

Vivekanand College, Kolhapur (Autonomous)

B.Sc.-Annual Teaching Plan

Academic Year - 2021-22

Semester- I, III and V

Department- Chemistry
Course Title – Organic Chemistry

Subject – Chemistry,

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

Month – October (3 weeks)			Module/ Unit	Sub-Units Planned
B.Sc.I : Lectures	Practicals	Total		
06	12	18	1)Stereochemistry of Organic compounds	Introduction, Stereoisomerism –Optical isomerism , Chirality, Enantiomers and diastereoisomerism
B.Sc.II : Lectures	Practicals	Total		
06	24	30	1)Amino acids, Peptides and Proteins	Introduction, Amino acids, Examples, and Classification of amino acids.
B.Sc.III: Lectures	Practicals	Total		
06	21	27	1)Natural Products – Terpenoids	Introduction, Isolation methods and Classification of terpenoids, General methods for identification of structure of terpenoids.
M.Sc.II:Lectures	Practicals	Total		
03	12	15	Paper-Advanced Synthetic methods – Unit : Use of following in the synthesis .	Introduction, Use of Merrifield Resin in Polypeptide synthesis – Structure, Preparation of Merrifield resin.

Dr. Mrs. Shirke

Dr. Mrs. Shirke S. D.

Name and Signature of the Teacher



Dr. Mrs. Shirke

Name and Signature of HOD

Chemistry Department
Vivekanand College
Kolhapur.

Academic Year – 2021-22, Programme : B.Sc. Semester – I, III and V

Department- Chemistry Subject – Chemistry, Course Title – Organic Chemistry

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

Month – November (3 weeks)			Module Unit	Sub-Units Planned
B.Sc.I : Lectures	Practicals	Total		
06	21	27	1) Stereochemistry of Organic compounds	Elements of Symmetry-Plane, center of symmetry, alternating axis of symmetry, Optical isomerism in 2,3 dihydroxybutanoic acid, Tartaric acid and chlorobutanoic acid, Geometrical isomerism – maleic acid and Fumaric acid.
B.Sc.II : Lectures	Practicals	Total		
06	24	30	1) Amino acids, Peptides and Proteins	Electrophoresis, Zwitterions Preparation of Amino acids – Strecker's Synthesis, Gabriel's phthalimide synthesis, Peptide bonds., Mono-, di-, Polypeptides...
B.Sc.III: Lectures	Practicals	Total		
06	21	27	1) Natural Products - Terpenoids	General methods contd... Analytical evidence for structure of Citral and its Synthetic evidence. Alkaloids – Definition, Introduction
M.Sc.II: Lectures	Practicals	Total	Paper: Advanced synthetic methods	
03	12	15	Unit : Use of following in the synthesis	i) Merrifield resin contd... ii) Use of Ionic Liquids – Definition, Examples, structures, Nomenclature ..

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Academic Year – 2021-22, Programme : B.Sc. Semester – I III and V

Department- Chemistry Subject – Chemistry, Course Title – Organic Chemistry.

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

Month – December (4 weeks)			Module Unit	Sub-Units Planned
B.Sc.I : Lectures	Practicals	Total		
08	16	24	1) Stereochemistry of Organic compounds	Geometrical Isomerism : In olefins, Oximes and alicyclic compounds. R S Nomenclature., E and Z Nomenclature. Conformational isomerism in Ethane
B.Sc.II : Lectures	Practicals	Total		
08	32	40	1) Amino acids, Peptides and Proteins	Protein structures : Classification, - Primary , secondary and tertiary, and Quaternary structure of Proteins. Reactions of Proteins - Esterification of –COOH group and –acetylation of NH ₂ group, Complexation with Cu ions.
B.Sc.III: Lectures	Practicals	Total		
08	28	36	1) Natural Products-Alkaloids	Classification of Alkaloids, General methods for Identification of structure, Analytical evidence for structure of Nicotine.
M.Sc.II Lectures	Practicals	Total		
04	16	20	Use of following in synthesis	Applications of Ionic liquids and Reactions in presence of Ionic liquids iii) Use of Microwaves in synthesis: Introduction, Principle, requirements. Microwave assisted Reactions in aqueous medium, organic medium iv) Multicomponent Reactions

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Academic Year – 2021-22, Programme : B.Sc. Semester – I III and V

Department- Chemistry Subject – Chemistry, Course Title – Organic Chemistry.

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

Month –January (4 weeks)			Module Unit	Sub-Units Planned
B.Sc.I : Lectures	Practicals	Total		
08	16	24	1) Aromaticity	Conformational Isomerism in clohex completed...Aromaticity : Defination Conditions for aromaticity, Classification of aromatic compound .MOT and VBT and Electrophilic Substitution Reactions.
B.Sc.II :Lectures	Practicals	Total		
08	32	40	1)Amino acids, Peptides and Proteins	Reactions of Proteins - Esterification of –COOH group and –acetylation of NH ₂ group, Complexation with Cu ions., Biuret Test and Hinsberg's Test.
B.Sc.III:Lectures	Practicals	Total		
08	32	40	1)Natural Products- Alkaloids 2)A)Pharmaceuticals B) Green Chemistry	Synthetic Evidence for Nicotine. 2.Defination, Ideal drug- properties, Classification, and Synthesis of benzocaine, isoniazid, cypermethrin, , ethophan, Sulpha Drugs B)Microwave reactions and Ionic liquids –Principle , examples and reactions.
M.Sc.II Lectures	Practicals	Total		
04	16	20	Use of following in synthesis	v) Reactions in Microwave Oven - In presence of solid support, vi)Ultrasound waves and vii)Electroorganic synthesis.(some extra lectures are required to complete the syllabus)

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Academic Year - 2021-22, Programme : B.Sc. Semester – II, IV and VI

Department- Chemistry Subject – Chemistry, Course Title – Organic chemistry

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

A Month of February - There was vacation, but we conducted the Practical Examination for M.Sc.I and M.Sc.-II from 1st February and Supervisions are also there.

Month – March (4 week)			Module Unit	Sub-Units Planned
B.Sc.I : Lectures	Practicals	Total		
NIL	24	24	No Organic paper NIL	NIL
B.Sc.II :Lectures	Practicals	Total		
NIL	24	24	No Organic paper NIL	NIL
B.Sc.III:Lectures	Practicals	Total		
08	28	36	1.NMR Spectroscopy	Introduction, Nuclear spin, Precessional frequency,,Nuclear resonance, Chemical shift, shielding and Deshielding, Instrumentation and ,Coupling Constant
M.Sc.II:Lectures	Practicals	Total		
04	-	04	Agrochemicals	Introduction - Classification of pesticides i) Carbamates, – Carbofuran, carbaryl, Baygon,aldicarb and Malathion-structure synthesis and Applications.

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Academic Year – 2021 - 22 Programme : B.Sc. Semester – II, IV and VI

Department- Chemistry Subject – Chemistry, Course Title –Organic Chemistry.

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


Month – April (3 Weeks)			Module Unit	Sub-Units Planned
B.Sc.I : Lectures	Practicals	Total		
NIL	24	24	NIL	NIL
B.Sc.II :Lectures	Practicals	Total		
NIL	24	24	NIL	NIL
B.Sc.III:Lectures	Practicals	Total		
04	21	25	NMR contd...	, Chemical shift, shielding and Deshielding, Instrumentation and ,Coupling Constant
M.Sc.IILectures	Practicals	Total		
04	-	04	Agrochemicals	.ii) Organophosphorous insecticides – monocrotophos, Ethophan, Phorate, chloropyriphos and mevinphos. iii)Natural and synthetic Pyrethroids-Defination,, Composition of natural pyrethroids , structures and properties.

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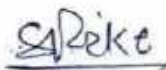



Academic Year - 2021-22, Programme : B.Sc. Semester – II IV and VI

Department- Chemistry Subject – Chemistry, Course Title – Organic chemistry

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

Month- May (3 weeks)			Module Unit	Sub-Units Planned
B.Sc.I : Lectures	Practicals	Total		
NIL	16	16	NIL	NIL
B.Sc.II :Lectures	Practicals	Total		
NIL	08	08	NIL	NIL
B.Sc.III:Lectures	Practicals	Total		
06	21	27	NMR Spectroscopy 2. Mass Spectroscopy	Examples based on sets of equivalent protons, peak area, coupling constants, splitting and identification of structures 2. Mass – Spectroscopy – Instrumentation, Fragmentation pattern, Classification of fragments, Applications.
M.Sc.II:Lectures	Practicals	Total		
03+04	-	07	Agrochemicals	iv) Synthetic pyrethroids - synthesis and applications v) Juvenile Hormones- Definition, Types of JH, structures and applications.(Extra lectures are conducted to complete the syllabus.)PGR- Indole-3-acetic acid, Giberellin etc.structure and their applications.

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In month of June – The working Days - 26

Examinations: Theory and Practical Examinations of B.Sc.- I, II and B.Sc.- III, M. Sc.- I and II were conducted through out the month.

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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year - 2021-22

Sem. I, III

Department- Chemistry

Name of the Teacher – Mr.S.C.Kumbhar

Month – October

M.Sc.I Sem I:- Course Title:- Chemistry				
: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	48	56	Chemistry of Transition elements	General characteristic and properties of transition elements, co-ordination chemistry of transition metal ions, stereochemistry of coordination compounds, crystal field theory, crystal field splitting of d orbital's for octahedral, tetrahedral, square planar and square pyramidal complexes, crystal field stabilisation energy (CFSE), factors affecting the crystal field parameters, strong and weak field complexes, spectrochemical series
			Study of following reactions	Schmidt, Curtius, Lossen, Prins, Orton, Hofmann-Martius, Mitsunobu and Baylis-Hillmann reaction, Arndt-Eistert, Biginelli, Duff, Darzen.
M.Sc.II Sem III :- Course Title:- Organic Chemistry				
Lectures	Practicals	Total		
08	--	08	Study of following reactions	Mechanism, Stereochemistry, migratory aptitude and applications of Dienone-phenol, Favorskii, Wolff, Smile's, Brook, Neber, Stevens

Month – November

M.Sc.I Sem I:- Course Title:- Chemistry				
: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
06	36	42	Chemistry of Transition Elements and b) Bioinorganic Chemistry	Jahn- Teller effect, Interpretation of electronic spectra through d-d spectra and charge transfer spectra, nephelauxetic series, metal clusters, sandwich compounds, metal carbonyls. b) Role of metal ions in biological

				processes, structure and properties of metalloproteins in electron transport processes, cytochromes, ferredoxins and iron sulphur proteins, metal ion transport and storage: Ionophores and ion pumps, transferrin and ferritin, Biological nitrogen fixation, PS-I, PS -II, Oxygen uptake proteins, metal complexes in medicines.
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M.Sc.II Sem III :- Course Title:- Organic Chemistry

Lectures	Practicals	Total		
06	--	06	Study of following reactions	Sommelet-Hauser rearrangement, Eschenmoser fragmentation, von Richter reaction, Epoxide rearrangement with lewis acid.

