

Vivekanand College, Kolhapur (Empowered Autonomous)

Teaching Plan (2026-27)

Subject: Chemistry

Course Title :Organic Chemistry(Theory)

B.Sc.- I and B.Sc.-III :Organic Chemistry

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

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	B.Sc.-I Organic Chemistry 1. Aromaticity B.Sc.-III:Organic 1.NMR- Spectroscopy	1. Introduction to aromatic compounds, Classification, 2. Contd...Structure of Benzene based upon MOT and VBT 3. MOT contd...Electrophilic Substitution Reactions- Nitration, Sulphonation 1. Principle, Terms related to NMR- Spinning Nucleus, Flipping of proton, Nuclear Resonance, Equivalent Protons. Magnetic and nonmagnetic Nuclei, Chemical Shift, Factors affecting Chemical Shift.
----	04	16		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Continued- 2. Stereochemistry NMR Spectroscopy contd...	Electrophilic Substitution Reactions - Halogenation, Friedal Craft's Alkylation and Acylation reactions. Mechanisms. Introduction, Stereoisomerism, Types - Optical, and Geometrical Isomerism with examples. Anisotropic Effect- Examples Shielding and Deshielding, Coupling Constant etc.Problems...
----	04	16		
Month: September			Module/Unit:	Sub-units planned
----	04	16	Stereochemistry 2.IR Spectroscopy	Elements of Symmetry-Plane, Center and Axis of symmetry...Configurations- R and S - Rules and Problems solutions Introduction,Principle,conditions for absorption
Month: October			Module/Unit:	Sub-units planned

Academic Year: 2020-23

Department: Chemistry

-----	04	16	Stereochemistry 2.IR Spectroscopy	Configurations- R and S - Rules and Problems solutions, E and Z configuration - Problems solutions IR, Instrumentation, Fundamental Modes of vibration,, Regions in IR spectrum, Hook;s Law, Characteristics of IR absorption of functional groups. Problems solutions
Month: November			Module/Unit:	Sub-units planned
-----	-----	---	05 Nov.-14 Nov.- Diwali Holidays	—

S.D. Shirke

Dr. S. D. Shirke

S.D. Shirke

Dr. S. D. Shirke

HEAD
HOD
DEPARTMENT OF CHEMISTRY
IVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Academic Year: 2026-27

Sem-I

Department: Chemistry

Vivekanand College, Kolhapur (Empowered Autonomous)

Teaching Plan (2026-27)

Subject: Chemistry

Course Title :Organic Chemistry (Practicals)

BSc. Part I-Organic Chemistry (Practicals)

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

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	B.Sc.-I Organic/Inorganic Practicals	Identification of Unknown Organic compound- 1. Benzoic acid 2. Beta Naphthol 3. Water Analysis 4. Standardization of solutions.
----	04	16		1.Estimation of Sucrose (Cane Sugar) 2.Estimation of Unsaturation (Cinnamic Acid) 3.Preparation of Derivatives. 4.Preparation of Dihydropyrimidone
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B.Sc.-I	1.Preparation of Oxalic acid solution and determination of strength of KMnO_4 2.Organic spotting - Acetone 3. Heat of Ionization,4.Chemical netics.
----	04	16		1. Preparation of Dibenzal Propanone and Preparation of Derivatives 2. Identification and Separation of Binary Mixure - Mix.1 3.Binary Mixture No. 2 4. Binary Mix. No. 3
Month: September			Module/Unit:	Sub-units planned
----	04	16	B.Sc.-I	1.Preparation of Std. solution of $\text{K}_2\text{Cr}_2\text{O}_7$ and determination of strength of FAS solution. 2.Organic Spotting- Cinnamic acid 3.Chromatography Mix. No. 1 and spot tests4. Chromatography Mix. No. 2 and Spot Tests.

Academic Year: 2025-26

Department: Chemistry

			B.Sc.-III	1. Organic Preparation of Bis - 2-Naphthol 2.Preparation of Derivatives 3.Binary Mixture-No. 4 .Binary Mixture Separation...
Month: October			Module/Unit:	Sub-units planned
-----	04	16	B.Sc.-I B.Sc.-III	1. Preparation of Urea-Oxalate. 2.Organic Spotting salicylic acid 3. Chromatography- Mix. No.I and spot tests. 4.Chromatography Mix. No. II and Spot Tests 1. Estimation of Acid-Ester mixture 2.Preparation of Ethylbenzene from Acetophenone 3. Picrate derivatives and Nitroderivative Preparation.
Month: November			Module/Unit:	Sub-units planned
-----	----	--	05 Nov.-14 Nov.- Diwali Holidays	



Dr. S. D. Shirke



Dr. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B. Sc. I, Sem-I

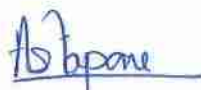
Department: Chemistry

Subject: Chemistry

Course Title: Chemistry Practical

Name of the Teacher: Dr. Asmita Shashikant Tapase

Month : July			Module/Unit:	Sub-units planned
Lectures -	Practicals 2*4=8	Total 8	-	• Estimation of Acetic acid from the given vinegar sample by titrimetric method. • Estimation of Cu (II) ions by iodometric titration by using Na₂S₂O₃ solution • Spot Tests (Any Two) Detection of following cations using spot tests: Cu²⁺, Co²⁺, Ni²⁺, Fe³⁺, Al³⁺, Zn²⁺, Mg²⁺, Pb²⁺
Month : August			Module/Unit:	Sub-units planned
Lectures -	Practicals 4*4=16	Total 16	-	Paper Chromatography (Any Three) • Detection of following cations using Paper Chromatography: Cu²⁺ + Co²⁺, Co²⁺ + Ni²⁺, Ni²⁺ + Cu²⁺ • Preparation of Derivatives: Preparation of Urea Oxalate. • Organic Spotting – Compounds containing C, H, (O) (Any Two)
Month : September			Module/Unit:	Sub-units planned
Lectures -	Practicals 4*4=16	Total 16	-	• Preparation of Derivatives: • Preparation of 2, 4-DNP of ketones. • Preparation of Osazone. To determine normality of bulk solution of HCl/ H₂SO₄. • Estimation of Phenol • Organic Spotting – Compounds containing C, H, (O) (Any Two)
Month : October			Module/Unit:	Sub-units planned
Lectures	Practicals 2*4=8	Total 8	Theory and [practical exams]	Organic Spotting – Compounds containing C, H, (O) (Any Two)



Dr. A. S. Tapase



Dr. S. D. Shirke

HEAD

**DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)**

Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

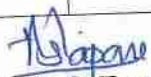
Academic Year: 2026-27 Semesters: B.Sc. II (Major), Sem-III Department: Chemistry

Subject: Chemistry

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

Name of the Teacher: Dr. Asmita Shashikant Tapase

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Chemical Kinetics	• Introduction, • The concept of reaction rates, order and molecularity of a reaction, zero, first order reaction
06	-	06		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical Kinetics	• 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 • Concept of activation energy: 1) Activated complex theory 2) Collision Theory and calculation of activation energy by Arrhenius equation, • Numerical Problems.
08	4*4=16	24		
Month: September			Module/Unit:	Sub-units planned
08	4*4=16	24	Electrochemistry	• Introduction, molar and equivalence conductance, • Relation between equivalent and molar conductance • Transference number and its experimental determination • Kohlraush law • Applications of Kohlraush law
Month: October			Module/Unit:	Sub-units planned
04	08	12	Electrochemistry	• Determination of degree of ionization of weak and strong electrolyte • Conductometric titrations


Dr. A. S. Tapase


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

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: DSE-1002E1: Physical Chemistry

Name of the Teacher: Dr. Asmita Shashikant Tapase

Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Quantum Theory	• Introduction, • Dual nature of matter and energy: De Broglie hypothesis
02	-	02		
Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Quantum Theory	• The Heisenberg's uncertainty principle, • Concept of energy operators (Hamiltonian) • Derivation of Schrodinger wave equation, Physical interpretation of ψ and ψ^2, • Particle in a one dimensional box, Schrodinger wave equation for hydrogen atom, Concept of quantum numbers.
08	8*3=24	32		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Quantum Theory	• Particle in a one dimensional box, • Schrodinger wave equation for hydrogen atom • Concept of quantum numbers.
08	8*4=32	40		
			Photochemistry	• 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
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Photochemistry	• Quantum yield, • reasons for high and low quantum yield, • Factors affecting Quantum yield, • Photosensitized reactions--dissociation of H_2, photosynthesis, • Exapmles of Photochemical recations- 1)Photo-dimerization of anthracene, 2) decomposition of HI and HBr, • Photophysical and photochemical processes
08	8*4=32	40		
Month: October			Module/Unit:	Sub-units planned

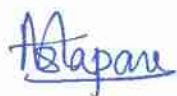
04	8*2=16	20	Photochemistry	• Jablonaski diagram depicting various processes occurring in the excited state: • Qualitative description of fluorescence and phosphorescence, • Chemiluminescence, • Electroluminescence, • Numerical problems
Month : November			-	• Theory Examination


Dr. A. S. Tapase


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

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	A. Chemical kinetics 1. The study of energy of activation of first order reaction i. e. hydrolysis of methyl acetate in presence of 0.5 N HCl/0.5 N H₂SO₄. 2. To study the hydrolysis of methyl acetate by using its two concentrations in presence of 0.5 N HCl and hence find velocity constant of the reaction. B. Partial molar volume To determine the partial molar volume of ethyl alcohol in a mixture of ethyl alcohol and water (Any seven mixtures be given). C. Phase Equilibria To determine the limit of homogenous phase in the system Chloroform-acetic acid-water. A. Potentiometry 1. Titration of strong acid with strong alkali
-	8*4	32		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	2. Determination of standard electrode potential of Zn/Zn⁺⁺, Cu/Cu⁺⁺, Ag/Ag⁺ (Any two). 3. Estimate the amount of Cl⁻, Br⁻ and I⁻ in given unknown halide mixture by titrating it against standard AgNO₃ solution. 32 BoS in Chemistry, Vivekanand College, Kolhapur (An Empowered Autonomous Institute) B. Conductometry 1. Titration of a mixture of weak acid and strong acid with strong alkali 2. To study the effect of substituent on dissociation constant of weak acid with respect to acetic acid and monochloroacetic acid (cell constant to be given). 3. To determine the velocity constant of hydrolysis of ethyl acetate by NaOH solution by conductometric method.
-	8*4	32		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	C. Colorimetry 1. To verify Lambert- Beer's law using CuSO₄ solution. 2. Determination of Chromium with 1,5-diphenylcarbazide colorimetrically. D. pH metry Determination of dissociation constant of monobasic acid (Acetic acid). E. Refractometry To determine the percentage composition of unknown mixture by (i) graphical method and (ii) by composition law (Densities of pure liquids A & B be given).
-	8*4	32		
Month: October			Module/Unit:	Sub-units planned

Lectures	Practical s	Total	-	F. Spectrophotometry Determination of dissociation constant of acid by spectrophotometrically. G. Making molecules on computer.
-	8*2	16		
Month: October				Practical and Theory Examination



