

DSCC - 1

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core (DSC)

CC1: Fundamentals of Chemistry - I

(Credit: Theory -03, Practical – 01)

Course learning outcome (COs)

CO1: Extra nuclear structure of atoms and Periodicity:

CO2: Basics of Organic Chemistry Bonding and Physical Properties, Valence Bond Theory, Electronic displacement, MO Theory, Physical properties, Stereochemistry – I

CO3: Thermodynamics -I, Chemical Kinetics-I,

CO4: Acid-Base Titrations, Oxidation-Reduction Titrimetry

COs-POs Mapping

CC1: Fundamentals of Chemistry - I

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01	√	√		√	√				√	√
C02	√	√		√	√				√	√
C03	√	√		√	√				√	√
C04	√	√	√	√	√	√			√	√

DSCC - 2

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core (DSC)

CC2: Fundamentals of Chemistry - II

(Credit: Theory -03, Practical - 01)

Course learning outcome (COs)

C01: Chemical Bonding - I, Theoretical principles of inorganic qualitative analysis

C02: Stereochemistry - II, General Treatment of Reaction Mechanism-I, Reactive intermediates, Reaction thermodynamics, Reaction kinetics, Substitution Reaction

C03: Kinetic Theory and Gaseous state, Real gas and Virial equation,

C04: Qualitative semimicro analysis of mixtures containing three radicals.

COs-POs Mapping

CC1: Fundamentals of Chemistry - II

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01	√	√		√	√				√	√
C02	√	√		√	√				√	√
C03	√	√		√	√				√	√
C04	√	√	√	√	√	√			√	√

DSCC3

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core (DSCC-3)

PAPER: CHEM-H-CC3-3
(Credit: Theory -03, Practical – 01)

Physical Chemistry - II

Course learning outcome (COs)

CO1: Thermodynamics – II, Second Law, Systems of Variable Compositions

CO2: Applications of Thermodynamics – I, Chemical Equilibrium

CO3: ELECTROCHEMISTRY-I, Conductance, Ionic Equilibrium

CO4: Chemical Kinetics (Analytical) Experiments

COs-POs Mapping

DSCC3: Physical Chemistry - I

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
CO1	√	√		√	√				√	√
CO2	√	√		√	√				√	
CO3	√	√		√	√				√	√
CO4	√	√	√	√	√	√		√	√	√

DSCC - 4

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core Course (DSCC)

Paper: CHEM-H-CC4-3: Organic Chemistry - I

(Credit: Theory -03, Practical - 01)

Course learning outcome (COs)

- C01: Aromatic Substitution, Electrophilic aromatic substitution, Nucleophilic aromatic substitution, Birch Reduction of benzenoid aromatics, General Treatment of Reaction Mechanism -II, Concept of organic acids and bases, Tautomerism**
- C02: Stereochemistry -III, Nucleophilic substitution reactions, Elimination reactions**
- C03: Chemistry of alkenes and alkynes, Addition to $C\equiv C$ (in comparison to $C=C$),**
- C04: Identification of Pure Single organic Compound**

COs-POs Mapping

DSCC-4: Organic Chemistry - I

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01	√	√		√	√					√
C02	√	√		√	√					√
C03	√	√		√	√					√
C04	√	√	√	√	√		√		√	√

DSCC - 5

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core Course (DSCC)

Paper: CHEM-H-CC5-4: Inorganic Chemistry - I

(Credit: Theory -03, Practical - 01)

Course learning outcome (COs)

- C01: Chemical bonding-II: Molecular orbital concept of bonding, Metallic Bond, Weak Chemical Forces.**
- C02: Acids and bases: Acid-Base concept, Acid-base equilibria in aqueous solution..**
- C03: Radioactivity: Nuclear stability, Nuclear Reactions, Radiocarbon dating**
- C04: Complexometric Titration: Ca (II) and Mg (II) in a mixture, Hardness of water, Fe (III) and Al (III) in a mixture, Cu (II) and Zn (II) in a mixture, Cu (II) and Ni (II) in a mixture**

COs-POs Mapping

DSCC-5: Inorganic Chemistry - I

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01	√	√		√	√				√	√
C02	√	√		√	√				√	√
C03	√	√		√	√				√	√
C04	√	√	√	√	√	√			√	√

DSCC - 6

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core Course (DSCC)

Paper: CHEM-H-CC6-4: Organic Chemistry – II

(Credit: Theory -03, Practical – 01)

Course learning outcome (COs)

- C05: Stereochemistry – IV: Conformation-II, Concept of prostereoisomerism, Chirality arising out of stereoaxis.**
- C06: Chemistry of carbonyl Compounds: Nucleophilic Addition to C=O, Exploitation of acidity of α -H of C=O, Nucleophilic addition to α , β -unsaturated carbonyl system, Substitution at sp^2 carbon (C=O system).**
- C07: Organometallics**
- C08: Qualitative analysis of single solid organic compound**

