

# **Department of Chemistry**

Course Specific Outcomes  
&  
Programme Specific Outcomes

**For M.Sc. Course**


## Dyal Singh College, Karnal

Name of the Programme: MASTER OF SCIENCE (M.Sc. CHEMISTRY)

Duration: Two Years

Programme Outcomes (POs) for PG courses of Faculty of M.Sc. CHEMISTRY		
PO1	Knowledge	Capable to apply the full scale and thorough knowledge in social practices gained during the course of study.
PO2	Communication	Competency in communicating with effective scientific aptitude in context of chemistry on general and scientific topics with society.
PO3	Problem Solving	Proficiency in critical thinking and solving general and scientific problems by applying the knowledge gained during the course of study. Implementing qualitative as well as quantitative analytical synthetic and phenomenon-based problems in chemical sciences.
PO4	Individual and Team Work	Capability to learn and work as an individual and also as a team in the course of multidisciplinary options.
PO5	Investigation of Problems	Capable of analysing the different aspects of a problem, designing of experiments, analysing and interpreting the data to reach a conclusion.
PO6	Modern Tool Usage	Capability to learn and use modern skills, tools and technologies for social and scientific practices and acquired the knowledge of spectroscopy that is used significantly in medical fields like MRI and X-Rays.
PO7	Science and Society	Capable to assess different kinds of social issues by applying reasoning and scientific aptitude developed during the course. Knowledge of medicines, foods, fertilizers and many more can be applied for the welfare of society.
PO8	Life-Long Learning	Developed Learning attitude for newer skills and activities throughout their life.
PO9	Environment and Sustainability	Capable to use the acquired knowledge to design new ideas and systems that are helpful for environment and its sustainability like green chemistry.
PO10	Ethics	Able to apply different ethics and principles, avoid unethical behaviour such as fabrication of data, committing plagiarism and unbiased truthful actions in all aspects different professional and social practices
PO11	Project Management	Competency to handle and manage projects with comprehensive theoretical as well as practical knowledge and understanding of diverse scientific principles.

<b>Programme Specific Outcomes (PSOs) for Chemistry subject of M.Sc. Chemistry</b>	
The aim of the curriculum designed for MSc course is to cultivate the technical aptitude of students for professional skills in the area of Chemical industries/ Research programmes.	
<b>PSO1</b>	Knowledge of chemistry plays an important role in the area of Fertilizer industry, Food adulteration and Fats/Oil industries..
<b>PSO2</b>	Will become recognizable with the various branches of chemistry such as analytical, physical, organic, inorganic, environmental and polymer.
<b>PSO3</b>	Teaching of this subject will inculcate the ability in youth to synthesize the medicines in pharmaceutical industry.
<b>PSO4</b>	Knowledge of spectroscopy plays significant role in the medical applications such as MRI and X-Rays.
<b>PSO5</b>	The programme of mathematics for chemists will develop knowledge in area integration of any spectrographs and graphs drawing/analysis.

  
 Principal  
 Dyal Singh College  
 KARNAL



**M. Sc. Previous (1st Semester) CHEMISTRY****Course Outcomes of Paper-I Inorganic Chemistry (General)****Course Objectives:**

CHEM-M-I.1	Describe advanced symmetry concepts of chemical molecules and the great orthogonality theorem with their applications. To identify the axis, plane, centre, point group, polarity, dipole moment and product of symmetry operations and character tables of chemical compounds.
CHEM-M-I.2	To describe VSEPR theory and Walsh diagrams. Energy of hybridisation. Huckel theory for simple molecules. To discuss the substitution reactions of covalently bonded molecules boron, silicon and nitrogen.
CHEM-M-I.3	To know about the metal equilibria in solutions. To describe the factors affecting stability of metal ligand complexes. Using various methods for the determination of stability constant.
CHEM-M-I.4	To determine the various methods for the determination of stability constant and apply the concept of molecular orbital theory to tetrahedral square planar and octahedral complexes.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-I.1	3	3	3	3	3	3	3	3	2	2	3
CHEM-M-I.2	3	3	3	3	2	3	3	2	3	3	3
CHEM-M-I.3	3	3	3	3	3	3	3	3	3	2	3
CHEM-M-I.4	3	3	3	3	3	2	3	2	2	3	3
Average	3	3	3	3	2.75	2.75	3	2.5	2.5	2.5	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-I.1	2	3	3	3	3
CHEM-M-I.2	3	3	3	3	3
CHEM-M-I.3	3	3	3	3	2
CHEM-M-I.4	2	3	3	3	3
Average	2.5	3	3	3	2.75

**M. Sc. Previous (Ist Semester) CHEMISTRY**

**Course Outcomes of Paper-II Physical Chemistry (General)**

**Course Objectives:**

CHEM-M-II.1	Recapitulation of thermodynamic laws, concept of fugacity and its determination. Concept of activity and its determination using emf measurement, vapour pressure method and some other methods, partial molar quantities, chemical potential for ideal gases and mixture of gases, Gibbs-Duhem equation, concept of escaping tendency and chemical potential.
CHEM-M-II.2	To explain Collision theory of reaction rates, steric requirements, Arrhenius equation and activated complex theory (ACT) and to demonstrate the thermodynamic formulations of activated complex theory. To describe the concept of potential energy surfaces and Lindemann-Christiansen and Hinshelwood mechanisms of unimolecular reactions.
CHEM-M-II.3	To discuss Debye-Hückel theory of ion-ion interaction and activity coefficient, its applicability, limitations and its modification for finite-sized ions, effect of ion-solvent interaction on activity coefficient. To derive D-H-O equation - its applicability and limitations, Pair-wise association of ions (Bjerrum treatment) and its modifications for ion-pair formation. To know the Concept of electrical double layer and its structure. To know about Helmholtz-Perrin, Gouy-Chapman, and Stern models, electrokinetic phenomena and the determination of zeta potential.
CHEM-M-II.4	To discuss the Langmuir adsorption isotherm and its kinetic derivation for non-dissociative and dissociative adsorption. To know about surface catalyzed unimolecular and bimolecular reactions, temporary and permanent catalytic poisons. To carry out a comparison between homogeneous and heterogeneous reaction rates.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-II.1	3	3	3	3	3	3	3	3	2	2	3
CHEM-M-II.2	3	3	3	3	3	3	3	2	3	3	2
CHEM-M-II.3	3	3	2	3	3	3	3	3	3	2	3
CHEM-M-II.4	3	3	3	3	3	2	3	2	2	3	3
Average	3	3	2.75	3	3	2.75	3	2.5	2.5	2.5	2.75

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-II.1	2	2	3	3	3
CHEM-M-II.2	3	3	3	3	3
CHEM-M-II.3	3	3	3	3	2
CHEM-M-II.4	2	3	3	3	3
Average	2.5	2.75	3	3	2.75



**M. Sc. Ist Year (Ist Semester) CHEMISTRY**

**Course Outcomes of Paper-III Organic Chemistry (General)**

**Course Objectives:**

CHEM-M-III.1	Describe reaction intermediates, energy profile diagrams and to establish the mechanism of organic reactions and simultaneously understand the effect of structure on reactivity and application of Hammett /Taft equations, Curtin-Hammett principles, Hammond postulates in theoretical treatment of organic reactions.
CHEM-M-III.2	Understand mechanistic details of different types of factors affecting aliphatic nucleophilic substitution reactions and the terminology involved therein. To know mechanistic details of different types of elimination reactions, Saytzeff and Hoffman rules and their application in prediction of product formation in various elimination reactions.
CHEM-M-III.3	Stereo-chemical terms, inter-conversions, stereo-structural formulae of organic molecules, analyze configurations, create stereo-structures and correlate configuration by applying the concept of chemical correlation.
CHEM-M-III.4	To realize the concepts of prochirality, topicity related terms, asymmetric synthesis, its main categories vis-à-vis application of Cram's, Prelog and Horeaus rule. To describe stability of different configurations and conformations of acyclic and cyclic organic compounds, sugars and decalins.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-III.1	3	3	3	3	3	3	3	3	2	2	3
CHEM-M-III.2	3	3	3	3	3	3	3	2	3	3	3
CHEM-M-III.3	3	2	3	3	3	3	3	3	3	3	3
CHEM-M-III.4	3	3	3	3	3	2	3	2	2	2	3
Average	3	2.75	3	3	3	2.75	3	2.5	2.5	2.5	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-III.1	2	3	3	3	3
CHEM-M-III.2	3	3	3	3	3
CHEM-M-III.3	3	3	3	3	2
CHEM-M-III.4	2	3	3	2	3
Average	2.5	3	3	2.75	2.75

**M. Sc. 1st Year (1st Semester) CHEMISTRY**

**Course Outcomes of Paper-IVa Chemistry of Life Science**

**Course Objectives:**

CHEM-M-IVa.1	<p>To describe the prokaryotic and eukaryotic cell Structure, metabolic processes occurring in cell. Able to discuss the Carbohydrate metabolism-glycolysis, Kreb's cycle, glycogenolysis, glycogenesis pentose phosphate pathway and gluconeogenesis.</p> <p>To explain the Structure and functions of important derivatives of monosaccharides like glycosides, deoxy sugars, myoinositol, structural polysaccharides - cellulose and chitin. Storage polysaccharides-starch and glycogen.</p>
CHEM-M-IVa.2	<p>To analyze the structure and functions of fatty acids, triacylglycerols, glycerophospholipids, sphingolipids, cholesterol, bile acids. <math>\beta</math>-oxidation of fatty acid, Fluid mosaic mode of cell membrane. To know the concept of the amino acids, peptides and proteins. Able to describe the primary, secondary structure of proteins and forces responsible for holding these structures. To understand enzymatic and chemical cleavage of polypeptide chain, sequencing of amino acids in a polypeptide segment, concept of denaturation of proteins.</p>
CHEM-M-IVa.3	<p>To explain the Structure of nucleotides, nucleosides, DNA (Watson-Crick model) RNA and their conformation. Able to explain the DNA replication, translation and transcription. Universality of the code, codon, anticodon pairing, protein biosynthesis.</p>

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-IVa.1	3	3	3	2	3	3	3	3	2	2	3
CHEM-M-IVa.2	3	3	3	3	3	2	3	3	3	2	3
CHEM-M-IVa.3	3	3	2	3	3	3	3	2	3	2	3
Average	3	3	2.66	2.66	3	2.66	3	2.66	2.66	2	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-IVa.1	2	3	3	3	3
CHEM-M-IVa.2	3	3	3	3	3
CHEM-M-IVa.3	3	3	3	3	2
Average	2.66	3	3	3	2.66



**M. Sc. Ist Year (Ist Semester) CHEMISTRY**

**Course Outcomes of Paper-IVb Mathematics for Chemists**

**Course Objectives:**

CHEM-IVb.1	To perform vector mathematical operations. To explain scalar and vector products of vectors. To discuss definition and properties of matrices and determinants. To solve linear equations using matrices.
CHEM-IVb.2	To discuss need, theory and applications of logarithms. To execute the knowledge in solving general and chemical problems. To represent equations graphically and to perform curve fitting for least squares method. To perform binomial expansion. To prove and apply trigonometric identities and explain polar coordinates in trigonometric functions. To explain rules of differentiation and find out the derivative of a function by applying various methods of differentiation.
CHEM-IVb.3	To perform partial differentiation and discuss exact and inexact differentials and their applications in chemistry. To explain rules and methods of integration and its application in chemistry. To discuss types of differential equations and their solutions with their application to physico-chemical problems.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-IVb.1	3	3	3	3	3	3	3	3	2	3	3
CHEM-M-IVb.2	3	3	3	2	3	3	3	2	3	3	3
CHEM-M-IVb.3	3	2	3	3	3	2	3	3	3	2	3
Average	3	2.66	3	2.66	3	2.66	3	2.66	2.66	2.66	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-IVb.1	2	3	3	3	3
CHEM-M-IVb.2	3	3	3	3	3
CHEM-M-IVb.3	3	3	3	3	2
Average	2.66	3	3	3	2.66



**M. Sc. Ist Year (II<sup>nd</sup> Semester) CHEMISTRY****Course Outcomes of Paper-V Inorganic Chemistry (General)****Course Objectives: After studying this paper, the student will:**

