, acinitrazole, etc	Lecture