SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

M.Sc. Forensic Science SEM II

Course Type	Course Code	Course Title	Teaching-Learning Scheme L-P-T	Total Notional Hours	Course credits
DSC	**P2S02NCFSC01**	Finger Prints & Law (Criminal Justice System)	4-0-1	**120**	04

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

- **CLO 1: Understand and explain** the history, development, formation, classification, recording, and comparison of fingerprints, including ridge characteristics, poroscopy, edgeoscopy, ridge counting, and ridge tracing.
- **CLO 2: Apply forensic fingerprint examination techniques** for the detection, development, preservation, photography, lifting, and analysis of latent, visible, plastic, and chance fingerprints using conventional and advanced methods.
- **CLO 3: Analyse and utilize modern fingerprint identification systems** including Henry Classification System, Fingerprint Bureau procedures, AFIS, NCIC, biometric recognition systems, artificial intelligence, and advanced imaging technologies in forensic investigations.
- **CLO 4: Interpret and apply relevant provisions of criminal laws and evidentiary statutes** related to forensic science, including the Indian Evidence Act, Criminal Procedure Code, Indian Penal Code, and provisions governing digital evidence.
- **CLO 5: Evaluate the role of forensic science within the Criminal Justice System**, including the application of special laws related to explosives, wildlife and environmental protection, poisons, and the functioning of prison and correctional systems in criminal investigations and administration of justice.

Unit	Course Content	Learning Pedagogies	CLO(s)
I	History and development of fingerprints, formation of ridges, composition of sweat, poroscopy, edgeoscopy, pattern area, ridge tracing, ridge counting, taking of fingerprints and palm prints from living and dead person, post mortem fingerprinting, forgery of fingerprints. Preserving and lifting of fingerprints, basis of comparison, individual characteristics, various types of ridge characteristics.	Classroom Lectures Seminars Problem-Based Learning Self-Directed Learning ICT-Enabled Learning (Digital Resources)	CLO1
II	Search of fingerprint, Chance fingerprint, latent and visible fingerprint, plastic fingerprints, development of latent fingerprint, conventional methods of development of fingerprints- fluorescent methods, magnetic powder method, fuming method, chemical method, etc., digital imaging and enhancement, photography of fingerprints, Touchless Fingerprint Recognition, application of laser and other radiations to develop latent fingerprints, metal deposition method and development of latent prints of skin, Advanced chemical imaging and nanotechnology.	Classroom Lectures Experiential learning Problem-Based Learning Self-Directed Learning ICT-Enabled Learning (Digital Resources)	CLO2

III	Classification of fingerprints for the comparison purpose and recording purpose- symbols, numerical values, primary classification, secondary classification, subdivision and classification by ridge tracing and counting, sub classification of mixed type pattern, Henry system of classification, single digit classification, extension of Henry system, fingerprint bureau, AFIS, NCIC System for classification, Artificial intelligence and biometric matching,	Classroom Lectures Seminars Problem-Based Learning Self-Directed Learning ICT-Enabled Learning (Digital Resources)	CLO3
IV	**Criminal Justice System:** Section of Evidence act: 32, 45, 46, 47, 53, 57, 58, 60, 73, 135, 136,137,159 Section of Criminal Procedure code:164A, 291,292,293 Section of Indian Penal Code: Offence against Person: 299, 300, 302,304B, 306,319,320,326,339,340,351,359,362,375,376, 377 Offence against property: section 378, 383, 390, 405, 415, 441, 463, 471,499,503,511. Sections for digital evidence :65B Explosives Act, Wildlife/ environment protection act, law relating to poisons. Prison system in Criminal Justice.	Classroom Lectures Experiential learning Problem-Based Learning Self-Directed Learning ICT-Enabled Learning (Digital Resources)	CLO4 CLO5

Assessment Methodologies/Tools

(A)Internal Assessment

(a) Formative assessment (30Marks)

Quiz

Assignment, Self-learning, and Term work

Seminar/Presentation

Regularity

(b) Summative Assessment (20 Marks)