CHEM-M- V.1	Get insights of spectroscopic term symbols, spin orbit coupling, spectral terms, ground state terms-Hund's rules, term symbol.
CHEM-M- V.2	Learn about Interpretation of electronic spectra, Orgel and Tanabe-Sugano diagrams, calculations of Dq, B and $\beta$ parameters, charge transfer spectra, Circular Dichroism and Optical Rotatory Dispersion.
CHEM-M- V.3	Get to know about metal carbonyls, structure and bonding
CHEM-M- V.4	Have understanding of higher boranes, carboranes, metalloboranes and metallocarboranes.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M- V.1	3	3	3	2	3	2	2	2	2	2	2
CHEM-M- V.2	3	2	3	3	3	3	3	3	2	3	3
CHEM-M- V.3	3	3	3	2	2	3	2	3	3	2	3
CHEM-M- V.4	3	2	3	3	2	3	3	2	3	3	3
Average	3	2.5	3	2.5	2.5	2.75	2.5	2.5	2.5	2.5	2.75

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M- V.1	3	3	2	2	3
CHEM-M- V.2	2	3	2	3	3
CHEM-M- V.3	3	3	3	3	2
CHEM-M- V.4	2	3	3	2	2
Average	2.5	3	2.5	2.5	2.5

**M. Sc. Ist Year (II<sup>nd</sup> Semester) CHEMISTRY**

**Course Outcomes of Paper-VI Physical Chemistry (General)**

**Course Objectives: After studying this paper, the student will:**

CHEM-M- VI.1	Acquire knowledge of postulates of quantum mechanics and associated parameters, Schrodinger equation for a particle in a box, linear harmonic oscillator and tunnelling problem.
CHEM-M- VI.2	Have insights of Rigid rotator, Hydrogen atom, shape of atomic orbitals up to d - level.
CHEM-M- VI.3	Get to know about Kinetics of Polymerization, molecular mass of polymers and various modern day polymers.
CHEM-M- VI.4	Have understanding of Nuclear stability and binding energy, nuclear fission and nuclear fusion, radio chromatography, radiometric titrations, Neutron absorptiometry.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M- VI.1	3	2	3	2	3	3	2	2	2	2	2
CHEM-M- VI.2	3	2	3	2	3	3	2	3	2	3	2
CHEM-M- VI.3	3	3	3	2	2	3	2	3	3	2	3
CHEM-M- VI.4	3	3	3	2	2	3	2	2	3	3	3
Average	3	2.5	3	2	2.5	3	2	2.5	2.5	2.5	2.5

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M- VI.1	2	3	2	2	3
CHEM-M- VI.2	3	3	2	3	3
CHEM-M- VI.3	2	3	3	3	2
CHEM-M- VI.4	3	3	3	2	2
Average	2.5	3	2.5	2.5	2.5



**M. Sc. Ist Year (II<sup>nd</sup> Semester) CHEMISTRY****Course Outcomes of Paper-VII Organic Chemistry (General)****Course Objectives: After studying this paper, the student will:**

CHEM-M- VII.1	Acquire knowledge of aromatic Electrophilic and nucleophilic Substitution reactions, energy profile diagram, general aspects of generation, structure, stability and reactivity of arynes.
CHEM-M- VII.2	Have insights of Aliphatic Electrophilic Substitution, Neighbouring Group Participation and Carbocation Rearrangements.
CHEM-M- VII.3	Get to know about the generation, structure, stability, reactivity of free radicals and addition reaction of C-C bond.
CHEM-M- VII.4	Have understanding of addition - elimination Reactions of Ketones and Aldehydes, Reactivity of carbonyl compounds towards addition.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M- VII.1	3	2	3	2	3	3	2	2	2	3	2
CHEM-M- VII.2	3	2	3	3	3	3	3	3	2	2	2
CHEM-M- VII.3	3	3	3	2	2	3	3	3	3	2	3
CHEM-M- VII.4	3	3	3	3	2	3	2	2	3	3	3
Average	3	2.5	3	2.5	2.5	3	2.5	2.5	2.5	2.5	2.5

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M- VII.1	3	3	2	2	2
CHEM-M- VII.2	2	3	2	3	3
CHEM-M- VII.3	3	3	3	3	3
CHEM-M- VII.4	2	3	3	2	2
Average	2.5	3	2.5	2.5	2.5

**M. Sc. Ist Year (II<sup>nd</sup> Semester) CHEMISTRY****Course Outcomes of Paper-VIII Applications of Computer in Chemistry****Course Objectives: After studying this paper, the student will:**

CHEM-M- VII.1	Acquire skill in relation to handling Binary, octal & hexadecimal number systems, using Internet, word processing package.
CHEM-M- VII.2	Learn introduction to Operating system (UNIX, Windows) and programming language. Algorithm, Flow charts and Writing simple programs. Have insights of Aliphatic Electrophilic Substitution, Neighbouring Group Participation and Carbocation Rearrangements.
CHEM-M- VII.3	Get to know about the Numerical Methods, Statistical treatment of data, variance and correlations, linear regression, Curve fitting.
CHEM-M- VII.4	Be expert in writing programs and using ChemDraw, an important tool for knowing various parameters of a molecule.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M- VII.1	3	3	3	2	3	3	2	3	3	3	3
CHEM-M- VII.2	3	3	3	2	3	3	3	3	3	3	3
CHEM-M- VII.3	3	3	2	3	3	3	3	3	3	3	3
CHEM-M- VII.4	3	3	3	3	2	3	2	3	2	3	3
Average	3	3	2.75	2.5	2.75	3	2.5	3	2.75	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M- VII.1	3	3	3	3	3
CHEM-M- VII.2	3	3	3	3	3
CHEM-M- VII.3	3	3	3	2	3
CHEM-M- VII.4	3	2	3	3	3
Average	3	2.75	3	2.75	3



**M. Sc. Ist Year (II<sup>nd</sup> Semester) CHEMISTRY**

**Course Outcomes of Paper-VIII Applications of Computer in Chemistry**

**Course Objectives: After studying this paper, the student will:**

CHEM-M- VII.1	Acquire skill in relation to handling Binary, octal & hexadecimal number systems, using Internet, word processing package.
CHEM-M- VII.2	Learn introduction to Operating system (UNIX, Windows) and programming language. Algorithm, Flow charts and Writing simple programs.
CHEM-M- VII.3	Get to know about the Numerical Methods, Statistical treatment of data, variance and correlations, linear regression, Curve fitting.
CHEM-M- VII.4	Be expert in writing programs and using ChemDraw, an important tool for knowing various parameters of a molecule.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M- VII.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-M- VII.2	3	2	3	3	3	3	3	3	3	2	3
CHEM-M- VII.3	3	3	3	3	3	3	3	3	3	2	3
CHEM-M- VII.4	3	3	3	3	2	3	3	3	2	3	3
Average	3	2.75	3	3	2.75	3	3	3	2.75	2.5	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M- VII.1	3	3	3	3	3
CHEM-M- VII.2	3	3	3	3	3
CHEM-M- VII.3	3	2	3	2	3
CHEM-M- VII.4	3	3	3	2	3
Average	3	2.75	3	2.5	3

**M. Sc. Ist Year (II<sup>nd</sup> Semester) CHEMISTRY****Course Outcomes of Paper-IX Inorganic Chemistry Practical (General)****Course Objectives: After performing practical, the student will:**

CHEM-M- IX.1	Acquire skill in qualitative analysis of radicals.
CHEM-M- IX.2	Learn skills required for quantitative Analysis using volumetric/gravimetric methods.
CHEM-M- IX.3	Be able to prepare selected inorganic compounds and study their spectroscopic studies.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M- IX.1	3	3	3	3	3	3	3	3	3	2	3
CHEM-M- IX.2	3	3	3	3	3	3	3	3	3	3	3
CHEM-M- IX.3	3	3	3	3	3	2	3	2	3	3	3
Average	3	3	3	3	3	2.6	3	2.6	3	2.6	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M- IX.1	3	3	3	3	3
CHEM-M- IX.2	3	3	3	3	3
CHEM-M- IX.3	3	3	2	3	3
Average	3	3	2.66	3	3



**M. Sc. Ist Year (II<sup>nd</sup> Semester) CHEMISTRY****Course Outcomes of Paper-X Physical Chemistry Practical****Course Objectives: After performing practical, the student will:**

CHEM-M- X.1	Acquire knowledge for calculating refractive index and molar refractivity, the specific and molecular rotation.
CHEM-M- X.2	Learn skills required for potentiometric titration, conductometric titration, pH metric titration.
CHEM-M- X.3	Have a hand on experience in studying chemical kinetics, viscosity measurements, distribution law and adsorption in laboratory.

CHEM-M stands for CHEMISTRY M.Sc.

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M- X.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-M- X.2	3	3	3	3	3	3	3	3	3	3	3
CHEM-M- X.3	3	3	3	3	3	3	3	3	3	3	3
Average	3	3	3	3	3	3	3	3	3	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M- X.1	3	3	3	3	3
CHEM-M- X.2	3	3	3	3	3
CHEM-M- X.3	3	3	3	3	3
Average	3	3	3	3	3

**M. Sc. Ist Year (II<sup>nd</sup> Semester) CHEMISTRY****Course Outcomes of Paper-XI Organic Chemistry Practical****Course Objectives: After performing practical, the student will:**

CHEM-M- XI.1	Acquire knowledge for Purification of organic compounds involving fractional crystallization, fractional distillation, steam distillation, sublimation and extraction.
CHEM-M- XI.2	Learn skills required for systematic identification of pure organic compounds and preparation of their derivatives.
CHEM-M- XI.3	Also have knowledge for preparation of organic compounds involving two stages.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M- XI.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-M- XI.2	3	3	3	3	3	2	3	3	3	3	3
CHEM-M- XI.3	3	3	3	3	3	3	3	3	3	3	3
Average	3	3	3	3	3	2.66	3	3	3	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M- XI.1	3	3	3	3	3
CHEM-M- XI.2	3	3	3	3	3
CHEM-M- XI.3	3	3	3	3	3
Average	3	3	3	3	3



**M. Sc. IInd Year (3<sup>rd</sup> Semester) CHEMISTRY****Course Outcomes of Paper-XII Inorganic Chemistry (General)****Course Objectives:**

CHEM-M stands for CHEMISTRY M.Sc.

CHEM-M-XII.1	To elucidate the electron transfer processes in living organisms with reference to iron sulphur proteins and cytochromes. To be acquainted with the fundamentals of polarography and its applications.
CHEM-M-XII.2	To apply the symmetry and group theory in explanation of structural features with the assist of vibrational spectra.
CHEM-M-XII.3	To know the basic theory of Photoelectron spectroscopy and study of molecules.
CHEM-M-XII.4	To study the chemical information from ESCA.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XII.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XII.2	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XII.3	3	2	3	2	3	3	2	3	2	3	3
CHEM-M-XII.4	3	3	3	2	3	3	3	3	2	3	3
Average	3	2.75	3	2.5	3	3	2.75	3	2.5	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XII.1	3	3	3	3	3
CHEM-M-XII.2	3	3	2	2	3
CHEM-M-XII.3	3	3	3	2	3
CHEM-M-XII.4	3	3	3	3	3
Average	3	3	2.75	2.5	3

**M. Sc. IIInd Year (3<sup>rd</sup> Semester) CHEMISTRY**

**Course Outcomes of Paper-XIII Physical Chemistry (General)**

**Course Objectives:**

CHEM-M-XIII.1	To know the basic concept of microwave spectroscopy and able to interpret the rotational spectra of rigid diatomic and polyatomic linear molecules and symmetric top molecules.
CHEM-M-XIII.2	Know about NMR, NQR and ESR spectroscopy and their applications in chemistry.
CHEM-M-XIII.3	To understand the basic concept of reciprocal lattice related to X-ray crystallography and interpretation of powder X-ray diffraction patterns.
CHEM-M-XIII.4	To determine interplanar spacing for different crystal systems and structure factors for different types of lattices.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XIII.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XIII.2	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XIII.3	3	2	3	2	3	3	2	3	2	3	3
CHEM-M-XIII.4	3	3	3	2	3	3	3	3	2	3	3
Average	3	2.75	3	2.5	3	3	2.75	3	2.5	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XIII.1	3	3	3	3	3
CHEM-M-XIII.2	3	3	2	2	3
CHEM-M-XIII.3	3	3	3	2	3
CHEM-M-XIII.4	3	3	3	2	3
Average	3	3	2.75	2.25	3



**M. Sc. IInd Year (3<sup>rd</sup> Semester) CHEMISTRY****Course Outcomes of Paper-XIV Organic Chemistry (General)****Course Objectives:**