Dr. A. S. Tapase



Dr. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: M.Sc. I, Sem-I

Department: Chemistry

Subject: Chemistry

Course Title: Analytical Chemistry

Name of the Teacher: Dr. Asmita Shashikant Tapase

Month: July			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: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Surface characterization by spectroscopy	b) Auger spectroscopy
04	-	04		
				Principle, instrumentation, qualitative and quantitative applications
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Surface characterization by spectroscopy	c) Secondary ion-mass spectrometry
04	-	04		
				Principle, instrumentation, qualitative and quantitative applications
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Surface characterization by spectroscopy	d) Ion scattering and Rutherford backscattering spectroscopy
04	-	04		
				Principle, instrumentation, qualitative and quantitative applications
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total		Theory and Practical Examination

Dr. A. S. Tapase

Dr. S. D. Shirke

HEAD

DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

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

Programme: M.Sc. I Semester I

Subject: Chemistry Course Title: Physical Chemistry & Analytical Chemistry

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical kinetics	Introduction to basic concepts, Experimental methods of following the 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 NO ₂ and F ₂ , 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	Catalysis: 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		

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

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: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Spectroscopic Techniques	Introduction, region of electromagnetic radiation, definitions and units of wavelength, frequency, energy, amplitude, wave number and their relations, Interactions of radiation with matter, rotational, vibrational, electronic energy levels, types of spectroscopy methods.
4	-	4		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Spectroscopic Techniques	Rayleigh and Raman scattering, quantum and classical theories of Raman Effect, pure rotational Raman spectra of linear and symmetric top molecules, Raman activity of vibrations, rule of mutual exclusion, vibrational Raman spectra, and rotational fine structure.
6	-	6		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Spectroscopic Techniques	Diatomic molecules, selection rules, breakdown of selection rules, Franck-Condon factors, Dissociation energies, Photoelectron spectroscopy of diatomic (N ₂) and simple polyatomic molecules (H ₂ O, Formaldehyde), Adiabatic and vertical ionisation energies, Koopman's theorem. Numerical problems. Practical applications and examples in analytical chemistry and research.
5	-	5		

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

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

Programme: M.Sc. II Semester III

Subject: Chemistry Course Title: Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Voltammetry Techniques	Introduction, Principle, excitation signals in voltammetry, basic instrumentation based on operational amplifiers, voltammetric electrodes
3	-	3		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Voltammetry Techniques	Cyclic Voltammetry: Instrumentation, Determination of analytes using cyclic voltammetry, Applications. Pulse voltammetry: Introduction, Normal Pulse Voltammetry, Reverse pulse voltammetry, Differential pulse voltammetry, Square wave voltammetry.
6	-	6		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Voltammetry Techniques	Stripping voltammetry: Cathodic and Anodic stripping voltammetry, Electrodeposition step, Voltammetric completion of the analysis, adsorptive stripping methods, voltammetry with microelectrodes. Practical applications in analytical chemistry and research.
6	-	6		

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

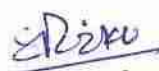
Name of the teacher: Miss. S. N. Inamdar

Programme: M.Sc. I Semester I

Subject: Chemistry Course Title: Inorganic Chemistry & Organic 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
HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B. Sc. I, Sem-I

Department: Chemistry

Subject: Chemistry

Course Title: 2DSC03CHE11: 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	• Introduction to atom • Bohr's theory of hydrogen atom and its limitations, Wave particle duality, • Heisenberg uncertainty principle, • Quantum numbers and their significance, • Shapes of s, p and d atomic orbitals, • Estimation of acetic acid from vinegar • Estimation of Cu (II) ions idometrically
4	8x2	20		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements	• Electrons filling rules in various orbitals: a) Aufbau's principle b) Hunds rule of maximum multiplicity c) Pauli's exclusion principle, • Electronic configuration of elements. • Stability of empty, half-filled and completely filled orbitals, • 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 • Paper chromatography I • Paper chromatography II • Organic spotting 1 • Organic spotting 2
4	8x4	36		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements, p-Block Elements (Group13, 14, 15)	• Chemical properties of the elements • Position of elements in periodic table. • Characteristics of group 13th, 14th and 15th elements with special reference to electronic configuration and periodic properties. • Compounds of group 13th, 14th and 15th elements. • Boron-diborane (only structure). • Organic spotting 3 • Organic spotting 4 • Preparation of urea oxalate derivative • Determination of normality of bulk solution
4	8x4	36		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	p-Block Elements (Group13, 14, 15)	• Allotropes of carbon and phosphorus. • Oxyacids of Nitrogen (HNO₂, HNO₃). • Spot test 1 • Spot test 2
2	8x2	18		

				• Estimation of Phenol • Journal checking • Practical exam preparations
Month : November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	• Theory and Practical Examination
-	-	-		

Shinde

Dr. S. D. Shinde

Dr. S. D. Shirke

Annual Teaching Plan

Academic Year: 2026-27

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

Department: Chemistry

Subject: Chemistry

Course Title: 2OEC03CHE11: Chemistry Lab-1

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

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B. Sc. I Practicals	• Estimation of acetic acid from vinegar • Estimation of Cu (II) ions idometrically
-	8x2	16		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B. Sc. I Practicals	• Paper chromatography I • Paper chromatography II • Organic spotting 1 • Organic spotting 2
-	8x4	32		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B. Sc. I Practicals	• Organic spotting 3 • Organic spotting 4 • Preparation of urea oxalate derivative • Determination of normality of bulk solution
-	8x4	32		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B. Sc. I Practicals	• Spot test 1 • Spot test 2 • Estimation of Phenol • Journal checking • Practical exam preparations
-	8x2	16		
Month : November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total		• Theory and Practical Examination
-	-	-		

Shinde

Dr. S. D. Shinde

S.D. Shirke

Dr. S. D. Shirke

HEAD

DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B. Sc. II, Sem-III

Department: Chemistry

Subject: Chemistry

Course Title: Chemistry Lab-3

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

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B. Sc. II Practicals	• Calibration of laboratory glassware • Standardisation of instruments • Extraction techniques • Thin layer chromatography
-	4x4	16		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B. Sc. II Practicals	• Separation and purification of mixture 1 • Separation and purification of mixture 2 • Separation and purification of mixture 3 • Column chromatography
-	4x4	16		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B. Sc. II Practicals	• Preparation of standard solution • Separation of liquids • Separation of liquids • Methods of green synthesis
-	4x4	16		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B. Sc. II Practicals	• Computer tools in chemistry • Cutting, bending, drawing out a jet of a glass tube • Journal checking • Practical Examination
-	4x2	08		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	• Theory and Practical Examination
-	-	-		



Dr. S. D. Shinde



Dr. S. D. Shirke

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: 2DSC03CHE52: Inorganic Chemistry

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

Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metals, Semiconductors, and Superconductors	- Introduction, - Properties of metallic solids.
02	-	02		
Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metals, Semiconductors, and Superconductors B. Sc. III Practicals	- Theories of bonding in metal. i) Free electron theory. ii) Molecular orbital theory (Band theory). - Classification of solids as conductor, insulators and semiconductors on the basis of band theory. - Semiconductors. Types of semiconductors - intrinsic and extrinsic semiconductors. - Applications of semiconductors. - Superconductors: Ceramic superconductors - Preparation and structures of mixed oxide $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ - Applications of superconductors. - Gravimetric estimation of iron - Gravimetric estimation of nickel - Gravimetric estimation of zinc - Strength of sodium chloride solution using Mohr's method.
04	4x4	20		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metals, Semiconductors, and Superconductors B. Sc. III Practicals	- Introduction and Importance of nanomaterials, - Properties (Comparison between bulk and nanomaterials): i) Optical properties ii) Electrical conductivity and iii) Mechanical properties, - Methods of preparation: Top-down, bottom-up fabrication a) Co-precipitation method b) Sol-gel method c) Chemical reduction method d) Hydrothermal method, - Applications of Nanomaterials. - Preparation of sodium cuprous thiosulphate - Preparation of potassium trioxalato aluminate (III). - Preparation of tris (ethylene diamine) nickel (II) thiosulphate. - Preparation of tris(thiourea) cuprous sulphate.
04	4x4	20		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total		

04	4x4	20	Chemistry of Non aqueous Solvents B. Sc. III Practicals	• Introduction to theories of Acids and Bases – Arrhenius concept, Bronsted-Lowry concept, Lewis Concept, Lux-Flood Concept (definition and examples), • 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, • Applications and limitations of HSAB principle. • Preparation of Potassium trioxalatoferrate (III). • Preparation of Ammonium diaminetetrathiocyanatochromate (III) • Percentage purity of tetrammine copper (II) sulphate. • Percentage purity of ferrous ammonium sulphate.
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemistry of Non aqueous Solvents	• Introduction, definition and characteristics of solvents, • Classification of solvents, Physical properties and Acid-Base reactions in Liquid Ammonia (NH₃) and Liquid Sulphur Dioxide (SO₂). • Percentage purity of potassium trioxalato aluminate. • Percentage purity of potassium trioxalato ferrate. • Strength of Zn⁺² ions complexometrically
3	4x3	15	B. Sc. III Practicals	
Month : November			-	• Theory Examination

S. D. Shinde

Dr. S. D. Shinde

S. D. Shirke

Dr. S. D. Shirke

Annual Teaching Plan

Academic Year: 2026-27

Semesters: M. Sc. II, Sem-III

Department: Chemistry

Subject: Analytical Chemistry

Paper No. DSC16CHE31: Advanced Analytical Technique

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

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Nanotechnology and Nano Chemistry	- Definition of nanomaterials and nanotechnology, - significance of nanotechnology,
3	-	3		
Month: August				
Lectures	Practicals	Total	Introduction to Nanotechnology and Nano Chemistry	- size and properties, - types of nanomaterials like 0D (quantum dots), 1D, 2D and 3D,
4	-	4		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Nanotechnology and Nano Chemistry	- introduction to physical, chemical and biological synthesis of nanomaterials with suitable examples, - top down and bottom-up approach,
3	-	3		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Nanotechnology and Nano Chemistry	- chemical synthesis of nanomaterials - Different types and processes for synthesis of nanomaterials using wet chemical approaches. - Fabricating nanomaterials with different morphology intended for specific applications, - Applications of Nanotechnology
5	-	5		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	Theory and Practical Examination
-	-	-		



Dr. S. D. Shinde



Dr. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

Name of the teacher: Dr. S. D. Kharade

Programme: B.Sc. I Semester I

Subject: Chemistry

Course Title: Chemistry Lab I

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Estimation of acetic acid from vinegar 2. Estimation of Cu (II) ions idometrically 3. Spot test 1 4. Spot test 2	1. Estimation of acetic acid from vinegar 2. Estimation of Cu (II) ions idometrically 3. Spot test 1 4. Spot test 2
-	4×4	16		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Paper chromatography I 2. Paper chromatography II 3. Organic spotting 1 4. Organic spotting 2	1. Paper chromatography I 2. Paper chromatography II 3. Organic spotting 1 4. Organic spotting 2
-	4×4	16		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Organic spotting 3 2. Organic spotting 4 3. Preparation of urea oxalate derivative 4. Determination of normality of bulk solution	1. Organic spotting 3 2. Organic spotting 4 3. Preparation of urea oxalate derivative 4. Determination of normality of bulk solution
-	4×4	16		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Estimation of Phenol 2. Journal checking 3. Practical exam preparations	1. Estimation of Phenol 2. Journal checking 3. Practical exam preparations
-	4×2	8		


Dr. S. D. Kharade


Head
Department of Chemistry
HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

Name of the teacher: Dr. S. D. Kharade

Programme: B.Sc. II Semester III (Major)