Mid Term Examination:20 Marks

(B) External Assessment

TermEndExamination:50 Marks

- **Weight age of Learning Efforts for Assessment**

Unit	Aligned COs	Total Learning Hours	Approximate weight age(Marks) to Learning levels (BT)			Total Marks
			Remember(R)	Understanding (U)	Analyse & above (A)	
I	CLO1 CLO2	30	1	1	11	13
II	CLO2 CLO3	32	0	1	11	12
III	CLO4	28	0	1	11	12
IV	CLO5	30	1	1	11	13
		120	**2**	**4**	**44**	**50**

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- Assessment and Evaluation

Sr. No.	Assessment/Evaluation	Component	Weightage (%)
1	Continuous Internal Evaluation	Seminars, Assignments, Quizzes, Class Regularity,	50
2	End-Semester Examination	Written Exam/Practical Exam Project Evaluation (Report, Presentation, Viva)	50

- **CLOs – PLOs Matrix**

CLO	PLO									
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO 1	3	2	2	3	3	1	-	3	2	1
CLO 2	3	2	2	3	3	1	-	3	2	1
CLO 3	3	2	2	3	3	1	-	3	2	1
CLO 4	3	1	3	1	-	-	-	2	1	2
CLO 5	3	2	1	-	1	-	-	1	1	1

Values to the CLO-PLO matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

CLO–PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-

- Suggested Learning Materials Books:

Sr.No.	Title	Author(s)	Publisher
1	Personal identification through fingerprint	Surinder Nath.	Shree pub.
2	Classification and Uses of Finger Prints	Sir E. R. Henry.	H. M. Stationery Office (HMSO)
3	Criminal Investigation: Practical Fingerprints, Thumb Impression, Handwriting Expert Testimony, Opinion Evidence	B. C. Bridge, M. Moner.	The University Book Agency (Prayagraj)
4	The Indian Penal Code	Chandrachud V V	Lexis-Nexis butters
5	Code of Criminal Procedure	Ratanlal Ranchodas.	Lexis-Nexis butters

- **Online Resources (Open Source)**

Sr.No.	Description of Resource(s)	Web link
1	NPTEL lectures of forensic science	https://nptel.ac.in/
2	SWAYAM onlinecourses of forensic science	https://swayam.gov.in/
3	National Digital Library of India(NDLI) e-books and lecture notes	https://ndl.iitkgp.ac.in/

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Course Type	Course Code	Course Title	Teaching-Learning Scheme L-P-T	Total Notional Hours	Course credits
DSC	**P2S02NCFSC02**	Forensic Ballistics	4-0-1	**120**	04

- **Course Learning Outcomes (CLOs)**
  On completion of this course, students will be able to:
- **CLO 1: Explain the history, classification, construction, functioning, and identification of firearms and ammunition**, including small arms, rifled and smooth-bore firearms, cartridges, primers, propellants, bullets, and improvised firearms and ammunition.
- **CLO 2: Apply the principles of internal, external, and terminal ballistics** to analyse projectile behaviour, firearm performance, recoil, trajectory, velocity, stability, penetration, and the factors affecting ballistic characteristics.
- **CLO 3: Examine firearm-related injuries and wound ballistics** by evaluating entry and exit wounds, projectile effects on various targets, cavitation, ricochet, explosive injuries, shotgun and rifle wounds, and post-mortem firearm injuries.
- **CLO 4: Perform forensic examination and identification of firearms and ammunition** through the analysis of firing pin marks, breech face marks, rifling characteristics, cartridge and bullet comparisons, test firing procedures, and gunshot residue (GSR) analysis.
- **CLO 5: Utilize modern ballistic investigation technologies and automated systems** such as BDAS, comparison microscopy, automated bullet and cartridge comparison systems, 3D topographic imaging, computational trajectory analysis, artificial intelligence, machine learning techniques, and advanced elemental and molecular GSR analysis for forensic casework.

