Digambarrao Bindu Arts, Commerce & Science College, Bhokar, Dist Nanded

Department of Chemistry

Annual Teaching Plan for 2017-2018

Workload Distribution

Class	Teachers Name			
	Mr. S.S. Tiwade		Mr.G.D.Kottapalle	
	Theory	Practical	Theory	Practical
B.Sc. I Sem.-I	Paper-I	Paper-V	Paper-II	Paper-V
B.Sc. I Sem.-II	Paper- III		Paper- IV	
B.Sc. II Sem.-III	Paper-VI	Paper-X	Paper-VII	Paper-XI
B.Sc. II Sem.-IV	Paper-VIII		Paper-IX	
B.Sc. III Sem.-V	Paper-XIII	Paper-XVII	Paper-XII	Paper-XVI
B.Sc. III Sem.-VI	Paper-XV		Paper-XIV	

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COLLEGE CODE 118

Principal

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DIGAMBARRAO BINDU ARTS, COMMERCE & SCIENCE COLLEGE, BHOKAR DIST. NANDED

DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2017-18

Class : B.SC- S.Y.
Title of the Paper & No.: Organic+Inorganic Chemistry VI & VIII
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2017-18			
	Organic+Inorganic Chemistry Paper no.VI Semester-III		
Month	**Course content**	**Expected Periods**	**Actual Periods**
July	**Part I (Organic Chemistry)** **Unit I:Name Reaction with Mechanism** **[A] Condensation reactions of Aldehydes and Ketones.** 1. Benzoin Condensation Reaction.2.KnoevengeI Reaction.3.Mannich Reaction 4.Perkins Reaction 5.Reformatsky reaction. 6.Gatterman Koch reaction. 7.Gatterman synthesis. **[B] Reduction reactions** 1.Clemmensen Reduction Reaction. 2.Meervin□Pondorof Verly reduction reaction. 3.Reduction with LiAlH4. 4.Reduction with NaBH4. **[C] OXIDATION REACTIONS.** 1.Baeyer- Villiger Oxidation Reaction. 2.Oppenauer oxidation.	**10**	**08**
July	**Unit II:Aromatic Carboxylic and Sulphonic Acids.** 1.Introduction and Classification of Aromatic Carboxylic Acids. **[A]** Synthesis and Chemical Reactions of Following Acids. **[B] Benzoic Acid.** 1.Preparations From: (a) Phenyl Cyanide, (b) Toluene. **2.**Reactions of Benzoic Acids: a) Acyl halide formation b) Reduction. C) Nitration. **[C] Anthranilic Acid:** 1. Preparations From : (a) Phthalimide. b) O□nitroToluene. 2. Reactions of Anthranilic Acids: a) Action of heat, b) Nitrous Acid, c) Action of acetic anhydride/acetyl chloride. **[D] Salicylic Acid:** 1. Preparations From: (a) Kolbe's reaction. (b) Reimer□Tiemann reaction. 2. Reactions of Salicylic Acids: a) Bromination, b) Nitration, c) Decarboxylation, d) Reaction with Zn-dust. **[E] Phthalic Acid** 1. Preparations From: (a) o□xylene. (b) Naphthalene. 2. Reactions of Phthalic Acids: a)Action of heat. b) Action of $PC1_5$. C) Action of ethanol. **[F] Benzene Sulphonic Acid.** 1. Introduction. 2. Preparation of benzene sulphonic acid from benzene with mechanism. 3. Chemical Reactions of benzene sulphonic acid, a) Salt formation b) formation of sulphonyl chloride, c) formation of sulphonic ester and amide. 4. Replacement of sulphonic group by: a) Hydroxyl group. b) cyano group, c) Hydrogen atom d) NH_2–group.	**06**	**08**
Aug.	**Unit III:Introduction to Organometallic Compounds.** **1. Organomagnesium Compounds:** 1.Preparation of Methyl magnesium bromide.	**09**	**09**

	c) Reactions in liquid ammonia as solvent : Auto ionization, Acid-Base, Ammonolysis, Precipitation and ammonation. d) Reactions in liquid SO2 : Autoionization, Acid-Base, Solvolysis, Precipitation and Solvation.		
	Organic+Inorganic Chemistry Paper no.VIII Semester-III		
Dec.	**Part I (organic Chemistry)** **Unit-I : Stereochemistry** 1. Introduction 2. Concept and Types of isomerism. (a) Structural isomerism (b) Stereo isomerism. 3. Types of structural isomerisin [Chain, Position, Functional, Metamerism, Tautomerism] 4. Types of Stereoisomerism [Conformational (n-butane) and Configurational] 5. Geometrical isomerism: Cis -Trans and E and Z system of nomenclature. 6. Optical isomerism: a) Concept of asymmetric carbon atom, Chiral centre. b) Dextro and Laevo forms, Racemic mixture. c) Element of symmetry [plane, Centre, and Axis] d) Concept of Diastereoisomers. e) Racemic modification. (with one example) f) Resolution (Concept) (with one example) g) Walden inversion. (with one example) **h)** Relative Configuration and Absolute configuration.[D,L and R,S notations]	**08**	**08**
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Jan.	**Unit:-III:Nitrogen Containing Organic Compounds. A] Aromatic Nitro Compounds.** 1. Introduction, Nomenclature, 2. Preparation of Nitrobenzene from benzene 3. Physical and Chemical properties of Nitrobenzene. 4. Electrophilic substitution reactions. 5. Reductions: a) in acidic medium. b) In neutral medium. c) In alkaline medium. d) Electrolytic reduction. **B] Aromatic amines:** 1) Introduction, Classification, Nomenclature, 2) Methods of preparations of aniline from	**08**	**09**

	f) Extraction of Lanthanides by ion exchange method. g) Applications of Lanthanides. **2. Actinides:** a) Electronic Configuration. b) Properties of Actinides. c) Comparison with Lanthanides. d) Extraction of Uranium from Pitchblend. e) Physical & Chemical Properties of Uranium. f) Separation of Neptunium, Plutonium, Americium from Uranium. g) Nuclear Fuels.		

