

# VIVEKANAND COLLEGE, KOLHAPUR ( Empowered Autonomous)

## Annual Teaching Plan Academic Year: 2023-24

Department: Chemistry , Academic Year – 2023-24

Semester- III and IV Subject – Chemistry, M.Sc.- II-Organic Chemistry

Class- M.Sc.-II-SEM-III Course Title: Paper No. 1145 A : Advanced Synthetic Methods

UNIT IV: Use of Following in the Synthesis

Name of the Teacher – Dr. Mrs. Shirke S. D.

Month –August ( 4 weeks)			Module Unit	Sub-Units Planned
Theory	Practicals	Total		
04	-----	04	I. Paper-Advanced Synthetic methods – <b>Unit IV: Use of following in the synthesis .</b>	<b>Use of Merrifield Resin</b> in Polypeptide synthesis – Structure, Preparation of Merrifield resin.
Month- September				
04	----	04	Continued...	<b>Use of Microwaves</b> in Organic Synthesis- Principle, Accessories required-containers, solvents. Reactions in aqueous, organic medium and with solid support.
Month- October			Continued...	<b>Use of Ultrasound Waves</b> – Principle, Reactions, in presence of ultrasound waves., <b>Multicomponent reactions</b> – Definition and Examples of reactions <b>Ionic Liquids</b> – Definition, Structures, Examples.
04	-----	04		
Month- November				
	Practicals	Total		

03	-----	03	Continued....	<b>Electro-organic synthesis-</b> Principle, Examples, Applications..
11 Nov. -23 Nov. Diwali Vacation	-----	-----		<b>Supramolecular chemistry,</b> Use of Ferrites and metal nanoparticles in organic synthesis.
Month- December			Theory Examinations	-----



*S.D. Shirke*

Dr. Mrs. Shirke S. D.

Name and Signature of the Teacher

*S.D. Shirke*

Dr. Mrs. Shirke S. D.

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**VIVEKANAND COLLEGE, KOLHAPUR ( Empowered Autonomous)**

**Annual Teaching Plan Academic Year: 2023-24**

Department: Chemistry , Academic Year – 2023-24

Semester- III Subject – Chemistry M.Sc.- II- Analytical Chemistry

Class- M.Sc.-II-SEM-III Course Title: Paper No. XII (A): Environmental Chemical

Analysis And Control

Name of the Teacher – Dr. Mrs. Shirke S. D.

Month –August ( 4 weeks)			Module Unit	Sub-Units Planned
Theory	Practicals	Total		
04	-----	04	Elective Paper- UNIT-III -Air and Water Pollutant Analysis	Introduction, - Pollution- Definition types of Pollutants., Chemistry of Air Pollutants, Characterization, sources air pollutants.
Month- September				
04	----	04	Continued...	Methods of analysis of air pollutants.- CO, CO <sub>2</sub> , NO <sub>x</sub> , NH <sub>3</sub> , H <sub>2</sub> , SO <sub>2</sub> .Air pollutants Monitoring Instruments, Potable and Industrial Water,-Major and Minor components
Month- October				
04	-----	04	Continued...	Dissolved Oxygen (DO), Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD) and their measurements.
Month- November				
03		03	Continued....	Analysis of Pd, Cd, Hg, Cr, As And their controlling methods.
11 Nov. -23 Nov.				

Diwali Vacation				
Month- December	-----		Theory Examinations	-----



*Dr. Mrs. Shirke*

Dr. Mrs. Shirke S. D.

Name and Signature of the Teacher

*Dr. Mrs. Shirke*

Name and Signature of HOD

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# Vivekanand College, Kolhapur (Empowered Autonomous)

## Annual Teaching Plan

Academic Year – 2023-24  
 Department- Chemistry  
 Course Title – Organic Chemistry

Semester- I, III and V  
 Subject – Chemistry,

**Course Title: DSC-1002 A : Part II-Organic chemistry**

Subject: Chemistry (Semester -I- NEP)- Major subject- Chemistry ,

**Open Elective – General Aspects of Organic Chemistry**

Name of the Teacher – Dr. Mrs. Shirke S. D.

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	<b>MAJOR</b> 1. Induction <b>Unit-1.</b> <b>Stereochemistry</b>  <b>OPEN</b> <b>ELECTIVE :</b> <b>Unit-1</b> <b>Green Chemistry</b>	<ul style="list-style-type: none"> <li>• General Introduction</li> <li>• Discussion on Course Structure</li> <li>• Discussion on Examination pattern and Syllabus . Definition, stereoisomerism .classification Introduction. - Definition and Twelve Principles with explanation.</li> </ul>
06	-	06		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<b>Major-</b> 1. Stereochemistry of Organic compounds  <b>OE-Continued</b> Green chemistry  <b>Practicals-</b>	<ul style="list-style-type: none"> <li>• 1. Optical Isomerism- examples-Lactic acid, Tartaric acid etc. 2. Geometrical Isomerism-In alkenes, aldoximes and ketoximes and cyclic compounds.</li> <li>• Green methods for synthesis – Using Zeolites  Chemical Kinetics, Viscosity. Estimation of Vinegar</li> </ul>
12	16	28		
Month: October			Module Unit:	Sub-units planned
10	14	24	Continued... Stereochemistry of Organic compounds. 2. Heterocyclic Compounds	<ul style="list-style-type: none"> <li>• Elements of Symmetry-. Geometrical isomerism – Maleic and Fumaric acid , R and S Nomenclature E and Z with examples</li> <li>• Introduction of heterocyclic</li> </ul>

# Vivekanand College, Kolhapur (Autonomous)

## Annual Teaching Plan

Academic Year: 2022-23

Semesters: B.Sc. I (A+B+C), Sem-I

Department: Chemistry

			<p><b>OE-Green chemistry continued...</b></p> <p><b>Practicals</b></p>	<p>compounds- definition and classification.</p> <ul style="list-style-type: none"> <li>• Use of Microwave oven:- Principle, conditions required-material, solvents- B.P.Polarity and chemical reactions.</li> <li>• Estimation of Aniline,</li> <li>• Standardization of Oxalic acid and to determine the strength of <math>KMnO_4</math></li> </ul>
Month: November			Module Unit:	Sub-units planned
12	16	28	<p><b>Major- Continued...</b></p> <p><b>OE-Continued...Green chemistry</b></p> <p><b>2. Soaps</b></p> <p><b>Practicals</b></p>	<p>i) Pyrrole - Structure, reactivity,( MOT) theory, preparation methods and reactions.</p> <p>ii) Pyridine – Structure and reactivity, Physical and chemical properties.</p> <p>Use of Ultrasound Waves-Principle and reactions.</p> <p>Definition, Preparation reactions, Raw materials required for manufacture of soap- Fats and Oils, Fatty Acids, Manufacturing methods and difference between soap and detergent.</p> <p>Organic Spotting – Two organic compounds</p>
Nov./Dec.			Examinations going on	



*S.D. Shirke*

Dr. S. D. Shirke  
Name of Teacher

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# Vivekanand College, Kolhapur (Autonomous)

## Annual Teaching Plan

# Vivekanand College, Kolhapur ( EmpoweredAutonomous) Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. II, Sem-IV

Department: Chemistry

Subject: Chemistry

Course Title : DSE-1002E2: Organic & Analytical Chemistry

[ In Semester – III, there is no Organic chemistry Syllabus involved for S.Y.B.Sc.]

Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Amino acids, Peptides and Proteins <b>Practicals</b>	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Definition, Classification and Examples</li> <li>• Electrophoresis, Isoelectric point</li> <li>• Zwitterions-Examples</li> <li>• Peptides- Structure</li> </ul> <b>SEM-III-and IV-</b> Chemical Kinetics, Preparation of Mohr's salt, Preparation of p-Nitroacetanilide, Gravimetric Analysis
04	12-	16		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Proteins.....  <b>Practicals</b>	<ul style="list-style-type: none"> <li>• Peptides- Structure</li> <li>• Strecker's synthesis of amino acids</li> <li>• Gabriel phthalimide synthesis</li> <li>• Reactions of Amino acids w.r.t. -COOH and -NH<sub>2</sub> group.</li> </ul> Chemical Kinetics, Preparation of Benzoic acid Preparation of Methyl orange, Organic Spotting
04	12	16		
Month: February			Module/Unit:	Sub-units planned
04	32	36	Continued...  <b>Practicals</b>	<ul style="list-style-type: none"> <li>• Peptides- Structure</li> </ul> Primary, secondary structures of protein Tertiary and Quaternary structures of Proteins. Denaturation of proteins  Chemical Kinetics and Instrumentation
Month: May			Module/Unit:	Sub-units planned
-	-	-	-	-



*S.D. Shirke*

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Annual Teaching Plan  
**Vivekanand College, Kolhapur (Autonomous)**  
**Annual Teaching Plan**

Academic Year: 2023-24

Semesters: B.Se. III, Sem-V

Department: Chemistry

Subject: Chemistry Course Title : DSE-1002 E1 and E2: Organic & Analytical Chemistry

Name of the Teacher: Dr. Mrs. Shirke S.D.