Subject: Chemistry

Course Title: Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Inorganic Semi-Micro Qualitative Analysis	1. Theoretical principles involved in qualitative analysis 2. Applications of solubility product and common ion effect in separation of cations into groups
2	-	2		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Inorganic Semi-Micro Qualitative Analysis	1. Application of complex formation in a) Separation of II group into IIA and IIB sub-groups. 2. b) Separation of Copper from Cadmium.
2	-	2		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Inorganic Semi-Micro Qualitative Analysis	1. c) Separation of Cobalt from Nickel. d) Separation of Cl ⁻ , Br ⁻ , I ⁻ 2. e) Detection of NO ₂ ⁻ , NO ₃ ⁻ (Brown ring test)
2	-	2		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Inorganic Semi-Micro Qualitative Analysis	1. Application of oxidation and reduction in a) Separation of Cl ⁻ , Br ⁻ , I ⁻ in mixture 2. b) Separation of NO ₂ ⁻ and NO ₃ ⁻ in mixture, Spot test analysis.
2	-	2		


Dr. S. D. Kharade


Head
Department of Chemistry
HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

Name of the teacher: Dr. S. D. Kharade

Programme: B.Sc. II Semester III (Minor)

Subject: Chemistry

Course Title: General Aspects in Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Inorganic Semi-Micro Qualitative Analysis	1. Theoretical principles involved in qualitative analysis 2. Applications of solubility product and common ion effect in separation of cations into groups
2	-	2		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Inorganic Semi-Micro Qualitative Analysis	1. Application of complex formation in a) Separation of II group into IIA and IIB sub-groups. 2. b) Separation of Copper from Cadmium.
2	-	2		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Inorganic Semi-Micro Qualitative Analysis	1. c) Separation of Cobalt from Nickel. d) Separation of Cl ⁻ , Br ⁻ , I ⁻ 2. e) Detection of NO ₂ ⁻ , NO ₃ ⁻ (Brown ring test)
2	-	2		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Inorganic Semi-Micro Qualitative Analysis	1. Application of oxidation and reduction in a) Separation of Cl ⁻ , Br ⁻ , I ⁻ in a mixture 2. b) Separation of NO ₂ ⁻ and NO ₃ ⁻ in mixture, Spot test analysis.
2	-	2		



Dr. S. D. Kharade



Head

Department of Chemistry

DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

Name of the teacher: Dr. S. D. Kharade

Programme: B.Sc. II Semester III

Subject: Chemistry

Course Title: Chemistry Lab-3

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Calibration of laboratory glassware 2. Standardisation of instruments 3. Extraction techniques 4. Thin layer chromatography	1. Calibration of laboratory glassware 2. Standardisation of instruments 3. Extraction techniques 4. Thin layer chromatography
-	4 × 4 = 16	16		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Separation and purification of mixture 1 2. Separation and purification of mixture 2 3. Separation and purification of mixture 3 4. Column chromatography	1. Separation and purification of mixture 1 2. Separation and purification of mixture 2 3. Separation and purification of mixture 3 4. Column chromatography
-	4 × 4 = 16	16		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Preparation of standard solution 2. Separation of liquids 3. Separation of liquids 4. Methods of green synthesis	1. Preparation of standard solution 2. Separation of liquids 3. Separation of liquids 4. Methods of green synthesis
-	4 × 4 = 16	16		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1. Computer tools in chemistry 2. Cutting, bending, drawing out a jet of a glass tube 3. Journal checking 4. Practical Examination	1. Computer tools in chemistry 2. Cutting, bending, drawing out a jet of a glass tube 3. Journal checking 4. Practical Examination
-	4 × 4 = 16	16		


Dr. S. D. Kharade


Head
Department Of Chemistry
HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

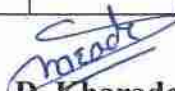
Name of the teacher: Dr. S. D. Kharade

Programme: B.Sc. III Semester V

Subject: Chemistry

Course Title: Inorganic Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Organometallic Chemistry	1. Definition, Nomenclature 2. EAN rule of organometallic compounds 3. Synthesis and structural study of alkyl and aryl compounds of Li, Be and Al
4	-	4		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Organometallic Chemistry	1. Zeiss salt and ferrocene 2. Preparation, structure, bonding and properties of mononuclear carbonyls: $[\text{Ni}(\text{CO})_4]$, $[\text{Fe}(\text{CO})_5]$, $[\text{Cr}(\text{CO})_6]$.
4	-	4		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Catalysis and Molecular orbital theory (MOT)	(A) Catalysis 1. Introduction, Classification of a catalytic reaction - Homogeneous and Heterogeneous, 2. Types of Catalysis, Characteristics of catalytic reactions, 3. Mechanism of catalysis - Intermediate compound formation theory and Adsorption theory, 4. Industrial applications of catalysis.
4	-	4		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Catalysis and Molecular orbital theory (MOT)	(B) Molecular orbital theory (MOT) 1. Introduction, 2. MOT of octahedral complexes with sigma bonding such as $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$, $[\text{CoF}_6]^{3-}$, $[\text{Co}(\text{NH}_3)_6]^{3+}$, 3. Merits and demerits of MOT.
4	-	4		


Dr. S. D. Kharade


Head
Department Of Chemistry
HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

Name of the teacher: Dr. S. D. Kharade

Programme: B.Sc. III Semester V

Subject: Chemistry

Course Title: Chemistry Lab-5

Month July			Module/Unit:	Sub-units planned
Lectur es	Practicals	Total	Gravimetric Estimations	1. Gravimetric estimation of iron 2. Gravimetric estimation of nickel 3. Gravimetric estimation of zinc
-	4 × 4 = 16	16		
Month August			Module/Unit:	Sub-units planned
Lectur es	Practicals	Total	Inorganic Preparations	1. Preparation of sodium cuprous thiosulphate 2. Preparation of potassium trioxalato aluminate (III). 3. Preparation of tris (ethylene diamine) nickel (II) thiosulphate. 4. Preparation of tris(thiourea) cuprous sulphate.
-	4 × 4 = 16	16		
Month September			Module/Unit:	Sub-units planned
Lectur es	Practicals	Total	1. Inorganic Preparations 2. Titrimetric Estimations	1. Potassium trioxalato ferrate (III). 2. Ammonium diaminetetraethiocyanatochromate (III) 3. Percentage purity of tetrammine copper (II) sulphate. 4. Percentage purity of ferrous ammonium sulphate.
-	4 × 4 = 16	16		
Month October			Module/Unit:	Sub-units planned
Lectur es	Practicals	Total	1. Titrimetric Estimations	1. Percentage purity of potassium trioxalato aluminate. 2. Percentage purity of potassium trioxalato ferrate. 3. Strength of Zn ⁺² ions complexometrically 4. Strength of sodium chloride solution using Mohr's method.
-	4 × 4 = 16	16		

Dr. S. D. Kharade

Head
Department Of Chemistry
HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2024-25

Annual Teaching Plan

Name of the teacher: Dr. S. D. Kharade

Programme: M.Sc. II Semester III

Subject: Chemistry

Course Title: Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Advanced Instrumentation Techniques-A	Scanning Electron Microscope (SEM) - Introduction, principle, instrumentation, applications
4	-	4		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Advanced Instrumentation Techniques-A	Transmission Electron Microscope (TEM) - Introduction, principle, instrumentation, applications
4	-	4		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Advanced Instrumentation Techniques-A	Electron Dispersion Spectroscopy (EDS) - Introduction, principle, instrumentation, applications, Energy Dispersive applications
4	-	4		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Advanced Instrumentation Techniques-A	Scanning Tunnelling Microscopy (STM) - Introduction, principle, instrumentation, applications; Atomic Force Microscopy (AFM) - Introduction, principle, instrumentation, applications. Practical applications and examples in analytical chemistry and research.
4	-	4		


Dr. S. D. Kharade


Head
Department Of Chemistry
HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27 [Semesters: B.Sc. I (Major), Sem-I]

Department: Chemistry

Subject: Chemistry Course Title: DSC03CHE11: Inorganic Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Induction	- General Introduction - Discussion on Course Structure - Discussion on Examination pattern - Discussion on Syllabus
02	-	02		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical Bonding and Molecular structure -Ionic Bonding	- General introduction - Types of Bond - Formation of ionic Solid - Factors Governing to Formation of ionic Solid
04	16	20		
Month: September			Module/Unit:	Sub-units planned
04	16	20	Chemical Bonding and Molecular structure -Ionic Bonding	- Born-Haber Cycle - Applications of Born-Haber Cycle - Fajan's Rule - Applications of Fajan's rule % of Covalent Character in Ionic Comp.
Month: October			Module/Unit:	Sub-units planned
04	16	20	Chemical Bonding and Molecular structure-Valence bond theory (VBT)	- Valence Bond Theory: Introduction, Assumptions, Applications and Limitations. - Concept of hybridization, different types of hybridization and geometry of molecule. - Linear geometry BeCl_2 (sp hybridization) - Planer trigonal geometry BF_3 (sp^2 hybridization) - Tetrahedral geometry SiCl_4 (sp^3 hybridization)
Month: November			Module/Unit:	Sub-units planned
03	08	11	Chemical Bonding and Molecular structure-Valence bond theory (VBT)	- Trigonal bipyramidal geometry PCl_5 (sp^3d hybridization) - Octahedral geometry SF_6 (sp^3d^2 hybridization) - Pentagonal bipyramidal geometry (IF_7) (sp^3d^3 hybridization) - Valence Shell Electron Pair Repulsion (VSEPR) Theory H_2O, ClF_3, ICl_4^-

Dr. S. S. Ankushrao

Dr. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27 | Semesters: B.Sc. I (IKS), Sem-I | Department: Chemistry

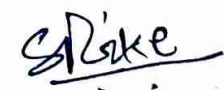
Subject: Chemistry

Course Title: IKS03GEC11: IKS

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	IKS-Introduction	General Introduction Introduction
02	-	02		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	IKS-Chemistry in Ancient and Medieval India	- Chemistry in pre-Harrapan period - Chemistry in Indus Valley civilization
02	-	02		
Month: September			Module/Unit:	Sub-units planned
02	-	02	IKS-Chemistry in Ancient and Medieval India	- Chemistry in post-Harrapan period - Chemistry in Vedic and Ayurvedic: Chemistry in Charaka and Sushruta,
Month: October			Module/Unit:	Sub-units planned
02	02	02	IKS-Chemistry in Ancient and Medieval India	- Chemistry in Tantric Period - Rasaratnakara of Nagarjuna - Iatrochemical period.