Month – December

M.Sc.I Sem I:- Course Title:- Chemistry

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	48	56	Stereochemistry and Bonding in main group compounds	VSEPR theory and drawbacks, bond length, bond angles, bond energies and resonance, $P\pi-P\pi$ and $P\pi-d\pi$ bonds, Bent rule, Walsh diagram, Back bonding, some simple reactions of covalently bonded molecules (atomic inversion, Berry pseudorotation, nucleophilic displacement and free radical reaction)..

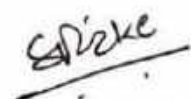
M.Sc.II Sem III :- Course Title:- Organic Chemistry

Lectures	Practicals	Total		
08	--	08	Photochemistry	Effect of light intensity on the rate of photochemical reactions, Types of photochemical reactions, photodissociation gas phase photolysis, photochemistry of alkynes, intramolecular reactions of the olefinic bonds, geometrical isomerism, cyclisation reactions, rearrangements of 1,4 and 1,5-dienes, photochemistry of carbonyl compounds, intramolecular reactions of carbonyl compounds saturated cyclic and acyclic α, β -unsaturated compounds

Month – January

M.Sc.I Sem I:- Course Title:- Chemistry				
: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
06	36	42	Metal ligand equilibria in solution	Definition of stability constant, step wise and overall formation constant and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect, ternary complexes and factors affecting their stabilities, stability of metal complexes of crown ether, Determination of stability constant for binary complexes using pH-metric (Bjerrums method) and spectrophotometric (Job's and mole ratio) techniques.
			b) Elimination reactions	b) The E1, E2 and E1cB mechanisms. Orientation in Elimination reactions. Hofmann versus Saytzeff elimination, Pyrolytic syn-elimination, competition between substitution and elimination reactions, Reactivity: effects of substrate structures, attacking base, the leaving group, the nature of medium on elimination reactions. Pyrolytic elimination reactions.
M.Sc.II Sem III :- Course Title:- Organic Chemistry				
Lectures	Practicals	Total		
06	--	06	Photochemistry	Cyclohexadienones, intermolecular cycloaddition reactions, dimerisation and oxitane formation, photochemistry of aromatic compounds, photo fries reactions of anilides, photo fries rearrangements, Singlet molecular oxygen reactions, photochemistry of vision.


Mr.S.C.Kumbhar


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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year - 2021-22

Sem. II, IV

Department- Chemistry

Name of the Teacher – Mr.S.C.Kumbhar

Month – March

M.Sc.I Sem. II:- Course Title:- Inorganic Chemistry-II

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
06	36	42	a) Organometallic Chemistry of transition elements	a) Ligand hapticity, electron count for different types of organometallic compounds, 18 and 16 electron rule exceptions, synthesis, structure and bonding, organometallic reagents in organic synthesis and in homogeneous catalytic reactions (Hydrogenation, hydroformylation, isomerisation and polymerisation), pi metal complexes.

M.Sc.II Sem IV :- Course Title:- Organic Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	a) Kinetic and thermodynamic control of reactions	Nitration and Sulphonation of naphthalene, Wittig, Enolization, Friedel-Crafts and Diels Alder reactions.

Month – April

M.Sc.I Sem. II:- Course Title:- Inorganic Chemistry-II

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	48	56	Reaction mechanism of transition metal complexes	Classification of inorganic reactions, ligand substitution reaction and their mechanisms of octahedral complexes, Acid hydrolysis, factors affecting the acid hydrolysis, Base hydrolysis, square planar complexes, trans effect, Electron transfer reaction: mechanism of inner and outer sphere electron transfer reactions in octahedral complexes.

M.Sc.II Sem IV :- Course Title:- Organic Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	Non-Classical Carbocation	Formation, stability, reactivity and synthetic applications.

Month – May

M.Sc.I Sem. II:- Course Title:- Inorganic Chemistry-II

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	48	56	a) Spectroscopic term symbols	Terms, Inter-electronic repulsion, spin orbit coupling, ground terms, determination of term symbol of d1 to d5 Configuration / complexes, Energy ordering of terms, microstates, Weak and stronger field approach, Orgel diagram of d1 to d9 configuration in an octahedral and tetrahedral environments, Correlation diagram of d1 , d2 , d8 and d9 configuration in octahedral and tetrahedral environments, non crossing rule

M.Sc.II Sem IV :- Course Title:- Organic Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	Free radical reactions	Types of free radical reactions, detection by ESR, free radical substitution mechanism, mechanism at an aromatic substrate, neighboring group assistance. Reactivity for aliphatic and aromatic substrates at a bridgehead. Reactivity in attacking radicals. The effect of solvent on reactivity. Allylic hydrogenation (NBS)

Month – June

M.Sc.I Sem. II:- Course Title:- Inorganic Chemistry-II

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	48	56	Nuclear and radiochemistry	Nuclear stability and nuclear binding energy, radioactivity and radioactive decay, radioactive equilibrium, classification of nuclear reactions, Q value, nuclear reaction cross-sections, nuclear fission, nuclear fusion, applications of radioactivity.

M.Sc.II Sem IV :- Course Title:- Organic Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	Steroids	Occurrence, nomenclature, basic skeleton, Diels hydrocarbon. Study of the following Hormones: Cholesterol, Androsterone, Testosterone, Estrone, Progesterone, Aldosteron and Cortisone (only synthesis).

S.C. Kumbhar
Mr. S.C.Kumbhar



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

Academic Year - 2021-22

Sem. I, III

Department- Chemistry

Name of the Teacher – Dr. A. A. Patravale

Month – October				
M.Sc.I Sem I:- Course Title:- Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
04	--	04	Reaction mechanism	Introduction of reaction mechanism and reactivity of carbocations and carbanions, free radicals, arynes, carbenes, N-heterocyclic carbene, nitrenes
M.Sc.II Sem I :- Course Title:- Analytical Chemistry				
Lectures	Practicals	Total		
16	32	48	a) Reaction mechanism b) Aliphatic Nucleophilic substitutions	a) reactivity of nitrenes and Nitrogen, sulphur and phosphorus ylides. b) SN2 and SN1, SNi reactions with respects to mechanism and stereochemistry. Nucleophilic substitutions at an allylic, aliphatic trigonal, benzylic, aryl and vinylic carbons.

Month – November				
M.Sc.I Sem I:- Course Title:- Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
03	--	03	b) Aliphatic Nucleophilic substitutions	Reactivity effect of substrate structure, effect of attacking nucleophiles, leaving groups and reaction medium.
M.Sc.II Sem III :- Course Title:- Analytical Chemistry				
Lectures	Practicals	Total		
12	24	36	Drugs	Development of new drugs, procedures followed in drug design. History and development of Quantitative structure activity relationship (QSAR). Concepts of drug receptors, Relation of chemical structure and chemical activity. Antibiotics Introduction, β -lactum Antibiotics, cephalosporin

				Antibiotics, SAR of β -lactum and cephalosporin, Structural features of tetracycline & macrocyclic antibiotics (no synthesis).
			Study of the Following types of drugs	a) Antimalerials b) Analgesic & Antipyretics c) Anti-inflammatory d) Antitubercular & antileprotic e) Anaesthetics f)Antihistamines g) Tranquilizer h) Anti AIDS Cardiovascular: j) Anti-neoplastic drugs

Month – December

M.Sc.I Sem I:- Course Title:- Chemistry

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
04	--	04	Aromatic Electrophilic Substitutions	Introduction, the arenium ion mechanism, orientation Sulphonation, Friedel-Crafts and Halogenation. The ortho/para ratio, ipso attack, concept of aromaticity, Diazo-coupling, Vilsmeier Haak reaction, Von Richter rearrangement. Nucleophilic aromatic substitution reactions SN 1, SN2

M.Sc.II Sem III :- Course Title:- Analytical Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
16	32	48	Heterocycles a) Five membered Heterocycles	Synthesis and reactions of Furan, benzofurans, Pyrrol, benzopyrroles, Thiophene, Benzothiophenes.

Month – January

M.Sc.I Sem I:- Course Title:- Chemistry

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
03	--	03	b) Six membered Heterocycles with one heteroatom	Synthesis and reactions of Pyridine, Quinoline, Coumarine,

M.Sc.II Sem III :- Course Title:- Analytical Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
12	24	36	Practical	Estimation of various drug and chemicals


Dr. A. A. Patravale


Dr. Mrs. S. D. Shirke

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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year - 2021-22

Sem. II, IV

Department- Chemistry

Name of the Teacher – Dr. A. A. Patravale

Month – March				
M.Sc.I Sem. II:- Course Title:- Analytical Chemistry-II				
: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
06	--	06	Practical	Estimation of various drug and chemicals
M.Sc.II Sem IV :- Course Title:- Organic Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
12	32	44	Benzenoid and Non benzenoid aromatic Compounds	a) Polycyclic aromatic compounds: Synthesis, reactions, Linear and non-linear ortho fused polynuclear hydrocarbons.

Month – April				
M.Sc.I Sem. II:- Course Title:- Organic Chemistry-II				
: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	a) Oxidation	Oxidation of alcohol to aldehyde, ketone or acid: Jones reagent, Swern oxidation, Collins reagent, Fetizon's reagent, PCC, PDC, IBX, Activated MnO ₂ , Chromyl chloride (Etard reaction), TEMPO, NMO, Moffatt oxidation .
M.Sc.II Sem IV :- Course Title:- Analytical Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
12	48	60	Benzenoid and Non benzenoid aromatic Compounds	b) Introduction to Aromaticity and anti-aromaticity, Non- benzenoids compounds, Three and five membered carbocyclic compounds, Crown ether complexes, cyclodextrins, cryptands, catenanes and rotaxanes.

Month – May

M.Sc.I Sem. II:- Course Title:- Organic Chemistry-II

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	b) Hydroboration c) Enamines	Mechanism and Synthetic Applications Formation and reactivity of enamines

M.Sc.II Sem IV :- Course Title:- Analytical Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
16	32	48	Synthesis and applications of perfumery	Introduction to perfumery compounds and its commercial process, essential oil, method of preparation and important, synthesis of 2-Phenylethanol, Yara-yara, vanillin
				preparation and important, synthesis of other food flavours, synthetic musk, Jasmone, ionones, beta-ionones from citral, phenyl acetic acid and its ester, benzyl acetate.