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit 1. NMR Spectroscopy	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Principles of NMR</li> <li>• NMR Instrumentation – Schematic diagram</li> <li>• Magnetic and nonmagnetic nuclei.</li> </ul>
04	-	04		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Continued...	<ul style="list-style-type: none"> <li>• Chemical Shift - Definition, Factors affecting Chemical shift, Shielding and deshielding .</li> <li>• Merits of TMS, Peak integration</li> <li>• Coupling Constant</li> <li>• Types of coupling constant.</li> <li>• Spin- spin coupling</li> <li>• Estimation of sucrose, saponification value of oil, Preparation of dihydropyrimidone, Preparation of derivatives</li> </ul>
08	28	36	Practicals	
Month: October			Module/Unit:	Sub-units planned
08	28	36	Continued...NMR spectroscopy	<ul style="list-style-type: none"> <li>• Chemical Shift - Definition, Factors affecting Chemical shift, Shielding and deshielding .</li> <li>• Merits of TMS, Peak integration.</li> <li>• Coupling Constant</li> <li>• Types of coupling constant.</li> <li>• Spin- spin coupling, Problem solutions</li> </ul>
			Unit-2: (Analytical Chemistry) Flame Photometry Practicals	
Month: November			Module/Unit:	Sub-units planned
08	24	32	Continued.... Practicals	<ul style="list-style-type: none"> <li>• Applications of Flame Photometry</li> <li>• Advantages of Flame Photometry</li> <li>• Separation and Identification of Binary Organic Mixtures -1</li> </ul>

*S.D.*

Dr. Mrs. S.D. Shirke

*S.D.*

Dr. S. D. Shirke



Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. III, Sem-VI

Department: Chemistry

Subject: Chemistry

Course Title: DSE-1002F1: Physical & Inorganic Chemistry  
DSE-1002F2: Organic & Industrial Chemistry

Name of the Teacher: Dr. Arjun Shanakar Kumbhar

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Infra-Red (IR) Spectroscopy	Introduction, Principle of I.R. Spectroscopy, IR Instrumentation, schematic diagram, Fundamental modes of vibrations, Condition for absorption of IR radiations, Regions of I.R. Spectrum, fundamental group region, finger print region,
06	-	06		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Infra-Red (IR) Spectroscopy	Hooks Law for Calculation of vibrational frequency, IR Sampling, Factors affecting on IR absorption frequency, Characteristic of I.R. absorption of following functional (8) 22 groups Alkanes, alkenes, alkynes, Alcohol and phenols, Ethers, Carbonyl compounds, Amines, Nitro com, Aromatic Compounds
8	52	60		
Month: September			Module/Unit:	Sub-units planned
8	52	60	Mass Spectroscopy	Introduction, Principle of mass spectroscopy, Mass spectrometer - schematic diagram, Types of ions produced in mass spectrum, Fragmentation patterns of alkanes, alkenes, aromatic hydrocarbons, alcohols, phenols, amines and carbonyl compounds, McLafferty rearrangement, Applications.
Month: October			Module/Unit:	Sub-units planned
6	-	06	EMF	Introduction Thermodynamics of electrode potentials, Nernst equation for electrode and cell potentials in terms of activities. E.M.F. series. Types of electrodes:
Month: November			Module/Unit:	Sub-units planned
		04	EMF	Reversible and Irreversible cells. Chemical cells without transference. Concentration cells with and without transference. iii. Liquid - Liquid junction potential: Origin, elimination and determination. Equilibrium constant from cell emf, Determination of the thermodynamic parameters such as $\Delta G$ , $\Delta H$ and $\Delta S$ . Applications of emf measurements Determination of pH of solution using Hydrogen electrode.

Dr. A. S. Ankushrao

Dr. A. S. Kumbhar



Dr. S. D. Shirke

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Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. II, Sem-III Department: Chemistry

Subject: Chemistry

Course Title: DSC-1002A: Physical Chemistry

Name of the Teacher: Dr. Arjun Shankar Kumbhar

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Induction	<ul style="list-style-type: none"> <li>General Introduction</li> </ul>
01	-	01		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Kinetic Theory of gases	Introduction, postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation, Deviation of real gases from ideal behavior,
4	32	36		
Month: September			Module/Unit:	Sub-units planned
4	32	36	Kinetic Theory of gases	<ul style="list-style-type: none"> <li>Compressibility factor, causes of deviation, van der Waals equation of state for real gases, Boyle temperature (derivation not required),</li> </ul>
Month: November			Module/Unit:	Sub-units planned
4	32	36	Kinetic Theory of gases	Critical phenomena, critical constants and their calculation from van der Waals equation.
Month: December			Module/Unit:	Sub-units planned
04	32	36	Kinetic Theory of gases	<ul style="list-style-type: none"> <li>Critical phenomena, critical constants and their calculation from van der Waals equation.</li> </ul>



Dr. A. S. Kumbhar




Dr. S. D. Shirke

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## Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. I (major+minor) Sem-I Department: Chemistry

Subject: Chemistry

Course Title: DSC03-CHE12-Organic Chemistry

MIN03-CHE12- Organic Chemistry

Name of the Teacher: Mr. Satish Suresh Kadam

Month: July			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Introduction	<ul style="list-style-type: none"> <li>• General Introduction</li> <li>• Discussion on Syllabus</li> <li>• Basic terms in organic Chemistry</li> </ul>
03	-	03		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	<ul style="list-style-type: none"> <li>▪ Fundamentals of Organic Chemistry</li> </ul>	<ul style="list-style-type: none"> <li>• General introduction</li> <li>• Reactive Intermediates: Carbocations, Carbanions and free radicals</li> </ul>
4	16	20		
Month: September			Module/Unit:	Sub-units planned
4	16	20	<ul style="list-style-type: none"> <li>▪ Fundamentals of Organic Chemistry</li> </ul>	<ul style="list-style-type: none"> <li>• Carbene, Nitrene, Benzyne</li> <li>• Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation.</li> <li>• Cleavage of Bonds Homolysis and Heterolysis</li> <li>• Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles.</li> </ul>
Month: October			Module/Unit:	Sub-units planned
4	16	20	<ul style="list-style-type: none"> <li>• Chemistry of aromatic compounds</li> </ul>	<ul style="list-style-type: none"> <li>• Introduction to Aromatic compounds</li> <li>• Meaning of important terms</li> <li>• Huckels Rule and their applications</li> <li>• Aromatic electrophilic substitution reaction</li> </ul>
Month: November			Module/Unit:	Sub-units planned
2	08	10	<ul style="list-style-type: none"> <li>• Chemistry of aliphatic and aromatic compounds</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanism of nitration, sulphonation, halogenations</li> <li>• Friedel craft alkylation &amp; acylation</li> </ul>

*Satish S. Kadam*

Mr. S. S. Kadam



*Dr. S. D. Shirke*

Dr. S. D. Shirke  
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## Vivekanand College, Kolhapur (Autonomous)

### Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. I Sem-I (Open elective) Department: Chemistry

Subject: Chemistry

Course Title: OEC03-Fundamental of Organic Chemistry

Name of the Teacher: Mr. Satish Suresh Kadam

Month: July			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Introduction	<ul style="list-style-type: none"> <li>• General Introduction</li> <li>• Discussion on Syllabus</li> <li>• Basic terms in organic Chemistry</li> </ul>
03	-	03		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Fundamentals of Organic Chemistry	<ul style="list-style-type: none"> <li>• General introduction</li> <li>• Reactive Intermediates: Carbocations, Carbanions and free radicals</li> </ul>
4	16	20		
Month: September			Module/Unit:	Sub-units planned
4	16	20	Fundamentals of Organic Chemistry	<ul style="list-style-type: none"> <li>• Carbene, Nitrene, Benzyne</li> <li>• Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation.</li> <li>• Cleavage of Bonds Homolysis and Heterolysis</li> <li>• Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles.</li> </ul>
Month: October			Module/Unit:	Sub-units planned
• 4	• 16	• 20	Chemistry of aliphatic & aromatic compounds	<ul style="list-style-type: none"> <li>• Introduction to Aliphatic compounds</li> <li>• Meaning of important terms</li> <li>• Huckels Rule and their applications</li> <li>• Aromatic electrophilic substitution reaction</li> <li>•</li> </ul>
Month: November			Module/Unit:	Sub-units planned
2	08	10	Chemistry of aliphatic and aromatic compounds	<ul style="list-style-type: none"> <li>• Mechanism of nitration, sulphonation, halogenations</li> <li>• Friedel craft alkylation &amp; acylation</li> </ul>

  
Mr. S. S. Kadam



  
Dr. S. D. Shirke  
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# Vivekanand College, Kolhapur (Autonomous)

## Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: DSE-1002F1: Physical & Inorganic Chemistry  
DSE-1002F2: Organic & Analytical Chemistry

Name of the Teacher: Mr. Satish Suresh Kadam

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Spectroscopy	<ul style="list-style-type: none"> <li>• Meaning of spectroscopy,</li> <li>• Nature of electromagnetic radiation -wave length, frequency, energy, amplitude, wave number, and their relationship, ,</li> <li>• Types of spectroscopy and advantages of spectroscopic methods.</li> <li>• Energy types and energy levels of atoms and molecules.</li> </ul>
04	-	04		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Ultra-Violet (UV) Spectroscopy	<ul style="list-style-type: none"> <li>• Introduction, Beer-Lamberts law</li> <li>• , Terms used in U.V. Spectroscopy- Chromophore, Auxochrome, Bathochromic shift, hypsochromic shift, hyperchromic and hypochromic effect,</li> <li>• Modes of electromagnetic transitions. Effect of conjugation on position of U.V. band,</li> </ul>
4	28	32		
Month: September			Module/Unit:	Sub-units planned
4	28	32	Ultra-Violet (UV) Spectroscopy	<ul style="list-style-type: none"> <li>• Calculation of <math>\lambda</math>-max by Woodward and Fisher rules for dienes and enones systems,</li> <li>• Colour and visible spectrum,</li> <li>• Applications of U.V. Spectroscopy</li> </ul>
Month: October			Module/Unit:	Sub-units planned
4	28	32	Combined problems based on NMR, IR, UV	<ul style="list-style-type: none"> <li>• To solve Combined problems based on NMR, IR, UV</li> </ul>
Month: November			Module/Unit:	Sub-units planned
4	28	32	Combined problems based on NMR, IR, UV	<ul style="list-style-type: none"> <li>• To solve Combined problems based on NMR, IR, UV</li> </ul>