CHEM-M-XIV.1	To apply Fieser-Woodward rules for calculating $\lambda_{max}$ for conjugated dienes and carbonyl compounds.
CHEM-M-XIV.2	To introduce and discuss the chemical shift and coupling constant in relation to stereochemical structure of the organic compound.
CHEM-M-XIV.3	To explain the difference between First order and second order NMR spectra and Tools used for simplification of complex NMR spectrum (instrumental and chemical).
CHEM-M-XIV.4	To know the difference between <sup>1</sup> H-NMR and <sup>13</sup> C-NMR and their applications in structure determination of organic compounds.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XIV.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XIV.2	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XIV.3	3	2	3	2	3	3	2	3	2	3	3
CHEM-M-XIV.4	3	3	3	2	3	3	3	3	2	3	3
Average	3	2.75	3	2.5	3	3	2.75	3	2.5	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XIV.1	3	3	3	3	3
CHEM-M-XIV.2	3	3	2	3	3
CHEM-M-XIV.3	3	3	3	2	3
CHEM-M-XIV.4	3	3	3	2	3
Average	3	3	2.75	2.5	3

**M. Sc. IInd Year (3<sup>rd</sup> Semester) CHEMISTRY**

**Course Outcomes of Paper-XV Organic Chemistry (Special)**

**Course Objectives:**

CHEM-M-XV.1	To know about the role of various Organometallic Reagents of Li, Mg, Cd, Zn,Cu, S, Si, B, I, Pd, Ni, Fe, Co, Rh, Cr and Ti compounds in organic synthesis along with their preparations, properties and applications of these reagents with mechanistic details.
CHEM-M-XV.2	To understand the principle of Organometallic Reagents and their applications in organic synthesis.
CHEM-M-XV.3	To understand the principle of oxidation, oxidative processes related to Hydrocarbons- alkenes,aromatic rings, activated and unactivated saturated C-H groups, alcohols, diols, aldehydes, ketones, ketals and carboxylic acids. Amines, hydrazines, and sulphides.
CHEM-M-XV.4	To be able to understand the reduction of carbonyl compounds – aldehydes, ketones, acids and their derivatives, Epoxides. reduction of compounds containing nitro, nitroso, azo and oxime groups.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XV.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XV.2	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XV.3	3	2	3	2	3	3	2	3	2	3	3
CHEM-M-XV.4	3	3	3	2	3	3	3	3	2	3	3
Average	3	2.75	3	2.5	3	3	2.75	3	2.5	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XV.1	3	3	3	3	3
CHEM-M-XV.2	3	3	2	2	3
CHEM-M-XV.3	3	3	3		3
CHEM-M-XV.4	3	3	3	2	3
Average	3	3	2.75	2.5	3



**M. Sc. IInd Year (3<sup>rd</sup> Semester) CHEMISTRY****Course Outcomes of Paper-XVI Organic Chemistry (Special)****Course Objectives:**

CHEM-M-XVI.1	Appreciate the role of Molecular Orbitals in analysing Pericyclic Reactions.
CHEM-M-XVI.2	Interpret the stereochemical course of a Pericyclic Reaction and identify the product.
CHEM-M-XVI.3	Predict the course of an organic photochemical reaction and identify the product with the type of functional group present on the molecule.
CHEM-M-XVI.4	To interpret the stereochemical course of a different chemical reactions and classify the product.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XVI.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XVI.2	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XVI.3	3	2	3	2	3	3	2	3	2	3	3
CHEM-M-XVI.4	3	3	3	2	3	3	3	3	2	3	3
Average	3	2.75	3	2.5	3	3	2.75	3	2.5	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XVI.1	3	3	3	3	3
CHEM-M-XVI.2	3	3	2	3	3
CHEM-M-XVI.3	3	3	3	2	3
CHEM-M-XVI.4	3	3	3	2	3
Average	3	3	2.75	2.5	3

**M. Sc. Final Year (4<sup>th</sup> Semester) CHEMISTRY**

**Course Outcomes of Paper-XVII Organic Chemistry (Special)**

**Course Objectives:**

CHEM-M-XVII.1	An introduction about Disconnection approach-I, In this we study about Synthons and Synthetic equivalents, general principles of the disconnection approach, functional group interconversions, chemoselectivity, regioselectivity, etc.
CHEM-M-XVII.2	To discuss about Disconnection approach-II, in this we study about reversal polarity, amine synthesis, synthesis of alkenes, synthesis of three membered rings, photochemistry in organic synthesis.
CHEM-M-XVII.3	An introduction about Disconnection approach-III, in this we study about Principle of alcoholic, amino, carbonyl and carboxylic groups, two group C-C disconnection, control in carbonyl condensations, synthesis of Juvabione.
CHEM-M- XVII.4	Discussing about principle of green chemistry and its application. And an idea of supramolecular chemistry.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XVII.1	3	3	3	2	3	3	3	3	2	2	3
CHEM-M-XVII.2	3	3	3	2	3	3	3	3	2	3	3
CHEM-M-XVII.3	3	3	3	2	3	3	3	3	3	3	3
CHEM-M- XVII.4	3	3	3	3	3	3	3	3	3	3	3
Average	3	3	3	2.25	3	3	3	3	2.5	2.75	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XVII.1	3	3	3	3	3
CHEM-M-XVII.2	3	3	2	2	3
CHEM-M-XVII.3	3	3	3	2	3
CHEM-M- XVII.4	3	3	3	2	3
Average	3	3	2.75	2.25	3



**M. Sc. Final Year (4<sup>th</sup> Semester) CHEMISTRY**

**Course Outcomes of Paper-XVIII Organic Chemistry (Special)**

**Course Objectives:**

CHEM-M-XVIII.1	Discussing about a detailed study of HoffFman, Curtius, Lossen, Neber, Baeyer Villiger rearrangements.
CHEM-M- XVIII.2	Discussing about detailed study including mechanism Shapiro reaction, Prevost and woodward hydroxylation. And discussion about Occurrence, nomenclature, general method of structure determination of flavonoids.
CHEM-M- XVIII.3	Discuss about Hetrocyclic compounds – systematic nomenclature for monocyclic and fused ring systems. Method of synthesis .
CHEM-M-XVIII.4	Discussing about method of synthesis of the following 6 membered heterocycles. Aromaticity, metallocenes and nonbenzenoid aromatics compounds.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XVIII.1	3	3	3	2	3	3	3	3	2	2	3
CHEM-M-XVIII.2	3	3	3	2	3	3	3	3	3	3	3
CHEM-M-XVIII.3	3	3	3	3	3	3	3	3	2	2	3
CHEM-M-XVIII.4	3	3	3	3	3	3	3	3	3	2	3
Average	3	3	3	2.5	3	3	3	3	2.5	2.25	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XVIII.1	3	3	3	2	3
CHEM-M- XVIII.2	3	3	3	3	3
CHEM-M- XVIII.3	3	3	3	3	3
CHEM-M-XVIII.4	3	3	3	3	3
Average	3	3	3	2.75	3

**M. Sc. Final Year (4<sup>th</sup> Semester) CHEMISTRY****Course Outcomes of Paper-XIX Organic Chemistry (Special)****Course Objectives:**

CHEM-M-XIX.1	Discussing about enzymes. Introduction and historical perspective, chemical and biological catalysis, remarkable properties of enzymes like catalytic power, specificity and regulation. Nomenclature and classification, extraction and purification.
CHEM-M-XIX.2	Discussing about Mechanism of action of chymotrypsin, carboxypeptidase-A and papain. Role of prostaglandins.
CHEM-M-XIX.3	Understanding about structure determination of terpenoids, alpha-pinene, camphor.
CHEM-M-XIX.4	To discuss about isolation and nomenclature of steroids, structure, synthesis and stereochemistry of cholesterol.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XIX.1	3	3	3	3	3	3	3	3	3	3	3
CHEM-M-XIX.2	3	3	3	2	3	3	3	3	2	3	3
CHEM-M-XIX.3	3	3	3	3	3	3	3	3	3	2	3
CHEM-M-XIX.4	3	3	3	2	3	3	3	3	2	3	3
Average	3	3	3	2.5	3	3	3	3	2.5	2.75	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XIX.1	3	3	3	3	3
CHEM-M-XIX.2	3	3	3	2	3
CHEM-M-XIX.3	3	3	3	3	3
CHEM-M-XIX.4	3	3	3	2	3
Average	3	3	3	2.5	3



**M. Sc. Final Year (4<sup>th</sup> Semester) CHEMISTRY****Course Outcomes of Paper-XX Organic Chemistry (Special)****Course Objectives:**

CHEM-M-XX.1	Discussing about classification and discovery of new drugs, history and development of chemotherapeutic agents. Elementary idea about drug action. Drug development.
CHEM-M-XX.2	Discussing about synthesis, general mode of action and medicinal uses of important drugs in following categories – antineoplastic agents, antimalarials, analgesics, antipyrics and anti-inflammatory agents, antifertility agents, cardiovascular drugs.
CHEM-M-XX.3	Discussing about antibiotics, like penicillins and semi-synthetic penicillins, synthesis, structure elucidation and medical uses of penicillin and cephalosporins.
CHEM-M-XX.4	Discussing about alkaloids – definition, nomenclature and physiological action, occurrence, isolation, general methods of structure elucidation. Structure, stereochemistry, synthesis and biosynthesis of Ephedrine, Nicotine, Quinine and Reserpine.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XX.1	3	3	3	2	3	3	3	3	3	3	3
CHEM-M-XX.2	3	3	3	2	3	3	3	3	3	2	3
CHEM-M-XX.3	3	3	3	2	3	3	3	3	3	2	3
CHEM-M-XX.4	3	3	3	3	3	3	3	3	2	2	3
Average	3	3	3	2.25	3	3	3	3	2.75	2.25	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XX.1	3	3	3	2	3
CHEM-M-XX.2	3	3	3	2	3
CHEM-M-XX.3	3	3	3	2	3
CHEM-M-XX.4	3	3	3	3	3
Average	3	3	3	2.25	3



**M. Sc. Final Year (4<sup>th</sup> Semester) CHEMISTRY****Course Outcomes of Paper-XXI Organic Chemistry (Practicals)****Course Objectives:**

CHEM-M-XXI.1	In Qualitative Analysis for the separation of compounds of a binary (liquid-solid or solid-solid) organic mixture using physical and chemical methods and characterization of the components with the help of chemicals analysis.
CHEM-M-XXI.2	Confirmation of their structures with the help of IR and PMR Spectral data.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XXI.1	3	3	3	3	3	3	3	3	2	2	3
CHEM-M-XXI.2	3	3	3	2	3	3	3	3	3	2	3
Average	3	3	3	2.5	3	3	3	3	2.5	2	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XXI.1	3	3	3	2	3
CHEM-M-XXI.2	3	3	3	3	3
Average	3	3	3	2.5	3

**M. Sc. FINAL Year (4<sup>th</sup> Semester) CHEMISTRY****Course Outcomes of Paper-XXII organic Chemistry (Practical)****Course Objectives:**

CHEM-M-XXII.1	Understanding about preparation of organic compounds. Preparation of Organic compounds involving two or three stages. Isolation and purification of natural products.
CHEM-M-XXII.2	Techniques of Purification and separation; Separation of mixtures using TLC, vacuum distillation and sublimation.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XXII.1	3	3	3	2	3	3	3	3	3	3	3
CHEM-M-XXII.2	3	3	3	2	3	3	3	3	3	3	3
Average	3	3	3	2	3	3	3	3	3	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XXII.1	3	3	3	2	3
CHEM-M-XXII.2	3	3	3	3	3
Average	3	3	3	2.5	3

**M. Sc. final Year (4<sup>th</sup> Semester) CHEMISTRY****Course Outcomes of Paper XXIII organic Chemistry (PRACTICALS)****Course Objectives:**

CHEM-M-XXIII.1	Understanding about preparation of organic compounds: preparation of organic compounds involving two or three stages; isolation and purification of natural products.
CHEM-M-XXIII.2	Understanding about techniques of purification and separation; separation of mixtures using TLC, vacuum distillation and sublimation.

CHEM-M stands for CHEMISTRY M.Sc.