Month – June

M.Sc.I Sem. II:- Course Title:- Organic Chemistry-II

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	Atomic Absorption Spectroscopy (AAS) Inductively Coupled Plasma Spectroscopy	Introduction, Principal, difference between AAS and FES, Advantages of AAS over FES, advantages and disadvantages of AAS, Instrumentation, Single and double beam AAS, detection limit and sensitivity, Interferences, applications. Graphite furnace atomic absorption spectroscopy, general description, advantages and disadvantages. Flame photometry, Cold Vapor Mercury, Hydride Generation, Spark emission, challenges and limitations. Introduction, Nebulisation Torch, Plasma, Instrumentation, Interferences, and Applications. Problems: Simple problems based on AAS and ICP

M.Sc.II Sem IV :- Course Title:- Analytical Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
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12	24	36	Dyes and Intermediates	Classification and synthesis of important dye intermediates by using nitration, sulphonation, diazotization reactions. Commercial processes for azo-dyes, reactive dyes, optical brighteners, thermal sensitive dyes, dispersed dyes and reactive dyes.
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Dr. A. A. Patravale

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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2021-22 Semesters: B.Sc. I (A+B+C), Sem -I Department: Chemistry

Subject: Chemistry Course Title: DSC-1002A: Inorganic and Organic Chemistry

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

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements	<ul style="list-style-type: none"> • Introduction to atom • Bohr's theory of hydrogen atom and its limitations, Wave particle duality, • Heisenberg uncertainty principle, • Water analysis: To determine the alkalinity of water sample by using Phenolphthaline and Methyl Orange Indicator
5	4	9		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements	<ul style="list-style-type: none"> • Quantum numbers and their significance, • Shapes of s, p and d atomic orbitals, • 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, • To prepare standard 0.1 N KMnO_4 solution and to determine the strength of given oxalic acid solutions. • To determine quantity of Fe (II) ions from the given solutions by titrating it with 0.1 N $\text{K}_2\text{Cr}_2\text{O}_7$ solutions by using internal indicator. • Estimation of amount of Acetic acid from the given vinegar sample by titrimetric method.
09	12	21		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Atomic Structure and Periodicity of Elements	<ul style="list-style-type: none"> • 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 • Chemical properties of the elements • Estimation of Acetamide • Estimation of Aspirin from given pharmaceutical tablet. • Bromination of phenol/aniline/acetanilide
12	16	28		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical Bonding and Molecular structure (C) Molecular orbital theory (MOT)	<ul style="list-style-type: none"> • Introduction: Atomic Orbital's and Molecular Orbital's, LCAO method, formation of bonding, anti bonding and nonbonding molecular orbitals. • conditions of successful overlap, • Types of overlaps - S-S, S-P_x, P_x-P_x, P_y-P_y/ P_z-P_z overlaps.
12	12	24		

			<ul style="list-style-type: none"> • Bond order and its significance. • Energy level sequence for molecular orbital when $n=1$ & 2. • MO diagrams for homonuclear diatomic molecules of 1st & 2nd period elements (He_2, Li_2, B_2, N_2, O_2). • Molecular orbital diagrams for heteronuclear diatomic molecules. (CO, NO) • Determination of integral enthalpy of solution of salts (KNO_3, NH_4Cl). • Determination of enthalpy of hydration of copper sulphate. • Study of the solubility of benzoic acid in water and determination of ΔH.
Month : February			Practical and theory Examination

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Name and Signature of Teacher

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Name and Signature of HoD

Head

Department of Chemistry
Vivekananda College, Kalyanur



and determination of ΔH .

Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2021-22 Semesters: B.Sc. I (A+B+C), Sem-II Department: Chemistry

Subject: Chemistry Course Title: Chemistry Practicals

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

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> To study the reaction rate of hydrolysis of methyl acetate in presence of 0.5N HCl. To determine viscosity of given liquid A and B. To determine equivalent weight of Mg by Eudiometer. Estimation of Aniline
-	16	16		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> Spot Tests Detection of following cations using spot tests: Cu^{2+}, Co^{2+}, Ni^{2+}, Fe^{3+}, Al^{3+}, Zn^{2+}, Mg^{+2}, Pb^{2+} Paper Chromatography Detection of following cations using Paper Chromatography: Cu^{2+}, Co^{2+}, Co^{2+}, Ni^{2+}, Ni^{2+}, Cu^{2+} To estimate amount of Cu (II) ions by iodometric titration by using $\text{Na}_2\text{S}_2\text{O}_3$ solution
-	16	16		
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> Determination of enthalpy of neutralization of HCl with NaOH Organic Spotting Determination of enthalpy of hydration of copper sulphate. Study of the solubility of benzoic acid in water and determination of ΔH.
-	16	16		
Month: June				Practical and Theory Examination

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Name and Signature of Teacher

S. Shinde

Name and Signature of HoD

Head

Department of Chemistry
Vivekanand College, Kolhapur



Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. II, Sem-III

Department: Chemistry

Subject: Chemistry

Course Title: Chemistry Practicals

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

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> To determine the unknown concentration of given coloured compounds ($\text{KMnO}_4/\text{CuSO}_4$) colorimetrically. Estimation of (i) Mg^{2+} or (ii) Zn^{2+} by complexometric titrations using EDTA. Preparation of Hexamine Nickel Chloride. Estimation of total hardness of a given sample of water by complexometric titration.
-	16	16		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> Organic Spotting: Carboxylic acids, phenolic, Estimate the amount of metal present in a given solution gravimetrically- Fe as $\text{Fe}(\text{OH})_3$ To determine volumetrically the amounts of sodium carbonate and sodium hydroxide present together in the given solution.
-	24	24		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> Organic Spotting: aldehydic, ketonic, amide, nitro, amines Determination of alkali content of antacid tablet using HCl. To estimate H_2O_2 by Iodometric method. Preparations of Ferrous ammonium sulphate (Mohr's salt). Preparation of Potash Alum.
-	32	32		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> To determine Cell Constant of the given Conductivity cell and to verify Ostwald dilution law using acetic acid Solution Conductometrically. To determine the normality of given strong acid and weak acid by titrating it against strong base Conductometrically. Semi-micro qualitative analysis using H_2S of mixtures - out of the following: Cations: NH_4^+, Cu^{2+}, Cd^{2+}, Fe^{3+}, Al^{3+}, Co^{2+}, Cr^{3+}, Ni^{2+}, Mn^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, K^+, Mg^{2+}. Anions: CO_3^{2-}, S^{2-}, SO_3^{2-}, $\text{S}_2\text{O}_3^{2-}$, NO_3^-, CH_3COO^-, Cl^-, Br^-, I^-, SO_4^{2-}, $\text{C}_2\text{O}_4^{2-}$, F^-
-	32	32		
Month : February				<ul style="list-style-type: none"> Practical and theory Examination

Name and Signature of Teacher

Name and Signature of HoD



Department of Chemistry
Vivekanand College, Kolhapur

Annual Teaching Plan

Academic Year: 2021-22

Semesters: B. Sc. II, Sem-IV

Department: Chemistry

Subject: Chemistry

Course Title: DSC-1002D: Inorganic and Physical Chemistry

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

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Lanthanoids and Actinoids	<ul style="list-style-type: none"> A] Lanthanoids: Introduction, electronic configurations, oxidation states, colour and spectra, magnetic properties, lanthanide contraction, Occurrence and separation of lanthanides (ion exchange method only). Determination of the relative and absolute viscosity of a liquid or dilute solution using an Ostwald's viscometer. To investigate the reaction between potassium per sulphate and KI (Equal Concentration) To investigate the reaction between potassium persulphate and KI (Unequal Concentration) To study the hydrolysis of methyl acetate in presence of HCl and H₂SO₄ and to determine relative strength.
4	16	4		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Lanthanoids and Actinoids	<ul style="list-style-type: none"> B] Actinoids: Introduction, position in periodic table, electronic configuration, oxidation states; General methods of preparation of Transuranic elements- i) Neutron capture followed by β decay ii) Accelerated projectile bombardment iii) Heavy ion bombardment; IUPAC nomenclature of the super heavy elements with atomic number (Z) greater than 100. Estimation of Acetone Estimations of Vitamin-C from tablets Preparation of methyl orange Preparation of p-nitro acetanilide
8	32	40		
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Valence Bond Theory	<ul style="list-style-type: none"> Definition and formation of co-ordinate covalent bond in BF₃-NH₃ and [NH₄]*, Distinguish between double salt and complex salt, Werner's theory i) Postulates, ii) theory as applied to cobalt amines complexes; Description of the terms: ligands, co-ordination compounds, Coordination number; IUPAC system of nomenclature, Structural and stereoisomerism in complexes with coordination numbers 4 and 6; Estimate the amount of metal present in a given solution gravimetrically-Ni as Ni-DMG, Ba as BaSO₄ Determination of the surface tension of a liquid or a dilute solution using a Stalagmometer.
8	32	40		

				<ul style="list-style-type: none"> • Study of the variation of surface tension of a detergent solution with concentration
Month: June			Module/Unit:	Sub-units planned
4	-	4	Valence Bond Theory	<ul style="list-style-type: none"> • Postulates of VBT, Inner and outer orbital complexes w. r. t. coordination numbers 4 and 6; Drawbacks of VBT. • Practical and Theory Examination

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Name and Signature of Teacher

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Head

Department of Chemistry
Vivekanand College, Kolhapur



Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

Course Title: 1002E1: Physical and Inorganic Chemistry

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

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metals, Semiconductors and Superconductors	<ul style="list-style-type: none"> • Introduction, Properties of metallic solids. • 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. • Preparation of sodium cuprous thiosulphate
6	7	11		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Metals, Semiconductors and Superconductors	<ul style="list-style-type: none"> • Superconductors: Ceramic superconductors - Preparation and structures of mixed oxide $YBa_2Cu_3O_{7-x}$ • Applications of superconductors.
6	21	27		
			Catalysis	<ul style="list-style-type: none"> • Introduction • General principles and properties of catalysts, homogenous catalysis (catalytic steps and examples) and heterogeneous catalysis (catalytic steps and examples) • Preparation of tetra amine copper (II) sulphate. • Preparation of ammonium diamminetetra thiocyanatochromate (III) • Preparation of tris(thiourea) cuprous sulphate.
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Catalysis	<ul style="list-style-type: none"> • industrial applications, • Deactivation or regeneration of catalysts, Phase transfer catalysts, • application of zeolites as catalysts.
8	28	36		
			Organometallic Compounds	<ul style="list-style-type: none"> • Introduction • Definition nomenclature and Classification of organometallic compounds, • EAN rule as applied to carbonyls, • Determination of percentage purity of tetrammine copper (II) sulphate. • Determination of percentage purity of ferrous ammonium sulphate. • Determination of percentage purity of potassium trioxalato aluminate. • Preparation of Urea formaldehyde resin.
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Organometallic	<ul style="list-style-type: none"> • Structures of methyl lithium, Zeiss salt and

6	21	27	Compounds	<p>ferrocene,</p> <ul style="list-style-type: none"> • Preparation, structure, bonding and properties of mononuclear and polynuclear carbonyls of 3d metals. • Gravimetric estimation of iron as ferric oxide from the given solution containing ferrous ammonium sulphate, copper sulphate and free sulphuric acid. • Gravimetric estimation of aluminium as aluminium oxide from the given solution containing potash alum, copper sulphate and free sulphuric acid. • Gravimetric estimation of barium as barium sulphate from the given solution containing barium chloride, ferric chloride and free hydrochloric acid.
Month : February				<ul style="list-style-type: none"> • Practical and theory Examination

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S. D. S. K.