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DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2018-19

Class : B.SC-F.Y
Title of the Paper & No.: Organic+Inorganic Chemistry I & III
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2018-19		
Organic+Inorganic Chemistry Paper no.I Semester-I		
Month	**Course content**	**Expected Periods**
July	**Unit I: Nomenclature of Organic Compounds:** Functional groups and types of organic compounds, Basic rules of IUPAC Nomenclature, Nomenclature of mono and bi- functional compounds on the basis of priority order of following classes of organic compounds: alkanes, alkenes, alkynes, alcohols, ethers, aldehydes, ketones, carboxylic acid, carboxylic acid derivatives (acid halides, esters, anhydrides, amides), amines; Nomenclature of aromatic compounds: Mono, di and polysubstituted benzene (with not more than two functional groups)	**07**
July	**Unit II: Basic Concepts in Organic Chemistry:** Basic terms: Substrate and Reagents, types of reagents (Electrophilic and Nucleophilic). Notation of arrows: curved arrow, Half headed arrow, double headed arrow, straight arrow. Bond fission: Homolytic and heterolytic fission.Reaction intermediates: Carbocation, Carbanion, Free radical, (Introduction, structure & Stability), carbene, nitrene & benzyne (only introduction).Electron mobility: Inductive effect (effect on acidic strength of alpha substituted acetic acid and α-chloroacetic acid), Mesomeric effect (Aniline and Nitrobenzene), Hyperconjugation (toluene).	**09**
Aug.	**Unit III: Alkanes Alkenes and alkynes:** Alkanes: Introduction, Preparation of alkanes from a) Hydrolysis of Grignard reagent b) Kolbes synthesis. Chemical reaction: a) Pyrrolysis (mechanism), b) aromatization. Alkenes: Introduction, Preparation methods a) But-1-ene from but-1-yne b) But- 2-ene from butan-2-ol.Chemical reactions with mechanism: a) Electrophilic addition of Br2 to ethene b) Electrophilic addition of HBr to propene C) Free radical addition of HBr to propene (Peroxide effect).	**08**
Aug.	**Unit IV: Cycloalkanes, Cycloalkenes and Dienes :** Cycloalkanes: Introduction, Preparation of cycloalkanes from a)Adipic acid b)Aromatic hydrocarbon.Baeyer strain theory and Saches Mohr theory. Ring opening reaction with H2 and HI.Cycloalkenes: Introduction, preparation methods:Dehydration of cyclohexanol ,Dehydrohalogenation of halocyclohexane.Chemical reactions: a) Epoxidation of cyclohexene, b) Allylic halogenations.4.2 Dienes: Introduction, classification & Resonance structures.Preparationmethods of 1,3-butadiene from-a)1,4-dibromobutane, b)1,4-butanediol.Chemical reactions: a) addition of Br2 and HBr to 1,3-butadiene, b) addition of ethene to 1,3-butadiene (Diel's- Alder reaction).	**06**
	Unit V: Periodic Table and Periodic Properties: periodic law, Long form of the periodic table, Sketch, Cause of periodicity, Division of elements in to s, p, d, and f blocks. General characteristics of s, p, d and f block elements. **B] Periodic properties:** ***Atomic and Ionic size:*** Definition and explanation of atomic radius, ionic radius, Covalent radius, Vander waals radius. Variation of atomic size along a period and in a group. ***Ionization Energy:*** Definition and Explanation, Successive ionization energy, Factors	

	and From 1,2-dihaloalkane). Chemical reactions: [Reaction of ethylene glycol with, 1) Pb(OAC)4, 2) $P_2O_5/ZnCl_2$]. b) **Trihydric alcohol (Glycerol):** Preparation methods from: 1) Oils and fats 2) Propene. Chemical reactions: [Reactions of glycerol with, 1) Nitric acid, 2) Acetyl chloride]. **B) Epoxides :** Introduction and nomenclature. Preparation methods: **a)** Oxidation of ethene in presence of Ag catalyst , b) Oxidation of ethene with per acetic acid. Chemical reactions: (Ring opening reactions of propylene oxide in acidic and basic medium/reagent,	
Feb.	**Unit IV : Study of P-block elements:** Variation in properties : atomic radius, ionization energy, electron affinity, electronegativity , metallic character , melting and boiling point , oxidizing and reducing properties , Variation in acidic and basic character of hydroxides of P-block elements , diagonal relationship between B and Si	**05**
Feb.	**Unit-V : Acids and Bases.:** Introduction, Arrhenius concept, Bronsted-Lowry concept, Lewis acids and bases concept Discuss briefly with suitable example.Solvent system concept, Cady-Elsey concept, Lux-Flood concept and Usanovich concept for acids and bases.Definition of Hard, Soft and borderline acids and bases with various example. Pearson's principle (SHAB Principle), theories of hardness and softness such as Electronic theory, pi-bonding theory and Pitzer's theory.Application of SHAB Principle such as relative stability of compound, feasibility of chemical reaction. Limitation of SHAB concept.	**10**

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DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2018-19

Class : B.SC- S.Y.
Title of the Paper & No.: Organic+Inorganic Chemistry VI & VIII
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2018-19			
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DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2018-19