Dr. S. S. Ankushrao


Dr. Mrs. S. D. Shirke

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27 [Semesters: B.Sc. I (Major), Sem-II]

Department: Chemistry

Subject: Chemistry

Course Title: DSC03CHE22: Analytical Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Introduction to Analytical Chemistry	- General Introduction - Importance of analysis - Analytical processes (Qualitative and Quantitative) - Methods of analysis (Only classification) - Sampling of solids, liquids and gases
04	-	04		
Month: January				
Lectures	Practicals	Total	Introduction to Analytical Chemistry	- Errors, types of errors (determinate and indeterminate), methods of expressing accuracy (Absolute and relative error) - Significant figures, mean, median, standard deviation - Numerical problems
04	16	20		
Month: February				
04	16	20	Fundamentals of Industrial Chemistry & IPR	- General introduction, Difference between classical and industrial chemistry, Raw materials for chemical industry, Material safety data sheets (MSDS) - Definition and Explanation of terms - Molecular weight, Equivalent weight
Month: March				
04	16	20	Fundamentals of Industrial Chemistry & IPR	- Molarity, Normality, Molality, Molarity of mixed solution, Acidity of base, Basicity of acid, ppt, ppm, ppb solutions, Mole Fraction, Weight fraction, Percentage composition by W/W, W/V, V/V, Problems based on Normality, Molarity, mole fraction, mixed solution, etc. - IPR - Introduction to IPR and its significance in present scenario


Dr. S. S. Ankushrao


Dr. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B.Sc. II, Sem-III

Department: Chemistry

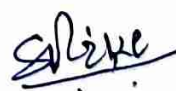
Subject: Chemistry

Course Title: DSC03CHE31: Physical Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Thermodynamics	Introduction, first and second law of thermodynamics, Concept of Entropy: Definition, mathematical expression, unit, spontaneity criteria for change in entropy.
2	08	10		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Thermodynamics	- Physical significance of Entropy. - Entropy changes for reversible and irreversible processes in isolated systems. - Entropy changes in mixing of gases.
3	16	19		
Month: September			Module/Unit:	Sub-units planned
3	16	19	Thermodynamics	- Introduction of Concept of Enthalpy and Internal energy, Integral and differential enthalpy of solution. - Variation of Enthalpy of reaction with temperature (Kirchhoff's equation)
Month: October			Module/Unit:	Sub-units planned
02	16	18	Thermodynamics	- Third law of thermodynamics, standard entropy, application of third law of thermodynamics in determination of absolute entropy, Entropy changes in chemical reactions - Numerical problems.


Dr. S. S. Ankushrao


Dr. S. D. Shirke

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B.Sc. II, Sem-IV

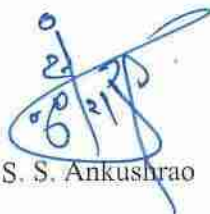
Department: Chemistry

Subject: Chemistry

Course Title: DSC03CHE41: Inorganic Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Crystal Field Theory	• Introduction • Assumptions of CFT • Crystal field stabilization energy (CFSE) • Crystal field splitting of 'd' orbital in octahedral Complexes.
4	-	4		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Crystal Field Theory	• Comparison of CFSE for O_h and T_d complexes • Crystal field effects for weak and strong fields ligands, Tetrahedral symmetry, • Crystal field splitting of 'd' orbital in Tetrahedral and square planar complex
4	-	04		
Month: February			Module/Unit:	Sub-units planned
4	-	04	Crystal Field Theory	• Jahn-Teller distortion, • Limitations of CFT. • Factors affecting the Magnitude of $10 Dq$, Spectrochemical series
Month: March			Module/Unit:	Sub-units planned
-	-	-	-	-



Dr. S. S. Ankushrao



Dr. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: DSE03CHE51: Analytical Chemistry
DSC03CHE59: Inorganic Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Soil and Water Analysis	A) Soil Analysis Introduction to Soil Science: Soil Composition
01	16	17		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Soil and Water Analysis	Importance of Soil Testing and Analysis, Sampling of Soil Physical Characteristics of soil: Soil texture, Porosity, color, Soil structure.
02	16	18		
Month: September			Module/Unit:	Sub-units planned
02	16	18	Soil and Water Analysis	Soil parameters testing: pH, Electrical Conductivity, Soil Organic carbon (Walkey-Black Method), Available Nitrogen, Total Sulphur.
Month: October			Module/Unit:	Sub-units planned
02	16	18	Soil and Water Analysis	B) Water Analysis Introduction Physical & Chemical analysis of water: pH, Conductance, Colour, odour
Month: November			Module/Unit:	Sub-units planned
01	08	09	Soil and Water Analysis	Physical & Chemical analysis of water: Turbidity, TSS, TDS and taste.

Dr. S. S. Ankushrao

Dr. S. D. Shirke

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B.Sc. III, Sem-VI

Department: Chemistry

Subject: Chemistry

Course Title: DSC03CHE62: Inorganic Chemistry

DSC03CHE69: Inorganic Chemistry Practical

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Bioinorganic Chemistry	• Introduction, • Essential and trace elements in biological process • Metalloporphyrin's with special reference to haemoglobin and myoglobin,
04	16	20		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Bioinorganic Chemistry	• Role of metal ions present in biological systems with special reference to Na⁺, K⁺, Mg²⁺ and Ca²⁺ ions • Na/K pump, • Role of Mg²⁺ ions in energy production and chlorophyll, Role of Ca²⁺ in blood clotting
04	16	20		
Month: February			Module/Unit:	Sub-units planned
04	16	20	Nuclear Chemistry	• Nuclear reactions and energetic of nuclear reactions, • Types of nuclear reactions: i) Artificial transmutation ii) Artificial radioactivity iii) Nuclear fission and its application in Heavy water nuclear reactor iv) Nuclear fusion, •
Month: March			Module/Unit:	Sub-units planned
04	08	12	Nuclear Chemistry	• Applications of radio-isotopes as tracers: i) Chemical Investigation-Esterification ii) Structural Determination-Phosphorus pentachloride iii) Analytical Chemistry-Isotopic dilution method for determination of volume of blood iv) Age determination - Dating by C14.


Dr. S. S. Ankushrao


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

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: M.Sc. I, Sem-I

Department: Chemistry

Subject: Chemistry

Course Title: DSC14RMD11: Research Methodology

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Data Interpretation & Report Writing	Meaning of Interpretation, Why Interpretation? Techniques of Interpretation, Precaution in Interpretation.
02	-	02		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Data Interpretation & Report Writing	Significance of Report Writing, Types of Reports, Different Steps in Writing Report, Layout of the Research Report Mechanics of Writing a Research Report: Writing preliminaries, main body of research, references and bibliography.
04	-	04		
Month: February			Module/Unit:	Sub-units planned
04	-	04	Data Interpretation & Report Writing	Precautions for Writing Research Reports. Meaning and importance of workshop, seminar, conference, symposium, etc. in research. Plagiarism- Concept and significance of plagiarism.
Month: March			Module/Unit:	Sub-units planned
04	-	04	Data Interpretation & Report Writing	Writing tools: Grammarly, Answerthepublic, Quillbot, Notion, Buzzsumo, Copyscape, Chatgpt, ginger.
Month: April			Module/Unit:	Sub-units planned
02	-	02	Data Interpretation & Report Writing	Referencing and citation tools: Endnote, Mendeley, Jabref, Zotero

Dr. S. S. Ankushrao

Dr. S. D. Shirke

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: M.Sc. II, Sem-III

Department: Chemistry

Subject: Chemistry

Course Title: DSC14CHE31: Advanced Spectroscopic Methods

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Proton NMR Spectroscopy	Part [A]: Recapitulation of proton NMR spectroscopy
02	-	02		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Proton NMR Spectroscopy	Factors affecting coupling constants (Karplus curve variation, dihedral angle, bond order, electronegativity), analysis of First order spectra,
04	-	04		
Month: September			Module/Unit:	Sub-units planned
04	-	04	Proton NMR Spectroscopy	Complex spin-spin splitting of second order spectra, different spin systems (AB, AM, AX, ABX/AMX spin systems with examples). Simplification of complex spectra (High field strength, chiral resolving agent, effect of deuteration, nuclear magnetic double resonance,
Month: October			Module/Unit:	Sub-units planned
04	-	04	Proton NMR Spectroscopy	Shift reagent, solvent effect); Spectra of Homotopic, Enantiotropic and Diastereotopic systems. Part [B] Advanced NMR techniques (5) Fourier transform technique, nuclear overhauser effect (NOE),
Month: November			Module/Unit:	Sub-units planned
02	-	02	Proton NMR Spectroscopy	COSY, NOESY, Resonance of other nuclei – ¹⁹ F, ³¹ P.



Dr. S. S. Ankushrao



Dr. S. D. Shirke

HEAD

DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Annual Teaching Plan

Academic Year: 2025-26

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

Subject: Chemistry

Course Title:

(i) DSC-V: DSC03CHE31: Physical Chemistry

(ii) MIN03CHE31: General Aspects in Physical Chemistry

(iii) PR03CHE31: Practicals

(iv) VSC03CHE31: VSC Practicals

Name of the Teacher: Dr. Arjun Shankar Kumbhar

Month: July			Module/Unit: I	Sub-units planned
Lectures	Practicals hr	Total	(i) Kinetic Theory of Gases (DSC & MIN)	General Introduction Introduction, postulates of Kinetic Theory of Gases
5	20	25	(ii) Thermodynamics (MIN)	Introduction, first and second laws of thermodynamics,
			Physical	i) Determination of the surface tension of a liquid or a dilute solution using a Staglomer. ii) Study of the variation of surface tension of a detergent solution with concentration. iii) Determination of the relative and absolute viscosity of a liquid of dilute solution using an Ostwald's viscometer. iv) To study the effect of acid strength on hydrolysis of an ester using 0.5 M HCl and 0.25 M HCl
Month: August			Module/Unit: I	Sub-units planned
Lectures	Practicals	Total	(i) Kinetic Theory of Gases (DSC)	Derivation of the kinetic gas equation, Deviation of real gases from ideal behavior, Compressibility factor, causes of deviation, van der Waals equation of state for real gases, Boyle temperature (derivation not required)
7	24	31	(ii) Thermodynamics (MIN)	Concept of Entropy: Definition, mathematical expression, unit, spontaneity criteria for change in entropy. Physical significance of Entropy.
				i)To investigate the reaction between potassium per sulphate and KI (Equal Concentration) ii)To investigate the reaction between potassium persulphate and KI (Unequal Concentration) iii)To study the hydrolysis of methyl acetate in presence of HCl and H ₂ SO ₄ and to determine relative strength. iv)To determine temperature coefficient of a given second order reaction. v)To determine the normality of given strong acid by titrating it against strong base a. Conductometrically. vi)To determine Cell Constant of the given Conductivity cell and to verify Ostwald dilution law using acetic acid Solution Conductometrically.
Month: September			Module/Unit: II	Sub-units planned

7	24	31	(i) Kinetic Theory of Gases (DSC & MIN)	Critical Phenomena: PV-isotherms of real gases (Andrew's isotherms), Continuity of state, Critical constants and their calculation from Vander Waals equation. Maxwell- Boltzmann Distribution laws of molecular velocities and energies. Numerical problems
			Thermodynamics	Entropy changes for reversible and irreversible processes in isolated systems. Entropy change in mixing of gases. Introduction of Concept of Enthalpy and Internal energy, Integral and differential enthalpy of solution.
				i) To determine the normality of given weak acid by titrating it against strong base Conductometrically. ii) Determination of solubility and solubility product of sparingly soluble salt by conductance measurements. iii) To determine the normality of given strong acid by titrating it against strong base Potentiometrically. iv) To determine the specific and molar refractions of benzene, toluene and xylene by Abbe's refractometer and hence to determine the refraction of $-\text{CH}_2$ group (Methylene group) (Densities should be determined by students). v) To determine the specific rotation and unknown concentration of sugar solution polarimetry. vi) To determine the unknown concentration of given coloured compounds (KMnO_4) Colorimetrically.
Month: October			Module/Unit: II	Sub-units planned
2	24	26	Thermodynamics	Variation of Enthalpy of reaction with temperature (Kirchhoff's equation), Third law of thermodynamics, standard entropy, application of third law of thermodynamics in determination of absolute entropy, Entropy changes in chemical reactions Numerical problems.
				i) To determine the unknown concentration of given coloured compounds (CuSO_4) Colorimetrically. ii) Estimation of Zn^{2+} by complexometric titrations using EDTA iii) To determine volumetrically the amounts of sodium carbonate and sodium hydroxide present together in the given solution. iv) Determination of alkali content of antacid tablet using HCl. v) To determine percentage of nitrogen in the give nitrogenous fertiliser (ammonium sulphate). vi) To determine % of magnesium in the given sample of talcum powder using given solution of EDTA. vii) To estimate the amount of acetic acid in commercial vinegar using NaOH. viii) To estimate the amount of calcium from the chalk by titrimetric method. (By redox titration using KMO_4 solution.)