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Head

Department of Chemistry
Yyekanand College, Kolhapur



Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2021-22

Semesters: B .Sc. III, Sem-VI

Department: Chemistry

Subject: Chemistry

Course Title: 1002F1: Physical and Inorganic Chemistry

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

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Inorganic Reaction mechanism	<ul style="list-style-type: none"> • Introduction • Classification of Mechanism • Study of Mechanism Association, dissociation, interchange and the rate determining steps • SN¹ and SN² reaction for inert and labile complexes • Mechanism of substitution in cobalt (III) octahedral complexes • Trans effect and its theories • Applications of trans effect in synthesis of Pt (II) complexes • Determination of percentage of magnesium in the given sample of talcum powder. • Determination of amount of aluminum in the given solution of potash alum. • Determination of titrable acidity in the given sample of milk or lassi. • Determination of Fe in cement.
8	28	36		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chelation	<ul style="list-style-type: none"> • A brief introduction with respect to ligands, chelating agent, chelation and metal chelates, • Structural requirements of chelate formation, Difference between metal chelate and metal complex, Classification of chelating agents (with specific illustration of bidentate chelating agents), • Application of chelation with respect to chelating agents - EDTA and DMG • Determination of chlorine in bleaching powder. • Determination of Free acidity in ammonium sulphate fertilizer. • Determination of percentage of CaCO₃ in chalk. • Determination of COD.
8	28	36		
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Nuclear Chemistry	<ul style="list-style-type: none"> • 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, • 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. • Determination of amount of magnesium in the
8	28	36		

				given solution containing (Mg^{2+} • and Zn^{2+}) using anion exchange resin and standard solution of EDTA.
Month : June				• Practical and theory Examination

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Name and Signature of Teacher

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Head
Department of Chemistry
Vivekanand & College, Kolhapur



Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2021-22

Semesters: M. Sc. I, Sem -I

Department: Chemistry

Subject: Chemistry

Course Title: CP-1131A: Inorganic Chemistry- I

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

Month: October			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Electronic, Electric and Optical behaviour of Inorganic materials	<ul style="list-style-type: none"> • Introduction • Properties of metals, types of metallic solids
2	-	2		
Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Electronic, Electric and Optical behaviour of Inorganic materials	<ul style="list-style-type: none"> • Metals, Insulators and Semiconductors, • Electronic structure of solid, band theory, • band structure of metals, insulators and semiconductors, • Analysis of iron ore • Analysis of pyrolusite ore
3	2	5		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Electronic, Electric and Optical behaviour of Inorganic materials	<ul style="list-style-type: none"> • Intrinsic and extrinsic semiconductors, • doping of semiconductors and conduction mechanism, the band gap, • temperature dependence of conductivity, carrier density and carrier mobility in semiconductors, • Preparation of Hexathiourea plumbus (II) nitrate • Preparation of Nickel ammonium sulphate • Preparation of Prussian blue • Preparation of Hexamine cobalt(III) chloride
5	4	9		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Electronic, Electric and Optical behaviour of Inorganic materials	<ul style="list-style-type: none"> • synthesis and purification of semiconducting materials, single crystal growth, zone refining, fractional crystallization, • semiconductor devices, rectifier transistors, optical devices, photoconductors, photovoltaic cells, solar batteries. • Analysis of solder metal alloy • Analysis of stainless steel alloy
5	2	7		
Month : February				<ul style="list-style-type: none"> • Practical and theory Examination


Name and Signature of Teacher


Name and Signature of HoD



Department of Chemistry
Vivekanand Jr. College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2021-22

Semesters: M.Sc. I, Sem-II

Department: Chemistry

Subject: Chemistry

Course Title: CP 1131 B: Inorganic Chemistry - II

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

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Studies and applications of Lanthanides and Actinides	<ul style="list-style-type: none"> • Introduction • Electronic configuration, oxidation states • Analysis of bauxite ore • Analysis of dolomite ore
4	2	6		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Studies and applications of Lanthanides and Actinides	<ul style="list-style-type: none"> • Spectral and magnetic properties, • use of lanthanide compounds as shift reagents and complex formation, • Potassium dioxalato dihydroxo manganate(IV) • Ammonium trioxalato chromate • Nitropentammine cobalt (III) chloride • Potassium hexathiocyanato chromate
4	4	8		
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Studies and applications of Lanthanides and Actinides	<ul style="list-style-type: none"> • Modern methods of separation of lanthanides and actinides, • Analysis of Brass alloy • Analysis of Monel metal alloy
4	2	6		
Month : June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Studies and applications of Lanthanides and Actinides	<ul style="list-style-type: none"> • Organometallic chemistry applications of lanthanide and actinide compounds in Industries. • Practical and theory Examination
2	-	2		

Sarita Dattajirao Shinde

Name and Signature of Teacher



S. D. Shinde

Name and Signature of HoD

Head

Department of Chemistry
Vivekanand College, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year - 2021-22

Sem. I, III, V

Department- Chemistry

Name of the Teacher – **Dr. Undale K. A.**

Month – October					
B.Sc.I Sem I					
Lectures	Practicals	Total		Module Unit	Sub-Units Planned
--	16	16			
B.Sc.II Sem III :- Course Title:- Physical and Analytical Chemistry					
Lectures	Practicals	Total			
04	32	36		Phase Equilibria	Introduction, Phase, components and degrees of freedom of a system, criteria of phase equilibrium, Gibbs Phase Rule, Clausius-Clapeyron equation and its importance,
B.Sc.III.Sem V:- Course Title:- Physical and Analytical Chemistry					
Lectures	Practicals	Total			
08	28	36		Molecular Spectroscopy	Introduction, Electromagnetic radiations, Electromagnetic spectrum, Energy level diagram. Rotational spectra of diatomic molecules: Rigid rotor model, Moment of inertia (derivation expected), Energy levels of rigid rotor, selection rules, spectral intensity, Maxwell-Boltzmann population distribution, Determination of bond length, isotopic effect, interaction of radiation with rotating molecules.
M. Sc. II Sem III :- Course Title:- Organic Reaction Mechanism					
Lectures	Practicals	Total			
04	--	04		Pericyclic Reactions	Molecular orbital symmetry, Frontier orbital of ethylene, 1,3- butadiene, 1,3,5-hexatriene and allyl system,

Month – November

B.Sc.I Sem I

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
--	16	16		

B.Sc.II Sem III :- Course Title:- Physical and Analytical Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
04	32	36	Phase Equilibria	Phase diagrams of onecomponent systems (water and sulphur) and two component systems involving eutectics, congruent and incongruent melting points (lead-silver, FeCl ₃ -H ₂ O and KI-Water only).

B.Sc.III. Sem V:- Course Title:- Physical and Analytical Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	28	36	Molecular Spectroscopy Chromatography	Vibrational spectra of diatomic molecules: Simple Harmonic oscillator model, vibrational energies of diatomic molecules, determination of force constant, overtones. Interaction of radiation with vibrating molecules. Raman Spectra: concept of polarizability, pure rotational and pure vibrational Raman spectra of diatomic molecules, selection rules. Numerical problems Introduction, General Introduction, Basic principle of chromatography, Classification of Chromatography..

M. Sc. II Sem III :- Course Title:- Organic Reaction Mechanism

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
04	--	04	Pericyclic Reactions	classification of pericyclic reaction, Wood-ward Hoffman correlation diagrams, FMO and PMO approach, electrocyclic reactions, conrotatory and disrotatory motions, $4n$, $4n+2$ and allyl systems, cycloaddition, and supra and antara facial additions, $4n$ and $4n+2$ systems, $2+2$ additions of ketenes,

Month – December

B.Sc.I Sem I				
: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
--	16	16		
B.Sc.II Sem III :- Course Title:- Physical and Analytical Chemistry				
Lectures	Practicals	Total		
04	32	36	Solutions	Thermodynamics of ideal solutions: Ideal solutions and Raoult's law, deviations from Raoult's law, non-ideal solutions, Vapour pressure-composition and temperature composition curves of ideal and non-ideal solutions, Distillation of solutions, Azeotropes,
B.Sc.III. Sem V:- Course Title:- Physical and Analytical Chemistry				
Lectures	Practicals	Total		
08	28	36	Chromatography	Paper Chromatography: Principle, methodology, types of Papers and treatment, sample loading, choice of solvent, development: ascending, descending, circular; location of spot, determination of R_f value, applications and Advantages and Disadvantages. Thin layer chromatography: principle, solvent system, stationary phases, preparation of TLC plates, detecting reagents, methodology-sample loading, development, detection of spot, determination of R_f value, preparative TLC, applications and Advantages and Disadvantages. Comparison of TLC and paper chromatography.
M. Sc. II Sem III :- Course Title:- Organic Reaction Mechanism				
Lectures	Practicals	Total		
04	--	04	Pericyclic Reactions	1,3-dipolar cycloaddition and chelotropic reactions, sigmatropic rearrangement, supra and antarafacial shifts of H,

Month – January

B.Sc.I Sem I

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
--	16	16		

B.Sc.II Sem III :- Course Title:- Physical and Analytical Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
04	32	36	Phase Equilibria Solutions	Numericals Unit Test

B.Sc.III.Sem V:- Course Title:- Physical and Analytical Chemistry

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	28	36	Synthetic Reagents	DDQ, OsO ₄ , N-bromosuccinamide, Zn-Hg, DCC, LiAlH ₄ , CAN, Raney Ni, Diazomethane Unit Test

M. Sc. II Sem III :- Course Title:- Organic Reaction Mechanism

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
04	--	04	Pericyclic Reactions	Sigmatropic shifts involving carbon moieties, (3,3) and (5,5) sigmatropic rearrangement and Claisen and Cope and Aza Cope rearrangement, Ene reaction. Unit Test

Dr. Undale K. A.