Class : B.SC-T.Y
Title of the Paper & No.: Physical+Inorganic Chemistry XIII & XV
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2018-19			
	Physical +Inorganic Chemistry Paper no.XIII Semester-V		
Month	**Course content**	**Expected Periods**	**Actual Periods**
June **July**	**Section – A (Physical Chemistry)** **Unit –I** **1.1.1. Spectroscopy-I :** a) Brief introduction to molecular Spectroscopy. Width and intensity of spectral lines. Factors affecting width and intensity of spectral line. b) Rotational spectra : Classification of molecules, Rotational spectra of diatomic molecules.(Rigid rotator model) Moment of inertia, energy levels of rigid rotator, selection rule, spacing between spectral lines of diatomic rigid rotator, isotopic effect. Numerical. c) Vibrational Spectra: Infrared spectrum, simple harmonic oscillator model, energy levels of simple harmonic oscillator, selection rule, pure vibrational spectrum, intensity, determination of force constant, qualitative relation between force constant and bond energies. Numerical on force constant.	**09**	**09**
July	**Unit –II** **1.1.2. Spectroscopy-II:** a) Raman spectra : Raman effect,Concept of polarazability, classical and quantum theory of Raman scattering, rotational Raman spectrum of a diatomic molecule. Experimental Raman Spectroscopy. b) Electronic spectra : Concept of potential energy curve, Franck-Condon Principle, Types of electronic transistions.	**05**	**05**
Aug.	**Unit III** **1.1.3. Chemical Kinetics:** a) Introduction, Third order reaction with equal concentration of all reactants, characteristics of third order reaction.b) Kinetics of complex reaction : i) Opposing reaction ii) Consecutive reaction c) Kinetics of Photochemical reaction : i) Hydrogen –chlorine reaction ii) Decomposition of HI iii) Dimerization of anthracene.	**08**	**07**
Aug.	**Unit IV** **1.1.4. Distribution Law:** a) Introduction, Nernst Distribution law, Solubility and distribution law, Limitations of law. b) Association and dissociation of solute in solvent.c) Henry's law. d)Determination of equilibrium constant from distribution coefficient. e) Extraction of solvent. f) Liquid -liquid chromatography. g) Applications of distribution law. h) Numerical on distribution law	**08**	**08**
Sept.	**Section B (Inorganic Chemistry)** **Unit V:** **1.1.5 Organometallic compounds** a) Definition b) Nomenclature and classification of organometallic compounds c) Preparation, properties, bonding and application of alkyl and aryls of Li , Al, Sn, Ti.	**09**	**09**
Sept.	**Unit VI:** **1.1.6 Metal carbonyls** a. Definition, types 1) MononIuclear carbonyl, characteristics and examples; 2) Polynuclear carbonyl, characteristics and examples. b. Preparation	**06**	**07**

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Department of Chemistry

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B.Sc. I Sem.-I	Paper-I	Paper-V	Paper-II	Paper-V				
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Head
Department of Chemistry
Digambarrao Bindu College, Bhokar,
Dist. Nanded.

DIGAMBARRAO BINDU ARTS, COMMERCE & SCIENCE COLLEGE, BHOKAR DIST. NANDED

DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2019-20

Class : B.SC-T.Y
Title of the Paper & No.: Physical+Inorganic Chemistry XIII & XV
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2019-20			
	Physical +Inorganic Chemistry Paper no.XIII Semester-V		
Month	**Course content**	**Expected Periods**	**Actual Periods**
June **July**	**Section – A (Physical Chemistry)** **Unit –I** **1.1.1. Spectroscopy-I :** a) Brief introduction to molecular Spectroscopy. Width and intensity of spectral lines. Factors affecting width and intensity of spectral line. b) Rotational spectra : Classification of molecules, Rotational spectra of diatomic molecules.(Rigid rotator model) Moment of inertia, energy levels of rigid rotator, selection rule, spacing between spectral lines of diatomic rigid rotator, isotopic effect. Numerical. c) Vibrational Spectra: Infrared spectrum, simple harmonic oscillator model, energy levels of simple harmonic oscillator, selection rule, pure vibrational spectrum, intensity, determination of force constant, qualitative relation between force constant and bond energies. Numerical on force constant.	**09**	**09**
July	**Unit –II** **1.1.2. Spectroscopy-II:** a) Raman spectra : Raman effect,Concept of polarazability, classical and quantum theory of Raman scattering, rotational Raman spectrum of a diatomic molecule. Experimental Raman Spectroscopy. b) Electronic spectra : Concept of potential energy curve, Franck-Condon Principle, Types of electronic transistions.	**05**	**05**
Aug.	**Unit III** **1.1.3. Chemical Kinetics:** a) Introduction, Third order reaction with equal concentration of all reactants, characteristics of third order reaction.b) Kinetics of complex reaction : i) Opposing reaction ii) Consecutive reaction c) Kinetics of Photochemical reaction : i) Hydrogen –chlorine reaction ii) Decomposition of HI iii) Dimerization of anthracene.	**08**	**07**
Aug.	**Unit IV** **1.1.4. Distribution Law:** a) Introduction, Nernst Distribution law, Solubility and distribution law, Limitations of law. b) Association and dissociation of solute in solvent.c) Henry's law. d)Determination of equilibrium constant from distribution coefficient. e) Extraction of solvent. f) Liquid -liquid chromatography. g) Applications of distribution law. h) Numerical on distribution law	**08**	**08**
Sept.	**Section B (Inorganic Chemistry)** **Unit V:** **1.1.5 Organometallic compounds** a) Definition b) Nomenclature and classification of organometallic compounds c) Preparation, properties, bonding and application of alkyl and aryls of Li , Al, Sn, Ti.	**09**	**09**
Sept.	**Unit VI:** **1.1.6 Metal carbonyls** a. Definition, types 1) MononIuclear carbonyl, characteristics and examples; 2) Polynuclear carbonyl, characteristics and examples. b. Preparation	**06**	**07**

