



Shri Swami Vivekanand Shikshan Sanstha
Vivekanand College, Kolhapur (Autonomous)
Department of Chemistry

Curriculum relevance: Course contents with focus on Employability / Entrepreneurship /Skill development (UG) 2018-19 to 2023-24

Sr. No.	Course Code	Course / SECs Titles	Year of Introduction	Employability	Entrepreneurship	Skill Development
B. Sc. Chemistry (Newly Introduced Between 2018-19 and 2020-21)						
1.	DSC-1002A	Section-I Inorganic Chemistry Section-II Organic Chemistry	2018-19	Oxoacids of nitrogen, phosphorus and sulfur, Strength of organic acids and bases Catalytic hydrogenation	NIL	Hydroboration-oxidation Ozonolysis
2.	DSC-1002B	Section-I Physical Chemistry Section-II Analytical & Industrial Chemistry	2018-19	Carnot's cycle and its efficiency Le Chatelier's principle	NIL	Diazonium salts Nitration, halogenation and sulphonation
3.	DSC-1002C	Section-I Physical Chemistry Section-II Analytical & Industrial Chemistry	2019-20	NIL	NIL	pH determination using hydrogen electrode and quinhydrone electrode Applications of conductance measurements
4.	SEC-SD	Basics in Chemistry	2019-20	NIL	NIL	Nil
5.	DSC-1002D	Section-I Inorganic Chemistry Section-II Organic Chemistry	2019-20	Nil	NIL	X-ray diffraction by crystals

6.	SEC-SD	Basics in Chemistry	2019-20	Nil	NIL	Nil
7.	DSC-1002E1	Section-I Physical Chemistry Section-II Inorganic Chemistry	2020-21	Raman spectra Chemiluminescence, Electroluminescence Applications of superconductors Bio-Inorganic Chemistry	Applications of superconductors	
8.	DSC-1002E2	Section-I Organic Chemistry Section-II Analytical Chemistry	2020-21	Synthetic Reagents Natural product Pharmaceuticals Qualitative and Quantitative Aspects of Analysis Chromatography	Pharmaceuticals	Titrimetric Analysis Gravimetric Analysis Potentiometric titrations Colorimetry: Chromatography
9.	SEC-SE	Basic Analytical Chemistry	2020-21	Basics in Practical Chemistry		Preparation of solution of different concentration Demonstrations
10.	DSC-1002F1	Section-I Physical Chemistry Section-II Inorganic Chemistry	2020-21	Renewable Energy Sources Biomass Energy Nanomaterials	NIL	Nanomaterials
11.	DSC-1002F2	Section-I Organic Spectroscopic Techniques Section-II Industrial Chemistry	2020-21	Ultra-Violet (UV) Spectroscopy Infra-Red (IR) Spectroscopy Nuclear Magnetic Resonance (NMR) Spectroscopy Mass spectroscopy Introduction to Industrial Chemistry Manufacturing of Heavy Chemicals Manufacturing of Sugar and Jaggery Fermentation Industry Fertilizers	Introduction to Industrial Chemistry Manufacturing of Heavy Chemicals Manufacturing of Sugar and Jaggery Fermentation Industry Fertilizers	NIL
12.	SEC-SF	Project work and industrial study tour	2020-21	Project work	Nil	Project work
B. Sc. Chemistry (Revised I Between 2021-22 and 2023-24)						
13.	DSC-1002A	Section-I Inorganic Chemistry Section-II Organic Chemistry	2021-22	Electrophilic substitution reactions: Nitration, Sulphonation, Halogenation and Friedel craft reaction, Aldehydes and Ketones	NIL	Strength of organic acids and bases. Hydroboration-oxidation Ozonolysis