COs-POs Mapping

DSCC-6: Organic Chemistry – II

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01	√	√		√	√					√
C02	√	√		√	√					√
C03	√	√		√	√					√
C04	√	√	√	√	√		√		√	√

DSCC7

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core (DSCC-7)

PAPER: CHEM-H-CC7-4
(Credit: Theory -03, Practical – 01)

Physical Chemistry - II

Course learning outcome (COs)

CO1: Transport processes and Liquid State, Diffusion and Viscosity, Surface tension and energy

CO2: Solid State, Bravais Lattice and Laws of Crystallography, Crystal plane

CO3: Application of Thermodynamics – II, Colligative properties, Phase Equilibrium, Phase Rule, Binary solutions

CO4: ELECTROCHEMISTRY-II, Electromotive Force,

CO5: Surface tension measurements using Stalagmometer, Viscosity measurement using Ostwald's viscometer, Conductometric Experiments

COs-POs Mapping

DSCC7: Physical Chemistry - II

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
CO1	√	√		√	√				√	√
CO2	√	√		√	√				√	
CO3	√	√		√	√				√	√
CO4	√	√		√	√				√	
CO5	√	√	√	√	√	√		√	√	√

DSCC - 8

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core Course (DSCC)

Paper: CHEM-H-CC8-4: Inorganic Chemistry - II

(Credit: Theory -03, Practical - 01)

Course learning outcome (COs)

- C01:** Coordination chemistry: Basics of coordination chemistry, Valence bond theory and crystal field theory, Electronic spectra of complexes and magnetic properties.
- C02:** Supramolecular chemistry.
- C03:** Redox reactions: Basic principle of redox reactions, Redox titrations,
- C04:** Estimation of mixtures of metal ions: Fe^{3+} and Cu^{2+} in a mixture, Fe^{3+} and Cr^{3+} in a mixture, Fe^{3+} and $\text{Cr}_2\text{O}_7^{2-}$ in a mixture, Fe^{3+} and Mn^{2+} in a mixture, Cr^{3+} and Mn^{2+} in a mixture.

COs-POs Mapping

DSCC-8: Inorganic Chemistry - II

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01	√	√		√	√				√	√
C02	√	√		√	√				√	√
C03	√	√		√	√				√	√
C04	√	√	√	√	√	√			√	√

DSCC - 9

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core Course (DSCC)

Paper: CHEM-H-CC9-5: ORGANIC CHEMISTRY – III

(Credit: Theory -03, Practical – 01)

Course learning outcome (COs)

- CO1: Organic Spectroscopy -I: UV Spectroscopy, IR Spectroscopy, NMR Spectroscopy.**
- CO2: Rearrangements: Rearrangement to electron-deficient carbon, Rearrangement to electron-deficient nitrogen, Rearrangement to electron-deficient oxygen, Aromatic rearrangements: Migration from oxygen to ring carbon, Migration from nitrogen to ring carbon.**
- CO3: Nitrogen compounds: Amines: Aliphatic & Aromatic, Nitro compounds (aliphatic and aromatic), Alkyl nitrile and isonitrile, Diazonium salts and their related compounds.**
- CO4: Organic Preparations.**

COs-POs Mapping

DSCC-9: ORGANIC CHEMISTRY – III

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	√	√		√	√					√
CO2	√	√		√	√					√
CO3	√	√		√	√					√
CO4	√	√	√	√	√		√		√	√

DSCC - 10

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core Course (DSCC)

Paper: CHEM-H-CC10-5: Inorganic Chemistry - III

(Credit: Theory -03, Practical - 01)

Course learning outcome (COs)

C01: s- and p- block elements

C02: d- and f- block elements

C03: Nuclear Model and Radiotracer methods

C04: Analysis of materials of industrial importance: Cu and Zn in brass, CaCO₃ and MgCO₃ in Dolomite, Cr and Mn in steel, Vitamin C, DO in water sample, Fe₂O₃ in Portland cement, Mg in talcum powder.