Digambarrao Bindu Arts, Commerce & Science College, Bhokar, Dist Nanded

Department of Chemistry

Annual Teaching Plan for 2020-2021

Workload Distribution

Class	Name of Teachers			
	Mr. S.S. Tiwade		Mr.G.D.Kottapalle	
	Theory	Practical	Theory	Practical
B.Sc. I Sem.-I	Paper-I	Paper-V	Paper-II	Paper-V
B.Sc. I Sem.-II	Paper- III		Paper- IV	
B.Sc. II Sem.-III	Paper-VI	Paper-X	Paper-VII	Paper-XI
B.Sc. II Sem.-IV	Paper-VIII		Paper-IX	
B.Sc. III Sem.-V	Paper-XIII	Paper-XVII	Paper-XII	Paper-XVI
B.Sc. III Sem.-VI	Paper-XV		Paper-XIV	

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DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2020-21

Class : B.SC-F.Y
Title of the Paper & No.: Organic+Inorganic Chemistry I & III
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2020-21

Organic+Inorganic Chemistry Paper no.I Semester-I

Month	Course content	Expected Periods
Sept.	**Unit I: Nomenclature of Organic Compounds:** Functional groups and types of organic compounds, Basic rules of IUPAC Nomenclature, Nomenclature of mono and bi- functional compounds on the basis of priority order of following classes of organic compounds: alkanes, alkenes, alkynes, alcohols, ethers, aldehydes, ketones, carboxylic acid, carboxylic acid derivatives (acid halides, esters, anhydrides, amides), amines; Nomenclature of aromatic compounds: Mono, di and polysubstituted benzene (with not more than two functional groups)	07
Oct.	**Unit II: Basic Concepts in Organic Chemistry:** Basic terms: Substrate and Reagents, types of reagents (Electrophilic and Nucleophilic). Notation of arrows: curved arrow, Half headed arrow, double headed arrow, straight arrow. Bond fission: Homolytic and heterolytic fission.Reaction intermediates: Carbocation, Carbanion, Free radical, (Introduction, structure & Stability), carbene, nitrene & benzyne (only introduction).Electron mobility: Inductive effect (effect on acidic strength of alpha substituted acetic acid and α-chloroacetic acid), Mesomeric effect (Aniline and Nitrobenzene), Hyperconjugation (toluene).	09
Nov.	**Unit III: Alkanes Alkenes and alkynes:** Alkanes: Introduction, Preparation of alkanes from a) Hydrolysis of Grignard reagent b) Kolbes synthesis. Chemical reaction: a) Pyrrolysis (mechanism), b) aromatization. Alkenes: Introduction, Preparation methods a) But-1-ene from but-1-yne b) But- 2-ene from butan-2-ol.Chemical reactions with mechanism: a) Electrophilic addition of Br2 to ethene b) Electrophilic addition of HBr to propene C) Free radical addition of HBr to propene (Peroxide effect).	08
Nov.	**Unit IV: Cycloalkanes, Cycloalkenes and Dienes :** Cycloalkanes: Introduction, Preparation of cycloalkanes from a)Adipic acid b)Aromatic hydrocarbon.Baeyer strain theory and Saches Mohr theory. Ring opening reaction with H2 and HI.Cycloalkenes: Introduction, preparation methods:Dehydration of cyclohexanol ,Dehydrohalogenation of halocyclohexane.Chemical reactions: a) Epoxidation of cyclohexene, b) Allylic halogenations.4.2 Dienes: Introduction, classification & Resonance structures.Preparationmethods of 1,3-butadiene from-a)1,4-dibromobutane, b)1,4-butanediol.Chemical reactions: a) addition of Br2 and HBr to 1,3-butadiene, b) addition of ethene to 1,3-butadiene (Diel's- Alder reaction).	06
	Unit V: Periodic Table and Periodic Properties: periodic law, Long form of the periodic table, Sketch, Cause of periodicity, Division of elements in to s, p, d, and f blocks. General characteristics of s, p, d and f block elements. **B] Periodic properties:** *Atomic and Ionic size:* Definition and explanation of atomic radius, ionic radius, Covalent radius, Vander waals radius. Variation of atomic size along a period and in a group. *Ionization Energy:* Definition and Explanation, Successive ionization energy, Factors	

	and From 1,2-dihaloalkane). Chemical reactions: [Reaction of ethylene glycol with, 1) $Pb(OAC)_4$, 2) $P_2O_5/ZnCl_2$]. b) **Trihydric alcohol (Glycerol):** Preparation methods from: 1) Oils and fats 2) Propene. Chemical reactions: [Reactions of glycerol with, 1) Nitric acid, 2) Acetyl chloride]. **B) Epoxides :** Introduction and nomenclature. Preparation methods: **a)** Oxidation of ethene in presence of Ag catalyst , b) Oxidation of ethene with per acetic acid. Chemical reactions: (Ring opening reactions of propylene oxide in acidic and basic medium/reagent,	
Apr.	**Unit IV : Study of P-block elements:** Variation in properties : atomic radius, ionization energy, electron affinity, electronegativity , metallic character , melting and boiling point , oxidizing and reducing properties , Variation in acidic and basic character of hydroxides of P-block elements , diagonal relationship between B and Si	**05**
May.	**Unit-V : Acids and Bases.:** Introduction, Arrhenius concept. Bronsted-Lowry concept, Lewis acids and bases concept Discuss briefly with suitable example.Solvent system concept, Cady-Elsey concept, Lux-Flood concept and Usanovich concept for acids and bases.Definition of Hard, Soft and borderline acids and bases with various example. Pearson's principle (SHAB Principle), theories of hardness and softness such as Electronic theory, pi-bonding theory and Pitzer's theory.Application of SHAB Principle such as relative stability of compound, feasibility of chemical reaction. Limitation of SHAB concept.	**10**

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DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2020-21

Class : B.SC- S.Y.
Title of the Paper & No.: Organic+Inorganic Chemistry VI & VIII
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2020-21