14	DSC-1002B	Section-I Physical Chemistry Section-II Analytical & Industrial Chemistry	2021-22	Carnot's cycle and its efficiency Le Chatelier's principle	NIL	Diazonium salts Nitration, halogenation and sulphonation
15	DSC-1002C	Section-I Physical Chemistry Section-II Analytical & Industrial Chemistry	2022-23	Arrhenius equation Phase Equilibria Electrochemistry Gravimetric Analysis Conductometric Analysis Unit Operations & Unit Processes Electroplating	Electrochemistry Unit Operations & Unit Processes Electroplating	Ostwald's Viscometer, Refractive index Electrochemistry Gravimetric Analysis Conductometric Analysis
16	DSC-1002D	Section-I Inorganic Chemistry Section-II Organic Chemistry	2022-23	Carboxylic acids and their derivatives, Carbohydrates	Nil	Amines and Diazonium Salts
17	SEC-SD	Basics in Chemistry	2022-23	Basics in Practical Chemistry Preparation of solution of different concentration Chromatography Ion exchange chromatography	Analysis of water	Basics in Practical Chemistry Preparation of solution of different concentration Chromatography Ion exchange chromatography
18	DSC-1002E1	Section-I Physical Chemistry Section-II Inorganic Chemistry	2023-24	Photochemistry Applications of emf measurements Metals, Semiconductors and Superconductors, Nanomaterials application of zeolites as catalysts	Nil	Nil
19	DSC-1002E2	Section-I Organic Chemistry Section-II Analytical Chemistry	2023-24	Ultra-Violet (UV) Spectroscopy Infra-Red (IR) Spectroscopy Nuclear Magnetic Resonance (NMR) Spectroscopy Mass spectroscopy Introduction to Industrial Chemistry Manufacturing of Heavy Chemicals Manufacturing of Sugar and Jaggery Fermentation Industry Fertilizers	Introduction to Industrial Chemistry Manufacturing of Heavy Chemicals Manufacturing of Sugar and Jaggery Fermentation Industry Fertilizers	NIL
20	SEC-SE	Basic Analytical Chemistry	2023-24	Basics in Practical Chemistry, Hands-on training	Basics in Practical Chemistry, Hands-on training	Basics in Practical Chemistry, Hands-on training
21	DSC-1002E1	Section-I Physical Chemistry Section-II Inorganic Chemistry	2023-24	Determination of surface area using Langmuir method and BET equations. Renewable Energy Sources Biomass Energy, Nanomaterials	Nil	

22	DSC-1002E2	Section-I Organic Spectroscopic Techniques Section-II Analytical Chemistry	2023-24	Synthetic Reagents, Isolation of natural products, Pharmaceuticals, Titrimetric Analysis, Gravimetric Analysis Potentiometric titrations Chromatography	Nil	Titrimetric Analysis, Gravimetric Analysis Potentiometric titrations Chromatography
23	SEC-SF	Project work and industrial study tour	2023-24	Project work	Nil	Project work

M. Sc. Chemistry (Newly Introduced Between 2018-19 and 2023-24)

1	CC- 1131A	Inorganic Chemistry	2018-19	Determination of stability constant for binary complexes using pH-metric (Bjerrums method) and spectrophotometric (Job's and mole ratio) techniques. Bioinorganic Chemistry	photoconductors, photovoltaic cells, solar batteries	Determination of stability constant for binary complexes using pH-metric (Bjerrums method) and spectrophotometric (Job's and mole ratio) techniques.
2	CC-1132A	Organic Chemistry	2018-19	Study of following reactions, Conformational analysis	Nil	Nil
3	CC-1133A	Physical Chemistry	2018-19	Polymers, Rubber, uger spectroscopy to the study of surfaces	Nil	Nil
4	CC-1134A	Analytical Chemistry	2018-19	Quality Control and quality assurance Chromatographic methods Electroanalytical Techniques Research Methodology Nano materials	Quality Control and quality assurance	Quality Control and quality assurance Chromatographic methods Electroanalytical Techniques
5	CC- 1137B	Inorganic Chemistry	2018-19	Organometallic Chemistry of transition elements applications of radioactivity	Nil	Nil
6	CC- 1138B	Organic Chemistry	2018-19	Name reactions and reagents Methodologies in organic synthesis	Nil	Nil