**Mapping of CO with PO's**

Cos#	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CHEM-M-XXIII.1	3	3	3	2	3	3	3	3	3	3	3
CHEM-M-XXIII.2	3	3	3	3	3	3	3	3	2	3	3
Average	3	3	3	2.5	3	3	3	3	2.5	3	3

**Mapping of CO with PSO's**

Cos#	PSO1	PSO2	PSO3	PSO4	PSO5
CHEM-M-XXIII.1	3	3	3	2	3
CHEM-M-XXIII.2	3	3	3	3	3
Average	3	3	3	2.5	3



Principal  
Dyal Singh College  
KARNAL



# **Department of Forensic Science**

Course Specific Outcomes  
&  
Programme Specific Outcomes

**For B.Sc. & M.Sc. Integrated Course**

**DYAL SINGH COLLEGE, KARNAL**

Name of the Programme: **M.Sc. Forensic Science 5yr Integrated (UG) With Forensic Science (as One Of The Subject)**

**Duration (in Years): 3(UG) + 2(PG)**

**Subject: Forensic Science**

<b>PROGRAMME OUTCOMES(POs)</b>		
PO1	Knowledge	Proficiency in demonstrating multidisciplinary knowledge gained during course of study
PO2	Communication	Proficiency to communicate effectively on general and scientific topics with the scientific community and with society at large
PO3	Dealing with problems	Will be able to think critically , analyze, to have rational and research-based knowledge including performing of experiments, analysis and interpretation of data from evidences to deduce opinion
PO4	Modern tool/Instrument usage	Ability to learn and use conventional and latest techniques, skills and modern tools/instruments for scientific practices
PO5	Science and Society	Ability to apply reasoning to assess the different issues related to society and the consequent responsibilities relevant to the professional scientific practices
PO6	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life
PO7	Ethics	Apply ethical principles and professional responsibilities in scientific and legal practices

<b>PROGRAMME SPECIFIC OUTCOMES (PSOs)</b>	
<b>The objective of the curriculum designed for M.Sc. 5yr Integrated (UG) with Forensic Science course is to develop professional, ethical graduates whose competence in problem-solving, legal analysis and application, quantitative reasoning, investigation and scientific laboratory procedures can be applied to immediate employment or advanced study.</b>	
PSO1	Students will gain knowledge to comprehend the basic knowledge of Forensic Science in resolving the criminal and civil cases by applying fundamental principles of Forensic Science
PSO2	Students will be empowered with skills to identify, examine and evaluate the problems related to Forensic to solve the crime cases.
PSO3	Students will develop subject specific expertise by analytical and experimental work.
PSO4	Students will be capable of using research-based knowledge and research methods with problem solving expertise and robust communication and Scientific inquiry skill with reference to Forensic Science.
PSO5	Forensic specialist youth will come out with a thorough knowledge of Ethics and law with all recent developments and emerging trends in Forensic Science.
PSO6	Students will be trained with excellence in Forensic Science for career in teaching, research, industry and independent Forensic practices.

**UG-FSC-101: BASICS OF FORENSIC SCIENCE****Course Objectives:** To Provide knowledge about the basics of the field.**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-101.1 Learn the different domains of forensic science.

UG-FSC-101.2 Understand the role of judicial officers and medico legal expert.

UG-FSC-101.3 Understand the legal admissibility of various evidences.

UG-FSC-101.4 Learn about the ethical issues in forensic science.

**CO-PO Mapping Matrix for Course Code UG-FSC-101**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-101.1		2.5	3	2.75	3	2	3	3
UG-FSC-101.2		2.5	3	2.75	2	3	3	3
UG-FSC-101.3		3	2	2.75	3	2	3	3
UG-FSC-101.4		3	2	2.75	2	3	3	3
Average		2.75	2.5	2.75	2.5	2.5	3	3

**CO-PSO Mapping Matrix for Course Code UG-FSC-101**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-101.1		3	2	3	3	2
UG-FSC-101.2		2	3	3	2	3
UG-FSC-101.3		3	2	3	3	2
UG-FSC-101.4		2	3	3	2	3
Average		2.5	2.5	3	2.5	2.5

**UG-FSC-102: CRIME SCENE INVESTIGATION AND MANAGEMENT****Course Objectives:** To Provide knowledge about crime scene investigation, management and study of various special crime scenes.**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-102.1 Learn the different types of crime scenes and the significance of it.

UG-FSC-102.2 Understand the duties of a First Responding Officer at a crime scene.

UG-FSC-102.3 Learn about the importance of FSL and the international perspective of Forensic Science.

UG-FSC-102.4 Learn about the criminal behaviour by different theories.

**CO-PO Mapping Matrix for Course Code UG-FSC-102**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-102.1		3	2	3	3	2	3	3
UG-FSC-102.2		2.5	2.5	2	2	3	3	2
UG-FSC-102.3		2.5	2.5	3	3	2	3	3
UG-FSC-102.4		3	3	3	2	3	3	2
Average		2.75	2.5	2.75	2.5	2.5	3	2.5

**CO-PSO Mapping Matrix for Course Code UG-FSC-102**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-102.1		3	3	2.5	3	2



UG-FSC-102.2	2	2.5	2.5	2	3
UG-FSC-102.3	2	3	3	3	2
UG-FSC-102.4	3	2.5	3	2	3
Average	2.5	2.75	2.75	2.5	2.5

### UG-FSC-201: CRIME DETECTION

**Course Objectives:** To Provide knowledge about Forensic Science Laboratories at central and state level and various other crime detection agencies.

**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-201.1 Learn about the organizational set up of Forensic Science Laboratories.

UG-FSC-201.2 Understand the relationship between Forensic Scientist and Police.

UG-FSC-201.3 Understand the role and functions of DFSS.

UG-FSC-201.4 Learn about the crime detection agencies like CBI, IB , RAW, etc.

#### CO-PO Mapping Matrix for Course Code UG-FSC-201

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-201.1		2.5	3	3	2.5	2	3	3
UG-FSC-201.2		2.5	3	2	2.5	3	3	3
UG-FSC-201.3		3	3	3	2.5	2	3	3
UG-FSC-201.4		3	3	2	2.5	3	3	2
Average		2.75	3	2.5	2.5	2.5	3	2.75

#### CO-PSO Mapping Matrix for Course Code UG-FSC-201

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-201.1		3	3	3	2.5	2
UG-FSC-201.2		2	2	3	2.5	3
UG-FSC-201.3		2	3	3	3	2
UG-FSC-201.4		3	2	3	3	3
Average		2.5	2.5	3	2.75	2.5

### UG-FSC-202: FORENSIC EVIDENCES

**Course Objectives:** To Provide knowledge about the different classes of Forensic evidences.

**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-202.1 Learn the general information provided by physical evidences.

UG-FSC-202.2 Learn about the searching methods of evidences and the methods of preservation, packaging and handling of physical evidences.

UG-FSC-202.3 Understand the different classes like biological, botanical, chemical and toxicological samples and the handling.

UG-FSC-202.4 Learn about the science of bloodstain pattern analysis.

#### CO-PO Mapping Matrix for Course Code UG-FSC-202

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-202.1		2.5	3	3	2.75	2	3	3
UG-FSC-202.2		2.5	2.5	2	2.75	3	3	2
UG-FSC-202.3		3	3	3	2.75	2	3	3
UG-FSC-202.4		3	2.5	2	2.75	3	3	2
Average		2.75	2.75	2.5	2.75	2.5	3	2.5

<b>CO-PSO Mapping Matrix for Course Code UG-FSC-202</b>						
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
UG-FSC-202.1	3	3	3	3	2.5	2
UG-FSC-202.2	2	2	2	2.5	2.5	3
UG-FSC-202.3	2	3	3	3	3	2
UG-FSC-202.4	3	2	2	2.5	3	3
Average	2.5	2.5	2.5	2.75	2.75	2.5

**UG-FSC-203: PRACTICAL**

**Course Objectives:** To Provide practical information about the different physical evidences followed by handling and preservation.

**Course Outcomes:** At the end of this course, the student will be able to:  
 UG-FSC-203.1 Learn the examination of diatoms by using optical methods.  
 UG-FSC-203.2 Understand the examination of biological fluids like semen, saliva, etc.  
 UG-FSC-203.3 Students can analyse the patterns of fingerprints and study of features of handwriting.  
 UG-FSC-203.4 Understand the Report writing of a crime scene.

<b>CO-PO Mapping Matrix for Course Code UG-FSC-203</b>								
<b>CO</b>	<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>
UG-FSC-203.1	2.5	3	3	3	3	2	3	3
UG-FSC-203.2	2.5	2	2	2	2.5	3	3	2
UG-FSC-203.3	3	3	3	3	3	2	3	3
UG-FSC-203.4	3	2	2	2	2.5	3	3	2
Average	2.75	2.5	2.5	2.5	2.75	2.5	3	2.5

<b>CO-PSO Mapping Matrix for Course Code UG-FSC-203</b>						
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
UG-FSC-203.1	3	3	3	3	2.5	2
UG-FSC-203.2	2.5	2.5	2.5	3	3	3
UG-FSC-203.3	2.5	3	3	2	2.5	2
UG-FSC-203.4	3	2.5	2.5	2	3	3
Average	2.75	2.75	2.75	2.5	2.75	2.5

**UG-FSC-301: Analytical Techniques And Methods Used In Forensic Science**

**Course Objectives:** To Provide knowledge about various instrumental techniques used in Forensic science for analysis of various type of evidences.

**Course Outcomes:** At the end of this course, the student will be able to:  
 UG-FSC-301.1 Learn the technique and handling of various types of microscopes.  
 UG-FSC-301.2 Understand the basic principle, instrumentation and use of various type of chromatographic techniques.  
 UG-FSC-301.3 Understand the basic principle, instrumentation and use of various type of spectroscopic techniques.  
 UG-FSC-301.4 Learn about the use of various analytical techniques and methods in forensic science examination.



CO-PO Mapping Matrix for Course Code UG-FSC-301								
CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-301.1		2.5	3	3	2.5	2	3	3
UG-FSC-301.2		3	2	2	2.5	3	3	2
UG-FSC-301.3		2.5	3	3	3	2	3	3
UG-FSC-301.4		3	2	2	3	3	3	2
Average		2.75	2.5	2.5	2.75	2.5	3	2.5

CO-PSO Mapping Matrix for Course Code UG-FSC-301						
CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-301.1		3	3	3	2.5	2
UG-FSC-301.2		3	2.5	2	3	3
UG-FSC-301.3		2	3	3	2.5	2
UG-FSC-301.4		2	2.5	2	3	3
Average		2.5	2.75	2.5	2.75	2.5

### UG-FSC-302: QUESTIONED DOCUMENTS AND REPORT WRITING

**Course Objectives:** The importance of collection, preservation and examining of questioned documents in crime cases.

**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-302.1 Learn about the preliminary examination of questioned documents.

UG-FSC-302.2 Understand about the basic principles of handwriting, general and individual characteristics of handwriting.

UG-FSC-302.3 Learn about various types of forgeries and their detection.

UG-FSC-302.4 Learn about the different stages of investigations, types of offences and components of scientific report writing.

CO-PO Mapping Matrix for Course Code UG-FSC-302								
CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-302.1		2	3	3	2.5	2	3	3
UG-FSC-302.2		3	3	2	2.5	2	3	2
UG-FSC-302.3		2	3	3	3	2	3	3
UG-FSC-302.4		3	3	2	3	2	3	2
Average		2.5	3	2.5	2.75	2	3	2.5

CO-PSO Mapping Matrix for Course Code UG-FSC-302						
CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-302.1		3	3	2	2.5	2
UG-FSC-302.2		3	2.5	2	3	3
UG-FSC-302.3		2	3	2	2.5	2
UG-FSC-302.4		2	2.5	2	3	3
Average		2.5	2.75	2	2.75	2.5

## UG-FSC-401: FORENSIC MEDICINE

**Course Objectives:** To study the application of medical knowledge in criminal investigation, particularly in establishing the causes of injury or death.

**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-401.1 Learn about the fundamental aspects and scope of medical Jurisprudence, Legal procedure in criminal court.

UG-FSC-401.2 Understand about the medico-legal aspects of death.

UG-FSC-401.3 Learn about various types of injuries and their medico-legal importance.

UG-FSC-401.4 Learn about the different methods of identification of living and dead.

### CO-PO Mapping Matrix for Course Code UG-FSC-401

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-401.1	2	3	3	2.5	2	2	3	
UG-FSC-401.2	3	3	2	2.5	2	3	2	
UG-FSC-401.3	2	3	3	3	2	2	3	
UG-FSC-401.4	3	3	2	3	2	3	2	
Average	2.5	3	2.5	2.75	2	2.5	2.5	

### CO-PSO Mapping Matrix for Course Code UG-FSC-401

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-401.1	3	3	3	2.5	2	
UG-FSC-401.2	3	2.5	3	3	3	
UG-FSC-401.3	2	3	3	2.5	2	
UG-FSC-401.4	2	2.5	3	3	3	
Average	2.5	2.75	3	2.75	2.5	

## UG-FSC-402: FORENSIC CHEMISTRY AND TOXICOLOGY

**Course Objectives:** To introduce students about the nature and analysis of evidence related to chemistry and toxicological importance in Forensics.