*Satish S. Kadam*

Mr. S. S. Kadam



*S. D. Shirke*

Dr. S. D. Shirke  
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**Vivekanand College, Kolhapur (Empowered Autonomous)**

**Annual Teaching Plan**

**Academic Year: 2023-24**

**Semesters: M. Sc. II, Sem-III**

**Department: Chemistry**

**Subject: Inorganic Chemistry**

**Course Title: CC – 2101C: Organometallic and Bioinorganic Chemistry**

**Name of the Teacher: Dr. Mrs. Sarita Dattajirao Shinde**

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metal Compounds in Medicine	<ul style="list-style-type: none"> <li>• Medicinal uses of metal complexes as antibacterial, anticancer, antibiotics and antiviral activity of metal complexes,</li> </ul>
3	-	3		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metal Compounds in Medicine	<ul style="list-style-type: none"> <li>• Use of cis-platin as antitumor drug,</li> <li>• Metal deficiency and diseases: iron, zinc and copper deficiency,</li> <li>• Use of metals and metal compounds in the diagnosis and chemotherapy,</li> </ul>
4	-	4		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metal Compounds in Medicine	<ul style="list-style-type: none"> <li>• Chemotherapy with compounds of some non essential elements;</li> <li>• Chelate therapy,</li> <li>• Gold and gold complexes as anticancer drugs and their use in therapy of Rheumatic-Arthritis,</li> </ul>
5	-	5		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metal Compounds in Medicine	<ul style="list-style-type: none"> <li>• Use of Lithium complexes as psycho pharmacological drugs.</li> </ul>
2	-	2		

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**Dr. S. D. Shinde**



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## Annual Teaching Plan

Academic Year: 2023-24

Semesters: M. Sc. II, Sem-III

Department: Chemistry

Subject: Analytical Chemistry

Paper No. - IX: Advanced Analytical Technique

Name of the Teacher: Dr. Mrs. Sarita Dattajirao Shinde

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Nanotechnology and Nano Chemistry	<ul style="list-style-type: none"> <li>• Definition of nanomaterials and nanotechnology,</li> <li>• significance of nanotechnology,</li> <li>• size and properties,</li> </ul>
3	-	3		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Nanotechnology and Nano Chemistry	<ul style="list-style-type: none"> <li>• types of nanomaterials like 0D (quantum dots), 1D, 2D and 3D,</li> <li>• introduction to physical, chemical and biological synthesis of nanomaterials with suitable examples,</li> <li>• top down and bottom-up approach,</li> </ul>
4	-	4		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Nanotechnology and Nano Chemistry	<ul style="list-style-type: none"> <li>• chemical synthesis of nanomaterials - Different types and processes for synthesis of nanomaterials using wet chemical approaches.</li> <li>• Fabricating nanomaterials with different morphology intended for specific applications,</li> </ul>
5	-	5		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Nanotechnology and Nano Chemistry	<ul style="list-style-type: none"> <li>• Applications of Nanotechnology</li> </ul>
2	-	2		



Dr. S. D. Shinde




Dr. S. D. Shirke

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Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: 1002E2: Inorganic Chemistry

Name of the Teacher: Dr. Mrs. Sarita Dattajirao Shinde

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metals, Semiconductors, Superconductors and Nanomaterials	<ul style="list-style-type: none"> <li>• Introduction, Properties of metallic solids.</li> <li>• Theories of bonding in metal. i) Free electron theory. ii) Molecular orbital theory (Band theory).</li> <li>• Classification of solids as conductor, insulators and semiconductors on the basis of band theory.</li> <li>• Semiconductors. Types of semiconductors - intrinsic and extrinsic semiconductors.</li> <li>• Applications of semiconductors.</li> </ul>
05	-	05		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metals, Semiconductors, Superconductors and Nanomaterials	<ul style="list-style-type: none"> <li>• Superconductors: Ceramic superconductors - Preparation and structures of mixed oxide <math>YBa_2Cu_3O_{7-x}</math></li> <li>• Applications of superconductors.</li> <li>• Introduction and Importance of nanomaterials,</li> <li>• Properties (Comparison between bulk and nanomaterials): i) Optical properties ii) Electrical conductivity and iii) Mechanical properties,</li> <li>• Methods of preparation: Top-down, bottom-up fabrication a) Co-precipitation method b) Sol-gel method c) Chemical reduction method d) Hydrothermal method,</li> <li>• Applications of Nanomaterials.</li> <li>• Preparation of tetra amine copper (II) sulphate.</li> <li>• Preparation of ammonium diamminetetra thiocyanatochromate (III)</li> <li>• Preparation of tris(thiourea) cuprous sulphate.</li> </ul>
10	21	31		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Acids, Bases and Non aqueous Solvents	<ul style="list-style-type: none"> <li>• Introduction to theories of Acids and Bases – Arrhenius concept, Bronsted-Lowry concept, Lewis Concept, Lux-Flood Concept (definition and examples),</li> <li>• Hard and Soft Acids and Bases (HSAB Concept), Classification of acids and bases as hard, soft and borderline, Pearson's HSAB concept, Acid – Base strength and hardness-softness,</li> <li>• Applications and limitations of HSAB principle.</li> <li>• Determination of percentage purity of tetrammine copper (II) sulphate.</li> <li>• Determination of percentage purity of ferrous ammonium sulphate.</li> <li>• Determination of percentage purity of potassium trioxalato aluminate.</li> <li>• Preparation of Urea formaldehyde resin.</li> </ul>
10	28	38		



Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Acids, Bases and Non aqueous Solvents	<ul style="list-style-type: none"> <li>• Introduction, definition and characteristics of solvents,</li> <li>• Classification of solvents, Physical properties and Acid-Base reactions in Liquid Ammonia (NH<sub>3</sub>) and Liquid Sulphur Dioxide (SO<sub>2</sub>).</li> <li>• Gravimetric estimation of aluminium as aluminium oxide from the given solution containing potash alum, copper sulphate and free sulphuric acid.</li> <li>• Gravimetric estimation of barium as barium sulphate from the given solution containing barium chloride, ferric chloride and free hydrochloric acid.</li> <li>• Gravimetric estimation of iron as ferric oxide from the given solution containing ferrous ammonium sulphate, copper sulphate and free sulphuric acid.</li> <li>• Preparation of sodium cuprous thiosulphate</li> </ul>
5	28	33		
Month : November			-	<ul style="list-style-type: none"> <li>• Theory Examination</li> </ul>



Dr. S. D. Shinde




Dr. S. D. Shirke

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Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2023-24

Semesters: B. Sc. II, Sem-III

Department: Chemistry

Subject: Chemistry

Course Title: Chemistry Practicals

Name of the Teacher: Dr. Mrs. Sarita Dattajirao Shinde

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> <li>To determine the unknown concentration of given coloured compounds (<math>\text{KMnO}_4/\text{CuSO}_4</math>) colorimetrically.</li> <li>Estimation of (i) <math>\text{Mg}^{2+}</math> or (ii) <math>\text{Zn}^{2+}</math> by complexometric titrations using EDTA.</li> <li>Preparation of Tetrammine Copper Sulphate.</li> <li>Preparation of Ferrous ammonium sulphate (Mohr's salt).</li> </ul>
-	16	16		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> <li>Organic Spotting: Carboxylic acids, phenolic,</li> <li>Estimate the amount of metal present in a given solution gravimetrically- Fe as <math>\text{Fe}(\text{OH})_3</math></li> <li>To determine volumetrically the amounts of sodium carbonate and sodium hydroxide present together in the given solution.</li> </ul>
-	16	16		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> <li>Organic Spotting: aldehydic, ketonic, amide, nitro, amines</li> <li>Determination of alkali content of antacid tablet using HCl.</li> <li>To estimate <math>\text{H}_2\text{O}_2</math> by Iodometric method.</li> <li>Preparation of Potash Alum.</li> </ul>
-	16	16		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> <li>To determine Cell Constant of the given Conductivity cell and to verify Ostwald dilution law using acetic acid Solution Conductometrically.</li> <li>To determine the normality of given strong acid and weak acid by titrating it against strong base Conductometrically.</li> </ul>
-	8	8		

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Dr. S. D. Shinde



*Shirke*

Dr. S. D. Shirke  
HEAD  
DEPARTMENT OF CHEMISTRY  
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Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2023-24

Semesters: B. Sc. I (OE), Sem-I

Department: Chemistry

Subject: Chemistry


Course Title: DSC03CHE11: Inorganic Chemistry

Name of the Teacher: Dr. Mrs. Sarita Dattajirao Shinde

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements	<ul style="list-style-type: none"> <li>Quantum numbers and their significance,</li> <li>Shapes of s, p and d atomic orbitals,</li> <li>Electrons filling rules in various orbitals: a) Aufbau's principle b) Hund's rule of maximum multiplicity c) Pauli's exclusion principle,</li> </ul>
2	-	2		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements,	<ul style="list-style-type: none"> <li>Electronic configuration of elements.</li> <li>Stability of empty, half-filled and completely filled orbitals,</li> <li>Periodicity General discussion of the following properties of the elements with reference to s block elements: a) electronic configuration b) atomic radii c) ionic radii d) ionization energy</li> <li>Water analysis</li> <li>To prepare standard 0.1 N <math>KMnO_4</math> solution and to determine the strength of given oxalic acid solutions.</li> <li>To determine quantity of Fe (II) ions from the given solutions by titrating it with 0.1 N <math>K_2Cr_2O_7</math> solutions by using internal indicator.</li> <li>Estimation of amount of Acetic acid from the given vinegar sample by titrimetric method.</li> </ul>
2	16	18		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Acids and Bases	<ul style="list-style-type: none"> <li>e) electron affinity f) electronegativity g) metallic characters h) reactivity i) oxidation state j) melting and boiling points</li> <li>Chemical properties of the elements</li> <li>Introduction to theories of Acids and Bases</li> <li>Arrhenius concept</li> <li>Estimation of Aniline</li> <li>Estimation of Acetamide</li> <li>Estimation of Aspirin from given pharmaceutical tablet.</li> </ul>
4	16	20		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Acids and Bases	<ul style="list-style-type: none"> <li>Bronsted- Lowry concept</li> <li>Lewis concept</li> <li>Lux-Flood concept</li> <li>Theory Examination</li> </ul>
2	-	2		