Organic+Inorganic Chemistry Paper no.VI Semester-III

Month	Course content	Expected Periods	Actual Periods
Sept.	**Part I (Organic Chemistry)** **Unit I:Name Reaction with Mechanism** **[A] Condensation reactions of Aldehydes and Ketones.** 1. Benzoin Condensation Reaction.2.Knoevengel Reaction.3.Mannich Reaction 4.Perkins Reaction 5.Reformatsky reaction. 6.Gatterman Koch reaction. 7.Gatterman synthesis. **[B] Reduction reactions** 1.Clemmensen Reduction Reaction. 2.Meervin Pondorof Verly reduction reaction. 3.Reduction with LiAlH4. 4.Reduction with NaBH4. **[C] OXIDATION REACTIONS.** 1.Baeyer- Villiger Oxidation Reaction. 2.Oppenauer oxidation.	10	08
Oct.	**Unit II:Aromatic Carboxylic and Sulphonic Acids.** 1. Introduction and Classification of Aromatic Carboxylic Acids. **[A]** Synthesis and Chemical Reactions of Following Acids. **[B] Benzoic Acid.** 1. Preparations From: (a) Phenyl Cyanide, (b) Toluene. 2. Reactions of Benzoic Acids: a) Acyl halide formation b) Reduction. C) Nitration. **[C] Anthranilic Acid:** 1. Preparations From : (a) Phthalimide. b) O nitroToluene. 2. Reactions of Anthranilic Acids: a) Action of heat, b) Nitrous Acid, c) Action of acetic anhydride/acetyl chloride. **[D] Salicylic Acid:** 1. Preparations From: (a) Kolbe's reaction. (b) Reimer Tiemann reaction. 2. Reactions of Salicylic Acids: a) Bromination, b) Nitration, c) Decarboxylation, d) Reaction with Zn-dust. **[E] Phthalic Acid** 1. Preparations From: (a) o xylene. (b) Naphthalene. 2. Reactions of Phthalic Acids: a)Action of heat. b) Action of PCl5. C) Action of ethanol. **[F] Benzene Sulphonic Acid.** 1. Introduction. 2. Preparation of benzene sulphonic acid from benzene with mechanism. 3. Chemical Reactions of benzene sulphonic acid, a) Salt formation b) formation of sulphonyl chloride, c) formation of sulphonic ester and amide. 4. Replacement of sulphonic group by: a) Hydroxyl group. b) cyano group, c) Hydrogen atom d) NH_2–group.	06	08
Oct.	**Unit III:Introduction to Organometallic Compounds.** **1. Organomagnesium Compounds:** 1.Preparation of Methyl magnesium bromide.	09	09

	c) Reactions in liquid ammonia as solvent : Auto ionization, Acid-Base, Ammonolysis, Precipitation and ammonation. d) Reactions in liquid SO2 : Autoionization, Acid-Base, Solvolysis, Precipitation and Solvation.		
	Organic+Inorganic Chemistry Paper no.VIII Semester-IV		
Feb.	**Part I (organic Chemistry)** **Unit-I : Stereochemistry** 1. Introduction 2. Concept and Types of isomerism. (a) Structural isomerism (b) Stereo isomerism. 3. Types of structural isomerisin [Chain, Position, Functional, Metamerism, Tautomerism] 4. Types of Stereoisomerism [Conformational (n-butane) and Configurational] 5. Geometrical isomerism: Cis -Trans and E and Z system of nomenclature. 6. Optical isomerism: a) Concept of asymmetric carbon atom, Chiral centre. b) Dextro and Laevo forms, Racemic mixture. c) Element of symmetry [plane, Centre, and Axis] d) Concept of Diastereoisomers. e) Racemic modification. (with one example) f) Resolution (Concept) (with one example) g) Walden inversion. (with one example) h) Relative Configuration and Absolute configuration.[D,L and R,S notations]	**08**	**08**
Feb.	**Unit:-II: Carbohydrates.** 1. Introduction. 2. Classification and Nomenclature 3. Reactions of Monosaccharide's (Glucose and Fructose) a) Addition reactions b) Ether formation c) Reduction of glucose d) Oxidation of glucose Osazone formation with mechanism 4. Open and cyclic structure of glucose 5. Determination of ring size 6. Mutarotation with Mechanism. 7. Epimerization. 8. Cyclic Structure of D-glucose.(supporting evidence for six member ring) 9. Interconvertions: a) Glucose to Fructose. b) Fructose to Glucose. c) Glucose to Mannose. d) Glucose to Arabinose (Ruff Degradation) e) Arabinose to Glucose (Kiliani synthesis) 10. Pyranose Structure of Glucose. 11. Manufacturing of sucrose (sugar) from sugar cane.	**08**	**08**
Mar.	**Unit:-III:Nitrogen Containing Organic Compounds. A] Aromatic Nitro Compounds.** 1. Introduction, Nomenclature, 2. Preparation of Nitrobenzene from benzene 3. Physical and Chemical properties of Nitrobenzene. 4. Electrophilic substitution reactions. 5. Reductions: a) in acidic medium. b) In neutral medium. c) In alkaline medium. d) Electrolytic reduction. **B] Aromatic amines:** 1) Introduction, Classification, Nomenclature, 2) Methods of preparations of aniline from i) chlorobenzene ii) phenol	**08**	**09**

	g) Applications of Lanthanides. **2. Actinides:** a) Electronic Configuration. b) Properties of Actinides. c) Comparison with Lanthanides. d) Extraction of Uranium from Pitchblend. e) Physical & Chemical Properties of Uranium. f) Separation of Neptunium, Plutonium, Americium from Uranium. g) Nuclear Fuels.		