7	CC- 1139B	Physical Chemistry	2018-19	Photochemistry Electrochemistry	Nil	Photochemistry Electrochemistry
8	CC- 1140B	Analytical Chemistry	2018-19	Raman spectroscopy Nuclear Magnetic Resonance (NMR) Mass spectroscopy (MS) Thermal Analysis	Nil	Nil
9	CC- 1143C	Organic Reaction Mechanism	2019-20	Pericyclic reactions Study of name reactions	Nil	Nil
10	CC- 1144C	Advanced Spectroscopic Methods	2019-20	Ultraviolet Spectroscopy IR Spectroscopy Proton NMR Spectroscopy Advanced NMR techniques Mass Spectrometry Structural problems based on combined spectroscopic techniques (including reaction sequences)	Nil	Ultraviolet Spectroscopy IR Spectroscopy Proton NMR Spectroscopy Advanced NMR techniques Mass Spectrometry
11	CC- 1145C	Advanced Synthetic Methods	2019-20	Disconnection approach Application of the following reagents and reaction in synthesis Applications of following metal in organic synthesis Application of the following in synthesis	Disconnection approach Application of the following reagents and reaction in synthesis Applications of following metal in organic synthesis Application of the following in synthesis	Disconnection approach Application of the following reagents and reaction in synthesis Applications of following metal in organic synthesis Application of the following in synthesis
12	CC- 1146C	Drugs and Heterocycles	2019-20	Drug design (10) Study of Antibiotics Study of the Following types of drugs	Drug design (10) Study of Antibiotics Study of the Following types of drugs	Nil
13	CC- 1149D	Theoretical Organic Chemistry	2019-20	Cryptands, catenanes and rotaxanes. Kinetic and thermodynamic control of reactions	Nil	Nil
14	CC- 1150D	Stereochemistry	2019-20	Newer methods of stereoselective synthesis O.R.D. and C.D.: Types of curves	Nil	Nil

15	CC_1151D	Natural Products	2019-20	isolation methods of alkaloids Study of Steroids, Prostaglandins, Vitamins	Nil	Nil
16	CC – 1152 D	Applied organic Chemistry	2019-20	Agrochemical, Synthesis and applications of perfumery, Dyes and Intermediates and Polymers	Nil	Agrochemical, Synthesis and applications of perfumery, Dyes and Intermediates and Polymers
17	CC_2100C	Inorganic Chemical Spectroscopy	2022-23	IR, NMR, XPS, and Mass Spectroscopy	Nil	Nil
18	CC_2101C	Organometallic and Bioinorganic Chemistry	2022-23	NIL	Nil	Nil
19	CC_2102C	Coordination Chemistry - I	2022-23	Chelation and metal complexes	Nil	Chelation and metal complexes
20	CC_2103C	Material Science	2022-23	Superconductors, magnetic materials, catalysis and ceramics	Chelation and metal complexes	Nil
21	CC_2106D	Instrumental techniques	2022-23	Powder and single crystal XRD, NQR, and XRF	Nil	Nil
22	CC_2107D	Coordination Chemistry-II	2022-23	Coordination polymers, applications of coordination compounds	Nil	Nil
23	CC_2108D	Energy and Environmental Chemistry	2022-23	Energy conservation devices, fuel cells, production of hydrogen, batteries, techniques in environmental analysis	Energy conservation devices, fuel cells, production of hydrogen, batteries, techniques in environmental analysis	Nil
25	CC-2200C	Advanced Analytical Techniques	2023-24	Advances in Mass Spectrometry-A Nanotechnology and Nano Chemistry Advanced Instrumentation Techniques	Nil	Nil

26	CC-2201C	Organo Analytical Chemistry	2023-24	Hyphenated Techniques Drug Analysis, Analysis of vitamins Clinical Analysis, Body fluid analysis Pesticides Analysis, Forensic Analysis	Hyphenated Techniques Drug Analysis, Analysis of vitamins Clinical Analysis, Body fluid analysis Pesticides Analysis, Forensic Analysis	Nil
27	CC-2202C	Electroanalytical Techniques in Chemical Analysis	2023-24	Voltammetry Techniques, Particle Size Analysis, Ion selective electrodes, Electrophoresis	Nil	Voltammetry Techniques, Particle Size Analysis, Ion selective electrodes, Electrophoresis
28	CC-2203C	Environmental Chemical Analysis and Control	2023-24	Sampling in analysis, Organic Pollutants and Their Analysis, Air and Water Pollutant Analysis	Nil	Nil
29	CC-2206D	Modern Separation Methods in Analysis	2023-24	Advanced Gas Chromatographic Techniques Advanced Liquid Chromatographic Techniques Ion Chromatography	Advanced Gas Chromatographic Techniques Advanced Liquid Chromatographic Techniques Ion Chromatography	Nil
30	CC-2207D	Organic Industrial Analysis	2023-24	Analysis of oils, fats soaps detergents, foods, additives, cosmetics, lotions, creams, face powder Analysis of Paints, pigments and petroleum products	Analysis of oils, fats soaps detergents, foods, additives, cosmetics, lotions, creams, face powder Analysis of Paints, pigments	Nil
31	CC-2208D	Advanced Methods in Chemical Analysis	2023-24	Fluorescence and Phosphorescence Spectrophotometry Photoelectron spectroscopy X-ray spectroscopy	Nil	Nil
32	CC-2209D	Industrial Analytical Chemistry	2023-24	Spectrochemical Methods of Analysis Analysis of metals and alloys Analysis of soil and fertilizers	Analysis of metals and alloys Analysis of soil and fertilizers	Nil