**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-402.1 Learn about the chemical tests that are being used in Forensic Chemistry.

UG-FSC-402.2 Understand about the general chemistry and analysis of legal and illegal alcoholic substances, evidence related to petroleum products and drugs of abuse, NDPS act.

UG-FSC-402.3 Learn about various types of methods for extraction of poisons.

UG-FSC-402.4 Learn about the medico legal aspects and analysis of different types of toxic substances related to crime like metallic poison, snake venom etc.

### CO-PO Mapping Matrix for Course Code UG-FSC-301

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-402.1	2	3	3	2.5	3	2	3	
UG-FSC-402.2	3	3	2	2.5	2	3	2	
UG-FSC-402.3	2	3	3	3	3	2	3	
UG-FSC-402.4	3	3	2	3	2	3	2	
Average	2.5	3	2.5	2.75	2.5	2.5	2.5	

<b>CO-PSO Mapping Matrix for Course Code UG-FSC-301</b>						
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>UG-FSC-402.1</b>		3	3	3	2.5	2
<b>UG-FSC-402.2</b>		3	2.5	2	3	3
<b>UG-FSC-402.3</b>		2	3	3	2.5	2
<b>UG-FSC-402.4</b>		2	2.5	2	3	3
<b>Average</b>		2.5	2.75	2.5	2.75	2.5

<b>UG-FSC-403: PRACTICALS</b>
<b>Course Objectives:</b> To identify handwriting characters and study natural variations in handwriting. To study alterations, obliterations and erasures in handwriting samples. This course will provide knowledge of various evidence found on crime scenes.
<b>Course Outcomes:</b> At the end of this course, the student will be able to: UG-FSC-403.1 Students can identify class and individual characteristics of handwriting. UG-FSC-403.2 Students can decipher secret writing and can examine the altered documents. UG-FSC-403.3 Students will be able to write a scientific report and interpret it. UG-FSC-403.4 Students can analyse blood spatter patterns and learn how to sketch scenes of crime.

<b>CO-PO Mapping Matrix for Course Code UG-FSC-403</b>								
<b>CO</b>	<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>
<b>UG-FSC-403.1</b>		2	3	3	2.5	3	2	3
<b>UG-FSC-403.2</b>		3	3	2	2.5	2	3	2
<b>UG-FSC-403.3</b>		2	3	3	3	3	2	3
<b>UG-FSC-403.4</b>		3	3	2	3	2	3	2
<b>Average</b>		2.5	3	2.5	2.75	2.5	2.5	2.5

<b>CO-PSO Mapping Matrix for Course Code UG-FSC-403</b>						
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
<b>UG-FSC-403.1</b>		3	3	3	2.5	2
<b>UG-FSC-403.2</b>		3	2.5	2	3	3
<b>UG-FSC-403.3</b>		2	3	3	2.5	2
<b>UG-FSC-403.4</b>		2	2.5	2	3	3
<b>Average</b>		2.5	2.75	2.5	2.75	2.5

<b>UG-FSC-501: FINGER PRINTS &amp; IMPRESSIONS</b>
<b>Course Objectives:</b> To Provide knowledge about fingerprints and their types with various chemical and instrumental techniques used in development and analysis of fingerprints and brief introduction of type of biometric and their application in forensic investigations.
<b>Course Outcomes:</b> At the end of this course, the student will be able to: UG-FSC-501.1 Learn the basics and classification of fingerprints. UG-FSC-501.2 Understand the basic principle, various types of instrumentation used in development of fingerprints. UG-FSC-501.3 Understand the basic principle and procedure of examination of fingerprints. UG-FSC-501.4 Learn about the biometric and their application in Forensic Science.

<b>CO-PO Mapping Matrix for Course Code UG-FSC-501</b>
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CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-501.1		3	3	3	2.5	2	3	3
UG-FSC-501.2		2	2.5	2	2.5	3	3	2
UG-FSC-501.3		3	3	3	3	2	3	3
UG-FSC-501.4		2	2.5	2	3	3	3	2
Average		2.5	2.75	2.5	2.75	2.5	3	2.5

**CO-PSO Mapping Matrix for Course Code UG-FSC-501**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-501.1		3	3	3	2.5	2
UG-FSC-501.2		3	2.5	2	3	3
UG-FSC-501.3		2	3	3	2.5	2
UG-FSC-501.4		2	2.5	2	3	3
Average		2.5	2.75	2.5	2.75	2.5

**UG-FSC-502: Analytical Techniques And Methods Used In Forensic Science - Ii**

**Course Objectives:** This paper aims to provide knowledge about various instrumental techniques used in Forensic science for analysis of various types of evidence.

**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-502.1 Learn the technique and handling of various types of biophysical techniques.

UG-FSC-502.2 Understand the basic principle, instrumentation and use of various types of chromatographic techniques.

UG-FSC-503.3 Understand the basic principle, instrumentation and use of various types of digestion techniques.

UG-FSC-504.4 Learn about the use of various analytical techniques and methods in forensic science examination.

**CO-PO Mapping Matrix for Course Code UG-FSC-502**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-502.1		2	3	3	2.5	3	3	3
UG-FSC-502.2		3	2	2	2.5	3	3	2
UG-FSC-502.3		2	3	3	3	3	3	3
UG-FSC-502.4		3	2	2	3	2	3	2
Average		2.5	2.5	2.5	2.75	2.75	3	2.5

**CO-PSO Mapping Matrix for Course Code UG-FSC-502**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-502.1		3	3	2.5	2.5	2
UG-FSC-502.2		3	2.5	2.5	3	3
UG-FSC-502.3		2	3	2.5	2.5	2
UG-FSC-502.4		2	2.5	2.5	3	3
Average		2.5	2.75	2.5	2.75	2.5

**UG-FSC-601: COMPUTER FORENSICS AND BIOMETRICS**

**Course Objectives:** To study the application of computers and the role of digital forensics and the

relationship of digital forensics to traditional forensic science, traditional science and the appropriate use of scientific methods.

**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-601.1 Learn about the fundamental aspects and scope of medical Jurisprudence, Legal procedure in criminal court.

UG-FSC-601.2 Understand about the medico-legal aspects of death.

UG-FSC-601.3 Learn about various types of injuries and their medico-legal importance.

UG-FSC-601.4 Learn about the different methods of identification of living and dead.

**CO-PO Mapping Matrix for Course Code UG-FSC-601**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-601.1		2	3	3	2.5	3	2	3
UG-FSC-601.2		3	3	2	2.5	2	3	2
UG-FSC-601.3		2	3	3	3	3	2	3
UG-FSC-601.4		3	3	2	3	2	3	2
<b>Average</b>		2.5	3	2.5	2.75	2.5	2.5	2.5

**CO-PSO Mapping Matrix for Course Code UG-FSC-601**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-601.1		3	3	3	2.5	2
UG-FSC-601.2		3	2.5	2	3	3
UG-FSC-601.3		2	3	3	2.5	2
UG-FSC-601.4		2	2.5	2	3	3
<b>Average</b>		2.5	2.75	2.5	2.75	2.5

**UG-FSC-602: Advanced Forensic Serology and DNA Forensics**

**Course Objectives:** A brief introduction of basic principles underlying modern applications of biology in forensic science. The course will explore the science of forensic biology, serology with laboratory tests that are used to investigate crimes involving DNA, blood, and other body fluids. Focuses on the issues related to DNA fingerprinting as well.

**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-602.1 Learn about Forensic Biology and its application in Forensic Science.

UG-FSC-602.2 Understanding the biological and serological evidences

UG-FSC-602.3 Obtain the knowledge about the preliminary and confirmatory examination of biological fluids..

UG-FSC-602.4 Learn about the medico legal aspects of various crimes i.e. rape, murder, assault etc

**CO-PO Mapping Matrix for Course Code UG-FSC-602**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-602.1		2	3	3	2.5	2.75	2	3
UG-FSC-602.2		3	3	2	2.5	2.75	3	2
UG-FSC-602.3		2	3	3	3	2.75	2	3
UG-FSC-602.4		3	3	2	3	2.75	3	2
<b>Average</b>		2.5	3	2.5	2.75	2.75	2.5	2.5

**CO-PSO Mapping Matrix for Course Code UG-FSC-602**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-602.1		3	3	2.5	2.5	2
UG-FSC-602.2		3	2.5	3	3	3
UG-FSC-602.3		2	3	2.5	2.5	2
UG-FSC-602.4		2	2.5	3	3	3
Average		2.5	2.75	2.75	2.75	2.5

### UG-FSC-603: PRACTICALS

**Course Objectives:** This paper aims to let students' deals with various types of cyber crimes and the handling and examination of cyber evidence. Students will also explore the analysis methods and instrumentation of various biological, serological and fingerprint evidence .

**Course Outcomes:** At the end of this course, the student will be able to:

UG-FSC-603.1 identifies type of cyber crime, analysis of cyber evidence.

UG-FSC-603.2 made to understand about the risks and measures in the cyber world.

UG-FSC-603.3 to examine and give opinion on fingerprints.

UG-FSC-603.4 to study and analyze biological evidences

#### CO-PO Mapping Matrix for Course Code UG-FSC-603

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
UG-FSC-603.1		2	3	3	2.5	2.5	2	3
UG-FSC-603.2		3	3	2	2.5	3	3	2
UG-FSC-603.3		2	3	3	3	2.5	2	3
UG-FSC-603.4		3	3	2	3	3	3	2
Average		2.5	3	2.5	2.75	2.75	2.5	2.5

#### CO-PSO Mapping Matrix for Course Code UG-FSC-603

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
UG-FSC-603.1		3	3	3	2.5	2
UG-FSC-603.2		3	2.5	3	3	3
UG-FSC-603.3		2	3	3	2.5	2
UG-FSC-603.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5



## DYAL SINGH COLLEGE, KARNAL

Name of the Programme: **M.Sc. Forensic Science 5yr Integrated (PG)**

**Duration (in years ) : 3(UG) + 2(PG)**

**Subject: Forensic Science**

<b>PROGRAMME OUTCOMES(POs)</b>		
PO1	Knowledge	Proficiency in demonstrating multidisciplinary knowledge gained during course of study
PO2	Communication	Proficiency to communicate effectively on general and scientific topics with the scientific community and with society at large
PO3	Dealing with problems	Will be able to think critically , analyze, to have rational and research-based knowledge including performing of experiments, analysis and interpretation of data from evidences to deduce opinion
PO4	Modern tool/Instrument usage	Ability to learn and use conventional and latest techniques, skills and modern tools/instruments for scientific practices
PO5	Science and Society	Ability to apply reasoning to assess the different issues related to society and the consequent responsibilities relevant to the professional scientific practices
PO6	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout the life
PO7	Ethics	Apply ethical principles and professional responsibilities in scientific and legal practices
PO8	Research	Ability to do research in various thrust areas of Forensic Science by applying knowledge gained through practical and minor research project.

<b>PROGRAMME SPECIFIC OUTCOMES (PSOs)</b>	
<b>The objective of the curriculum designed for M.Sc. 5yr Integrated (UG) with Forensic Science course is to develop professional, ethical graduates whose competence in problem-solving, legal analysis and application, quantitative reasoning, investigation and scientific laboratory procedures can be applied to immediate employment or advanced study.</b>	
PSO1	Students will gain knowledge of the basic knowledge of Forensic Science to be used in resolving criminal and civil cases.
PSO2	Students will be empowered with skills to identify, examine and evaluate the problems related to Forensic to solve the crime cases.
PSO3	Students will develop subject specific expertise in analytical and experimental work.
PSO4	Students will be capable of using research and experimental based knowledge and research methods in problem solving expertise and robust communication and Scientific inquiry skills with reference to Forensic Science.
PSO5	These students will come out as Forensic specialist youth with a thorough knowledge of Ethics and law with all recent developments and emerging trends in Forensic Science.
PSO6	Students will be skilled with excellence in Forensic Science so that they can make a career in teaching, research, industry and independent Forensic practices.