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DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2020-21

Class : B.SC-T.Y
Title of the Paper & No.: Physical+Inorganic Chemistry XIII & XV
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2020-21			
	Physical +Inorganic Chemistry Paper no.XIII Semester-V		
Month	**Course content**	**Expected Periods**	**Actual Periods**
Sept	**Section – A (Physical Chemistry)** **Unit –I** **1.1.1. Spectroscopy-I :** a) Brief introduction to molecular Spectroscopy. Width and intensity of spectral lines. Factors affecting width and intensity of spectral line. b) Rotational spectra : Classification of molecules, Rotational spectra of diatomic molecules.(Rigid rotator model) Moment of inertia, energy levels of rigid rotator, selection rule, spacing between spectral lines of diatomic rigid rotator, isotopic effect. Numerical. c) Vibrational Spectra: Infrared spectrum, simple harmonic oscillator model, energy levels of simple harmonic oscillator, selection rule, pure vibrational spectrum, intensity, determination of force constant, qualitative relation between force constant and bond energies. Numerical on force constant.	09	09
Oct.	**Unit –II** **1.1.2. Spectroscopy-II:** a) Raman spectra : Raman effect,Concept of polarazability, classical and quantum theory of Raman scattering, rotational Raman spectrum of a diatomic molecule. Experimental Raman Spectroscopy. b) Electronic spectra : Concept of potential energy curve, Franck-Condon Principle, Types of electronic transistions.	05	05
Oct.	**Unit III** **1.1.3. Chemical Kinetics:** a) Introduction, Third order reaction with equal concentration of all reactants, characteristics of third order reaction.b) Kinetics of complex reaction : i) Opposing reaction ii) Consecutive reaction c) Kinetics of Photochemical reaction : i) Hydrogen –chlorine reaction ii) Decomposition of HI iii) Dimerization of anthracene.	08	07
Nov.	**Unit IV** **1.1.4. Distribution Law:** a) Introduction, Nernst Distribution law, Solubility and distribution law, Limitations of law. b) Association and dissociation of solute in solvent.c) Henry's law. d)Determination of equilibrium constant from distribution coefficient. e) Extraction of solvent. f) Liquid -liquid chromatography. g) Applications of distribution law. h) Numerical on distribution law	08	08
Nov.	**Section B (Inorganic Chemistry)** **Unit V:** **1.1.5 Organometallic compounds** a) Definition b) Nomenclature and classification of organometallic compounds c) Preparation, properties, bonding and application of alkyl and aryls of Li , Al, Sn, Ti.	09	09
Dec.	**Unit VI:** **1.1.6 Metal carbonyls** a. Definition, types 1) Mononluclear carbonyl, characteristics and examples; 2) Polynuclear carbonyl, characteristics and examples. b. Preparation	06	07

Digambarrao Bindu Arts, Commerce & Science College, Bhokar, Dist Nanded

Annual Teaching Plan for 2021-2022

Department of Chemistry

Workload Distribution

Class	Mr.S.S.Tiwade		Mr.G.D.Kottapalle		Dr.P.D.Tawade	
	Theory	Practical	Theory	Practical	Theory	Practical
B.Sc. I Sem.-I	Paper-I	Paper-V	Paper-II	Paper-V		Paper-V Batch B2
B.Sc. I Sem.-II	Paper- III		Paper- IV			
B.Sc. II Sem.-III	Paper-VI (Section-A)	Paper-X	Paper-VII	Paper-XI	Paper-VI (Section-B)	
B.Sc. II Sem.-IV	Paper-VIII		Paper-IX		Paper-VIII (Section-B)	
B.Sc. III Sem.-V	Paper-XIII	Paper-XVII	Paper-XII	Paper-XVI		Paper-XVII Batch B2
B.Sc. III Sem.-VI	Paper-XV		Paper-XIV			

Head

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DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2021-22

Class : B.SC-F.Y
Title of the Paper & No.: Organic+Inorganic Chemistry I & III
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2021-22

Organic+Inorganic Chemistry Paper no.I Semester-I

Month	Course content	Expected Periods
Sept.	**Unit I: Nomenclature of Organic Compounds:** Functional groups and types of organic compounds, Basic rules of IUPAC Nomenclature, Nomenclature of mono and bi- functional compounds on the basis of priority order of following classes of organic compounds: alkanes, alkenes, alkynes, alcohols, ethers, aldehydes, ketones, carboxylic acid, carboxylic acid derivatives (acid halides, esters, anhydrides, amides), amines; Nomenclature of aromatic compounds: Mono, di and polysubstituted benzene (with not more than two functional groups)	07
Oct.	**Unit II: Basic Concepts in Organic Chemistry:** Basic terms: Substrate and Reagents, types of reagents (Electrophilic and Nucleophilic). Notation of arrows: curved arrow, Half headed arrow, double headed arrow, straight arrow. Bond fission: Homolytic and heterolytic fission.Reaction intermediates: Carbocation, Carbanion, Free radical, (Introduction, structure & Stability), carbene, nitrene & benzyne (only introduction).Electron mobility: Inductive effect (effect on acidic strength of alpha substituted acetic acid and α-chloroacetic acid), Mesomeric effect (Aniline and Nitrobenzene), Hyperconjugation (toluene).	09
Nov.	**Unit III: Alkanes Alkenes and alkynes:** Alkanes: Introduction, Preparation of alkanes from a) Hydrolysis of Grignard reagent b) Kolbes synthesis. Chemical reaction: a) Pyrrolysis (mechanism), b) aromatization. Alkenes: Introduction, Preparation methods a) But-1-ene from but-1-yne b) But- 2-ene from butan-2-ol.Chemical reactions with mechanism: a) Electrophilic addition of Br2 to ethene b) Electrophilic addition of HBr to propene C) Free radical addition of HBr to propene (Peroxide effect).	08
Nov.	**Unit IV: Cycloalkanes, Cycloalkenes and Dienes :** Cycloalkanes: Introduction, Preparation of cycloalkanes from a)Adipic acid b)Aromatic hydrocarbon.Baeyer strain theory and Saches Mohr theory. Ring opening reaction with H_2 and HI.Cycloalkenes: Introduction, preparation methods:Dehydration of cyclohexanol ,Dehydrohalogenation of halocyclohexane.Chemical reactions: a) Epoxidation of cyclohexene, b) Allylic halogenations.4.2 Dienes: Introduction, classification & Resonance structures.Preparationmethods of 1,3-butadiene from-a)1,4-dibromobutane, b)1,4-butanediol.Chemical reactions: a) addition of Br2 and HBr to 1,3-butadiene, b) addition of ethene to 1,3-butadiene (Diel's- Alder reaction).	06
	Unit V: Periodic Table and Periodic Properties: periodic law, Long form of the periodic table, Sketch, Cause of periodicity, Division of elements in to s, p, d, and f blocks. General characteristics of s, p, d and f block elements. **B] Periodic properties:** *Atomic and Ionic size:* Definition and explanation of atomic radius, ionic radius, Covalent radius, Vander waals radius. Variation of atomic size along a period and in a group. *Ionization Energy:* Definition and Explanation, Successive ionization energy, Factors	