Dr. Mrs. S. D. Shirke

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Chemistry Department
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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year - 2021-22

Sem. II, IV, VI

Department- Chemistry

Name of the Teacher – Dr. Undale K. A.

Month – March

B.Sc.I Sem I Physical Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	16	24	Chemical Equilibria	Introduction, Concept of free energy, Free energy change in chemical reaction, law of chemical equilibrium, Distinction between Gibbs free energy and standard Gibbs free energy, LeChatelier's Principle
B.Sc.II Sem III :-				
Lectures	Practicals	Total		
--	32	32		
B.Sc.III Sem V:- Course Title:- Physical and Analytical Chemistry				
Lectures	Practicals	Total		
04	28	32	Renewable Energy Sources	Introduction, Batteries -Primary, Secondary cells, Lithium Ion Cell Fuel Cells- Types of fuel cells, Hydrogen- Oxygen fuel cell, Hydrocarbon – Oxygen fuel cell, Coal fired fuel cell.
M. Sc. II Sem III :- Course Title:- Organic Reaction Mechanism				
Lectures	Practicals	Total		
04	--	04	Newer methods of stereoselective synthesis	Introduction, Stereoselective, Stereospecific Reactions

Month – April

B.Sc.I Sem I Physical Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	16	24	Chemical Equilibria	Conditions for maximum yield industrial processes like manufacture ammonia and sulphuric acid. Relationship between K_p , K_c and K_x for reactions involving ideal gases.

B.Sc.II Sem III				
Lectures	Practicals	Total		
	32	32		
B.Sc.III.Sem V:- Course Title:- Physical and Analytical Chemistry				
Lectures	Practicals	Total		
04	28	32	Renewable Energy	Biomass Energy – Introduction, Origin of biomass, conversion of biomass into energy by alcohol fermentation and anaerobic digestion method.
M. Sc. II Sem III :- Course Title:- Organic Reaction Mechanism				
Lectures	Practicals	Total		
04	--	04	Newer methods of stereoselective synthesis	Enantioselective synthesis (chiral approach) reactions with hydride donors, hydroboration, catalytic hydrogenation

Month – May				
B.Sc.I Sem I:- Course Title:- Analytical And Industrial Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	16	24	Dairy Chemistry	Introduction, Constituents of Milk and their Physicochemical Properties, Milk Processing
B.Sc.II Sem III				
Lectures	Practicals	Total		
	32	32		
B.Sc. III Sem V:- Course Title:- Physical and Analytical Chemistry				
Lectures	Practicals	Total		
04	28	32	Fermentation Industry	Introduction, importance, Basic requirement of fermentation process, Factors favoring fermentation, fermentation operations. Manufacture of Industrial alcohol (Ethyl alcohol) from a) Molasses b) Food grains, c) manufacture of alcohol from fruits (wine).
M. Sc. II Sem III :- Course Title:- Organic Reaction Mechanism				
Lectures	Practicals	Total		
04	--	04	Newer methods of stereoselective synthesis	Catalytic hydrogenation via chiral hydrazones and oxazolines

Month – June

B.Sc.I Sem I

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	16	24	Dairy Chemistry	Milk Processing, Definition & Composition of Dairy Products: Cream, Butter, Ghee, Icecream, Milk Powder

B.Sc.II Sem III

Lectures	Practicals	Total		
	32	32		

B.Sc.III.Sem V:- Course Title:- Physical and Analytical Chemistry

Lectures	Practicals	Total		
04	28	32	Fermentation Industry	Grades of alcohols: Silence spirit, rectified spirit, absolute alcohol, proof spirit, denatured spirit, duty and duty free alcohol. Importance of power alcohol as fuel

M.Sc. II Sem III :- Course Title:- Organic Reaction Mechanism

Lectures	Practicals	Total		
04	--	04	Newer methods of stereoselective synthesis	Sharpless epoxidation, Diels Alder selective synthesis.

Dr. Undale K. A.

Dr. Mrs. S. D. Shirke

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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year - 2021-22

Sem. I, III

Department- Chemistry

Name of the Teacher – Dr. D. S. Gaikwad

Month – October					
M.Sc.I Sem I:- Course Title:- Chemistry					
: Lectures	Practicals	Total		Module Unit	Sub-Units Planned
04	--	04		Stereochemistry	Introduction of stereochemistry, Symmetry, Chirality, Prochiral relationship, homotopic, enantiotopic and diastereotopic groups and faces.
M.Sc.II Sem III :- Course Title:- Organic Chemistry					
Lectures	Practicals	Total			
16	32	48		Applications of following metal in organic synthesis	Introduction to organometallic chemistry, applications of metals in organic synthesis such as Pd, Mg, Rh, Tl, Si, use of Cu in Click chemistry

Month – November					
M.Sc.I Sem I:- Course Title:- Chemistry					
: Lectures	Practicals	Total		Module Unit	Sub-Units Planned
03	--	03		Stereochemistry	Recemic modifications and their resolution, Geometrical isomerism, R, S and E, Z nomenclature, Threo and Erythro isomers. Allenes and spiranes,
M.Sc.II Sem III :- Course Title:- Organic Chemistry					
Lectures	Practicals	Total			
12	24	36		Drugs and Heterocycles	a) Six membered Heterocycles with two and more Heteroatoms (8) Synthesis and reactions of diazines & triazines. b) Seven membered Heterocycles (7) Synthesis and reactions of azepines, oxepines & thiepinines.
				Mass Spectrometry	Mass Spectrometry Introduction, ion production- EI, CI, FD and FAB, factors affecting fragmentation, ion analysis, ion abundance;

Month – December

M.Sc.I Sem I:- Course Title:- Chemistry

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
04	--	04	Stereochemistry	Stereochemistry of the compounds containing Nitrogen, Sulphur and phosphorous. Conformational analysis: Cyclohexane derivatives, stability and reactivity, Conformational analysis of Mono and disubstituted cyclohexanes.

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

Lectures	Practicals	Total	Module Unit	Sub-Units Planned
16	32	48	Mass Spectrometry	Mass spectral fragmentation of aldehydes, ketones, aromatic hydrocarbons, carboxylic acids, ethers, alcohols, amines, nitro, cyano compounds; molecular ion peak, metastable ion peak; High resolution mass spectrometry (HRMS); MALDI; TOF; Problems associated with Mass Spectroscopy.
			Combined spectral problems	Structural problems based on combined spectroscopic techniques (including reaction sequences)

Month – January

M.Sc.I Sem I:- Course Title:- Chemistry

: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
03	--	03	Stereochemistry	Conformational analysis of Mono and disubstituted cyclohexanes. Previous year Question paper discussion.

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

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

			Combined spectral problems	Structural problems based on combined spectroscopic techniques (including reaction sequences)
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Dipal

Dr. D. S. Gaikwad



S. Shirke

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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year - 2021-22

Sem. II, IV

Department- Chemistry

Name of the Teacher – Dr. D. S. Gaikwad

Month – March				
M.Sc.I Sem. II:- Course Title:- Organic Chemistry-II				
: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
06	--	06	Study of following reactions	a) Study of following reactions Mechanism of condensation reaction involving enolates, Dieckmann, Wagner-Meerwein, Robinson annulation, Reimer-Tieman, Chichibabin, Pummerer, Payne rearrangement, SimonSmith, Ulmann, Mc-Murry, Dakin.
M.Sc.II Sem IV :- Course Title:- Organic Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
12	32	44	Vitamins	Introduction of Vitamins, Classification and nomenclature of Vitamins, Sources of vitamins and their deficiency, Synthesis, structure.

Month – April				
M.Sc.I Sem. II:- Course Title:- Organic Chemistry-II				
: Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	Study of following reactions	Alkylation and Acylation Introduction, Types of alkylation and alkylating agents: C-Alkylation and Acylation of active methylene compounds and their applications.
M.Sc.II Sem IV :- Course Title:- Organic Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
12	48	60	Vitamins	Biological functions of vitamin B1, B2, B5, B6 and Biotin (Vitamin H).
			Alkaloids	Introduction, occurrence, isolation and functions of alkaloids, Structure, stereochemistry and synthesis of the following: Morphine, Reserpine.

Month – May				
M.Sc.I Sem. II:- Course Title:- Organic Chemistry-II				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	Organometallic compounds	Study of Organometallic compounds Organo-lithium, organo cobalt, Ce, Ti, Use of lithium dialkyl cuprate, their addition to carbonyl and unsaturated carbonyl compounds.
M.Sc.II Sem IV :- Course Title:- Organic Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
16	32	48	Stereochemistry	Stereochemistry of compounds containing no chiral carbon atoms and diastereoisomerism (Geometrical isomerism). a) Stereochemistry of Allenes, Spiranes and Biphenyls
			Alkaloids	Introduction, occurrence, isolation and functions of alkaloids, Structure, stereochemistry and synthesis of the following: Atropine and Conin.

Month – June				
M.Sc.I Sem. II:- Course Title:- Organic Chemistry-II				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
08	--	08	Methodologies in organic synthesis	Ideas of syntheses and retrosyntheses, Functional group transformations and inter conversions of simple functionalities.
M.Sc.II Sem IV :- Course Title:- Organic Chemistry				
Lectures	Practicals	Total	Module Unit	Sub-Units Planned
12	24	36	Stereochemistry	Assignment of configuration b) Configuration of diastereomers (Geometrical isomerism) based on physical and chemical methods.

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Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. I, Sem-II

Department: Chemistry

Subject: Chemistry

Course Title: DSC-1002B: Organic and Physical Chemistry

Name of the Teacher: Mr. Annasaheb Tanaji Mane

Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Distribution law	<ul style="list-style-type: none">• Introduction• Nernst distribution law and its limitations,• Modification of distribution law with respect to change in molecular state of solute• Numerical problems.• Applications of the distribution law
7	16	23		



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Annual Teaching Plan

Academic Year: 2021-22 Semesters: B.Sc. II, Sem-IV Department: Chemistry

Subject: Chemistry Course Title: DSC-1002D: Inorganic and Physical Chemistry

Name of the Teacher: Mr. Annasaheb Tanaji Mane

Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Transition Elements (3d series)	<ul style="list-style-type: none">• Introduction• General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties and ability to form complexes.
5	32	37		
Month: May			Module/Unit:	Sub-units planned
5	32	37	Molecular Orbital Theory [MOT]	<ul style="list-style-type: none">• Introduction,• Salient features of MOT of octahedral complexes with sigma bonding such as $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$, $[\text{CoF}_6]^{3-}$, $[\text{Co}(\text{NH}_3)_6]^{3+}$,• Merits and demerits of MOT.