M. Sc. Chemistry (NEP: Newly Introduced Between 2023-24 and Onward)

33	DSC14CHE11	DSC - I: Major Paper: Inorganic & Organic Chemistry	2023-24	Interpretation of electronic spectra through d-d spectra and charge transfer spectra, Bioinorganic Chemistry Recemic modifications/mixture formation and their resolution	Nil	Nil
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34	DSC14CHE12	DSC-II: Major Paper: Physical & Analytical Chemistry	2023-24	Catalysis, Quality Control and Quality Assurance Good Laboratory Practices, Nuclear Magnetic Resonance (NMR) Mass spectroscopy (MS)	Nil	Nil;
35	RMD14CHE11	RMD I: Research Methodology	2023-24	Fundamentals of Research methodology Interpretation and Report Writing Computer Applications Data Interpretation by following techniques	Nil	Fundamentals of Research methodology Interpretation and Report Writing Computer Applications Data Interpretation
36	DSE14CHE11	DSE - I: Elective Paper I: Inorganic Chemistry: Advanced Inorganic Chemistry	2023-24	Electronic, Electric and Optical behaviour of Inorganic materials	Nil	Nil
37	DSE14CHE12	DSE - II: Elective Paper II: Organic Chemistry: Basics in Organic Chemistry	2023-24	Study of following rearrangement reactions Study of organometallic compounds Hydroboration	Nil	Nil
38	DSE14CHE13	DSE - III: Elective Paper III: Physical Chemistry	2023-24	Photochemistry Auger spectroscopy to the study of surfaces, polymers, rubber	Nil	Nil
39	DSE14CHE14	DSE - IV: Elective Paper IV: Analytical Chemistry	2023-24	Spectroscopic Techniques Surface Characterization by Spectroscopy Electroanalytical Techniques Atomic absorption and Inductively coupled plasma (ICP) Spectroscopy	Nil	Nil
40	DSC14CHE21	DSC - III: Major Paper: Inorganic & Organic Chemistry	2023-24	Study of following reactions	Nil	Nil
41	DSC14CHE22	DSC-IV: Major Paper: Physical & Analytical Chemistry	2023-24	Electrochemistry Thermal Analysis Methods Ultraviolet Spectroscopy IR Spectroscopy	Nil	Thermal Analysis Methods Ultraviolet Spectroscopy IR Spectroscopy
42	DSE14CHE21	DSE - V: Elective Paper I: Inorganic Chemistry: Applied Inorganic Chemistry	2023-24	psychopharmacological drugs, Antimicrobial agents Oxygen Transport and Storage Applications of Coordination Compounds	Nil	Nil

43	DSE14CHE22	DSE - VI: Elective Paper II: Organic Chemistry: Fundamental Organic Chemistry	2023-24	Oxidation Reduction Methodologies in organic synthesis Multi-component reactions, Microwave and Ultrasound techniques and their applications	Nil	Nil
44	DSE14CHE23	DSE - VII: Elective Paper III: Physical Chemistry (2023-24	Solid State Reactions, solid state laser and their applications, Preparation of materials		
45	DSE14CHE24	DSE - VIII: Elective Paper IV: Analytical Chemistry	2023-24	Study of chromatographic techniques Advanced Gas Chromatographic Techniques Advanced Liquid Chromatographic Techniques	Nil	Study of chromatographic techniques Advanced Gas Chromatographic Techniques Advanced Liquid Chromatographic Techniques




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