Dr. A. S. Kumbhar



Dr. S. D. Shirke
HEAD

DEPARTMENT OF CHEMISTRY
VISHWANAND COLLEGE, KOLHAPUR
(WASHIM ROAD)

Vivekanand College, Kolhapur

(An Empowered Autonomous Institute)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: DSC-VII: DSC03CHE43

Name of the Teacher: Dr. Arjun Shanakar Kumbhar

Month: July			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Mass Spectroscopy	Mass Spectroscopy. Introduction. Principles of mass spectroscopy. Mass spectrometer - schematic diagram.
04	-	02		
Month: August			Module/Unit: IV	Sub-units planned
Lectures	Practicals	Total	Unit: IV Mass Spectroscopy	Types of ions produced during fragmentation. Nitrogen rule. Fragmentation patterns of: alkanes, alkenes, aromatic hydrocarbons, alcohols, phenols. McLafferty rearrangement. Applications.
8	-	02		
Month: September			Module/Unit: IV	Sub-units planned
8	-	02	Unit: IV Mass Spectroscopy	Fragmentation patterns of: amines and carbonyl compounds. McLafferty rearrangement. Applications, Combined Problems
Month: October			Module/Unit: IV	Sub-units planned
4	-	02	Unit: IV Mass Spectroscopy	Combined Problems



Dr. A. S. Kumbhar



Dr. S. D. Shirke

HEAD

DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

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

Programme: M.Sc. I Semester I

Subject: Chemistry

Course Title: Analytical Chemistry

Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT III: Electroanalytical Techniques -	Polarography: Introduction, Instrumentation, Ilkovic equation and its verification. Polarographic measurements, Dropping mercury electrode
4	-	4		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT III: Electroanalytical Techniques	Determination of half wave potential, qualitative and quantitative applications
4	-	4		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT III: Electroanalytical Techniques	Amperometry: Basic principles, instrumentation, Amperometric titration curves, Amperometric indicators procedure for Amperometric titrations, Evaluation of amperometry in research and analytical applications.
4	-	4		
Month November			Module/Unit:	Sub-units planned

Lectures	Practicals	Total	UNIT III: Electroanalytical Techniques	Voltammetry: Voltammetric methods of analysis, basic principles, instrumentation, voltammetric measurements, Volta metric techniques, current in voltammetry, shape of voltammograms, quantitative and qualitative aspects of voltammetry, quantitative applications, characterization applications, Evaluation of CV in research and analytical applications
4	-	4		

V. S. Rajmane

Signature of the Faculty

(Miss. V. S. Rajmane)

S. D. Shirke

Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

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

Programme: M.Sc. II Semester III

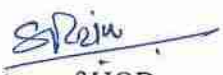
Subject: Chemistry

Course Title: Organic Chemistry

Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit IV: (A) Five- Study of five and six-membered heterocycles containing one membered heterocycles	Synthesis and reactions of (i) Pyrrol (ii) Furan, (iii) Thiophene, (iv) Benzopyrroles
4	-	4		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit IV: (A) Five- Study of five and six-membered heterocycles containing one membered heterocycles	(v) Benzofurans, and (vi) Benzothiophenes.
4	-	4		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	(B)Six-membered heterocycles with one heteroatom	Synthesis and reactions of (i) Pyridine,
4	-	4		
Month November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	(B)Six-membered heterocycles with one heteroatom	(ii)Quinoline, and (iii) Coumarin.
4	-	4		


Signature of the Faculty

(Miss. V. S. Rajmane)


Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

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

Programme: M.Sc. II Semester III

Subject: Chemistry

Course Title: Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit IV: A) Ion selective electrodes	Terminology, types and construction of electrodes, glass electrode
3	-	3		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A) Ion selective electrodes	solid state and precipitate electrodes, liquid – liquid membrane electrodes
12	4*3 = 12	24		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A) Ion selective electrodes	Enzyme and gas electrodes, and applications. Organic synthesis relating to nucleophilic and electrophilic attack on ligands.
12	4*3=12	24		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit IV: Electrophoresis	Introduction: paper electrophoresis: Technique, factors affecting migration of ions,
12	4*3=12	28		
Month November			Module/Unit:	Sub-units planned
			Unit IV: Electrophoresis	Capillary and zone electrophoresis and applications.
12	4*3=12	24		

Month December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit IV: Electrophoresis	Practical applications in analytical chemistry and research.
12	-	12		

Rajmane

Signature of the Faculty

(Miss. V. S. Rajmane)

S. Shirke

Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

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

Programme: M.Sc. II Semester III

Subject: Chemistry

Course Title: Analytical Chemistry

Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT-IV: Advanced Instrumentation Techniques-B	Raman Spectroscopy- Introduction, principle, instrumentation, applications X-Ray Fluorescence Spectroscopy (XFS) - Introduction, principle, instrumentation, applications
4	-	4		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT-IV: Advanced Instrumentation Techniques-B	Electron Spin Resonance Spectroscopy (ESR)- Introduction, principle, instrumentation, applications
4	-	4		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT-IV: Advanced Instrumentation Techniques-B	X-Ray Photoelectron Spectroscopy (XPS)- Introduction, principle, instrumentation, applications
4	-	4		
Month November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total		

4	-	4	UNIT-IV: Advanced Instrumentation Techniques- B	Auger Electron Spectroscopy - Introduction, principle, instrumentation, applications Secondary Ion Mass Spectrometry (SIMS) - Introduction, principle, instrumentation, applications Practical applications and examples in analytical chemistry and research.
---	---	---	---	--

Rajmane

Signature of the Faculty

(Miss. V. S. Rajmane)

S. D. Shirke

Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD

DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

Name of the Teacher: Ms. P. D. Narande.

Programme: M.Sc. I Semester II

Subject: Chemistry

Course Title: Organic/Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit I: Thermodynamics	Introduction, revision of basic concepts: Entropy and third law of thermodynamics
3	-	3		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Thermodynamics	Methods of determining the practical absolute entropies. Entropies of phase transition. Maxwell relations and its applications
8	-	8		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Thermodynamics	Thermodynamic equation of state. Ideal and non-ideal solutions, Thermodynamics of nonelectrolyte solutions Raoult's law
8	-	8		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Thermodynamics	Duhem-Margules equation and its applications to vapor pressure curves (Binary liquid mixture). Gibbs-Duhem equation and its
8	-	8		

				applications to study of partial molar quantities.
Month November			Module/Unit:	Sub-units planned
			Thermodynamics	Chemical potential, variation of chemical potential with temperature & pressure. Henry's law. Excess and mixing
8	-	8		
Month December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Thermodynamics	Thermodynamic properties. Equilibrium constants and general conditions of equilibrium in terms of thermodynamic potentials. Numerical Problems.
8	-	8		



Signature of the Faculty

(Ms. P. D. Narande)



Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

Name of the Teacher: Ms. P. D. Narande

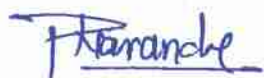
Programme: M.Sc. II Semester IV

Subject: Chemistry

Course Title: Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit III: (A) Steroids	Occurrence, nomenclature, basic skeleton
3	-	3		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	(A) Steroids	Diels hydrocarbon, Introductions and synthesis of the following hormones a) Cholesterol
8	-	8		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	(A) Steroids	b) Androsterone, (c) Testosterone, (d) Estrone
8	-	8		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	(A) Steroids	(e) Progesterone, (f) Aldosterone and (g) Cortisone
8	-	8		
Month November			Module/Unit:	Sub-units planned
			(B) Prostaglandins	Occurrence, nomenclature, classification, biogenesis and physiological effects
8	-	8		
Month December			Module/Unit:	Sub-units planned

Lectures	Practicals	Total	(B) Prostaglandins	Synthesis of PGE2 and PGF2
8	-	8		



Signature of the Faculty

(Ms. P. D. Narande)



Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
WVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

Name of the Teacher: Ms. P. D. Narande

Programme: M.Sc. II Semester IV

Subject: Chemistry

Course Title: Analytical Chemistry

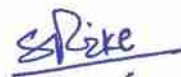
Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit IV: Analysis of Commercial materials	Introduction, Analysis of explosive materials
3	-	3		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Analysis of Commercial materials	TNT, RDX, lead azide, EDNA (ethylene dinitramine)
8	-	8		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Analysis of Commercial materials	Analysis of conducting polymer
8	-	8		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Analysis of Commercial materials	resins and 30 rubber
8	-	8		
Month November			Module/Unit:	Sub-units planned
			Analysis of Commercial materials	Analysis of luminescent paints,
8	-	8		
Month December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total		

8	-	8	Analysis of Commercial materials	Analysis of lubricants and adhesive.
---	---	---	----------------------------------	--------------------------------------



Signature of the Faculty

(Ms. P. D. Narande)



Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

Name of the Teacher: Ms. P. D. Narande

Programme: M.Sc. II Semester III

Subject: Chemistry

Course Title: Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit II: A) Colloids	Colloidal solution, classification of colloids, theories of origin of charge on sol particles,
3	-	3		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A) Colloids	Determination of charge on a colloidal particle, Stability of sols, Association colloids, Spontaneous ageing of colloids,
8	-	8		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A) Colloids	Factors affecting the spontaneous ageing, theories of spontaneous ageing, coagulation, kinetics of coagulation.
8	-	8		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit IV: B) Emulsion	Types of emulsion, preparation, properties, characteristics, Identification test between two types of emulsions, emulsifiers, emulsifications.
8	-	8		
Month November			Module/Unit:	Sub-units planned
			Unit IV: C) Gel	

8	-	8		Introduction, classification, methods for the preparation of gels, properties of gels,
Month December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit IV: C) Gel	Practical applications of colloids, emulsion and gels in analytical chemistry and research.
8	-	8		

P. D. Narande

Signature of the Faculty

(Ms. P. D. Narande)

S. D. Shirke

Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

Name of the Teacher: Ms. P. D. Narande.

Programme: M.Sc. II Semester III

Subject: Chemistry

Course Title: Analytical Chemistry

Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT III: Particle size Analysis	Introduction, Low angle LASER light scattering: Instrumentation, theoretical models, Mie theory, Fraunhofer diffraction theory, particle size distribution analysis, and applications.
8	-	8		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Particle size Analysis	Dynamic Light Scattering: Introduction, instrumentation, photodetector sample cell and sample handling, applications
8	-	8		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Particle size Analysis	Photosedimentation: Setting velocity and particle size, Stokes equation,
8	-	8		

				instrumentation, sedimentation modes, particle size distribution analysis, photometric measurements and applications
Month November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Particle size Analysis	Comparison with particle size measurements using XRD, SEM and TEM. (vi) practical applications in analytical chemistry and research
8	-	8		



Signature of the Faculty

(Ms. P. D. Narande)



Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

Name of the Teacher: Ms. P. D. Narande.