**PG-FSC-101: General Forensic Science**

**Course Objectives:** To Provide knowledge about the basics of the field of Forensic Science and familiarize students to crime scene management, including the basics of investigation, Documentation of Crime Scene and Basic Forensic Principles and Laws.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-101.1 Learn the different domains of forensic science.

PG-FSC-101.2 Understand about the history and background of Forensic Science.

PG-FSC-101.3 Describe reconstruction of scene of crime, basic principles of Crime Scene Documentation and its Importance.

PG-FSC-101.4 Learn about the ethical issues in forensic science.

**CO-PO Mapping Matrix for Course Code PG-FSC-101**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-101.1		3	3	3	3	2	3	3	2
PG-FSC-101.2		3	3	3	2	3	3	3	3
PG-FSC-101.3		3	3	3	3	2	3	3	2
PG-FSC-101.4		3	3	3	2	3	3	3	3
Average		3	3	3	2.5	2.5	3	3	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-101**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-101.1		3	3	3	3	2
PG-FSC-101.2		3	3	3	2	3
PG-FSC-101.3		3	3	3	3	2
PG-FSC-101.4		3	3	3	2	3
Average		3	3	3	2.5	2.5

**PG-FSC-102: Instrumental Analysis- I**

**Course Objectives:** To Provide knowledge about the basic analytical techniques which are used in examination and evaluation of evidences encountered in Forensic investigations.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-102.1 Understand about the principle and working of optical and electronic microscope.

PG-FSC-102.2 Obtain knowledge about the concept of different chromatographic techniques.

PG-FSC-102.3 Learn the basics of Spectroscopy, sources of radiation, their utility and limitations.

PG-FSC-102.4 Learn handling of different instruments and tools used in Forensic Science.

**CO-PO Mapping Matrix for Course Code PG-FSC-102**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-102.1		3	3	3	3	2	3	3	3
PG-FSC-102.2		2.5	3	3	2	3	3	2	2
PG-FSC-102.3		2.5	3	3	3	2	3	3	3
PG-FSC-102.4		3	3	3	2	3	3	2	2
Average		2.75	3	3	2.5	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-102**

PSO	PSO1	PSO2	PSO3	PSO4	PSO5
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<b>CO</b>					
PG-FSC-102.1	3	3	2.5	3	2
PG-FSC-102.2	2	3	2.5	2	3
PG-FSC-102.3	2	3	3	3	2
PG-FSC-102.4	3	3	3	2	3
Average	2.5	3	2.75	2.5	2.5

### **PG-FSC-103: Forensic Biology and Serology**

**Course Objectives:** The Paper aims to make students understand the Importance of biological material and its properties to aid in forensic investigations. The subject will also explore the learners regarding the analysis procedures of various evidences of related to animal or plant origin

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-103.1 Learn about the Biological Evidences, types and their Biological properties..

PG-FSC-103.2 Examine of biological evidence like biological fluids, hair, fibres, diatoms recovered from crime scenes.

PG-FSC-103.3 Understand the wildlife forensics and investigations in wildlife crimes.

PG-FSC-103.4 Learn about the entomology and its importance in PMI determination.

#### **CO-PO Mapping Matrix for Course Code PG-FSC-103**

<b>CO</b>	<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
PG-FSC-103.1		2.5	3	3	3	2	3	3	3
PG-FSC-103.2		2.5	3	2	3	3	3	3	2
PG-FSC-103.3		3	3	3	3	2	3	3	3
PG-FSC-103.4		3	3	2	3	3	3	3	2
Average		2.75	3	2.5	3	2.5	3	3	2.5

#### **CO-PSO Mapping Matrix for Course Code PG-FSC-103**

<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
PG-FSC-103.1		3	3	3	2.5	2
PG-FSC-103.2		2	2	3	2.5	3
PG-FSC-103.3		2	3	3	3	2
PG-FSC-103.4		3	2	3	3	3
Average		2.5	2.5	3	2.75	2.5

### **PG-FSC-104: Forensic Psychology and Statistics**

**Course Objectives:** The Paper aims to give introduction to the human behaviour and importance of psychological aspects in criminal trials and uses of statistics for veritable reporting of findings..

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-104.1 Learn the general principles of Forensic Psychology.

PG-FSC-104.2 made skilled in conducting tests of interrogations like polygraph test and brain mapping



etc.

PG-FSC-104.3 Exposed to Statistics Principles and their implementation in Forensics.

PG-FSC-104.4 Learn about the research methodology, sampling methods, statistical analysis of data

**CO-PO Mapping Matrix for Course Code PG-FSC-104**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
PG-FSC-104.1		2.5	2	3	2	2	3	3
PG-FSC-104.2		2.5	2	2	2	3	3	2
PG-FSC-104.3		3	2	3	2	2	3	3
PG-FSC-104.4		3	2	2	2	3	3	2
Average		2.75	2	2.5	2	2.5	3	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-104**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-104.1		3	3	3	2.5	2
PG-FSC-104.2		2	2	3	2.5	3
PG-FSC-104.3		2	3	3	3	2
PG-FSC-104.4		3	2	3	3	3
Average		2.5	2.5	3	2.75	2.5

**PG-FSC-105: PRACTICAL(Based on Papers PG-FSC 101 & PG-FSC 102)**

**Course Objectives:** To Provide practical knowledge to students about the crime scene investigation and reconstruction, polygraph test and chromatographic techniques.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-105.1 Learn the examination of different Crime Scenes and their Management.

PG-FSC-105.2 Understand the importance of Collection & Packaging Procedure and Chain of Custody

PG-FSC-105.3 Students will be exposed to different types of Microscopes and their handling.

PG-FSC-105.4 Understand the Report writing of a crime scene.

**CO-PO Mapping Matrix for Course Code PG-FSC-105**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
PG-FSC-105.1		2.5	2	3	3	2	3	3
PG-FSC-105.2		2.5	2	2	3	3	3	2
PG-FSC-105.3		3	2	3	3	2	3	3
PG-FSC-105.4		3	2	2	3	3	3	2
Average		2.75	2	2.5	3	2.5	3	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-105**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-105.1		3	3	3	2.5	2
PG-FSC-105.2		2.5	2.5	3	3	3
PG-FSC-105.3		2.5	3	3	2.5	2
PG-FSC-105.4		3	2.5	3	3	3

Average	2.75	2.75	3	2.75	2.5	
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**PG-FSC-106: PG-FSC-105: PRACTICAL(Based on Papers PG-FSC 103 & PG-FSC 104)**

**Course Objectives:** The Paper aims to make students aware of Biological evidence , their Importance and examination procedure.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-106.1 Learn about practical knowledge on Forensic analysis of biological samples like hair, fibres etc. for personal identification.

PG-FSC-106.2 Identify and examine botanical evidence of Forensic interest.

PG-FSC-106.3 Examine Biological Fluids.

PG-FSC-106.4 Learn about the use of various analytical techniques and methods used in forensic Biology.

**CO-PO Mapping Matrix for Course Code PG-FSC-106**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-106.1		3	3	3	2.5	2	3	3	3
PG-FSC-106.2		3	3	2	2.5	3	3	2	2
PG-FSC-106.3		3	3	3	3	2	3	3	3
PG-FSC-106.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-106**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-106.1		3	3	3	2.5	2
PG-FSC-106.2		3	2.5	3	3	3
PG-FSC-106.3		2	3	3	2.5	2
PG-FSC-106.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

**PG-FSC-201: FORENSIC CHEMISTRY AND TOXICOLOGY**

**Course Objectives:** The Paper aims to make students aware about the importance and analysis of toxicological and chemical evidences.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-102.1 Learn about the analysis of alcohol and non-alcoholic beverages.

PG-FSC-102.2 Learn about the analysis of trace evidences and petroleum products.

PG-FSC-102.3 Introduction to drugs of abuse and the legal perspective of NDPS Act.

PG-FSC-102.4 Learn about the different kinds of poisons followed by the pharmacokinetics.

**CO-PO Mapping Matrix for Course Code PG-FSC-201**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
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PG-FSC-102.1	3	3	3	2.5	2	3	3	3
PG-FSC-102.2	3	3	2	2.5	3	3	2	2
PG-FSC-102.3	3	3	3	3	2	3	3	3
PG-FSC-102.4	3	3	2	3	3	3	2	2
Average	3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-201**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-102.1	3	3	3	2.5	2	
PG-FSC-102.2	3	2.5	3	3	3	
PG-FSC-102.3	2	3	3	2.5	2	
PG-FSC-102.4	2	2.5	3	3	3	
Average	2.5	2.75	3	2.75	2.5	

**PG-FSC-202: INSTRUMENTAL ANALYSIS-II**

**Course Objectives:** The Paper aims to make students aware about the different biochemical and immunochemical techniques used in Forensic DNA analysis

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-202.1 Learn about isolation of DNA and RNA with the process of amplification.

PG-FSC-202.2 Learn about the concept of antigen-antibody interaction with techniques like ELISA and RIA.

PG-FSC-202.3 Learn about the various biophysical techniques like electrophoresis and centrifugation. .

PG-FSC-202.4 Learn about the enzyme kinetics.

**CO-PO Mapping Matrix for Course Code PG-FSC-202**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-202.1	3	3	3	2.5	2	3	3	3	
PG-FSC-202.2	3	3	2	2.5	3	3	2	2	
PG-FSC-202.3	3	3	3	3	2	3	3	3	
PG-FSC-202.4	3	3	2	3	3	3	2	2	
Average	3	3	2.5	2.75	2.5	3	2.5	2.5	

**CO-PSO Mapping Matrix for Course Code PG-FSC-202**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-202.1	3	3	3	2.5	2	
PG-FSC-202.2	3	2.5	3	3	3	
PG-FSC-202.3	2	3	3	2.5	2	
PG-FSC-202.4	2	2.5	3	3	3	
Average	2.5	2.75	3	2.75	2.5	



**PG-FSC-203: QUESTIONED DOCUMENT EXAMINATION**

**Course Objectives:** The Paper aims to make students aware about the nature of examination performed in the field of Questioned Documents.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-203.1 Learn about principles of handwriting and the different features associated with it.

PG-FSC-203.2 Examination and methods of alterations, obliterations performed in case of suspected documents.

PG-FSC-203.3 Study about the Presentation of Expert evidence in court of law.

PG-FSC-203.4 Learn about the examination of seal, stamp and counterfeit currency.

**CO-PO Mapping Matrix for Course Code PG-FSC-203**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-203.1	3	3	3	2.5	2	3	3	3	3
PG-FSC-203.2	3	3	2	2.5	3	3	2	2	2
PG-FSC-203.3	3	3	3	3	2	3	3	3	3
PG-FSC-203.4	3	3	2	3	3	3	2	2	2
Average	3	3	2.5	2.75	2.5	3	2.5	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-203**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-203.1	3	3	3	2.5	2	2
PG-FSC-203.2	3	2.5	3	3	3	3
PG-FSC-203.3	2	3	3	2.5	2	2
PG-FSC-203.4	2	2.5	3	3	3	3
Average	2.5	2.75	3	2.75	2.5	2.5

**PG-FSC-204: FORENSIC MEDICINE AND ANTHROPOLOGY**

**Course Objectives:** The Paper aims to make students aware about the medical knowledge required to establish the cause of death and identification of human remains on the basis of skeletal remains.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-204.1 Learn about the characteristics and causes of death with estimation of time since death.

PG-FSC-204.2 Study about the medico legal importance of various injuries.

PG-FSC-204.3 Study of determination of age, sex and stature from skeletal remains.

PG-FSC-204.4 Learn about the techniques of personal identification.