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Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

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

Name of the Teacher: Mr. Annasaheb Tanaji Mane

Month: November & December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Solid State Chemistry	<ul style="list-style-type: none">Structures of Solids,Classification of solids on the basis of bondingStructures of metallic solidsDefects in crystal structures
12	-	12		

Academic Year: 2021-22

Semesters: B.Sc. III, Sem-VI

Department: Chemistry

Subject: Chemistry

Course Title: -DSE-IV: Organic & Industrial Chemistry

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Manufacturing of Heavy Chemicals	<ul style="list-style-type: none">General introductionManufacture of NH₃ by modified Haber-Bosch process,Manufacture of H₂SO₄ by contact process,Manufacture of HNO₃ by Ostwald's process
06	-	06		

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Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. I, Sem-I

Department: Chemistry

Subject: Chemistry

Course Title: Chemistry Practicals

Name of the Teacher: Mr. Annasaheb Tanaji Mane

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	• Organic Spotting – (6)
-	16	16		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> • Estimation of Aniline/Phenol • Estimation of Aspirin from given pharmaceutical tablet.
-	16	16		
Month: January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	--	<ul style="list-style-type: none"> • To prepare standard 0.1 N KMnO₄ solution and to determine the strength of given oxalic acid solutions. • To determine quantity of Fe (II) ions from the given solutions by titrating it with 0.1N K₂Cr₂O₇ solutions by using internal indicator. • Estimation of amount of Acetic acid from the given vinegar sample by titrimetric method.
-	16	16		



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Annual Teaching Plan

Academic Year: 2021-22 Semesters: B.Sc. I, Sem-II Department: Chemistry

Subject: Chemistry Course Title: Chemistry Practicals

Name of the Teacher: Mr. Annasaheb Tanaji Mane

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> • Spot Tests Detection of following cations using spot tests: Cu^{2+}, Co^{2+}, Ni^{2+}, Fe^{3+}, Al^{3+}, Zn^{2+}, Mg^{+2}, Pb^{2+}
-	16	16		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> • Water analysis: To determine the alkalinity of water sample by using Phenolphthaline and Methyl Orange Indicator • To estimate amount of Cu (II) ions by iodometric titration by using $\text{Na}_2\text{S}_2\text{O}_3$ solution
-	16	16		
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	--	<ul style="list-style-type: none"> • To study the reaction rate of hydrolysis of methyl acetate in presence of 0.5N HCl. • To determine viscosity of given liquid A and B. • Determination of enthalpy of ionization of acetic acid. • Determination of enthalpy of neutralization of HCl with NaOH • Measurement of pH of different solutions like aerated drinks, fruit juices, shampoos and soaps using pH-meter. • To prepare and measure pH of buffer solutions ($\text{CH}_3\text{COOH}+\text{CH}_3\text{COONa}$) by potentiometer. • To determine equivalent weight of Mg by Eudiometer.
-	16	16		



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Annual Teaching Plan

Academic Year: 2021-22 Semesters: B.Sc. II, Sem-III Department: Chemistry

Subject: Chemistry Course Title: Chemistry Practicals

Name of the Teacher: Mr. Annasaheb Tanaji Mane

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	Organic Spotting: Carboxylic acids, phenolic, aldehydic, ketonic, amide, nitro, amines (at least 6 compounds) and preparation of one derivative.
-	32	32		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> Determination of the relative and absolute viscosity of a liquid or dilute solution using an Ostwald's viscometer. To investigate the reaction between potassium per sulphate and KI (Equal Concentration) To investigate the reaction between potassium persulphate and KI (Unequal Concentration) To study the hydrolysis of methyl acetate in presence of HCl and H₂SO₄ and to determine relative strength.
-	32	32		
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	--	<ul style="list-style-type: none"> Estimate the amount of metal present in a given solution gravimetrically. a) Ni as Ni-DMG b) Ba as BaSO₄ c) Fe as Fe(OH)₃. Preparation of Hexamine Nickel Chloride. Preparations of Ferrous ammonium sulphate (Mohr's salt). Preparation of Potash Alum.
-	32	32		



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Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. II, Sem-IV

Department: Chemistry

Subject: Chemistry

Course Title: Chemistry Practicals

Name of the Teacher: Mr. Annasaheb Tanaji Mane

Month: March			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	Semi-micro qualitative analysis using H ₂ S of mixtures - not more than four ionic species (two anions and two cations and excluding insoluble salts) out of the following: Cations: NH ₄ ⁺ , Cu ²⁺ , Cd ²⁺ , Fe ³⁺ , Al ³⁺ , Co ²⁺ , Cr ³⁺ , Ni ²⁺ , Mn ²⁺ , Zn ²⁺ , Ba ²⁺ , Sr ²⁺ , Ca ²⁺ , K ⁺ , Mg ²⁺ . Anions: CO ₃ ²⁻ , S ²⁻ , SO ₃ ²⁻ , S ₂ O ₃ ²⁻ , NO ₃ ⁻ , CH ₃ COO ⁻ , Cl ⁻ , Br ⁻ , I ⁻ , SO ₄ ²⁻ , C ₂ O ₄ ²⁻ , F ⁻ .
-	32	32		
Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	-	<ul style="list-style-type: none"> Determination of alkali content of antacid tablet using HCl. Estimation of total hardness of a given sample of water by complexometric titration
-	32	32		
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	--	<ul style="list-style-type: none"> Estimations of Vitamin-C from tablets. Estimation of Acetone. Preparation of p-nitro acetanilide.
-	32	32		



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Annual Teaching Plan

Academic Year: 2021-22

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

Department: Chemistry

Subject: Chemistry

Course Title: DSC-1002A: Inorganic & Organic Chemistry

Name of the Teacher: Mr. Satish Suresh Kadam

Month: November			Module/Unit:	Sub-units planned
Lectures	Practical	Total	Introduction	<ul style="list-style-type: none"> General Introduction Discussion on Syllabus Basic terms in organic Chemistry
06	-	06		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Fundamentals of Organic Chemistry	<ul style="list-style-type: none"> General introduction Reactive Intermediates: Carbocations, Carbanions and free radicals
12	16	28		
Month: January			Module/Unit:	Sub-units planned
12	16	28	Fundamentals of Organic Chemistry	<ul style="list-style-type: none"> Physical Effects, Electronic Displacements: Inductive Effect, Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds Homolysis and Heterolysis Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles.
Month: February			Module/Unit:	Sub-units planned
12	16	28	Aldehydes and Ketones	<ul style="list-style-type: none"> General introduction Reactions – Reaction with HCN, ROH, NaHSO₃. Preparation: from acid chlorides and from nitriles
Month: March			Module/Unit:	Sub-units planned
06	08	14	Aldehydes and Ketones	<ul style="list-style-type: none"> Iodoform test. Aldol Condensation, Cannizzaro's reaction, Wittig reaction, Benzoin condensation. Clemensen reduction and Wolff Kishner reduction. Meerwein-Ponndorf Verley reduction.

Satish S. Kadam

Mr. S. S. Kadam



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Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. II, Sem-III

Department: Chemistry

Subject: Chemistry

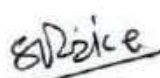
Course Title: DSC-1002C: Physical and Organic Chemistry

Name of the Teacher: Mr. Satish Suresh Kadam

Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Carboxylic acids and their derivatives	<ul style="list-style-type: none"> • Introduction • Preparation: Acidic and Alkaline hydrolysis of esters.
4	32	36		
Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Carboxylic acids and their derivatives	<ul style="list-style-type: none"> • Reactions: Hell -Vohlard - Zelinsky Reaction. • Preparation: Acid chlorides, Anhydrides, Amides from acids and their interconversion, • preparation of Esters with mechanism
4	32	36		
Month: July			Module/Unit:	Sub-units planned
4	32	36	Carboxylic acids and their derivatives	<ul style="list-style-type: none"> • Reactions: Comparative study of nucleophilicity of acyl derivatives • Reformatsky Reaction, • Perkin condensation with mechanism and their applications.
Month: February			Module/Unit:	Sub-units planned
-	-	-	-	-


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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. II, Sem-IV

Department: Chemistry

Subject: Chemistry

Course Title: DSC-1002D: Inorganic and Physical Chemistry

Name of the Teacher: Mr. Satish Suresh Kadam

Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Kinetic Theory of Gases	<ul style="list-style-type: none"> • Postulates of Kinetic Theory of Gases and derivation of the kinetic gas equation, • Deviation of real gases from ideal behaviour, • compressibility factor, causes of deviation,
4	-	4		
Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Kinetic Theory of Gases	<ul style="list-style-type: none"> • van der Waals equation of state for real gases, Boyle temperature (derivation not required) • , Critical phenomena, critical constants • calculation of van der Waals equation.
4	32	36		
Month: July			Module/Unit:	Sub-units planned
4	32	36	Kinetic Theory of Gases	<ul style="list-style-type: none"> • Andrews's isotherms of CO₂, Most probable, average and root mean square velocities (no derivation), • Collision cross section, collision number, collision frequency, collision diameter • mean free path of molecules.
Month: February			Module/Unit:	Sub-units planned
-	-	-	-	-

S. S. Kadam

Mr. S. S. Kadam



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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. III, Sem-V

Department: Chemistry

Subject: Chemistry

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

DSE-1002E2: Organic & Analytical Chemistry

Name of the Teacher: Mr. Satish Suresh Kadam

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Name reactions	<ul style="list-style-type: none">• Introduction.• Beckmann,• Benzilic acid,
04	-	04		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Name reactions	<ul style="list-style-type: none">• Baeyer Villiger,• Diels -Alder reaction,• Mannich Reaction,• Michael Reaction,
08	28	36		
Month: January			Module/Unit:	Sub-units planned
08	28	36	Name reactions	<ul style="list-style-type: none">• Fries,• Dienone-Phenol rearrangement• Problems based on reactions.
Month: February			Module/Unit:	Sub-units planned
08	28	36	Electrophilic and nucleophilic substitution reactions of Aromatic Compounds	<ul style="list-style-type: none">• Chemical properties of the following compounds with reference to electrophilic and nucleophilic substitution:• Naphthalene,
Month: March			Module/Unit:	Sub-units planned
03	14	17	Electrophilic and nucleophilic substitution reactions of Aromatic Compounds	<ul style="list-style-type: none">• Furan, Pyrrole,• Thiophene, and Pyridine

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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2021-22