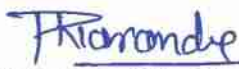
Programme: M.Sc. I Semester I

Subject: Chemistry

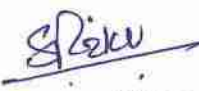
Course Title: Organic/Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Unit I: A)Photochemistry	Laws of photochemistry; construction of Jablonski diagram
3	-	3		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A)Photochemistry	Franck-Condon principle; selection rules; intensityof absorptionbands; nature of electronic spectra andprimary processes
4	-	4		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A)Photochemistry	Photo-dissociation, pre- dissociation. Photophysical phenomena: photophysical pathways of excited molecular systems (radiative and non- radiative)
4	-	4		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A)Photochemistry	Prompt fluorescence, delayed fluorescence, and phosphorescence
4	-	4		
Month November			Module/Unit:	Sub-units planned

			A)Photochemistry	Fluorescence quenching — concentration quenching, collisional quenching, quenching by excimer and exciplex emission
4	-	4		
Month December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A)Photochemistry	Fluorescence resonance energy transfer. Stern-Volmer relation; critical energy transfer distances; energy transfer efficiency
4	-	4		


Signature of the Faculty

(Ms. P. D. Narande)


Signature of HOD

(Dr. Mrs. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Department of Chemistry

Academic Year: 2025-26

Annual Teaching Plan

Name of the Teacher: Ms. P. D. Narande

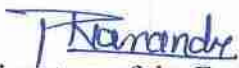
Programme: M.Sc. II Semester IV

Subject: Chemistry

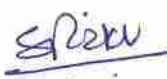
Course Title: Analytical Chemistry

Month July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A)Analysis of oils, fats and Soaps	Introduction to natural fats and oils; isolation of oils from natural resources and their purification. Analysis of oils and fats: Softening point, Congeal point, Titre point, Cloud point
3	-	3		
Month August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A)Analysis of oils, fats and Soaps	Iodine, saponification, acid, (15) 23 hydroxyl, R-M and Polenske value, Elaiden test, etc.
8	-	8		
Month September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	A)Analysis of oils, fats and Soaps	Introduction to soaps, manufacture of soaps (in brief), analysis of soaps: total anhydrous soap and combined alkali, potassium, water, free fatty acids, saponifiable and non-saponifiable matter in soaps
8	-	8		
Month October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total		

8	-	8	A) Analysis of oils, fats and Soaps	Estimation of phenol, copper and germicidal agents in soaps, determination of inorganic fillers and soap builders, and other additives, estimation of soap in detergents (THAM method)
Month November			Module/Unit:	Sub-units planned
			B) Analysis of Detergents	Classification of detergents, analysis of raw materials, separation as alcohol soluble and alcohol insoluble matter, additives in detergent formulation (chlorides, sulfates, phosphates, silicates, borates, oxygen releasing substances, CMC, EDTA, etc.)
8	-	8		
Month December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	B) Analysis of Detergents	Their role and analysis; analysis of active ingredients in detergents (methylene blue and Hyamine-1622 method).
8	-	8		


Signature of the Faculty

(Ms. P. D. Narande)


Signature of HOD

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

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

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

Programme: M.Sc. I Semester I

Subject: Chemistry Course Title: Organic/ Analytical Chemistry

Month : July/			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	1)Chemistry of transition elements	General characteristics and properties of transition elements; coordination chemistry of transition metal ions; stereochemistry of coordination compounds; crystal field theory;
04	12	16		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemistry of transition elements	crystal field splitting of d-orbitals for octahedral, tetrahedral, square planar, and square pyramidal complexes; crystal field stabilization energy (CFSE); factors affecting crystal field parameters;
04	12	16		
Month :September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemistry of transition elements	spectrochemical series; Jahn-Teller effect; interpretation of electronic spectra through d d spectra and charge transfer spectra; nephelauxetic series
04	12	16		
Month :October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	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.spectroscopy
05	12	17		



Mr. A. T. Mane



Dr. Mrs. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur
(An Empowered Autonomous Institute)

Department of Chemistry

Academic Year: 2026-27

Annual Teaching Plan

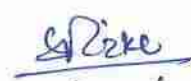
Name of the teacher: Mr. A. T. Mane

Programme: M.Sc. II Semester III

Subject: Chemistry Course Title: Analytical Chemistry

Month : July/			Module/Unit:	Sub-units planned
Lectures 08	Practicals -	Total 08	Drug Analysis	Introduction, classification, sources of impurities in pharmaceutical raw materials Limit tests: Limit test for impurities for Pb, As, Fe, Se, etc. Estimation of moisture, halide. Analysis of commonly used drugs such as antihistamines, sulfa drugs, barbiturates, etc
Month : August			Module/Unit:	Sub-units planned
Lectures 07 07	Practicals -	Total 14	Analysis of vitamins Pesticides Analysis	Analysis of vitamins (thiamine, ascorbic acid, Vit. A, Vit. B6, Vit. K) and hormones classification of pesticides, analysis of DDT, gammexane, endosulphan, zinab, ziram, malathion, thiram, thiometon, simazine and chloridane. Applications
Month : September			Module/Unit:	Sub-units planned
Lectures 08 05	Practicals - -	Total 13	Forensic Analysis Clinical Analysis	classification of poisons, Estimation of poisonous materials such as lead, mercury and arsenic, Practical applications. Biological significance, analysis of assay of enzymes. Sample collection and preservation of physiological fluids,
Month : October			Module/Unit:	Sub-units planned
Lectures 03 08	Practicals -	Total 11	Clinical Analysis Body fluid analysis	Composition and detection of abnormal level of certain constituents. Blood-Estimation of glucose, chlolesterol, urea, hemoglobin and bilirubin Urine- urea, uric acid,


Mr. A. T. Mane


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

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: M.Sc. I (Sem-I)

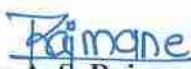
Department: Chemistry

Subject: Chemistry

Course Title: RMD14CHE11: Research Methodology

Name of the Teacher: Dr. Archana Sanjay Rajmane

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT III: Computer Applications	(A) Database Search Engines: Scirus, reaxys, Synthia, Google Scholar, ChemIndustry, Wiki-Databases, ChemSpider, Science Direct, SciFinder, Scopus, inflibnet, Cambridge structural database, Web of Science, Indian Citation Index. (B) Publishers in Chemical Sciences: American Chemical Society, Royal Society of Chemistry, Taylor and Francis, Elsevier, Springer, Bentham, Wiley, Themie. Practicals: Organic Estimation I Organic Estimation II
08	32	40		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT III: Computer Applications	(C) Chemometrics: Computer-based laboratory, statistics, and data interpretation, Computer-based information systems for e.g docking. (D) Software for Chemistry: Chemdraw, Chemdoodle, MarvinSketch, Origin, MestreNova, XRD Software Practicals: Organic Preparation I Organic Preparation II
08	32	40		
Month: September			Module/Unit:	Sub-units planned
08	32	40	UNIT I: Fundamentals of Research Methodology	(a) Meaning, Objectives, Motivation and Types of Research, (b) Research Approaches (c) Significance of Research, Research Methods versus Methodology, Research and Scientific Method, Importance of Knowing How Research is done? Practicals: Organic Estimation III Organic Estimation IV
Month: October			Module/Unit:	Sub-units planned
06	32	38	UNIT I: Fundamentals of Research Methodology	(d) Criteria of Good Research, research process and steps involved (e) Hypothesis: Meaning, function and types of hypothesis; Null/Alternative hypothesis (f) Literature survey, sources of information, review. (g) Ethical issues and intellectual property rights. (h) Publication process, selection of journals, citation index, impact factor, h-index, i10 index, Journal Cite Score, Google scholar index, Research gate, and Academia. Practicals: Organic Preparation III Organic Preparation IV


Dr. A. S. Rajmane


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

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27 Semesters: M.Sc. II (Sem-III)

Department: Chemistry

Subject: Chemistry

Course Title: DSCI4CHE32 Advanced Synthetic Methods

Course Title: DSE14CHE31: Drugs and Heterocycles

Name of the Teacher: Dr. Archana Sanjay Rajmane

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT II Application of the following reagents	(A) Reagents: (i) Lithium diisopropylamide (LDA), (ii) Tri-n-butyl tin hydride (TBTH), (iii) m-CPBA, (iv) Lead tetra acetate, (v) Diazomethane, (vi) Phase Transfer Catalyst (PTC; including quaternary ammonium salts and crown ethers), (vii) Dess-Martin periodinane,
08	-	08		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	UNIT II Application of the following reagents	((viii) Periodic acid, (ix) Corey Kim oxidation (x) SeO ₂ (xi) DCC. (B) Enolates in organic synthesis: Formation and applications
08	-	08		
Month: September			Module/Unit:	Sub-units planned
08	-	08	UNIT II Application of the following reagents	A) Six-membered heterocycles Synthesis and reactions of (i) Diazines: (ii) 1,2-diazine, (iii) 1,3-diazine, (iv) 1,4-diazine
Month: October			Module/Unit:	Sub-units planned
06	-	06	UNIT IV: Study of six and seven-membered heterocycles containing two or more heteroatoms	(ii) Triazines: 1,2,3-triazine, 1,2,4-triazine 1,3,5-triazine


Dr. A. S. Rajmane


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

Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Teaching Plan

Academic Year: 2026-27

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: B.Sc. II (Sem-III)

Subject: Analytical Chemistry

B.Sc. II (Sem-III)			Course Title: 2DSC03CHE32: Analytical Chemistry	
Month: July			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Conductometric Analysis	• Introduction, Basic Principle • Experimental setup
02	-	02		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Conductometric Analysis	• Titration curve of- • Strong acid vs Strong base • Weak acid vs Strong base
02	-	02		
Month: September			Module/Unit:	Sub-units planned
02	-	02	Conductometric Analysis	• Titration curve of- • Strong acid vs Weak base • Weak acid vs Weak base
Month: October			Module/Unit:	Sub-units planned
02	-	02	Conductometric Analysis	• Titration curve of- • Mixture of strong and weak acid/strong weak base vs, strong base/weak base or strong acid/weak acid • Sodium chloride vs silver nitrate
Month: November			Module/Unit:	Sub-units planned
02	-	02	Theory of Titrimetric Analysis	• Titration curve of- • Barium hydroxide vs magnesium sulphate advantages and limitations. • Home Assignment, Unit test. • Internal Examination

(Signature)

Dr. A. N. Ambhore

(Signature)

(Prof. Dr. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Teaching Plan

Academic Year: 2026-27

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: B.Sc. III (Sem- V)

Subject: Analytical Chemistry

B.Sc. III (Sem- V) Course Title: DSC03CHE51 Analytical Chemistry

Month: July			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Potentiometry and Colorimetry	A) Potentiometry: General Introduction, • Potentiometric titrations – Classical and analytical methods for locating end points, • Types of Potentiometric Titration: Acid-base, Redox, Precipitation titration, • Advantages of potentiometric titrations, • Basic circuit of direct.
04	-	04		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Potentiometry and Colorimetry	B) Colorimetry: Introduction • Lambert-Beer's law, deviation of law • Basic terms used- • Classification of methods of 'colour' measurement or comparison - Single beam photo-electric colorimeter, • Determination of unknown concentration
04	-	04		
Month: September			Module/Unit:	Sub-units planned
04	-	04	Flame Photometry	• Introduction, General principles of flame photometry • Instrumentation: Burners (Premix and Lunder graph burners), • Effect of solvent in flame photometry • Experimental procedure of analysis (Standard addition and internal standard),
Month: October			Module/Unit:	Sub-units planned
04	-	04	Flame Photometry	• Interferences and Factors that influence the intensity of emitted radiation in a flame photometer • Applications of flame photometry in real sample analysis • Limitations of flame photometry.
Month: November			Module/Unit:	Sub-units planned
02	-	02	Flame Photometry	• Completed the teaching task if remain. • Home Assignment, Unit test. • Internal Examination