**CO-PO Mapping Matrix for Course Code PG-FSC-204**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-204.1	3	3	3	2.5	2	3	3	3	3
PG-FSC-204.2	3	3	2	2.5	3	3	2	2	2
PG-FSC-204.3	3	3	3	3	2	3	3	3	3
PG-FSC-204.4	3	3	2	3	3	3	2	2	2
Average	3	3	2.5	2.75	2.5	3	2.5	2.5	2.5

<b>CO-PSO Mapping Matrix for Course Code PG-FSC-204</b>						
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
PG-FSC-204.1		3	3	3	2.5	2
PG-FSC-204.2		3	2.5	3	3	3
PG-FSC-204.3		2	3	3	2.5	2
PG-FSC-204.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

<b>PG-FSC- PG-FSC-205: BASICS OF FORENSIC SCIENCE (OPEN ELECTIVE)</b>									
<b>Course Objectives:</b> The Paper aims to make students aware									
<b>Course Outcomes:</b> At the end of this course, the student will be able to:									
PG-FSC-205.1 Learn about the history, development and need of forensic science.									
PG-FSC-205.2 Study about the basics of the science of fingerprinting.									
PG-FSC-205.3 Learn about the importance of forensic physics and the examination of evidences related to it. Study about the handling and examination of various types of chemical and toxicological evidences.									
PG-FSC-205.4 Learn about the concepts of serological analysis and DNA fingerprinting.									
<b>CO-PO Mapping Matrix for Course Code PG-FSC-205</b>									
<b>CO</b>	<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
PG-FSC-205.1		3	3	3	2.5	2	3	3	3
PG-FSC-205.2		3	3	2	2.5	3	3	2	2
PG-FSC-205.3		3	3	3	3	2	3	3	3
PG-FSC-205.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5
<b>CO-PSO Mapping Matrix for Course Code PG-FSC-205</b>									
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>			
PG-FSC-205.1		3	3	3	2.5	2			
PG-FSC-205.2		3	2.5	3	3	3			
PG-FSC-205.3		2	3	3	2.5	2			
PG-FSC-205.4		2	2.5	3	3	3			
Average		2.5	2.75	3	2.75	2.5			

**PG-FSC-207: PRACTICAL(Based on Papers PG-FSC-201 & PG-FSC-202)**

**Course Objectives:** The Paper aims to make students aware about the laboratory analysis of chemicals and toxicological evidences.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-207.1 Learn about practical knowledge on chemical analysis of phenolphthalein in trap cases.

PG-FSC-207.2 Learn about the preliminary and confirmatory analysis of metallic poisons

PG-FSC-207.3 Separation of drugs based on TLC method

PG-FSC-207.4 Examination and evaluation of estimation of ethanol.

**CO-PO Mapping Matrix for Course Code PG-FSC-207**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-207.1		3	3	3	2.5	2	3	3	3
PG-FSC-207.2		3	3	2	2.5	3	3	2	2
PG-FSC-207.3		3	3	3	3	2	3	3	3
PG-FSC-207.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-207**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-207.1		3	3	3	2.5	2
PG-FSC-207.2		3	2.5	3	3	3
PG-FSC-207.3		2	3	3	2.5	2
PG-FSC-207.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

**PG-FSC-208: PRACTICAL(Based on Papers PG-FSC-203 & PG-FSC-204)**

**Course Objectives:** The Paper aims to make students aware of practical knowledge regarding examination of questioned documents and skeletal analysis.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-208.1 Learn about practical knowledge on normal and disguised handwriting.

PG-FSC-208.2 Detection of different types of forgeries.

PG-FSC-208.3 Examine printed and indented handwriting.

PG-FSC-208.4 Learn about the determination of sex from skull and pelvis and stature determination from long bones.

**CO-PO Mapping Matrix for Course Code PG-FSC-208**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-208.1		3	3	3	2.5	2	3	3	3
PG-FSC-208.2		3	3	2	2.5	3	3	2	2
PG-FSC-208.3		3	3	3	3	2	3	3	3
PG-FSC-208.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5



<b>CO-PSO Mapping Matrix for Course Code PG-FSC-208</b>						
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
PG-FSC-208.1		3	3	3	2.5	2
PG-FSC-208.2		3	2.5	3	3	3
PG-FSC-208.3		2	3	3	2.5	2
PG-FSC-208.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

**PG-FSC- PG-FSC-301: FORENSIC BALLISTICS AND EXPLOSIVES**

**Course Objectives:** The Paper aims to make students aware of nature and scientific examination of evidences of firearms and ammunition.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-301.1 Learn about the history, classification and characteristics of firearms and ammunitions.

PG-FSC-301.2 Study about the basics of the forensic ballistics and measurements of trajectory parameters.

PG-FSC-301.3 Learn about firearm injuries. Firearms and ammunition linkage with the crime scene. Reconstruction of shooting incidence.

PG-FSC-301.4 Learn about explosives and their classification, types and composition.

<b>CO-PO Mapping Matrix for Course Code PG-FSC-301</b>									
<b>CO</b>	<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
PG-FSC-301.1		3	3	3	2.5	2	3	3	3
PG-FSC-301.2		3	3	2	2.5	3	3	2	2
PG-FSC-301.3		3	3	3	3	2	3	3	3
PG-FSC-301.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5

<b>CO-PSO Mapping Matrix for Course Code PG-FSC-301</b>						
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
PG-FSC-301.1		3	3	3	2.5	2
PG-FSC-301.2		3	2.5	3	3	3
PG-FSC-301.3		2	3	3	2.5	2
PG-FSC-301.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

**PG-FSC- PG-FSC-302: COMPUTER FORENSIC AND RECENT ADVANCES**

**Course Objectives:** The Paper aims to make students aware of various computer and internet related crimes.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-302.1 Learn about the basis of computer and types of computer crimes.

PG-FSC-302.2 Study about various cyber crimes and investigation of cyber crimes.

PG-FSC-302.3 Fundamental of Computer Security and recent advances in computer forensics. Reconstruction of shooting incidence.

PG-FSC-302.4 Learn about Quality Management (ISO/ IEC-17025, NABL) explosives and their classification, types and composition.

PG-FSC-302.5 Learn about different types of biometric tools.

PG-FSC-302.6 Learn about Intellectual property right and IT act 2000.

**CO-PO Mapping Matrix for Course Code PG-FSC-302**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-302.1		3	3	3	2.5	2	3	3	3
PG-FSC-302.2		3	3	2	2.5	3	3	2	2
PG-FSC-302.3		3	3	3	3	2	3	3	3
PG-FSC-302.4		3	3	2	3	3	3	2	2
PG-FSC-302.5		3	3	3	3	3	3	3	3
PG-FSC-302.6		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-302**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-302.1		3	3	3	2.5	2
PG-FSC-302.2		3	2.5	3	3	3
PG-FSC-302.3		2	3	3	2.5	2
PG-FSC-302.4		2	2.5	3	3	3
PG-FSC-302.5						
PG-FSC-302.6						
Average		2.5	2.75	3	2.75	2.5

**PG-FSC- PG-FSC-303: DNA PROFILING**

**Course Objectives:** To introduce students about the basic concepts of DNA fingerprinting and issues related to examination of evidences submitted in criminal cases.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-303.1 Learn about the Human chromosomes and karyotype and Forensic DNA Profiling.

PG-FSC-303.2 Study about basic Genotyping VNTR, STR, SNPs polymorphism

PG-FSC-303.3 Learn about the Methods of DNA profiling and gender identification.

PG-FSC-303.4 Learn about DNA Amplification (PCR) and blotting techniques.

PG-FSC-303.5 Learn about DNA sample preparation and Nucleic acid hybridization techniques.

PG-FSC-303.6 Learn about forensic issues regarded DNA issues.

**CO-PO Mapping Matrix for Course Code PG-FSC-303**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-303.1		3	3	3	2.5	2	3	3	3
PG-FSC-303.2		3	3	2	2.5	3	3	2	2
PG-FSC-303.3		3	3	3	3	2	3	3	3
PG-FSC-303.4		3	3	2	3	3	3	2	2
PG-FSC-303.5		3	3	3	3	3	3	3	3
PG-FSC-303.6		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5

CO-PSO Mapping Matrix for Course Code PG-FSC-303						
CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-303.1		3	3	3	2.5	2
PG-FSC-303.2		3	2.5	3	3	3
PG-FSC-303.3		2	3	3	2.5	2
PG-FSC-303.4		2	2.5	3	3	3
PG-FSC-303.5						
PG-FSC-303.6						
Average		2.5	2.75	3	2.75	2.5

**PG-FSC- PG-FSC-304: ADVANCES IN FORENSIC CHEMISTRY –I**

**Course Objectives:** The Paper aims to make students aware of alcoholic products, adulteration in petroleum etc and detailed analysis of evidences related to Forensic chemistry

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-304.1 Learn about the descriptive analysis of different adulterants in liquors used in Forensic Chemistry.

PG-FSC-304.2 Study about detailed process of extraction and isolation of drugs/ poisons from samples related to forensic toxicology.

PG-FSC-304.3 Learn about the recent methods of sample extraction from body fluids.

PG-FSC-304.4 Learn about Analysis of gold & other metals in cheating cases.

CO-PO Mapping Matrix for Course Code PG-FSC-304									
CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-304.1		3	3	3	2.5	2	3	3	3
PG-FSC-304.2		3	3	2	2.5	3	3	2	2
PG-FSC-304.3		3	3	3	3	2	3	3	3
PG-FSC-304.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5

CO-PSO Mapping Matrix for Course Code PG-FSC-304						
CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-304.1		3	3	3	2.5	2
PG-FSC-304.2		3	2.5	3	3	3
PG-FSC-304.3		2	3	3	2.5	2
PG-FSC-304.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

**PG-FSC- PG-FSC-305: ADVANCES IN FORENSIC BIOLOGY- I**

**Course Objectives:** The Paper aims to make students aware of basics of biological material and its properties to aid in forensic investigations.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-305.1 Learn about the insect development and geographical distribution for assistance in estimating the time since death and locating the probable crime scene.

PG-FSC-305.2 Study about analysis of various evidences of animal or plant origin.

PG-FSC-305.3 Learn about information of poaching and hunting of protected animal species and trade in international market.

PG-FSC-305.4 Learn about wildlife forensics.

**CO-PO Mapping Matrix for Course Code PG-FSC-305**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-305.1		3	3	3	2.5	2	3	3	3
PG-FSC-305.2		3	3	2	2.5	3	3	2	2
PG-FSC-305.3		3	3	3	3	2	3	3	3
PG-FSC-305.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-305**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-305.1		3	3	3	2.5	2
PG-FSC-305.2		3	2.5	3	3	3
PG-FSC-305.3		2	3	3	2.5	2
PG-FSC-305.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

**PG-FSC- PG-FSC-306: METHODS OF SOLVING FORENSIC CASES (OPEN ELECTIVE)**

**Course Objectives:** The Paper aims to introduce the students with the various methods which are being used in Forensic Investigations

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-306.1 Learn about various Forensic examinations conducted in the laboratories.

PG-FSC-306.2 Study about better implementation of scientific principles in criminal cases.

PG-FSC-306.3 Learn about methods of personal identification and their importance.

PG-FSC-306.4 Learn about forensic odontology, forensic medicine and writing examination.

**CO-PO Mapping Matrix for Course Code PG-FSC-306**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-306.1		3	3	3	2.5	2	3	3	3
PG-FSC-306.2		3	3	2	2.5	3	3	2	2
PG-FSC-306.3		3	3	3	3	2	3	3	3
PG-FSC-306.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-306**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-306.1		3	3	3	2.5	2
PG-FSC-306.2		3	2.5	3	3	3
PG-FSC-306.3		2	3	3	2.5	2
PG-FSC-306.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

**PG-FSC-307: PRACTICAL(Based on Papers PG-FSC-301 & PG-FSC-302 & PG-FSC-303)**



**Course Objectives:** The Paper aims to make students aware about the laboratory analysis of firearms and ammunitions.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-307.1 Learn about practical knowledge on fired bullets and cartridge cases.

PG-FSC-307.2 Learn to determine range of firing and examination of Firearms injuries.

PG-FSC-307.3 Identification of explosives by TLC methods

PG-FSC-307.4 Learn about Image processing using various tools and phishing case report.

PG-FSC-307.5 Learn about the preparation of human karyotype and extraction of DNA from body fluids.

**CO-PO Mapping Matrix for Course Code PG-FSC-307**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-307.1	3	3	3	2.5	2	3	3	3	3
PG-FSC-307.2	3	3	2	2.5	3	3	2	2	2
PG-FSC-307.3	3	3	3	3	2	3	3	3	3
PG-FSC-307.4	3	3	2	3	3	3	2	2	2
PG-FSC-307.5	3	3	2	3	2	3	3	3	3
Average	3	3	2.5	2.75	2.5	3	2.5	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-307**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-307.1	3	3	3	2.5	2	
PG-FSC-307.2	3	2.5	3	3	3	
PG-FSC-307.3	2	3	3	2.5	2	
PG-FSC-307.4	2	2.5	3	3	3	
PG-FSC-307.5	3	2.5	3	2.5	2	
Average	2.5	2.75	3	2.75	2.5	

**PG-FSC-308: PRACTICAL(Based on Paper PG-FSC-304)**

**Course Objectives:** The Paper aims to make students aware about the laboratory analysis of alcohol and poisons.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-308.1 Learn about practical knowledge on fired Analysis of alcoholic liquor and gasoline as per BIS specifications.