COs-POs Mapping

DSCC-10: Inorganic Chemistry - III

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01	√	√		√	√				√	√
C02	√	√		√	√				√	√
C03	√	√		√	√				√	√
C04	√	√	√	√	√	√			√	√

DSCC 11

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (HONS.)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core (DSCC-11)

PAPER: CHEM-H-CC11-5-Th
(Credit: Theory -03, Practical – 01)

Physical Chemistry - III

Course learning outcome (COs)

CO1: Foundation of Quantum Mechanics, Particle Aspect of Radiation, Wave Aspect of particles, Schrodinger Equation and Wavefunction, Concept of Operators, The Postulates and General Principles of Quantum Mechanics

CO2: Exactly Solvable Systems -1, Particle in a box, Stationary states under special potentials

CO3: Surface Chemistry, Adsorption, Colloids, Electrical Properties of molecules, Dipole moment and polarizability

CO4: Conductometric Experiments, Potentiometric Experiments, Solubility Product

COs-POs Mapping

CC11: Physical Chemistry - III

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
CO1	√	√		√	√				√	
CO2	√	√		√	√				√	
CO3	√	√		√	√		√		√	√
CO4	√	√	√	√	√	√		√	√	√

DSCC - 12

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core Course (DSCC)

Paper: CHEM-H-CC12-5: ORGANIC CHEMISTRY – IV

(Credit: Theory -03, Practical – 01)

Course learning outcome (COs)

- CO1: Organic Synthesis-I: Retrosynthetic analysis,**
- CO2: Carbocycles: Polynuclear hydrocarbons and their derivatives. Heterocycle-I: Heterocyclic compounds**
- CO3: Stereochemistry and Reactions of Alicyclic Compound**
- CO4: TLC & PAPER CHROMATOGRAPHY – AMINO ACIDS, DYES COLUMN CHROMATOGRAPHY (DEMO).**

COs-POs Mapping

DSCC-12: ORGANIC CHEMISTRY – IV

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	√	√		√	√					√
CO2	√	√		√	√					√
CO3	√	√		√	√					√
CO4	√	√	√	√	√	√	√		√	√

DSCC13

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (HONS.)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core (DSCC-13)

PAPER: CHEM-H-CC13-6
(Credit: Theory -03, Practical – 01)

Physical Chemistry - IV

Course learning outcome (COs)

CO1: Exactly Solvable Systems -2, Quantum Harmonic Oscillator, Rigid Rotator, Hydrogen atom and hydrogen-like ions

CO2: Molecular Spectroscopy, Rotation spectroscopy, Vibrational spectroscopy, Electronic Spectroscopy, Raman spectroscopy

CO3: Photochemistry, Rate of Photochemical processes,

CO4: Using Spreadsheet Software, MS Excel

COs-POs Mapping

DSCC13: Physical Chemistry - IV

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
CO1	√	√		√	√				√	
CO2	√	√		√	√				√	
CO3	√	√		√	√	√		√	√	√
CO4	√	√	√	√	√	√		√	√	√

DSCC - 14

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core Course (DSCC)

Paper: CHEM-H-CC14-6: FUNDAMENTALS OF CHEMISTRY – III

(Credit: Theory -03, Practical – 01)

Course learning outcome (COs)

- C01: Chemistry of Biomolecules: Carbohydrate Chemistry, Monosaccharides, Amino acids, peptides and nucleic acids**
- C02: Statistical Thermodynamics, The Boltzmann Distribution, Ensemble and Molecular Partition function, Thermodynamic variables and partition function, Applications, 3rd law of thermodynamics, Adiabatic demagnetization, Specific heat of Solids**
- C03: Silicate Materials of Industrial Importance. Glass, Cements, Chemical Explosives,**
- C04: Spectroscopic Analysis of Organic Compounds**

COs-POs Mapping

DSCC-14: FUNDAMENTALS OF CHEMISTRY – III

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01	√	√		√	√				√	√
C02	√	√		√	√				√	√
C03	√	√		√	√				√	√
C04	√	√	√	√	√		√		√	√

DSCC - 15

PROGRAMME OUTCOME OF B. SC. CHEMISTRY (MAJOR)

P01: Core competency

P02: Disciplinary knowledge and skill

P03: Skilled communicator

P04: Critical thinker and problem solver

P05: Sense of inquiry

P06: Team player

P07: Skilled project manager

P08: Digitally literate

P09: Ethical awareness/reasoning

P010: Lifelong learner

Discipline Specific Core Course (DSCC)

Paper: CHEM-H-CC15-6: Inorganic Chemistry - IV

(Credit: Theory -03, Practical - 01)

Course learning outcome (COs)

C05: Organometallic Chemistry-I

C06: Bioinorganic Chemistry - I

C07: Reaction kinetics and mechanism

C08: Preparation of Inorganic Complexes: *cis*-K[Cr(C₂O₄)₂(H₂O)₂], [Co(NH₃)₄(CO₃)] Cl, [Ni(en)₃]Cl₂, [Fe(acac)₃], [Cu(acac)₂], [VO(acac)₂], [Ni(salen)₂].

COs-POs Mapping

DSCC-15: Inorganic Chemistry - IV

	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010
C01	√	√		√	√				√	√
C02	√	√		√	√				√	√
C03	√	√		√	√				√	√
C04	√	√	√	√	√	√			√	√