  
Dr. S. D. Shinde



  
Dr. S. D. Shirke  
HEAD  
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Annual Teaching Plan

Academic Year: 2023-24

Semesters: B. Sc. I (Maj+Min), Sem-I Department: Chemistry

Subject: Chemistry

Course Title: DSC03CHE11: Inorganic Chemistry

Name of the Teacher: Dr. Mrs. Sarita Dattajirao Shinde

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements	<ul style="list-style-type: none"> <li>• Introduction to atom</li> <li>• Bohr's theory of hydrogen atom and its limitations, Wave particle duality,</li> <li>• Heisenberg uncertainty principle,</li> </ul>
2	-	2		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements	<ul style="list-style-type: none"> <li>• Quantum numbers and their significance,</li> <li>• Shapes of s, p and d atomic orbitals,</li> <li>• Electrons filling rules in various orbitals: a) Aufbau's principle b) Hunds rule of maximum multiplicity c) Pauli's exclusion principle,</li> <li>• Electronic configuration of elements.</li> <li>• Stability of empty, half-filled and completely filled orbitals,</li> <li>• Periodicity General discussion of the following properties of the elements with reference to s block elements: a) electronic configuration b) atomic radii c) ionic radii d) ionization energy e) electron affinity f) electronegativity g) metallic characters h) reactivity i) oxidation state j) melting and boiling points</li> </ul>
4	-	4		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements,  Acids and Bases	<ul style="list-style-type: none"> <li>• Chemical properties of the elements</li> <li>• Theories of Acids and Bases: Arrhenius concept, Bronsted-Lowry concept, Lewis concept, Lux-Flood concept. (Definition and examples only).</li> <li>• Hard and Soft Acids and Bases (HSAB concept).</li> <li>• Classification of Acids and Bases as hard soft and borderline.</li> <li>• Pearson's HSAB concept.</li> <li>• Acid-Base strength and hardness-softness.</li> <li>• Application and limitations of HSAB concept.</li> <li>• Water analysis: To determine the alkalinity of water sample by using Phenolphthaline and Methyl Orange Indicator</li> <li>• To prepare standard 0.1 N <math>\text{KMnO}_4</math> solution and to determine the strength of given oxalic acid solutions.</li> <li>• To determine quantity of Fe (II) ions from the given solutions by titrating it with 0.1 N <math>\text{K}_2\text{Cr}_2\text{O}_7</math> solutions by using internal indicator.</li> <li>• Estimation of amount of Acetic acid from the given vinegar sample by titrimetric method.</li> </ul>
4	16	20		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	p-Block	<ul style="list-style-type: none"> <li>• Position of elements in periodic table.</li> </ul>

4	16	24	Elements (Group 13, 14, 15)	<ul style="list-style-type: none"> <li>• Characteristics of group 13<sup>th</sup>, 14<sup>th</sup> and 15<sup>th</sup> elements with special reference to electronic configuration and periodic properties.</li> <li>• Compounds of group 13<sup>th</sup>, 14<sup>th</sup> and 15<sup>th</sup> elements.</li> <li>• Boron-diborane (only structure).</li> <li>• Estimation of Aniline</li> <li>• Estimation of Acetamide</li> <li>• Estimation of Aspirin from given pharmaceutical tablet.</li> <li>• Preparation and purification of Oximes of ketones.</li> </ul>
Month : November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	p-Block Elements (Group 13, 14, 15)	<ul style="list-style-type: none"> <li>• Allotropes of carbon and phosphorus.</li> <li>• Oxyacids of Nitrogen (HNO<sub>2</sub>, HNO<sub>3</sub>).</li> <li>• Theory Examination</li> </ul>
02	-	02		

  
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Dr. S. D. Shirke  
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# Vivekanand College, Kolhapur (Autonomous)

## Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. II (A+B), Sem-III

Department: Chemistry

Subject: Chemistry

Course Title: DSC-1002C-Part-I: Physical Chemistry and

DSC-1002C-Part-II: Analytical & Industrial Chemistry

Name of the Teacher: Dr. Asmita Shashikant Tapase

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Chemical Kinetics	<ul style="list-style-type: none"> <li>Introduction, The concept of reaction rates, order and molecularity of a reaction, zero, first order reaction (Derivation not expected).</li> </ul>
06	-	06		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical Kinetics	<ul style="list-style-type: none"> <li>Second order reactions (both for equal and unequal concentrations of reactants) of general equations for rate constants, Characteristic properties of second order reaction, examples. General methods for determination of order of a reaction</li> <li>Concept of activation energy: Activated complex theory and Collision Theory and calculation of activation energy by Arrhenius equation, Numerical Problems.</li> </ul>
08	16	24		
			Electrochemistry	<ul style="list-style-type: none"> <li>Introduction, molar and equivalence conductance,</li> <li>Relation between equivalent and molar conductance</li> <li>Transference number and its experimental determination</li> <li>Kohlraush law</li> <li>Applications</li> </ul>
Month: September			Module/Unit:	Sub-units planned
6	12	18	Electrochemistry	<ul style="list-style-type: none"> <li>Determination of degree of ionization of weak and strong electrolyte</li> <li>Conductometric titrations</li> </ul>
Month: October			Module/Unit:	Sub-units planned
12	16	28	Conductometric Titration	<ul style="list-style-type: none"> <li>Introduction, Conductometric Titrations: Basic principles, experimental set up titration curves in the titration of (i) strong acid vs, strong base, (ii) weak acid vs, strong base, (iii) weak acid vs weak base, (iv) Mixture of strong and weak acid/strong weak base vs, strong base/weak base or strong acid/weak acid</li> </ul>
Month: November			Module/Unit:	Sub-units planned
03	-	03	Conductometric Titration	<ul style="list-style-type: none"> <li>(v) sodium chloride vs silver nitrate (vi) barium hydroxide vs magnesium sulphate advantages and limitations</li> </ul>

  
Dr. A. S. Tapase



  
Dr. S. D. Shirke

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# Vivekanand College, Kolhapur (Autonomous)

## Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: DSE-1002E1: Physical & Inorganic Chemistry

Name of the Teacher: Dr. Asmita Shashikant Tapase

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Quantum Theory	<ul style="list-style-type: none"> <li>Introduction, Dual nature of matter and energy: De Broglie hypothesis, The Heisenberg's uncertainty principle, Concept of energy operators (Hamiltonian), Derivation of Schrodinger wave equation, Physical interpretation of <math>\psi</math> and <math>\psi^2</math>, Particle in a one dimensional box, Schrodinger wave equation for hydrogen atom, Concept of quantum numbers.</li> </ul>
09	-	09		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Quantum Theory	<ul style="list-style-type: none"> <li>The Heisenberg's uncertainty principle, Concept of energy operators (Hamiltonian), Derivation of Schrodinger wave equation, Physical interpretation of <math>\psi</math> and <math>\psi^2</math>, Particle in a one dimensional box, Schrodinger wave equation for hydrogen atom, Concept of quantum numbers.</li> </ul>
9	30	39		
Month: October			Module/Unit:	Sub-units planned
12	42	54	Quantum Theory Photochemistry	Particle in a one dimensional box, Schrodinger wave equation for hydrogen atom, Concept of quantum numbers.  Introduction - Difference between thermal and photochemical processes. Laws of photochemistry: i) Grothus-Draper law, ii) Lambert law, iii) Lambert-Beer's law (with derivations), iv) Stark-Einstein law Quantum yield, reasons for high and low quantum yield, Factors affecting Quantum yield, Photosensitized reactions-dissociation of H <sub>2</sub> , photosynthesis, Photo-dimerization of anthracene, decomposition of HI and HBr, Photophysical and photochemical processes
Month: November			Module/Unit:	Sub-units planned
03	-	03	Photochemistry	Jablonaski diagram depicting various processes occurring in the excited state: Qualitative description of fluorescence and phosphorescence, Chemiluminescence, Electroluminescence, Numerical problems

*Asmita*  
Dr. A. S. Tapase



*S. D. Shirke*

Dr. S. D. Shirke  
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# Vivekanand College, Kolhapur (Autonomous)

## Annual Teaching Plan

Academic Year: 2023-24

Semesters: M.Sc. II, Sem-I

Department: Chemistry

Subject: Chemistry

Course Title: Material Science

Name of the Teacher: Dr. Asmita Shashikant Tapase

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Magnetic Materials	Introduction, Atomic magnetism and solids,
03	-	03		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Magnetic Materials	type of magnetic materials, exchange interactions, hysteresis loop and their classification,
04	-	04		
Month: October			Module/Unit:	Sub-units planned
04	-	04	Magnetic Materials	calculation of magnetic moment from saturation magnetization magnetic domains, examples of magnetic materials,
Month: November			Module/Unit:	Sub-units planned
04	-	04	Magnetic Materials	soft & hard ferrites, structure & magnetic interactions in spinel, garnet hexagonal ferrites,

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Dr. A. S. Tapase



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Dr. S. D. Shirke

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# Vivekanand College, Kolhapur (Autonomous)