PG-FSC-308.2 Learn to determine range methanol and ethanol in alcoholic liquors and metallic poisons in viscera.

PG-FSC-308.3 Learn about Qualitative Analysis of explosion residues.

PG-FSC-308.4 Learn about extraction of acidic and basic drugs and pesticides from viscera.

**CO-PO Mapping Matrix for Course Code PG-FSC-308**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-308.1	3	3	3	2.5	2	3	3	3	3
PG-FSC-308.2	3	3	2	2.5	3	3	2	2	2
PG-FSC-308.3	3	3	3	3	2	3	3	3	3
PG-FSC-308.4	3	3	2	3	3	3	2	2	2
Average	3	3	2.5	2.75	2.5	3	2.5	2.5	2.5

<b>CO-PSO Mapping Matrix for Course Code PG-FSC-308</b>						
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>
PG-FSC-308.1		3	3	3	2.5	2
PG-FSC-308.2		3	2.5	3	3	3
PG-FSC-308.3		2	3	3	2.5	2
PG-FSC-308.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

<b>PG-FSC-309: PRACTICAL(Based on Paper PG-FSC-305)</b>									
<b>Course Objectives:</b> The Paper aims to make students aware about the measurement of human body and skeleton.									
<b>Course Outcomes:</b> At the end of this course, the student will be able to: PG-FSC-309.1 Learn to determine age from skull sutures and teeth. PG-FSC-309.2 Learn to determine sex from pelvis and skull. PG-FSC-309.3 Learn To Perform osteometric measurements on Long bones and craniometric measurement of skull and somatometric measurement on living. PG-FSC-309.4 Learn to identify various body fluids and fibres and hair.									
<b>CO-PO Mapping Matrix for Course Code PG-FSC-309</b>									
<b>CO</b>	<b>PO</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>
PG-FSC-309.1		3	3	3	2.5	2	3	3	3
PG-FSC-309.2		3	3	2	2.5	3	3	2	2
PG-FSC-309.3		3	3	3	3	2	3	3	3
PG-FSC-309.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5
<b>CO-PSO Mapping Matrix for Course Code PG-FSC-309</b>									
<b>CO</b>	<b>PSO</b>	<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>	<b>PSO5</b>			
PG-FSC-309.1		3	3	3	2.5	2			
PG-FSC-309.2		3	2.5	3	3	3			
PG-FSC-309.3		2	3	3	2.5	2			
PG-FSC-309.4		2	2.5	3	3	3			
Average		2.5	2.75	3	2.75	2.5			

**PG-FSC- 401: FORENSIC PHYSICS**

**Course Objectives:** The Paper aims to study the types, nature and examination of physical evidences of Forensic importance.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-401.1 Learn about the tools marks and their examination and restoration of obliterated marks.

PG-FSC-401.2 Study about the types of glass and their composition and forensic examinations of glass fractures

PG-FSC-401.3 Types of paint and their composition and also types of fibres and forensic aspects of fibre examination.

PG-FSC-401.4 Learn theory of voice production and its identification and methods of voice comparison.

**CO-PO Mapping Matrix for Course Code PG-FSC-401**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-401.1	3	3	3	2.5	2	3	3	3	3
PG-FSC-401.2	3	3	2	2.5	3	3	2	2	2
PG-FSC-401.3	3	3	3	3	2	3	3	3	3
PG-FSC-401.4	3	3	2	3	3	3	2	2	2
Average	3	3	2.5	2.75	2.5	3	2.5	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-401**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-401.1	3	3	3	2.5	2	
PG-FSC-401.2	3	2.5	3	3	3	
PG-FSC-401.3	2	3	3	2.5	2	
PG-FSC-401.4	2	2.5	3	3	3	
Average	2.5	2.75	3	2.75	2.5	

**PG-FSC- PG-FSC-402: FORENSIC DACTYLOGRAPHY AND OTHER IMPRESSIONS**

**Course Objectives:** The Paper aims to make students learn about fingerprints and various methods for the development of latent prints.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-402.1 Learn about the basis of development and morphology of ridged skin, types, and finger prints

PG-FSC-402.2 Study about searching and collection of prints samples of living and deads, and various material for recording prints.

PG-FSC-402.3 Learn different classification system, Henry system of classification and its extension and single digit finger print classification.

PG-FSC-402.4 Learn various methods of development of fingerprints: Physical methods, chemical methods and Biological methods of development of latent prints on skin.

PG-FSC-402.5 Learn about Automatic Finger Print Identification system (AFIS) and its variants, digital Image processing of finger prints and their enhancement.

PG-FSC-402.6 Learn about various other impressions such as tyre impressions and other prints such as lip print and ear print.

**CO-PO Mapping Matrix for Course Code PG-FSC-402**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
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PG-FSC-402.1	3	3	3	2.5	2	3	3	3
PG-FSC-402.2	3	3	2	2.5	3	3	2	2
PG-FSC-402.3	3	3	3	3	2	3	3	3
PG-FSC-402.4	3	3	2	3	3	3	2	2
PG-FSC-402.5	3	3	3	3	3	3	3	3
PG-FSC-402.6	3	3	2	3	3	3	2	2
Average	3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-402**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-402.1	3	3	3	2.5	2	
PG-FSC-402.2	3	2.5	3	3	3	
PG-FSC-402.3	2	3	3	2.5	2	
PG-FSC-402.4	2	2.5	3	3	3	
PG-FSC-402.5						
PG-FSC-402.6						
Average	2.5	2.75	3	2.75	2.5	

**PG-FSC- PG-FSC-403: ADVANCES IN FORENSIC CHEMISTRY II**

**Course Objectives:** To introduce students about the basic and detailed analysis of narcotic and Psychotropic substances and plants alkaloids.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-403.1 Learn about the Narcotic Drugs and Psychotropic Substances

PG-FSC-403.2 Study about basics and analysis of Opiate, cannabis, Barbiturates, Benzodiazepines etc.

PG-FSC-403.3 Learn about the different types of plant alkaloids.

PG-FSC-403.4 Learn about identification and analysis of different plant poisons.

PG-FSC-403.5 Learn about how to use sophisticated techniques for analysis of different poisons.

**CO-PO Mapping Matrix for Course Code PG-FSC-403**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-403.1	3	3	3	2.5	2	3	3	3	
PG-FSC-403.2	3	3	2	2.5	3	3	2	2	
PG-FSC-403.3	3	3	3	3	2	3	3	3	
PG-FSC-403.4	3	3	2	3	3	3	2	2	
PG-FSC-403.5	3	3	3	3	3	3	3	3	
Average	3	3	2.5	2.75	2.5	3	2.5	2.5	

**CO-PSO Mapping Matrix for Course Code PG-FSC-403**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-403.1	3	3	3	2.5	2	
PG-FSC-403.2	3	2.5	3	3	3	
PG-FSC-403.3	2	3	3	2.5	2	
PG-FSC-403.4	2	2.5	3	3	3	
PG-FSC-403.5	3	2.5	3	2.5	2	



Average	2.5	2.75	3	2.75	2.5	
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**PG-FSC- PG-FSC-404: ADVANCES IN FORENSIC BIOLOGY- II**

**Course Objectives:** The Paper aims to make students aware of basics of biological fluids and the immunological responses of the body and their application in forensic examination.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-404.1 Learn about immune response, acquired immunity, antigens and antisera.

PG-FSC-404.2 Study about Lectins and their Forensic significance and various method of sterilization.

PG-FSC-404.3 Learn about HLA system, Its applications in paternity testing.

PG-FSC-404.4 Learn about Individualization through various body fluids (Blood Grouping, seminal fluid saliva, urine, faecal matter, vaginal secretions)

**CO-PO Mapping Matrix for Course Code PG-FSC-404**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-404.1	3	3	3	3	2.5	2	3	3	3
PG-FSC-404.2	3	3	3	2	2.5	3	3	2	2
PG-FSC-404.3	3	3	3	3	3	2	3	3	3
PG-FSC-404.4	3	3	3	2	3	3	3	2	2
Average	3	3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-404**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-404.1	3	3	3	3	2.5	2
PG-FSC-404.2	3	3	2.5	3	3	3
PG-FSC-404.3	2	3	3	3	2.5	2
PG-FSC-404.4	2	3	2.5	3	3	3
Average	2.5	2.75	3	3	2.75	2.5

**PG-FSC-405: PRACTICAL(Based on Papers PG-FSC-401 & PG-FSC-402)**

**Course Objectives:** The Paper aims to make students aware about the laboratory analysis of various Physical Evidences.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-405.1 Learn about Physical and chemical examination of paints.

PG-FSC-405.2 Learn density gradients method for soil, paint and glass.

PG-FSC-405.3 Collection of plain and rolled inked fingerprints and identification of patterns

PG-FSC-405.4 Learn about various developing methods of fingerprint and their analysis.

PG-FSC-405.5 Learn casting of foot wear/ tyre impression mark and their comparison.

**CO-PO Mapping Matrix for Course Code PG-FSC-405**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-405.1	3	3	3	3	2.5	2	3	3	3
PG-FSC-405.2	3	3	3	2	2.5	3	3	2	2
PG-FSC-405.3	3	3	3	3	3	2	3	3	3
PG-FSC-405.4	3	3	3	2	3	3	3	2	2

PG-FSC-405.5	3	3	2	3	2	3	3	3
Average	3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-405**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-405.1	3	3	3	3	2.5	2
PG-FSC-405.2	3	2.5	3	3	3	3
PG-FSC-405.3	2	3	3	3	2.5	2
PG-FSC-405.4	2	2.5	3	3	3	3
PG-FSC-405.5	3	2.5	3	3	2.5	2
Average	2.5	2.75	3	3	2.75	2.5

**PG-FSC-406: PRACTICAL(Based on Paper PG-FSC-403)**

**Course Objectives:** The Paper aims to make students aware about the laboratory analysis of drugs..

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-406.1 Learn identification of Narcotic Drugs and Psychotropic substances

PG-FSC-406.2 Learn analysis of barbiturates, benzodiazepine and amphetamines using UV/Vis spectrophotometer

PG-FSC-406.3 Learn Identification of vegetable poisons through microscopy.

PG-FSC-406.4 Learn systematic analysis of plant poisons.

**CO-PO Mapping Matrix for Course Code PG-FSC-406**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-406.1	3	3	3	2.5	2	3	3	3	3
PG-FSC-406.2	3	3	2	2.5	3	3	2	2	2
PG-FSC-406.3	3	3	3	3	2	3	3	3	3
PG-FSC-406.4	3	3	2	3	3	3	2	2	2
Average	3	3	2.5	2.75	2.5	3	2.5	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-406**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-406.1	3	3	3	3	2.5	2
PG-FSC-406.2	3	2.5	3	3	3	3
PG-FSC-406.3	2	3	3	3	2.5	2
PG-FSC-406.4	2	2.5	3	3	3	3
Average	2.5	2.75	3	3	2.75	2.5

**PG-FSC-407: PRACTICAL(Based on Paper PG-FSC-404)**

**Course Objectives:** The Paper aims to make students aware about different types of body fluids and their analysis and also about DNA analysis.

**Course Outcomes:** At the end of this course, the student will be able to:

PG-FSC-407.1 Learn test for species of origin determination.

PG-FSC-407.2 Learn to determine blood group from stains of blood and various body fluids.

PG-FSC-407.3 Learn to Extraction and isolation of DNA from blood and other body fluids.


PG-FSC-407.4 Learn examination of hair of different animals as cat, dog, cow, horse and goat.

**CO-PO Mapping Matrix for Course Code PG-FSC-407**

CO	PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
PG-FSC-407.1		3	3	3	2.5	2	3	3	3
PG-FSC-407.2		3	3	2	2.5	3	3	2	2
PG-FSC-407.3		3	3	3	3	2	3	3	3
PG-FSC-407.4		3	3	2	3	3	3	2	2
Average		3	3	2.5	2.75	2.5	3	2.5	2.5

**CO-PSO Mapping Matrix for Course Code PG-FSC-407**

CO	PSO	PSO1	PSO2	PSO3	PSO4	PSO5
PG-FSC-407.1		3	3	3	2.5	2
PG-FSC-407.2		3	2.5	3	3	3
PG-FSC-407.3		2	3	3	2.5	2
PG-FSC-407.4		2	2.5	3	3	3
Average		2.5	2.75	3	2.75	2.5

  
Principal  
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