	and From 1,2-dihaloalkane). Chemical reactions: [Reaction of ethylene glycol with, 1) Pb(OAC)4, 2) P2O5/ZnCl2]. b) **Trihydric alcohol (Glycerol):** Preparation methods from: 1) Oils and fats 2) Propene. Chemical reactions: [Reactions of glycerol with, 1) Nitric acid, 2) Acetyl chloride]. **B) Epoxides :** Introduction and nomenclature. Preparation methods: **a)** Oxidation of ethene in presence of Ag catalyst , b) Oxidation of ethene with per acetic acid. Chemical reactions: (Ring opening reactions of propylene oxide in acidic and basic medium/reagent,	
Apr.	**Unit IV : Study of P-block elements:** Variation in properties : atomic radius, ionization energy, electron affinity, electronegativity , metallic character , melting and boiling point , oxidizing and reducing properties , Variation in acidic and basic character of hydroxides of P-block elements , diagonal relationship between B and Si	**05**
May.	**Unit-V : Acids and Bases.:** Introduction, Arrhenius concept, Bronsted-Lowry concept, Lewis acids and bases concept Discuss briefly with suitable example.Solvent system concept, Cady-Elsey concept, Lux-Flood concept and Usanovich concept for acids and bases.Definition of Hard, Soft and borderline acids and bases with various example. Pearson's principle (SHAB Principle), theories of hardness and softness such as Electronic theory, pi-bonding theory and Pitzer's theory.Application of SHAB Principle such as relative stability of compound, feasibility of chemical reaction. Limitation of SHAB concept.	**10**

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DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2021-22

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Title of the Paper & No.: Organic+Inorganic Chemistry VI & VIII
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2021-22			
	Organic+Inorganic Chemistry Paper no.VI Semester-III		
Month	**Course content**	**Expected Periods**	**Actual Periods**
Sept.	**Part I (Organic Chemistry)** **Unit I:Name Reaction with Mechanism** **[A] Condensation reactions of Aldehydes and Ketones.** 1. Benzoin Condensation Reaction.2.Knoevengel Reaction.3.Mannich Reaction 4.Perkins Reaction 5.Reformatsky reaction. 6.Gatterman Koch reaction. 7.Gatterman synthesis. **[B] Reduction reactions** 1.Clemmensen Reduction Reaction. 2.Meervin□Pondorof Verly reduction reaction. 3.Reduction with LiAlH4. 4.Reduction with NaBH4. **[C] OXIDATION REACTIONS.** 1.Baeyer- Villiger Oxidation Reaction. 2.Oppenauer oxidation.	10	08
Oct.	**Unit II:Aromatic Carboxylic and Sulphonic Acids.** 1.Introduction and Classification of Aromatic Carboxylic Acids. **[A]** Synthesis and Chemical Reactions of Following Acids. **[B] Benzoic Acid.** 1.Preparations From: (a) Phenyl Cyanide, (b) Toluene. **2.**Reactions of Benzoic Acids**:** a) Acyl halide formation b) Reduction. C) Nitration. **[C] Anthranilic Acid:** 1. Preparations From : (a) Phthalimide. b) O nitroToluene. 2. Reactions of Anthranilic Acids: a) Action of heat, b) Nitrous Acid, c) Action of acetic anhydride/acetyl chloride. **[D] Salicylic Acid:** 1. Preparations From: (a) Kolbe's reaction. (b) Reimer□Tiemann reaction. 2. Reactions of Salicylic Acids: a) Bromination, b) Nitration, c) Decarboxylation, d) Reaction with Zn-dust. **[E] Phthalic Acid** 1. Preparations From: (a) o□xylene. (b) Naphthalene. 2. Reactions of Phthalic Acids: a)Action of heat. b) Action of PCl_5. C) Action of ethanol. **[F] Benzene Sulphonic Acid.** 1. Introduction. 2. Preparation of benzene sulphonic acid from benzene with mechanism. 3. Chemical Reactions of benzene sulphonic acid, a) Salt formation b) formation of sulphonyl chloride, c) formation of sulphonic ester and amide. 4. Replacement of sulphonic group by: a) Hydroxyl group. b) cyano group, c) Hydrogen atom d) NH_2–group.	06	08
Oct.	**Unit III:Introduction to Organometallic Compounds.** **1. Organomagnesium Compounds:** 1.Preparation of Methyl magnesium bromide.	09	09