Semesters: B.Sc. III, Sem-VI

Department: Chemistry

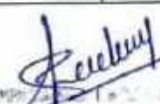
Subject: Chemistry

Course Title: DSE-1002F1: Physical & Inorganic Chemistry


DSE-1002F2: Organic & Industrial Chemistry

Name of the Teacher: Mr. Satish Suresh Kadam

Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Spectroscopy	<ul style="list-style-type: none"> • Meaning of spectroscopy, • Nature of electromagnetic radiation -wave length, frequency, energy, amplitude, wave number, and their relationship, , • Types of spectroscopy and advantages of spectroscopic methods. • Energy types and energy levels of atoms and molecules.
06	-	06		
Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Ultra-Violet (UV) Spectroscopy	<ul style="list-style-type: none"> • Introduction, Beer-Lamberts law • , Terms used in U.V. Spectroscopy- Chromophore, Auxochrome, Bathochromic shift, hypsochromic shift, hyperchromic and hypochromic effect, • Modes of electromagnetic transitions. Effect of conjugation on position of U.V. band, • Calculation of λ-max by Woodward and Fisher rules for dienes and enones systems, • Colour and visible spectrum, • Applications of U.V. Spectroscopy
8	28	36		
Month: July			Module/Unit:	Sub-units planned
8	28	36	Infra-Red (IR) Spectroscopy	<ul style="list-style-type: none"> • Introduction, Principle of I.R. Spectroscopy, • IR Instrumentation, schematic diagram, Fundamental modes of vibrations, • Condition for absorption of IR radiations, Regions of I.R. Spectrum, • fundamental group region, finger print region, • Hooks Law for Calculation of vibrational frequency
Month: August			Module/Unit:	Sub-units planned
6	-	06	Infra-Red (IR) Spectroscopy	<ul style="list-style-type: none"> • IR Sampling, Factors affecting on IR absorption frequency, Characteristic of I.R. absorption of following functional (8) 22 groups


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Annual Teaching Plan

Academic Year: 2021-22

Semesters: M.Sc. II, Sem-III

Department: Chemistry

Subject: Chemistry

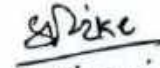
Course Title: Paper No. 1145A- ADVANCED SYNTHETIC METHODS

Name of the Teacher: Mr. Satish Suresh Kadam

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Application of the following reagents and reaction in synthesis	Sodium cyanoborohydride, Lithium diisopropylamide(LDA) Dicyclohexylcarbodiimide (DCC), Tri-n-butyl tin hydride (TBTH)
02	-	02		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Application of the following reagents and reaction in synthesis	,Per acids, Lead tetra acetate, Poly phosphoric acid (PPA), Diazomethane,
04	-	04		
Month: January			Module/Unit:	Sub-units planned
04	-	04	Application of the following reagents and reaction in synthesis	Ozone, Phase transfer catalyst, Woodward-Prevost hydroxylation, Barton and Shapiro reaction
Month: February			Module/Unit:	Sub-units planned
04	-	04	Application of the following reagents and reaction in synthesis	Hoffmann-Loffler-Fretag, Selenium dioxide, Dess-Martin periodinane,
Month: March			Module/Unit:	Sub-units planned
02	-	02	Application of the following reagents and reaction in synthesis	. Periodic acid and Grub's catalysts.


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Annual Teaching Plan

Academic Year: 2021-22

Semesters: M.Sc. II, Sem-IV

Department: Chemistry

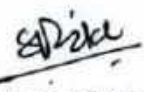
Subject: Chemistry

Course Title: Paper No. 1151B: CHEMISTRY OF NATURAL Product

Name of the Teacher: Mr. Satish Suresh Kadam

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	▪ a) Steroids & Prostaglandins	Occurrence, nomenclature, basic skeleton
02	-	02		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	▪ a) Steroids & Prostaglandins	Diels hydrocarbon. Study of the following Hormones: Cholesterol, Androsterone, Testosterone
04	-	04		
Month: January			Module/Unit:	Sub-units planned
04	--	04	▪ a) Steroids & Prostaglandins	Estrone, Progesterone, Aldosterone and Cortisone (only synthesis).
Month: February			Module/Unit:	Sub-units planned
04	-	04	▪ a) Steroids & Prostaglandins	Prostaglandins: Occurrence, nomenclature, classification, biogenesis and physiological effects, Synthesis of PGE2 and PGF2
Month: March			Module/Unit:	Sub-units planned
-	-	-		


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Vivekanand College, Kolhapur (Autonomous)

Annual Teaching Plan

Academic Year: 2021-22

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

Department: Chemistry

Subject: Chemistry

Course Title: DSC-1002A: Inorganic & Organic Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Induction	<ul style="list-style-type: none"> • General Introduction • Discussion on Course Structure • Discussion on Examination pattern • Discussion on Syllabus
06	-	06		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical Bonding and Molecular structure -Ionic Bonding	<ul style="list-style-type: none"> • General introduction • Types of Bond • Formation of ionic Solid • Factors Governing to Formation of ionic Solid
12	16	28		
Month: January			Module/Unit:	Sub-units planned
12	16	28	Chemical Bonding and Molecular structure -Ionic Bonding	<ul style="list-style-type: none"> • Born-Haber Cycle • Applications of Born-Haber Cycle • Fajan's Rule • Applications of Fajan's rule • % of Covalent Character in Ionic Comp.
Month: February			Module/Unit:	Sub-units planned
12	16	28	Chemical Bonding and Molecular structure-Valence bond theory (VBT)	<ul style="list-style-type: none"> • 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: March			Module/Unit:	Sub-units planned
06	08	14	Chemical Bonding and Molecular structure-Valence bond theory (VBT)	<ul style="list-style-type: none"> • 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^-

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Annual Teaching Plan

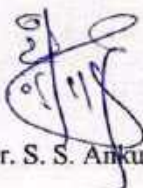
Academic Year: 2021-22 Semesters: B.Sc. I (A+B+C), Sem-II Department: Chemistry

Subject: Chemistry

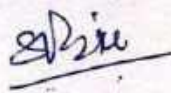
Course Title: DSC-1002B: Physical and Analytical & Industrial Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: April			Module/Unit:	Sub-units planned
Lectures	Practicals hr	Total	Chemical Energetics A) Thermodynamics	<ul style="list-style-type: none"> Introduction, Spontaneous and nonspontaneous process with examples,
06	-	06		
Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Chemical Energetics A) Thermodynamics	<ul style="list-style-type: none"> Statements of second law of thermodynamics, Carnot's cycle and its efficiency
12	16	28		
Month: June			Module/Unit:	Sub-units planned
12	16	28	Chemical Energetics A) Thermochemistry	<ul style="list-style-type: none"> Concept of entropy, physical significance of entropy, entropy as a state function of V & T, P & T
Month: July			Module/Unit:	Sub-units planned
09	16	25	Chemical Energetics A) Thermochemistry	<ul style="list-style-type: none"> Entropy of mixing of gases, entropy change accompanying phase transition
Month: August			Module/Unit:	Sub-units planned
06	08	14	Chemical Energetics A) Thermochemistry	<ul style="list-style-type: none"> Third law of thermodynamics, calculation of absolute entropies.


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Academic Year: 2021-22

Semesters: B.Sc. II, Sem-IV


Department: Chemistry

Subject: Chemistry

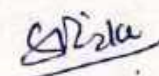
Course Title: DSC-1002D: Inorganic and Physical Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Crystal Field Theory	<ul style="list-style-type: none"> • Introduction • Assumptions of CFT • Crystal field stabilization energy (CFSE) • Crystal field splitting of 'd' orbital in octahedral Complexes.
4	-	4		
Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Crystal Field Theory	<ul style="list-style-type: none"> • Comparison of CFSE for <i>Oh</i> and <i>Td</i> 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: July			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Crystal Field Theory	<ul style="list-style-type: none"> • Jahn-Teller distortion, • Limitations of CFT. • Factors affecting the Magnitude of $10 Dq$, Spectrochemical series
4	-	04		
Month: February			Module/Unit:	Sub-units planned
-	-	-	-	-


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Academic Year: 2021-22

Semesters: B.Sc. III, Sem-V


Department: Chemistry

Subject: Chemistry

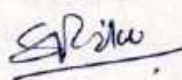
Course Title: DSE-1002E1: Physical & Inorganic Chemistry
DSE-1002E2: Organic & Analytical Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Bio-inorganic Chemistry	<ul style="list-style-type: none"> Introduction. Essential and trace elements in biological process. Metalloporphyrins with special reference to hemoglobin and myoglobin. Biological role of alkali and alkaline earth metal ions with special reference to Na⁺, K⁺ and Ca²⁺
04	-	04		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Theory of Titrimetric Analysis	<ul style="list-style-type: none"> Introduction Neutralization Indicators (Acid-Base Indicators) Theory of indicators w.r.t. Ostwald's colour change interval and Ostwald's Quinoid theory
08	52	60		
Month: January			Module/Unit:	Sub-units planned
08	52	60	Theory of Titrimetric Analysis	<ul style="list-style-type: none"> Neutralization curves and choice of indicators for the following titration, i. Strong acid-strong base ii. Strong acid-weak base iii. Strong base - weak acid Complexometric titration: General account Types of EDTA titration
Month: February			Module/Unit:	Sub-units planned
08	52	60	Theory of Titrimetric Analysis	<ul style="list-style-type: none"> Metallochromic indicators w.r.t. Eriochrome Black-T indicator
Month: March			Module/Unit:	Sub-units planned
03	13	16	Theory of Titrimetric Analysis	<ul style="list-style-type: none"> Redox titrations: General introduction, theory of redox indicators, Use of diphenyl amine and ferroin as redox indicators


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Academic Year: 2021-22

Semesters: B.Sc. III, Sem-VI

Department: Chemistry

Subject: Chemistry


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

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: May			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Corrosion and Passivity	<ul style="list-style-type: none">• Introduction of corrosion• Electrochemical theory of corrosion• Factors affecting on corrosion, i. Position of metals in the electrochemical series on the basis of standard reduction potential ii. Purity of metal
06	-	06		
Month: June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Corrosion and Passivity	<ul style="list-style-type: none">• iii. Effect of moisture iv. Effect of oxygen• Hydrogen overvoltage• Methods of protections of metals from corrosion• Passivity i. Definition ii. Types of passivity iii. Oxide film theory and evidences• iv. Applications of passivity
8	52	60		
Month: July			Module/Unit:	Sub-units planned
8	52	60	Introduction to Chemical Industry	<ul style="list-style-type: none">• General introduction, Indian Scenario of chemical industries, types of chemical industry, basic requirements of chemical industries, chemical production and raw materials; unit processes and unit operations and its types; modes of manufacturing-batch, semi-batch and continuous process;
Month: August			Module/Unit:	Sub-units planned
6	-	06	Introduction to Chemical Industry	<ul style="list-style-type: none">• Introduction to various departments in industry: Quality control, Quality assurance, process development, Research and Development, Analytical development, Environmental health and safety.• Industrial legislations-copy right act, patent act, trademarks; MSDS of hazardous chemicals.