Dr. A. N. Ambhore



(Prof. Dr. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Teaching Plan

Academic Year: 2026-27

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: M.Sc. I (Sem- I)

Subject: Organic Chemistry

M.Sc. I (Sem-I): - Course Title: DSE14CHE11 Organic Chemistry				
Month: July			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Introduction	- General Introduction - Basic terms in reaction mechanism - Generation, structure, stability and reactivity of Reactive Intermediates: Carbocations, Carbanions
04	-	04		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Reaction Mechanism: Structure and Reactivity	- General introduction - Generation, structure, stability and reactivity of Reactive Intermediates: free radicals, arynes, carbene, N-heterocyclic carbene,
04	-	04		
Month: September			Module/Unit:	Sub-units planned
04	-	04	- Reaction Mechanism: Structure and Reactivity - Elimination Reaction	- Generation, structure, stability and reactivity of Reactive Intermediates: nitrine, Nitrogen, sulphur and phosphorus ylides - E1, E2 & E1Cb mechanism - Orientation in elimination reactions
Month: October			Module/Unit:	Sub-units planned
04	-	04	Elimination Reaction	- Hofmann versus Saytzeff elimination - Pyrolytic syn elimination - Competition between substitution and elimination reaction
Month: November			Module/Unit:	Sub-units planned
04	-	04	Elimination Reaction	- Reactivity: effect of substrate, structures, attacking base, leaving group, nature of medium on elimination reaction - Completed the teaching task if remain. - Home Assignment, Unit test. - Internal Examination



Dr. A. N. Ambhore



(Prof. Dr. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Teaching Plan

Academic Year: 2026-27

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: M.Sc. II (Sem- III)

Subject: Organic Chemistry

M.Sc. II (Sem-III): - Course Title: DSE14CHE31 Advanced Spectroscopic methods					
Month: July			Module/Unit:	Sub-units planned	
Lectures	Practicals	Total	Ultraviolet Spectroscopy	• Introduction spectroscopy, • Woodward-Fisher rule for conjugated dienes and calculated compounds • Calculation of λ_{max}	
04	-	04			
Month: August			Module/Unit:	Sub-units planned	
Lectures	Practicals	Total	Ultraviolet Spectroscopy	• Woodward-Fisher rule for conjugated dienes and calculated compounds • Calculation of λ_{max}	
04	-	04			
Month: September			Module/Unit:	Sub-units planned	
04	-	04	Ultraviolet Spectroscopy Infrared Spectroscopy	• Ultraviolet spectra of aromatic and heterocyclic compounds, steric effect in biphenyls • Introduction to IR spectroscopy • Characteristics of vibrational frequencies of alkane, alkenes, and alkynes, aromatic compounds	
Month: October			Module/Unit:	Sub-units planned	
04	-	04	Infrared Spectroscopy	• Characteristics of vibrational frequencies of alcohol, phenol and amines • Detailed study of vibrational frequencies of carbonyl compounds (aldehydes, ketones, esters, amides, acids, anhydrides, lactones, lactams and conjugated carbonyl compounds)	
Month: November			Module/Unit:	Sub-units planned	
02	-	02	Infrared Spectroscopy	• Effects of hydrogen bonding and solvent effect on vibrational frequencies, overtones, combination bands and Fermi resonance. FT-IR of gaseous, solid and polymeric materials.	


Dr. A. N. Ambhore


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



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Teaching Plan

Academic Year: 2025-26

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: B.Sc. II (Sem-III)

Subject: Analytical Chemistry

B.Sc. II (Sem III) DSC03CHE32: Analytical Chemistry				
Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Conductometric Analysis	- Introduction, Basic principles, experimental set up titration curves - Conductometric Titrations: (i) strong acid vs, strong base (ii) weak acid vs, strong base (iii) weak acid vs, weak base
08	48	08		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Conductometric Analysis	- Conductometric Titrations: - Mixture of strong and weak acid/strong weak base vs, strong base/weak base or strong acid/weak acid, - Sodium chloride vs, silver nitrate - Barium hydroxide vs, magnesium sulphate - Advantages and limitations.
08	48	08		
Month: September			Module/Unit:	Sub-units planned
08	48	08	Gravimetric Analysis	- General introduction, - Common ion effect and solubility product - Principles, Conditions for good precipitation, - Factors affecting: pH, temperature, nature of solvent; Super saturation and precipitate formation, Precipitation from homogeneous solution, Examples
Month: October			Module/Unit:	Sub-units planned
08	48	08	Gravimetric Analysis	- Co-precipitation, post-precipitation and remedies for their minimization, - Digestion, Washing of precipitate and ignition of precipitate, - Brief idea about method of filtration and drying of precipitate, - Organic Precipitants
Month: November			Module/Unit:	Sub-units planned
04	24	04	Gravimetric Analysis	- Completed the teaching task if remain. - Home Assignment, Unit test. - Internal Examination

Dr. A. N. Ambhore

(Prof. Dr. S. D. Shirke)

HEAD

DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Teaching Plan

Academic Year: 2025-26

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: B.Sc. III (Sem- V)

Subject: Analytical Chemistry

B.Sc. III (Sem- V) Course Title: DSE03CHE51 Analytical Chemistry

Month: July			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Potentiometry and Colorimetry	A) Potentiometry: General Introduction, • Potentiometric titrations – Classical and analytical methods for locating end points, • Types of Potentiometric Titration: Acid-base, Redox, Precipitation titration, • Advantages of potentiometric titrations, • Basic circuit of direct.
08	-	08		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Potentiometry and Colorimetry	B) Colorimetry: Introduction • Lambert-Beer's law, deviation of law • Basic terms used- • Classification of methods of 'colour' measurement or comparison - Single beam photo-electric colorimeter, • Determination of unknown concentration
08	-	08		
Month: September			Module/Unit:	Sub-units planned
08	-	08	Flame Photometry	• Introduction, General principles of flame photometry • Instrumentation: Burners (Premix and Lunder graph burners), • Effect of solvent in flame photometry • Experimental procedure of analysis (Standard addition and internal standard),
Month: October			Module/Unit:	Sub-units planned
08	-	08	Flame Photometry	• Interferences and Factors that influence the intensity of emitted radiation in a flame photometer • Applications of flame photometry in real sample analysis • Limitations of flame photometry.
Month: November			Module/Unit:	Sub-units planned
04	-	04	Flame Photometry	• Completed the teaching task if remain. • Home Assignment, Unit test. • Internal Examination


Dr. A. N. Ambhore


(Prof. Dr. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Annual Teaching Plan

Academic Year: 2025-26

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: M.Sc. I (Sem-I)

Subject: Organic Chemistry

M.Sc. I (Sem-I): - Course Title: DSE14CHE11 Organic Chemistry				
Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction	- General Introduction - Basic terms in reaction mechanism - Generation, structure, stability and reactivity of Reactive Intermediates: Carbocations, Carbanions
02	-	02		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Reaction Mechanism: Structure and Reactivity	- General introduction - Generation, structure, stability and reactivity of Reactive Intermediates: free radicals, arynes, carbene, N-heterocyclic carbene,
04	-	04		
Month: September			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	- Reaction Mechanism: Structure and Reactivity - Elimination Reaction	- Generation, structure, stability and reactivity of Reactive Intermediates: nitrine, Nitrogen, sulphur and phosphorus ylides - E1, E2 & E1Cb mechanism - Orientation in elimination reactions
04	-	04		
Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Elimination Reaction	- Hofmann versus Saytzeff elimination - Pyrolytic syn elimination - Competition between substitution and elimination reaction
04	-	04		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Elimination Reaction	Reactivity: effect of substrate, structures, attacking base, leaving group, nature of medium on elimination reaction
02	-	02		



Dr. A. N. Ambhore



(Prof. Dr. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Teaching Plan

Academic Year: 2025-26

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: M.Sc. II (Sem-III)

Subject: Organic Chemistry

M.Sc. II (Sem-III): - Course Title: DSE14CHE31 Advanced Spectroscopic Methods				
Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Ultraviolet Spectroscopy	• Introduction spectroscopy, • Woodward-Fisher rule for conjugated dienes and calculated compounds • Calculation of λ_{max}
02	-	02		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Ultraviolet Spectroscopy	• Woodward-Fisher rule for conjugated dienes and calculated compounds • Calculation of λ_{max}
04	-	04		
Month: September			Module/Unit:	Sub-units planned
04	-	04	Ultraviolet Spectroscopy Infrared Spectroscopy	• Ultraviolet spectra of aromatic and heterocyclic compounds, steric effect in biphenyls • Introduction to IR spectroscopy • Characteristics of vibrational frequencies of alkane, alkenes, and alkynes, aromatic compounds
Month: October			Module/Unit:	Sub-units planned
04	-	04	Infrared Spectroscopy	• Characteristics of vibrational frequencies of alcohol, phenol and amines • Detailed study of vibrational frequencies of carbonyl compounds (aldehydes, ketones, esters, amides, acids, anhydrides, lactones, lactams and conjugated carbonyl compounds)
Month: November			Module/Unit:	Sub-units planned
02	-	02	Infrared Spectroscopy	• Effects of hydrogen bonding and solvent effect on vibrational frequencies, overtones, combination bands and Fermi resonance. FT-IR of gaseous, solid and polymeric materials.



Dr. A. N. Ambhore



(Prof. Dr. S. D. Shirke)

HEAD

DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Annual Teaching Plan

Academic Year: 2025-26

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: B.Sc. I (Sem-II)

Subject: Analytical Chemistry

B.Sc. I (Sem-II): Course Title: 2DSC03CHE22: Analytical Chemistry

Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chromatography	- Introduction, Basic Principle, Basic terms, Classification of Chromatography A) Paper Chromatography- - Principle, Methodology, Development - Location of spots, Determination of R_f value - Applications, advantages and disadvantages
08	-	08		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chromatography	B) Thin layer chromatography – - Principle, Solvent system, stationary phases, preparation of TLC plate, Detecting reagents, - Methodology – sample loading, development, detection of spot, R_f value, Applications, advantages and disadvantages. - Comparison of paper chromatography and TLC
08	-	08		
Month: February			Module/Unit:	Sub-units planned
08	-	08	Theory of Titrimetric Analysis	- Introduction - Acid-base indicators - Theory of indicators w.r.t. Ostwald's ionization theory and quinoid theory - Neutralization curves and choice of indicators for i) SA-SB ii) SA-WB iii) SB-WA
Month: March			Module/Unit:	Sub-units planned
08	-	08	Theory of Titrimetric Analysis	- Complexometric titrations: - Introduction, Types of EDTA titrations, Metallochromic indicators- Eriochrome black-T Indicator, Action of Eriochrome black-T
Month: April			Module/Unit:	Sub-units planned
04	-	04	Theory of Titrimetric Analysis	- Completed the teaching task if remain. - Home Assignment, Unit test. - Internal Examination