## Annual Teaching Plan

Academic Year: 2023-24

Semesters: M.Sc. I, Sem-I

Department: Chemistry

Subject: Chemistry

Course Title: Analytical Chemistry

Name of the Teacher: Dr. Asmita Shashikant Tapase

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Surface characterization by spectroscopy	Introduction a) Electron scattering chemical analysis or X-ray photoelectron spectroscopy Principle, instrumentation, qualitative and quantitative applications
03	-	03		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Surface characterization by spectroscopy	b) Auger spectroscopy Principle, instrumentation, qualitative and quantitative applications c) Secondary ion-mass spectrometry Principle, instrumentation, qualitative and quantitative applications d) Ion scattering and Rutherford backscattering spectroscopy Principle, instrumentation, qualitative and quantitative applications
04	-	04		
Month: October			Module/Unit:	Sub-units planned
04	-	04	Magnetic Materials	calculation of magnetic moment from saturation magnetization magnetic domains, examples of magnetic materials,
Month: November			Module/Unit:	Sub-units planned
04	-	04	Magnetic Materials	soft & hard ferrites, structure & magnetic interactions in spinel, garnet hexagonal ferrites,

*Asmita*

Dr. A. S. Tapase



*S. D. Shirke*

Dr. S. D. Shirke

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**Vivekanand College, Kolhapur (Empowered Autonomous)**  
**Annual Teaching Plan**  
**Academic Year - 2023-24 (Sem I & III)**  
**Department- Chemistry**  
**Name of the Teacher – Dr. D. S. Gaikwad**

<b>Month – July</b>					
<b>M.Sc.II Sem III :- Course Title:- Organic Chemistry (Paper: Advanced synthetic methods)</b>					
Lectures	Practicals	Total		Unit	Subunit planned
08	24	32		Applications of following metal in organic synthesis	Introduction to organometallic chemistry, Applications of palladium and Rhodium metal in organic synthesis.
<b>Month – August</b>					
<b>M.Sc.I Sem I (NEP):- Course Title:- Organic Chemistry (Optional elective)</b>					
Lectures	Practicals	Total		Unit	Sub-Units Planned
02	--	02		Organometallic chemistry	Applications of Gilman reagent in organic synthesis.
<b>M.Sc.II Sem III :- Course Title:- Organic Chemistry (Paper: Advanced synthetic methods)</b>					
Lectures	Practicals	Total		Unit	Sub-Units Planned
12	54	66		Applications of following metal in organic synthesis	Applications of Magnesium, Silicon and Thallium metal in organic synthesis.
				Mass Spectrometry	Mass Spectrometry Introduction, ion production- EI, CI, FD and FAB, factors affecting fragmentation, ion analysis, ion abundance;
<b>M.Sc. II Sem III :- Course Title:- Analytical Chemistry (Organoanalytical chemistry)</b>					
Lectures	Practicals	Total		Unit	Sub-Units Planned
03	--	03		Hyphenated Techniques	Introduction to hyphenated techniques: Introduction and principal of UV and IR spectroscopy.
<b>Month – September</b>					
<b>M.Sc.I Sem I (NEP):- Course Title:- Organic Chemistry (Optional elective)</b>					
Lectures	Practicals	Total		Unit	Sub-Units Planned
03	--	03		Organometallic chemistry	Applications of lithium, cobalt and Zinc in organic synthesis.

<b>M.Sc.II Sem III :- Course Title:- Organic Chemistry (paper: Advanced spectroscopic methods)</b>				
Lectures	Practicals	Total	Unit	Subunit planned
12	32	44	Mass Spectrometry	Mass spectral fragmentation of aldehydes, ketones, aromatic hydrocarbons, carboxylic acids, ethers, alcohols, amines, nitro, cyano compounds; molecular ion peak, metastable ion peak; High resolution mass spectrometry (HRMS), MALDI, TOF; Problems associated with Mass Spectroscopy.
			Combined spectral problems	Structural problems based on combined spectroscopic techniques (including reaction sequences)

**M.Sc.I Sem I (NEP):- Course Title:- Organic Chemistry (Optional elective)**

Lectures	Practicals	Total	Unit	Sub-Units Planned
03	--	03	Organometallic chemistry	Applications of lithium, cobalt and Zinc in organic synthesis.

**Month – October**

**M.Sc.I Sem I (NEP):- Course Title:- Organic Chemistry (Optional elective)**

Lectures	Practicals	Total	Unit	Sub-Units Planned
03	--	03	Organometallic chemistry	Applications of Mercury, Titanium and Aluminium in organic synthesis.

**M.Sc.II Sem III :- Course Title:- Organic Chemistry**

Lectures	Practicals	Total	Unit	Sub-Units Planned
12	24	36	Carbon-13 NMR Spectroscopy	General introduction to <sup>13</sup> C NMR spectroscopy; chemical shift values [aliphatic, olefinic, alkyne, aromatic, heteroaromatic and carbonyl compounds]; proton coupled, proton decoupled <sup>13</sup> C NMR spectra, advanced <sup>13</sup> C NMR techniques (NOE, DEPT, Off resonance, HETCOR), Heteronuclear coupling, problems associated with <sup>13</sup> C NMR.

			Combined spectral problems	Structural problems based on combined spectroscopic techniques (including reaction sequences)
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**M.Sc. II Sem III :- Course Title:- Analytical Chemistry (Organoanalytical chemistry)**

Lectures	Practicals	Total	Unit	Sub-Units Planned
03	--	03	Hyphenated Techniques	Introduction to hyphenated techniques: Introduction and principal of NMR and Mass spectroscopy.

Month – November

**M.Sc.II Sem III :- Course Title:- Organic Chemistry**

Lectures	Practicals	Total	Unit	Sub-Units Planned
02	--	02	Combined spectral problems	Structural problems based on combined spectroscopic techniques (including reaction sequences)

**M.Sc.I Sem I (NEP):- Course Title:- Organic Chemistry (Optional elective)**

Lectures	Practicals	Total	Unit	Sub-Units Planned
02	--	02	Organometallic chemistry	previous years question papers discussion and revision of the overall topic.

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Dr. D. S. Gaikwad



*S. D. Shirke*

Dr. Mrs. S. D. Shirke  
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**Vivekanand College, Kolhapur (Empowered Autonomous)**

Department of Chemistry  
Academic Year: 2023-24

**Annual Teaching Plan**

Name of the teacher: Mr. A. T. Mane

Programme : M.Sc. I Semester I

Subject: Chemistry Course Title: Inorganic Chemistry

Month : July/August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1)Chemistry of transition elements	General properties of transition elements, crystal field theory, crystal field stabilisation energy (CFSE), spectrochemical series, Jahn- Teller effect,.
10+ 05	12	27	2)Electronic, Electric and Optical behaviour of Inorganic materials	
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1)Bioinorganic Chemistry	Role of metal ions in biological processes, , cytochromes, ferredoxins and iron sulphur proteins, metal ion transport and storage: PS-I, PS -II, , metal complexes in medicines.  purification of semiconducting materials, , semiconductor devices, rectifier transistors, optical devices, photoconductors, photovoltaic cells, solar batteries.
5+ 10	12	27	2)Electronic, Electric and Optical behaviour of Inorganic materials	
Month Oct./ Nov.			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1) Nuclear and radiochemistry	Nuclear stability and nuclear binding energy, , classification of nuclear reactions, Q value, nuclear reaction cross-sections, , applications of radioactivity
5	10	15		

Programme : M.Sc. I Semester II

Subject: Chemistry Course Title: Inorganic Chemistry

Month January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemistry of non – Transition elements	General discussion on the properties of the non – transition elements, special features of individual elements, synthesis, properties and structure of halides and oxides of the non – transition elements,
4	08	12		
Month February			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemistry of non – Transition elements	Polymorphism in carbon, phosphorous and sulphur
4	08	12		
Month March			Module/Unit:	
Lectures	Practicals	Total	Chemistry of non – Transition elements	Synthesis, properties and structure of boranes, carboranes, silicates, carbides, phosphazenes, sulphur – nitrogen compounds,
4	08	12		
Month April			Module/Unit:	
Lectures	Practicals	Total	Chemistry of non – Transition elements	peroxo compounds of boron, carbon, sulphur, structure and bonding in oxyacids of nitrogen, phosphorous, sulphur and halogens, interhalogens, pseudohalides
4	08	12		



Mr. A. T. Mane



Dr. Mrs. S. D. Shirke

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# Vivekanand College, Kolhapur (Empowered Autonomous)

Department of Chemistry

Academic Year: 2023-24

## Annual Teaching Plan

Name of the teacher: Mr. A. T. Mane

Programme : M.Sc. II Semester III

Subject: Chemistry Course Title: Inorganic Chemistry

Month : July/August			Module/Unit:	Sub-units planned
Lectures 07	Practicals -	Total 07	Photochemistry of Metal Complexes	Absorption, Excitation, Photochemical laws, Quantum yield, Electronically excited states of Metal complexes, of coordination compounds,
Month : September			Module/Unit:	Sub-units planned
Lectures 08	Practicals -	Total 08	Photochemistry of Metal Complexes	Types of photochemical reactions; substitution reactions, rearrangement reactions and redox reactions, Photochemistry
Month : October			Module/Unit:	Sub-units planned
Lectures 07	Practicals -	Total 08	Magnetic Properties of Transition Metal Complexes	Types of magnetic behaviour, Diamagnetism, Origin of paramagnetism, Temperature dependent paramagnetism, Spin-orbit interaction, Pascal constants,
Month : November			Module/Unit:	Sub-units planned
Lectures 08	Practicals -	Total 08	Magnetic Properties of Transition Metal Complexes	Ferromagnetism and antiferromagnetism of metal complexes, Van Vleck's equation: derivation and applications, Spin orbit coupling and magnetic moment, Spins crossover