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Academic Year: 2021-22

Semesters: M.Sc. I, Sem-I

Department: Chemistry

Subject: Chemistry

Course Title: CC-1134 A: Analytical Chemistry-I

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Quality Control and quality assurance	Concepts and significance, Quality control and statistical techniques:
02	4	06		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Introduction to Quality Control and quality assurance	Quality control charts, the X-quality control chart, the R-quality control chart and its interpretation, spiked sample control charts
04	8	12		
Month: January			Module/Unit:	Sub-units planned
04	8	12	Introduction to Quality Control and quality assurance	Use of blind samples in quality control, use of proficiency evaluations in quality control. Quality in Analytical Chemistry: Quality systems in chemical laboratories.
Month: February				
04	4	08	Introduction to Quality Control and quality assurance	Cost and benefits of quality system, types of quality standards for laboratories, total quality management
Month: March				
02	4	06	Introduction to Quality Control and quality assurance	Quality audits, and qualities reviews, responsibility of laboratory staff for quality and problems.

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Academic Year: 2021-22

Semesters: M.Sc. I, Sem-II

Department: Chemistry

Subject: Chemistry

Course Title: CC-1140 B: Analytical Chemistry-II

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Thermal Analysis	Introduction to thermal analysis, types of thermal analysis, significance of thermal analysis in Analytical Chemistry, effect of heat on materials, chemical decomposition, phase transformation etc. and general thermal analysis applications, advantages and disadvantages.
02	4	06		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Thermal Analysis	a) Thermogravimetry analysis (TGA): principle, instrumentation, working, types of TGA, factors influencing TGA, curve to show nature of decomposition reactions, the product and qualities of compounds expelled, TGA in controlled atmosphere, TGA curves, analysis, research and analytical implications of TGA.
04	8	12		
Month: January			Module/Unit:	Sub-units planned
04	8	12	Thermal Analysis	b) Differential thermal analysis (DTA) and differential scanning calorimetry (DSC), instrumentation, methodology, application and research implications.
Month: February			Module/Unit:	Sub-units planned
04	4	08	Thermal Analysis	Thermometric titrations method and applications
Month: March			Module/Unit:	Sub-units planned
02	4	06	Thermal Analysis	Problems: Simple problems based on TGA, DTA and DSC.

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Academic Year: 2021-22

Semesters: M.Sc. II, Sem-III

Department: Chemistry

Subject: Chemistry

Course Title: CC-1144 C: Advanced Spectroscopic Methods

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Proton NMR Spectroscopy	Part [A]: Recapitulation of proton NMR spectroscopy
02	-	02		
Month: December			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: January			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: February			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: March			Module/Unit:	Sub-units planned
02	-	02	Proton NMR Spectroscopy	COSY, NOESY, Resonance of other nuclei – 19F, 31P.

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Academic Year: 2021-22

Semesters: M.Sc. II, Sem-IV

Department: Chemistry

Subject: Chemistry

Course Title: CC-1152 D: Applied Organic Chemistry

Name of the Teacher: Dr. Sanjay Shivram Ankushrao

Month: November			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Proton NMR Spectroscopy	Classification and synthesis of important dye intermediates by using nitration, sulphonation, diazotization reactions.
02	-	02		
Month: December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Dyes & its intermediates	Classification and synthesis of important dye intermediates by using nitration, sulphonation, diazotization reactions.
04	-	04		
Month: January			Module/Unit:	Sub-units planned
04	-	04	Dyes & its intermediates	Commercial processes for azo-dyes, reactive dyes, optical brighteners, thermal sensitive dyes, dispersed dyes and reactive dyes
Month: February			Module/Unit:	Sub-units planned
04	-	04	Dyes & its intermediates	Commercial processes for azo-dyes, reactive dyes, optical brighteners, thermal sensitive dyes, dispersed dyes and reactive dyes
Month: March			Module/Unit:	Sub-units planned
02	-	02	Dyes & its intermediates	Commercial processes for azo-dyes, reactive dyes, optical brighteners, thermal sensitive dyes, dispersed dyes and reactive dyes


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Academic Year: 2021-22

Annual Teaching Plan

Name of the teacher: Dr. Asmita Shahshikant Tapase

Programme : B.Sc. III Semester V

Subject: Chemistry Course Title: Physical Chemistry

Month December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Quantum Theory	Introduction, Dual nature of matter and energy: De Broglie hypothesis, The Heisenberg's uncertainty principle, Concept of energy operators (Hamiltonian),
3	7*2=14	17		
Month January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Quantum Theory	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.
3*2=6	14*4=48	56		

Programme : B.Sc. II Semester V

Subject: Chemistry Course Title: Physical Chemistry

Month December			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Electrochemistry II	Reversible and irreversible cells, Nernst equation and its importance, Types of electrodes, Standard electrode potential, electrochemical series, determination of thermodynamic Properties: ΔG , ΔH and ΔS from EMF data,
3	-	03		
Month January			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Electrochemistry II	Calculation of equilibrium constant from EMF data, Concentration cell, electrolyte concentration cell without transference only, Liquid junction potential and salt bridge, pH determination using hydrogen electrode and
3*3=9	-	9		

			quinhydrone electrode
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Programme : M.Sc. I Semester V

Subject: Chemistry **Course Title:** Physical Chemistry

Month December			Module/Unit:	Sub-units planned
Lecture s	Practical s	Total	Molecular Spectroscopy	Rotation spectra: Classification of molecules based on moment of inertia, rigid rotor, most intense line, isotopic effect on the rotational spectra, non-rigid rotator, diatomic molecules, linear triatomic molecules, symmetric top molecules, stark effect.
5	4*3=12	17		
Month January			Module/Unit:	Sub-units planned
Lecture s	Practical s	Total	Molecular Spectroscopy	Infra red spectroscopy: Diatomic molecule, selection rule, anharmonicity, Morse potential, justifying the form of Morse potential, combinations of overtones, and hot bands in polyatomic molecules.
5	4*3=12	17		
Month February			Module/Unit:	Sub-units planned
Lecture s	Practical s	Total	Molecular Spectroscopy	Vibrational rotational Spectra: fine structure in diatomic molecules, break down of the Born Oppenheimer approximation, effect due to nuclear spin, parallel and perpendicular vibrations. Numerical problems.
5	4*3=12	17		

A S Tapase

Dr. A. S. Tapase



S Shirke

Dr. Mrs. S. D. Shirke

Head

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Department of Chemistry

Academic Year: 2021-22

Annual Teaching Plan

Name of the teacher: Dr. Asmita Shahshikant Tapase

Programme : B.Sc. III Semester VI

Subject: Chemistry Course Title: Physical Chemistry

Month : March			Module/Unit:	Sub-units planned
Lectures 4	Practicals 14*4=56	Total 60	Thermodynamics	Introduction, Recapitulation of all four laws of thermodynamics, Free energy: Gibbs function (G) and Helmholtz function (A) Criteria for thermodynamic equilibrium and spontaneity, Relation between G and H: Gibbs Helmholtz equation,
Month : April			Module/Unit:	Sub-units planned
Lectures 4	Practicals 14*4=56	Total 60	Thermodynamics	Phase equilibria: Clapeyron-Clausius equation and its applications, Thermodynamic derivation of law of mass action,
Month : May			Module/Unit:	Sub-units planned
Lectures	Practicals 14*4=56	Total 60	Thermodynamics	van't-Hoff isotherm and isochore, Fugacity and activity concept, Partial molar quantities, partial molar volume, Concept of chemical potential, Numerical problems
Month : June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Theory and [practical exams	

Programme : B.Sc. II Semester VI

Subject: Chemistry Course Title: Physical Chemistry

Month : March			Module/Unit:	Sub-units planned
Lectures 4	Practicals -	Total 4	Chemical kinetics	The concept of reaction rates, Effect of temperature, pressure, catalyst and other factors on reaction rates,

Month : April			Module/Unit:	Sub-units planned
Lectures 4	Practicals -	Total 4	Chemical kinetics	The concept of reaction rates, Effect of temperature, pressure, catalyst and other factors on reaction rates,
Month : May			Module/Unit:	Sub-units planned
Lectures 4	Practicals -	Total 4	Chemical kinetics	Half-life of a reaction, General methods for determination of order of a reaction, Concept of activation energy and its calculation from Arrhenius equation.
Month : June			Module/Unit:	Sub-units planned
Lectures	Practicals	Total	Theory and Practical Exam	

Programme : B.Sc. I Semester VI

Subject: Chemistry Course Title: Physical Chemistry DSC-2D

Month December			Module/Unit:	Sub-units planned
Month : March			Module/Unit:	Sub-units planned
Lectures 4	Practicals -	Total 4	▪ Chemical kinetics	Introduction, Rate of reaction, definition and units of rate of reaction, Factors affecting the rate of the reaction. .
Month : April			Module/Unit:	Sub-units planned
Lectures 4	Practicals -	Total 4	▪ Chemical kinetics	Order and molecularity of the reaction, Zero, first order reaction, Characteristics of the first order reaction, Pseudo unimolecular reaction, examples.
Month : May			Module/Unit:	Sub-units planned
Lectures 4	Practicals -	Total 4	Nuclear chemistry	Introduction Terminology of nuclear chemistry-Average life, half life, reaction quotient decay constant
Month : June			Module/Unit:	Sub-units planned

Lectures 4	Practicals -	Total 4	Nuclear chemistry	Types of nuclear reaction , properties s of types of radiations , determination of decay constant, Numerical problems
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Programme : M.Sc. I Semester VI

Subject: Chemistry Course Title: Physical Chemistry

Month December			Module/Unit:	Sub-units planned
Month : March			Module/Unit:	Sub-units planned
Lectures 5	Practicals 4*3=12	Total 17	Chemical kinetics	Introduction to basic concepts, Experimental methods of following kinetics of a reaction, chemical and physical (measurement of pressure, volume, EMF, conductance, diffusion current and absorbance) methods and examples.
Month : April			Module/Unit:	Sub-units planned
Lectures 5	Practicals 4*3=12	Total 17	Chemical kinetics	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,
Month : May			Module/Unit:	Sub-units planned
Lectures 5	Practicals 4*3=12	Total 17	Chemical kinetics	Catalysis: Classification of catalysis, mathematical expression of autocatalytic reactions, Michaelis-Menten enzyme catalysis,
Month : June			Module/Unit:	Sub-units planned
Lectures 5	Practicals -	Total 5	Chemical kinetics	Homogeneous catalysis: acid and base catalyzed reactions, Heterogeneous catalysis: Adsorption of gas on a surface and its kinetics, Catalyzed hydrogen-deuterium exchange reaction. Numerical problems.

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