Dr. A. N. Ambhore


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



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Annual Teaching Plan

Academic Year: 2025-26

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

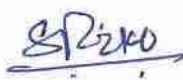
Department: Chemistry

Class: B.Sc. III (Sem- VI)

Subject: Industrial Chemistry

B.Sc. III (Sem VI): Course Title: DSE03CHE51 Industrial Chemistry				
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Manufacturing of Sugar and Jaggery	A) Sugar: • Introduction • Manufacturing of cane sugar: • Refining of cane sugar • Utilization of by-products
08	-	08		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Manufacturing of Sugar and Jaggery	B) Jaggery: • Composition & forms of Jaggery • Production process of jaggery • Analysis of Jaggery
08	-	08		
Month: February			Module/Unit:	Sub-units planned
08	-	08	Manufacturing of Heavy Chemicals	• Introduction • Manufacturing of NH_3: Haber-Bosch process, • Manufacturing of H_2SO_4: Contact process, • Manufacturing of HNO_3: Ostwald's process.
Month: March			Module/Unit:	Sub-units planned
08	-	08	Green Chemistry	• Introduction • Twelve principles of green chemistry • Goals of green chemistry, • Green chemicals: Green reagents, green catalyst, green solvents, • Green organic synthesis: Use of Zeolites, Natural catalysts, Biocatalysts • Emerging green technologies: Microwave chemistry, Sonochemistry, Photochemistry, Electrochemistry, Mechanochemistry, • Green synthesis: Polycarbonate, Carbaryl pesticide, Ibuprofen.
Month: April			Module/Unit:	Sub-units planned
04	-	04	Green Chemistry	• Completed the teaching task if remain. • Home Assignment, Unit test. • Internal Examination


Dr. A. N. Ambhore


(Prof. Dr. S. D. Shirke)



HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Annual Teaching Plan

Academic Year: 2025-26

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

Class: M.Sc. I

Subject: Organic Chemistry

M.Sc. I (Sem-II): - Course Title: DSE14CHE21 Inorganic & Organic Chemistry				
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Study of Following Reactions	- Mechanism of Condensation reaction - Arndt-Eistert reaction - Stobbe Reaction
04	-	04		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Study of Following Reactions	- Simon-Smith Reaction - Ulmann Reaction - Mc-Murry Reaction - Prins Reaction
04	-	04		
Month: February			Module/Unit:	Sub-units planned
04	-	04	Study of Following Reactions	- Nef Reaction - Passerini Reaction - Baylis-Hilman Reaction - Mitsunobu Reaction
Month: March			Module/Unit:	Sub-units planned
04	-	04	Study of Following Reactions	- Darzen Reaction - Duff Reaction - Click Reaction
Month: March			Module/Unit:	Sub-units planned
04	-	04	Study of Following Reactions	- Completed the teaching task if remain. - Home Assignment, Unit test. - Internal Examination


Dr. A. N. Ambhore


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



Vivekanand College, Kolhapur
(An Empowered Autonomous Institution)

Teaching Plan

Academic Year: 2025-26

Name of the Teacher: Dr. Ajay Niwruittirao Ambhore

Department: Chemistry

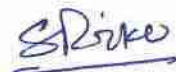
Class: M.Sc. II

Subject: Organic Chemistry

M.Sc. II (Sem-IV): - Course Title: DSE14CHE41 Theoretical Organic Chemistry				
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Methods of Determining Reaction Mechanism	(A) Kinetic Methods: - Order and Molecularity, - Methods of following reaction rates, - Types of reactions: 1st, 2nd and 3rd order reactions; - Reversible, Consecutive and Parallel reactions
04	-	04		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Methods of Determining Reaction Mechanism	- Energy of Activation, - Entropy of Activation, - Effect of Ionic strength, - Solvent effect and Kinetic isotopic effect
04	-	04		
Month: February			Module/Unit:	Sub-units planned
04	-	04	Methods of Determining Reaction Mechanism	(B) Non-Kinetic Methods: - Identification of reaction products, - Testing of the possible intermediates, Trapping of the intermediates, - Isotopic labelling, - Reaction catalysis,
Month: March			Module/Unit:	Sub-units planned
04	-	04	Methods of Determining Reaction Mechanism	- Cross-over experiments, - Stereochemical studies and Use of physical properties. - Hammett and Taft equations.
Month: April			Module/Unit:	Sub-units planned
04	-	04	Study of Following Reactions	- Completed the teaching task if remain. - Home Assignment, Unit test. - Internal Examination



Dr. A. N. Ambhore



(Prof. Dr. S. D. Shirke)

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)



Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B.Sc. II (Major & Minor), Sem III, B.Sc. III

Department: Chemistry

Subject: Chemistry

Course Title: DSC-1002C-Part-I: Analytical Chemistry

Name of the Teacher: Dr. Vikas Bibhishan Shinde

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Unit Operations	• Introduction, Meaning of unit operations and processes & its types, • Principle, applications & Brief study of various unit operations such as • Distillation, Extraction, Crystallization, Evaporation, Drying, Filtration.
07	4*3=12	19		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Gravimetric Analysis	• General introduction, Common ion effect and solubility product • principles, Conditions for good precipitation, Factors affecting to • precipitation like pH, temperature, nature of solvent; Super saturation • and precipitate formation, Precipitation from homogeneous solution • and examples, Co-precipitation, post-precipitation and remedies for • their minimization, Digestion, Washing of precipitate and ignition of • precipitate, Brief idea about method of filtration and drying of • precipitate, Organic Precipitants.
08	4*3=12	20		
Month: September			Module/Unit:	Sub-units planned
08	4*3=12	20	Chromatography	• Recapitulation: Definition and principle of chromatography, • Types of chromatography • A) Gas Chromatography: • Principle and theory of gas chromatography • Components of gas chromatography: Carrier gas tank, Sample • Injector, Column (types of columns), Detector. • Types of gas chromatography: GSC and GLC • Applications of gas chromatography: • B) High-Performance Liquid Chromatography (HPLC):

				• Principle and theory of HPLC,
Month: October			Module/Unit:	Sub-units planned
04	08	12	Chromatography	• Components of HPLC system: Mobile phase, Pump system, • Injector, Column (types of columns and stationary phases), • Detector, Data processing system • Types of HPLC: Normal phase HPLC, Reverse phase HPLC (RP-HPLC) • Mobile Phase and Stationary Phase: Selection of mobile phase, Types of stationary phases. • Applications of HPLC

V. B. Shinde

Dr. V. B. Shinde

S. D. Shirke

Dr. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Empowered Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B. Sc. I, Sem-I

Department: Chemistry

Subject: Chemistry

Course Title: Chemistry Practicals

Name of the Teacher: Mr. Sourabh Chandrakant Khilare

Month : August			Module/Unit:	Sub-units planned
Lectures -	Practicals 4*4=16	Total 16	Thermodynamics	• Estimation of Acetic acid from the given vinegar sample by titrimetric method. • Estimation of Cu (II) ions by iodometric titration by using Na₂S₂O₃ solution • Spot Tests (Any Two) Detection of following cations using spot tests: Cu ²⁺ , Co ²⁺ , Ni ²⁺ , Fe ⁺ , Al ³⁺ , Zn ²⁺ , Mg ²⁺ , Pb ²⁺
Month : September			Module/Unit:	Sub-units planned
Lectures -	Practicals 4*4=16	Total 16	Thermodynamics	Paper Chromatography (Any Three) • Detection of following cations using Paper Chromatography: Cu²⁺ + Co²⁺, Co²⁺ + Ni²⁺, Ni²⁺ + Cu²⁺ • Preparation of Derivatives: Preparation of Urea Oxalate. • Organic Spotting – Compounds containing C, H, (O) (Any Two)
Month : October			Module/Unit:	Sub-units planned
Lectures -	Practicals 4*4=16	Total 16	Thermodynamics	• Preparation of Derivatives: • Preparation of 2, 4-DNP of ketones. • Preparation of Osazone. To determine normality of bulk solution of HCl/ H ₂ SO ₄ . • Estimation of Phenol
Month : November			Module/Unit:	Sub-units planned
Lectures	Practicals 2*4=8	Total 8	Theory and [practical exams]	Organic Spotting – Compounds containing C, H, (O) (Any Two)



Mr Sourabh Khilare



Dr. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
 (EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

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

Subject: Chemistry
Physical Chemistry

Course Title: MIN-V: MIN03CHE31 : General Aspects in

Name of the Teacher: Mr. Sourabh Chandrakant Khilare

Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Electrochemistry II	• Introduction Conductance of electrolyte solution, Migration of ions. • Transference number, determination of transport number using moving boundary method, factors affecting transport number: nature of electrolyte, concentration, temperature, complex formation and degree of hydration.
04	4*3	16		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Electrochemistry II	• Conductometric titrations – A) Acid -base titrations with mixture of strong and weak acid - a) strong acid and strong base b) weak acid and weak base B) Precipitation titration. • Advantages of conductometric titrations.
04	4*4=16	20		
Month: September			Module/Unit:	Sub-units planned
04	4*4=16	20	Fundamentals of Industrial Chemistry	• Introduction, Meaning of unit operations and processes & its types
Month: October			Module/Unit:	Sub-units planned
04	4*4=16	20	Fundamentals of Industrial Chemistry	• Principle, applications & Brief study of various unit operations such as Distillation, Crystallization.



Mr. Sourabh Khilare



Dr. S. D. Shirke

HEAD
DEPARTMENT OF CHEMISTRY
VIVEKANAND COLLEGE, KOLHAPUR
(EMPOWERED AUTONOMOUS)

Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2026-27

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: DSE-1002E1: Physical Chemistry

Name of the Teacher: Mr. Sourabh Chandrakant Khilare

Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Molecular Spectroscopy	• Introduction, • Electromagnetic radiation.
02	-	02		
Month: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Molecular Spectroscopy	• Interaction of radiation with matter, Electromagnetic spectrum, Energy level diagram. • Rotational spectra of diatomic molecules: Rigid rotor model, moment of inertia, energy levels of rigid rotor, selection rules, Intensity of spectral lines, determination of bond length, isotope effect, Microwave oven
08	4*3=12	20		
Month: August			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Molecular Spectroscopy	• Vibrational spectra of diatomic molecules: Simple Harmonic oscillator model, Vibrational energies of diatomic molecules, Determination of force constant, overtones. • Raman spectra: Concept of polarizability, pure rotational and pure Vibrational Raman spectra of diatomic molecules, selection rules. Difference between thermal and photochemical processes.
08	4*4=16	24		
			Electromotive force	• Numericals • Introduction • Thermodynamics of electrode potentials, Nernst equation for electrode and cell potentials in terms of activities. • E. M. F. series.
Month: September			Module/Unit:	Sub-units planned

08	4*4=16	24	Electromotive force	- Types of electrodes: Description in terms of construction, representation, half cell reaction and emf equation for - Metal – metal ion electrode. - Amalgam electrode. - Metal–insoluble salt electrode. - Gas–electrode. - Oxidation–Reduction electrode. - Reversible and Irreversible cells. Chemical cells without transference. Concentration cells with [Derivation expected] and without transference [Derivation not expected] Liquid- Liquid junction potential: Origin, elimination and determination.
Month: October			Module/Unit:	Sub-units planned
04	4*2=08	12	Electromotive force	- Equilibrium constant from cell emf - Applications of emf measurements: - Determination of pH of solution using Hydrogen electrode. - Solubility and solubility product of sparingly soluble salts (based on concentration cells).
Month : November			-	Theory Examination


Mr Sourabh Khilare


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