Month : January			Module/Unit:	Sub-units planned
Lectures 15	Practicals -	Total 15	Mossbauer Spectroscopy	Basic principles of $^{57}\text{Fe}$ Mössbauer spectroscopy, Instrumentation, Mössbauer parameters; recoilless emission and absorption of x-rays, isomer shifts, magnetic dipole hf splitting and electric quadrupole hf splitting, Magnetic hyperfine interaction, Line broadening. Application of Mössbauer spectroscopy
Month : February			Module/Unit:	Sub-units planned
Lectures 15	Practicals -	Total 15	Electron Spin Resonance Spectroscopy	Presentation of spectrum, Hyperfine splitting in proton systems, Rules for evaluating ESR lines of Naphthalene anion radical, Pyrazine anion radical, Isomers of Xylene anion radicals, $\text{VO}_2$ Superhyperfine splitting, Instrumentation, 'g' value and factors affecting on 'g' value, Zero field splitting, Karmers's degeneracy, Applications, Numericals problems.
Month : March			Module/Unit:	Sub-units planned
Lectures 15	Practicals -	Total 15	Coordination Polymers	General introduction, Natural polymers, Synthesis of coordination polymers, Use of polymeric ligands in synthesis of coordination polymers, synthesis and uses of Metal coordination polymers, Silicon polymers and Organosilicon polymers.
Month : April			Module/Unit:	Sub-units planned
Lectures 15	Practicals -	Total 15	Applications of Coordination Compounds	Metal complexes in Inorganic qualitative analysis, The 'brown ring' test, complexometric titrations, Complexes in colourimetry, Coordination compounds in gravimetry, Stabilization of oxidation states, chemistry and therapy: Complexation in food poisoning, Metal Metal complexes in alkene conversions, Complexes in Electroplating, Complexes in Metallurgy,



Mr. A. T. Mane




Dr. Mrs. S. D. Shirke

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Vivekanand College, Kolhapur (Empowered Autonomous)  
 Syllabus Completion Report  
 Academic Year - 2023-24  
 Sem-I, Sem-III,  
 Department - Chemistry  
 Name of the Teacher — Mr. A.T. Mane

Name of the Class	Units Allotted	Units Completed	Remark
M.Sc.I	<b>Unit I :</b> a) Chemistry of transition elements b) Bioinorganic Chemistry <b>Unit II:</b> a) Non-aqueous solvent b) Nuclear and radiochemistry <b>Unit III:</b> Electronic, Electric and Optical behaviour of Inorganic materials	<b>Unit I :</b> a) Chemistry of transition elements b) Bioinorganic Chemistry <b>Unit II:</b> a) Non-aqueous solvent b) Nuclear and radiochemistry <b>Unit III:</b> Electronic, Electric and Optical behaviour of Inorganic materials	Completed
M.Sc.II (Inorganic chemistry)	<b>Unit I:</b> Photochemistry of metal complexes <b>Unit III:</b> Magnetic properties of Transition metal complexes.	<b>Unit I:</b> Photochemistry of metal complexes  <b>Unit III:</b> Magnetic properties of Transition metal complexes.	Completed



Mr. A. T. Mane



Dr. Mrs. S. D. Shirke

  
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**Department of Chemistry**

Academic Year: 2023-24

**Annual Teaching Plan**

Name of the teacher: Miss. S. N. Inamdar

Programme: M.Sc. I Semester I

Subject: Chemistry Course Title: Physical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical kinetics	Introduction to basic concepts, Experimental methods of following kinetics of a reaction.
2	12	14		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical kinetics	chemical and physical (measurement of pressure, volume, EMF, conductance, diffusion current and absorbance) methods and examples. Steady state approximation and study of reaction between N <sub>2</sub> O and F <sub>2</sub> , decomposition of ozone, and nitrogen pentoxide. Ionic reaction: Primary and secondary salt effect.
6	12	18		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical kinetics	<b>Catalysis:</b> Classification of catalysis, mathematical expression of autocatalytic reactions, Michaelis—Menten enzyme catalysis, Homogeneous catalysis: acid and base catalysed reactions.
4	8	12		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical kinetics	Heterogeneous catalysis: Adsorption of gas on a surface and its kinetics, Catalyzed hydrogen-deuterium exchange reaction.
3	8	11		



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**Department of Chemistry**

**Academic Year: 2023-24**

**Annual Teaching Plan**

**Name of the teacher: Miss. S. N. Inamdar**

**Programme: M.Sc. I Semester I**

**Subject: Chemistry Course Title: Inorganic Chemistry**


Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Studies and applications of Lanthanides and Actinides	Occurrence, properties of f-block elements, electronic configuration and oxidation state.
2	-	2		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Studies and applications of Lanthanides and Actinides	Colour, spectral and magnetic properties of lanthanides and actinides Lanthanide contraction Modern methods of separation of lanthanides and actinides.
5	-	5		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Studies and applications of Lanthanides and Actinides	applications of lanthanides and actinides, applications of lanthanide and actinide compounds in industries.
6	-	6		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Studies and applications of Lanthanides and Actinides	Photoluminescence properties of lanthanide compounds, organometallic chemistry of lanthanides and actinides.
2	-	2		

  
Miss. S. N. Inamdar

  
Dr. S. D. Shirke



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**Department of Chemistry**  
Academic Year: 2023-24

**Annual Teaching Plan**

Name of the teacher: Miss. S. N. Inamdar

Programme: M.Sc. I Semester I

Subject: Chemistry Course Title: Analytical Chemistry (Elective)

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Spectroscopic Techniques	<b>Introduction to Spectroscopy:</b> Introduction, region of electromagnetic radiations, definitions and units of wavelength, frequency, energy, amplitude, wave number and their relations, radiation interactions with matter, rotational, vibrational, electronic energy levels, types of spectroscopy methods.
2	-	2		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Spectroscopic Techniques	<b>Raman spectroscopy:</b> Rayleigh and Raman scattering, quantum and classical theories of Raman Effect, pure rotational Raman spectra of linear and symmetric top molecules.
6	-	4		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Spectroscopic Techniques	Raman activity of vibrations, rule of mutual exclusion, vibrational Raman spectra, and rotational fine structure.
4	-	4		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Spectroscopic Techniques	<b>Electronic spectroscopy:</b> Diatomic molecules, selection rules, breakdown of selection rules, Franck-Condon factors, Dissociation energies, Photoelectron spectroscopy of diatomic (N <sub>2</sub> ) and simple polyatomic molecules (1-120, Formaldehyde), Adiabatic and vertical ionization energies, Koopman's theorem. Numerical problems.
4	-	4		



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**Department of Chemistry**

**Academic Year: 2023-24**

**Annual Teaching Plan**

**Name of the teacher: Miss. S. N. Inamdar**

**Programme: M.Sc. II Semester III**

**Subject: Chemistry Course Title: Inorganic Chemistry**

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Oxygen Transport and Storage	Hemocyanin and hemerythrin, Synthetic oxygen carriers: Collmans compound; Vaska's complex.
3	-	3		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Oxygen Transport and Storage	Co(II) Schiff base complexes and Perfluorochemicals (PFCs), Perutz mechanism for structural changes in porphyrin ring system, Oxygenation and deoxygenation,
6	-	6		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Oxygen Transport and Storage	Oxygen adsorption isotherm and cooperativity, Role of globin chain in haemoglobin, Siderophores, Vanadium compounds as insulin mimetic agents in the treatment of diabetics.
6	-	6		



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**Department of Chemistry**  
**Academic Year: 2023-24**

**Annual Teaching Plan**

**Name of the teacher: Miss. S. N. Inamdar**

**Programme: M.Sc. II Semester III**

**Subject: Chemistry Course Title: Inorganic Chemistry**

Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	IR and Raman Spectroscopy	Raman Scattering, Raman Spectrometer: Fourier Transform Raman Spectrometer, Classical and quantum theory,
4	-	4		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	IR and Raman Spectroscopy	Pure rotational and vibrational Raman spectra, Rule of mutual exclusion. Overtone and combination vibrations, Rotational fine structure, Modes of vibrations, Applications, Selection rules for Infrared and Raman spectra, Structure determination using IR and Raman Spectroscopy.
6	-	6		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	IR and Raman Spectroscopy	Principle of IR Spectroscopy, Instrumentation: principle and working, The diatomic vibrating rotator, Vibration- rotation spectrum of carbon monoxide, The vibration of polyatomic molecules, The influence of rotation of the spectra of polyatomic molecules, Applications of IR Spectroscopy.
5	-	5		



Miss. S. N. Inamdar



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**Department of Chemistry**  
**Academic Year: 2023-24**

**Annual Teaching Plan**

Name of the teacher: Miss. S. N. Inamdar

Programme: M.Sc. I Semester I

Subject: Chemistry Practicals Course Title: Physical Chemistry

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> <li>• To determine dissociation constant of trichloroacetic acid from the kinetic data and hydrolysis of ester.</li> <li>• Determination of solubility and solubility product of silver halides by potentiometrically.</li> </ul>
-	12	12		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> <li>• Study of adsorption of acetic acid on charcoal.</li> <li>• Determination of binary mixture of weak and strong acid by potentiometrically.</li> </ul>
-	12	12		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> <li>• To determine normalities and strength of ternary mixture of trichloroacetic acid, monochloroacetic acid and acetic acid against NaOH by conductometrically.</li> <li>• Determination of dissociation constant of dibasic acid pH metrically.</li> </ul>
-	8	8		

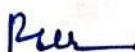


Miss. S. N. Inamdar





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Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2023-24

Semester: M.Sc. II Sem-III

Department: Chemistry

Subject: Chemistry

Course Title: Analytical chemistry

Name of the Teacher: Miss. V.S.Rajmane.