	c) Reactions in liquid ammonia as solvent : Auto ionization, Acid-Base, Ammonolysis, Precipitation and ammonation. d) Reactions in liquid SO2 : Autoionization, Acid-Base, Solvolysis, Precipitation and Solvation.		
	Organic+Inorganic Chemistry Paper no.VIII Semester-IV		
Feb.	**Part I (organic Chemistry)** **Unit-I : Stereochemistry** 1. Introduction 2. Concept and Types of isomerism. (a) Structural isomerism (b) Stereo isomerism. 3. Types of structural isomerisin [Chain, Position, Functional, Metamerism, Tautomerism] 4. Types of Stereoisomerism [Conformational (n-butane) and Configurational] 5. Geometrical isomerism: Cis -Trans and E and Z system of nomenclature. 6. Optical isomerism: a) Concept of asymmetric carbon atom, Chiral centre. b) Dextro and Laevo forms, Racemic mixture. c) Element of symmetry [plane, Centre, and Axis] d) Concept of Diastereoisomers. e) Racemic modification. (with one example) f) Resolution (Concept) (with one example) g) Walden inversion. (with one example) h) Relative Configuration and Absolute configuration.[D.L and R,S notations]	**08**	**08**
Feb.	**Unit:-II: Carbohydrates.** 1. Introduction. 2. Classification and Nomenclature 3. Reactions of Monosaccharide's (Glucose and Fructose) a) Addition reactions b) Ether formation c) Reduction of glucose d) Oxidation of glucose Osazone formation with mechanism 4. Open and cyclic structure of glucose 5. Determination of ring size 6. Mutarotation with Mechanism. 7. Epimerization. 8. Cyclic Structure of D-glucose.(supporting evidence for six member ring) 9. Interconvertions: a) Glucose to Fructose. b) Fructose to Glucose. c) Glucose to Mannose. d) Glucose to Arabinose (Ruff Degradation) e) Arabinose to Glucose (Kiliani synthesis) 10. Pyranose Structure of Glucose. 11. Manufacturing of sucrose (sugar) from sugar cane.	**08**	**08**
Mar.	**Unit:-III:Nitrogen Containing Organic Compounds. A] Aromatic Nitro Compounds.** 1. Introduction, Nomenclature, 2. Preparation of Nitrobenzene from benzene 3. Physical and Chemical properties of Nitrobenzene. 4. Electrophilic substitution reactions. 5. Reductions: a) in acidic medium. b) In neutral medium. c) In alkaline medium. d) Electrolytic reduction. **B] Aromatic amines:** 1) Introduction, Classification, Nomenclature, 2) Methods of preparations of aniline from i) chlorobenzene ii) phenol	**08**	**09**

	g) Applications of Lanthanides. **2. Actinides:** a) Electronic Configuration. b) Properties of Actinides. c) Comparison with Lanthanides. d) Extraction of Uranium from Pitchblend. e) Physical & Chemical Properties of Uranium. f) Separation of Neptunium, Plutonium, Americium from Uranium. g) Nuclear Fuels.		

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DEPARTMENT OF CHEMISTRY

ANNUAL TEACHING PLAN-2021-22

Class : B.SC-T.Y
Title of the Paper & No.: Physical+Inorganic Chemistry XIII & XV
Name of the Teacher : Mr. S. S. Tiwade

ANNUAL TEACHING PLAN 2021-22			
	Physical +Inorganic Chemistry Paper no.XIII Semester-V		
Month	**Course content**	**Expected Periods**	**Actual Periods**
Sept	**Section – A (Physical Chemistry)** **Unit –I** **1.1.1. Spectroscopy-I :** a) Brief introduction to molecular Spectroscopy. Width and intensity of spectral lines. Factors affecting width and intensity of spectral line. b) Rotational spectra : Classification of molecules, Rotational spectra of diatomic molecules.(Rigid rotator model) Moment of inertia, energy levels of rigid rotator, selection rule, spacing between spectral lines of diatomic rigid rotator, isotopic effect. Numerical. c) Vibrational Spectra: Infrared spectrum, simple harmonic oscillator model, energy levels of simple harmonic oscillator, selection rule, pure vibrational spectrum, intensity, determination of force constant, qualitative relation between force constant and bond energies. Numerical on force constant.	09	09
Oct.	**Unit –II** **1.1.2. Spectroscopy-II:** a) Raman spectra : Raman effect,Concept of polarazability, classical and quantum theory of Raman scattering, rotational Raman spectrum of a diatomic molecule. Experimental Raman Spectroscopy. b) Electronic spectra : Concept of potential energy curve, Franck-Condon Principle, Types of electronic transistions.	05	05
Oct.	**Unit III** **1.1.3. Chemical Kinetics:** a) Introduction, Third order reaction with equal concentration of all reactants, characteristics of third order reaction.b) Kinetics of complex reaction : i) Opposing reaction ii) Consecutive reaction c) Kinetics of Photochemical reaction : i) Hydrogen –chlorine reaction ii) Decomposition of HI iii) Dimerization of anthracene.	08	07
Nov.	**Unit IV** **1.1.4. Distribution Law:** a) Introduction, Nernst Distribution law, Solubility and distribution law, Limitations of law. b) Association and dissociation of solute in solvent.c) Henry's law. d)Determination of equilibrium constant from distribution coefficient. e) Extraction of solvent. f) Liquid -liquid chromatography. g) Applications of distribution law. h) Numerical on distribution law	08	08
Nov.	**Section B (Inorganic Chemistry)** **Unit V:** **1.1.5 Organometallic compounds** a) Definition b) Nomenclature and classification of organometallic compounds c) Preparation, properties, bonding and application of alkyl and aryls of Li , Al, Sn, Ti.	09	09
Dec.	**Unit VI:** **1.1.6 Metal carbonyls** a. Definition, types 1) Mononluclear carbonyl, characteristics and examples; 2) Polynuclear carbonyl, characteristics and examples. b. Preparation	06	07