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Voltammetry Techniques	<ul style="list-style-type: none"> <li>• <b>Voltammetry</b></li> <li>• Introduction, Instrumentation., application of Voltammetry.</li> <li>• Cyclic voltammetry</li> <li>• Pulse voltammetry</li> </ul>
8	-	8		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Voltammetry Techniques	<ul style="list-style-type: none"> <li>• <b>Normal Pulse voltammetry</b></li> <li>• Square wave voltammetry</li> <li>• Stripping voltammetry</li> <li>• Cathodic and anodic Stripping voltammetry</li> <li>• Application</li> </ul>
8	-	8		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Ion selective electrodes.	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Terminology</li> <li>• Types and construction of electrodes</li> <li>• Glass electrode</li> <li>• Solid state electrodes</li> <li>• Liquid liquid electrodes</li> <li>• Gas electrodes</li> <li>• Application</li> </ul>
8	-	8		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Electrophoresis	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Paper electrophoresis</li> <li>• Factors affecting migration of ions</li> <li>• Capillary electrophoresis</li> <li>• zone electrophoresis</li> <li>• Application</li> </ul>
8	-	8		

*Rajmane*  
Miss. V.S. Rajmane.

*Dr. S. D. Shirke*

Dr. S. D. Shirke  
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Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2023-24

Semester: M.Sc. II Sem-III Department: Chemistry

Subject: Analytical Chemistry

Course Title: Chemistry Practicals

Name of the Teacher: Miss. V.S. Rajmane

Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	-	
-	5	5		<ul style="list-style-type: none"> <li>To determine amount of tin (Gravimetrically) lead (Gravimetrically) and copper (volumetrically) from give bronze alloy</li> <li>To analysis the sample of galena ore for acid insoluble residue and estimate amount of lead Gravemetrically and iron volumetrically</li> <li>Conductometry</li> <li>p<sup>H</sup> Metry.</li> </ul>
Month: October			Module/Unit:	Sub-units planned
Lectures	Practical	Total	-	
-	5	5		<ul style="list-style-type: none"> <li>To estimate amount of aspirin from given pharmaceutical tablet.</li> <li>To determine amount of vitamin-C from given pharmaceutical tablet.</li> <li>To estimate amount of salicyclic acid and benzoic acid from supplied medicated powder sample.</li> <li>Jobs method</li> <li>Conductometry-I</li> </ul>
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	-	
-	5	5		<ul style="list-style-type: none"> <li>Estimation of antacid tablet.</li> <li>Estimation of sulpha drug.</li> <li>Salinity of water</li> <li>Potentiometry-I</li> <li>Potentiometry-II</li> </ul>

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Miss. V.S. Rajmane.

*S. D. Shirke*

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Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2023-24

Semester: M.Sc. I Sem-I

Department: Chemistry

Subject: Chemistry

Course Title: Analytical chemistry


Name of the Teacher: Miss. V.S. Rajmane.

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Electroanalytical Chemistry	<ul style="list-style-type: none"> <li>• <b>Polarography:</b> Introduction, Instrumentation, Ilkovic equation and its verification. Polarographic measurement. Dropping mercury electrodes, application of polarography.</li> </ul>
8	-	8		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Electroanalytical Chemistry	<ul style="list-style-type: none"> <li>• <b>Amperometry:</b> <ul style="list-style-type: none"> <li>• Basic principle, Instrumentation, Amperometric titration curves Amperometric Indicators, application of amperometry.</li> <li>• <b>Voltammetry :</b> Basic principle, Instrumentation quantitative and qualitative aspects of voltammetry quantitative application of voltammetry.</li> </ul> </li> </ul>
8	-	8		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Atomic absorption and inductively coupled plasma spectroscopy.	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Principle</li> <li>• Difference between AAS and FES</li> <li>• Advantages of AAS over FES</li> <li>• Advantages and disadvantages of AAS</li> <li>• Instrumentation of AAS</li> </ul>
8	-	8		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Inductively coupled plasma spectroscopy.	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Nebulisation torch, plasma, Instrumentation of ICP Interference and Application .</li> </ul>
8	-	8		

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Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2023-24

Semester: M.Sc. II Sem-III

Department: Chemistry

Subject: Chemistry

Course Title: Organic chemistry

Name of the Teacher: Miss. V.S.Rajmane.

Month: August			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Heterocycles	<ul style="list-style-type: none"> <li>• Introduction of Heterocycles</li> <li>• Synthesis of furan and electrophilic reaction of furan</li> <li>• Synthesis of benzofuran and electrophilic reaction of benzofuran</li> <li>•</li> </ul>
4	-	4		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Five membered Heterocycles	<ul style="list-style-type: none"> <li>• Synthesis of pyrrole and electrophilic reaction of furan</li> <li>• Synthesis of benzopyrrole and electrophilic reaction of benzopyrrole</li> </ul>
4	-	4		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Six membered Heterocycles with one heteroatoms.	<ul style="list-style-type: none"> <li>• Introduction of Heterocycles</li> <li>• Synthesis of thiophene and electrophilic reaction of thiophene</li> <li>• Synthesis of benzothiophene and electrophilic reaction of benzothiophene</li> </ul>
4	-	4		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Six membered Heterocycles with one heteroatoms	<ul style="list-style-type: none"> <li>• Synthesis and reaction of pyridine</li> <li>• Synthesis and reaction of Quinoline</li> <li>• Synthesis and reaction of Coumarine</li> </ul>
4	-	4		

*V.S. Rajmane*  
Miss. V.S. Rajmane.

*S. D. Shirke*

Dr. S. D. Shirke  
HEAD  
DEPARTMENT OF CHEMISTRY  
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# Vivekanand College, Kolhapur (Empowered Autonomous)

## Syllabus Completion Report

Academic Year - 2023-24

Sem- I, Sem- III

Department - Chemistry

Name of the teacher: Miss. V.S. Rajmane

Name of the class	Units Allotted	Units Completed	Remark
M.Sc. I ( Analytical chemistry)	<ul style="list-style-type: none"><li>• Electroanalytical chemistry</li><li>• Atomic absorption and inductively coupled plasma spectroscopy</li></ul>	<ul style="list-style-type: none"><li>• Electroanalytical chemistry</li><li>• Atomic absorption and inductively coupled plasma spectroscopy</li></ul>	Completed
M.Sc. II (organic chemistry)	<ul style="list-style-type: none"><li>• Heterocycles</li></ul>	<ul style="list-style-type: none"><li>• Heterocycles</li></ul>	Completed
M.Sc. II (Analytical chemistry)	<ul style="list-style-type: none"><li>• Voltammetry Techniques</li><li>• Ion selective electrodes and electrophoresis.</li></ul>	<ul style="list-style-type: none"><li>• Voltammetry Techniques</li><li>• Ion selective electrodes and electrophoresis.</li></ul>	Completed

*Rajmane*

Miss. V.S. Rajmane

*Dr. S. D. Shrike*

Dr. S. D. Shrike

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# Vivekanand College, Kolhapur (Autonomous)

## Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. I, Sem-I


Department: Chemistry

Subject: Chemistry

Course Title: Chemistry Practical

Name of the Teacher: Miss. Shubhangi Hanmantrao Deshmukh

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"><li>Standardisation Of FAS</li></ul>
-	04	04		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"><li>Standardisation Of Oxalic acid</li><li>Estimation of Acetamide</li><li>Alkalinity Of Water</li></ul>
-	12	12		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"><li>Analysis of Vinegar Sample</li><li>Estimation of Aniline</li><li>Organic spotting-2</li></ul>
-	16	16		

  
Miss. Deshmukh S.H.



  
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# Vivekanand College, Kolhapur (Autonomous)

## Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. II Sem- III

Department: Chemistry

Subject: Physical Chemistry

Course Title: DSC-1002C1-Part-I: Physical Chemistry

Name of the Teacher: Miss. Shubhangi Hanmantrao Deshmukh

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Physical Properties Of Liquids	<ul style="list-style-type: none"><li>Introduction, Classification Of Physical properties, Surface Tension and its Determination.</li></ul>
02	-	02		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Physical Properties Of Liquids	<ul style="list-style-type: none"><li>Determination of surface tension using Stalagmometric and differential capillary methods, Viscosity, Coefficient of Viscosity</li></ul>
2	-	2		
Month: October			Module/Unit:	Sub-units planned
2	-	2	Physical Properties Of Liquids	<ul style="list-style-type: none"><li>Viscosity and its determination using Ostwald's viscometer, Refractive index (Snell's law), Specific and Molecular refractivities and its determination using Abbe's refractometer.</li></ul>



Miss. Deshmukh S. H.



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## Annual Teaching Plan

Academic Year: 2023-24

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: DSE-1002E2: Inorganic Chemistry &  
DSE-1002E4: Analytical Chemistry

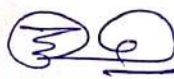
Name of the Teacher: Miss. Shubhangi Hanmantrao Deshmukh

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Molecular orbital Theory (MOT)	Introduction, MOT of octahedral complexes with sigma bonding such as $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ , $[\text{CoF}_6]^{3-}$ , $[\text{Co}(\text{NH}_3)_6]^{3+}$ , Merits and demerits of MOT
04	-	04		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Potentiometry and Colorimetry	<ul style="list-style-type: none"> <li>General Introduction, Potentiometric Titrations (Classical and Analytical methods for locating end points), Types of potentiometric Titration: Acid-Base Titration, Redox Titration,</li> </ul>
03	-	03		
Month: October			Module/Unit:	Sub-units planned
03		03	Potentiometry and Colorimetry	<ul style="list-style-type: none"> <li>Precipitation titration, Advantages of potentiometric titrations, Basic circuit of direct reading potentiometer. Introduction, Lambert's Beer's law, Basic coefficient,</li> </ul>
Month: November			Module/Unit:	Sub-units planned
03		03	Colorimetry	<ul style="list-style-type: none"> <li>Deviation from Beer's law, classification of methods of 'Colour' measurement or comparison- i) Photoelectric Colorimeter method – Single beam photo-electric colorimeter, Determination of unknown concentration by using Concentration-Absorbance plot.</li> </ul>

  
Miss: Deshmukh S. H.



  
PRINCIPAL  
VIVEKANAND COLLEGE, KOLHAPUR  
(EMPOWERED AUTONOMOUS)

  
Dr. S. D. Shirke  
HEAD  
DEPARTMENT OF CHEMISTRY  
VIVEKANAND COLLEGE, KOLHAPUR  
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur  
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Syllabus Completion Report  
Academic Year - 2023-24  
Sem-I, Sem-III, Sem-V  
Department - Chemistry

Name of the Teacher — Miss.S.H.Deshmukh

Name of the Class	Units Allotted	Units Completed	Remark
B.Sc.I	-	-	-
B.Sc.II	<ul style="list-style-type: none"><li>Physical Properties Of Liquids</li></ul>	<ul style="list-style-type: none"><li>Physical Properties Of Liquids</li></ul>	Completed
B.Sc.III	<ul style="list-style-type: none"><li>Molecular orbital Theory (MOT)</li><li>Potentiometry and Colorimetry</li></ul>	<ul style="list-style-type: none"><li>Molecular orbital Theory (MOT)</li><li>Potentiometry and Colorimetry</li></ul>	Completed



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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2023-24 Semesters: BSc III Department: Chemistry

Subject: Chemistry Course Title: Chemistry Theory

Name of the Teacher: Dr. Dr H.V Sanghani

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Catalysis:	<ul style="list-style-type: none"> <li>• Classification of catalytic reaction: Homogenous and heterogeneous catalysis</li> <li>• Types of catalysis</li> <li>• Characteristics of catalytic reaction</li> <li>• Mechanism of Catalysis: Intermediate compound formation theory,</li> <li>• Adsorption theory,</li> </ul>
6		6		
2		2		<ul style="list-style-type: none"> <li>• Industrial application</li> </ul>
Month: September			Module/Unit:	Sub-units planned
Lectures	Practical	Total	General Safety and Safe handling of chemicals	General safety and operational rule. a) Electrical Safety b) Vacuum operations c) Handling of glassware's d) Fume hood safety and ventilation
-	08	06		
Month: October				Sub-units planned
		2	General Safety and Safe handling of chemicals	f. Handling and Transportation of Chemicals g. Chemical spills on surface, guidance for handling of acids, phenols, reactive chemicals, handling of cryogenic liquids, handling of dry ice. h. Waste Management and Disposal Housekeeping

  
Dr. Heena V Sanghani



Dr. S. D. Shirke

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Annual Teaching Plan

Academic Year: 2023-24

Semester: BSc II Department: Chemistry

Subject: Chemistry

Course Title: Chemistry Theory

Name of the Teacher: Dr. Mrs. Dr H.V Sanghani

B.Sc. II				
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Semi Micro Analysis	Semi Micro Analysis Theoretical Principle in Qualitative analysis: Common ion Effect
6		6		
Month: October				
	2		2	Application of complex formation Separation of II Group Separation of IV group Separation and detection of Anions Application of oxidation Reduction Industrial application

*Heena*

Dr. Heena V Sanghani

*S. D. Shirke*

Dr. S. D. Shirke

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Annual Teaching Plan

Academic Year: 2023-24  
Chemistry

Semesters: M.Sc. I Sem-I & MScII Sem III

Department:

Subject: Chemistry

Course Title: Analytical Chemistry

Name of the Teacher: Dr. Heena V Sanghani

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Quality control and Quality Assurance	<ul style="list-style-type: none"> <li>Control Charts: Introduction, concepts and significance, Quality control and statistical techniques: Quality control chart</li> </ul> The X-quality control chart The R-quality control chart Interpretation Problems based on X-Chart and R-Chart <ul style="list-style-type: none"> <li>Quality in Analytical Chemistry</li> <li>C. Good Laboratory Practices:</li> </ul> Pharmaceutical industries, Accreditation of QC Laboratories, ICH <ul style="list-style-type: none"> <li>Guidelines on drug substances and products, Validation of analytical Methods</li> </ul>
15	-	15		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Treatment and analysis of residues	<ul style="list-style-type: none"> <li>Treatment and analysis of phenolic residues</li> <li>Methods of recovery of phenols from liquid Effluents</li> </ul> Methods of recovery of phenols from liquid Effluents <ul style="list-style-type: none"> <li>Organomercurials and its analysis, Analysis of Organochlorine pesticides</li> </ul>
15	-	10		
Month: October			Module/Unit:	Sub-units planned
5		5		<ul style="list-style-type: none"> <li>Organomercurials and its analysis, Analysis of Organochlorine pesticides</li> </ul>



Dr. Heena V Sanghani



Dr. S. D. Shirke

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**Syllabus Completion Report**

Academic Year – 2023-24

Sem-I, Sem-V

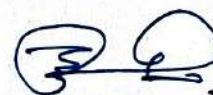
Department- Chemistry

Name of the Teacher – **Mr. S.C. Khilare**

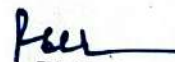
Name of the Class	Units Allotted	Units Completed	Remark
B.Sc.III	<ul style="list-style-type: none"><li>▪ Analysis of Fertilizer</li><li>▪ Organometallic chemistry</li><li>▪ chromatography</li></ul>	<ul style="list-style-type: none"><li>▪ Analysis of Fertilizer</li><li>▪ Organometallic chemistry</li><li>▪ chromatography</li></ul>	Completed
M.Sc.I	<ul style="list-style-type: none"><li>▪ Nuclear Magnetic Resonance</li><li>▪ Mass Spectroscopy</li></ul>	<ul style="list-style-type: none"><li>▪ Nuclear Magnetic Resonance</li><li>▪ Mass Spectroscopy</li></ul>	Completed



Mr. S.C. Khilare



Dr. S. D. Shirke  
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**Annual Teaching Plan**

**Academic Year: 2023-24      Semesters: M.Sc. I Sem-I      Department: Chemistry**

**Subject: Chemistry      Course Title: Inorganic chemistry**

**Name of the Teacher: Miss. P.A.Gholap**

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemistry of Organometallic compound	<ul style="list-style-type: none"> <li>• Synthesis, bonding, structure and reactivity</li> <li>• Classification of organometallic compounds</li> <li>• Reactions in organometallic compounds</li> </ul>
04	-	04		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemistry of Organometallic compound	<ul style="list-style-type: none"> <li>• Classification of organometallic compounds</li> <li>• 18 electron rules</li> </ul>
04	-	04		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemistry of Organometallic compound	<ul style="list-style-type: none"> <li>• Reactions in organometallic compounds</li> </ul>
04	-	04		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemistry of Organometallic compound	<ul style="list-style-type: none"> <li>• Reactions in organometallic compounds</li> </ul>
03	-	03		

Miss.P.A.Gholap.

Dr. S. D. Shrike

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Annual Teaching Plan

Academic Year: 2023-24

Semesters: M.Sc. II, Sem-III

Department: Chemistry

Subject: Chemistry

Course Title: Inorganic Chemistry (Material science)

Name of the Teacher: Miss.P.A.Gholap

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Catalysis	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Theories of catalysis</li> <li>• Kinetics and energetic aspects of catalysis, Selectivity,</li> <li>• Stereochemistry, orbital symmetry and reactivity.</li> </ul>
08	-	08		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Catalysis	<ul style="list-style-type: none"> <li>• Catalytic reactions of coordination</li> <li>• Organometallic compounds including polymerization activation of small molecules, addition to multiple bonds.</li> </ul>
07	-	07		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Mixed ligand complexes and catalysis of transition metal complexes	A) Mixed ligand complexes
08	-	08		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Mixed ligand complexes and catalysis of transition metal complexes	B) Catalysis of transition metal complexes
3	-	3		
Month: December				<ul style="list-style-type: none"> <li>• Practical and theory Examination</li> </ul>

*P.A.Gholap*

Miss.P.A.Gholap



*S.D. Shirke*

Dr. S. D. Shirke

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**Annual Teaching Plan**

**Academic Year: 2023-24**

**Semesters: M.Sc. II, Sem-III**

**Department: Chemistry**

**Subject: Chemistry**

**Course Title: Analytical Chemistry**

**Name of the Teacher: Miss.P.A.Gholap**

Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Colloids and Emulsions	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Classification of colloids</li> <li>• Theories of origin of charge on sol</li> <li>• Association colloids</li> <li>• Spontaneous ageing</li> </ul>
08	-	08		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Colloids and Emulsions	<ul style="list-style-type: none"> <li>• Emulsion</li> <li>• Types of emulsion</li> <li>• Emulsifiers</li> <li>• Gels</li> <li>• Applications</li> </ul>
07	-	07		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Particle size analysis	<ul style="list-style-type: none"> <li>• Low angle LASER light scattering</li> <li>• Photosedimentation</li> </ul>
08	-	08		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Particle size analysis	<ul style="list-style-type: none"> <li>• Dynamic light scattering</li> <li>• Application</li> </ul>
04	-	04		
Month: December				<ul style="list-style-type: none"> <li>• Practical and theory Examination</li> </ul>

*P.A.Gholap*

Miss.P.A.Gholap



*D.S.D. Shirke*

Dr. S. D. Shirke

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