Unit	Course Content	Learning Pedagogies	CLO(s)
I	**Introduction to fire-arms:** History and back ground of firearms, their classification and characteristics, identification of various parts of firearms. various component of small arms, smooth bore and rifled arms, different system and their functions, Rifling-various class characteristics, purpose of rifling, types of rifling and methods to produce rifling, trigger and firing mechanism, cartridge- firing mechanism, techniques and dismantling/assembling firearms, identification of origin, improvised/ country made firearms and constructional features. **Introduction to ammunition:** Types of ammunition, classification and constructional features of different types of cartridge, types of primers and priming composition, propellants and their composition, velocity and pressure characteristics under different condition, various types of bullets and compositional aspects, latest trend in their manufacturing and design, smooth bore firearms projectile, identification of origin, improvised ammunition and safety for handling firearms and ammunition.	Classroom Lectures, Seminars, Problem-Based Learning, Self-Directed Learning ICT-Enabled Learning (Digital Resources)	CLO1
II	**Internal ballistics:** Definition, ignition of propellants, shap and size of propellants, manner of burning, various factors affecting the internal ballistics lock time, ignition time, barrel	Classroom Lectures, Seminars,	CLO2

	time erosion, corrosion and gas cutting, equation of motion of projectile, projectile velocity determination, theory of recoil. **External ballistics:** Principle problems of exterior ballistics, details on vacuum trajectory, base drag, yaw, shape of projectile and stability, ballistic co-efficient and limiting velocity.	Problem-Based Learning, ICT-Enabled Learning (Digital Resources)	
III	**Terminal ballistics:** Effect of projectile on hitting the target function of bullet shape, striking velocity, striking angle and nature of target, tumbling of bullet, effect of instability of bullet, effect of intermediate targets, influence on range, cavitations- temporary and permanent cavities, ricochet and its effect, stopping power, wound ballistics, threshold velocity for penetration of skin/flash/bones, preparation of gel block, penetration of projectile in gel block and other targets, nature of wound of entry and exit, initial track with various ranges and velocities with various types of projectiles, explosive wounds, evaluation on injuries coursed due to shot gun, rifle, hand guns and country made firearms, methods of measurements of wound ballistics parameters, postmortem fire injuries.	Classroom Lectures, Seminars, Problem-Based Learning, Self-Directed Learning ICT-Enabled Learning (Digital Resources)	CLO3
IV	**Introduction to automated system** of trajectory computation and automated management of ballistic data. (BDAS). Principles of practice of identification of firearms, ammunition and their components, different types of marks produced during firing process on catridge and on bullet, techniques of obtaining test dies, 3D topographyic imaging, Ai & machine learning algorithms **Time of firing-** different methods employed & their Limitations, Stereo & Comparison Microscopy, Automated Bullet& Cartridge Comparison System, Likelihood ratio (LR) framework, Computational trajectory analysis. **Analysis of GSR** – mechanism of formation of GSR sources & collection, spot test, Chemical test, Identification of Shooter & Instrumental methods of GSR analysis, Molecular and Elemental analysis.	Classroom Lectures, Seminars, Problem-Based Learning, Self-Directed Learning ICT-Enabled Learning (Digital Resources)	CLO4, CLO5

Assessment Methodologies/Tools

(A)Internal Assessment

(a) Formative assessment(30Marks)

- Quiz
- Assignment, Self-learning, and Term work
- Seminar/Presentation
- Regularity

(b)Summative Assessment (20Marks)

- MidTermExamination:20Marks

(B) External Assessment

- Term End Examination: 50 Marks

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- **Weight age of Learning Efforts for Assessment**

Unit	Aligned COs	Total Learning Hours	Approximate weight age(Marks) to Learning levels (BT)			Total Marks
			Remember (R)	Understanding (U)	Analyse& above (A)	
I	CLO1 CLO2	30	1	1	11	13
II	CLO2 CLO3	32	0	1	11	12
III	CLO4	28	0	1	11	12
IV	CLO5	30	1	1	11	13
		120	**2**	**4**	**44**	**50**

- Assessment and Evaluation

Sr. No.	Assessment/Evaluation	Component	Weight age (%)
1	Continuous Internal Evaluation	Seminars, Assignments, Quizzes, Class Regularity,	50
2	End-Semester Examination	Written Exam/Practical Exam Project Evaluation (Report, Presentation, Viva)	50

- **CLOs – PLOs Matrix**

CLO	PLO									
	PLO1	**PLO2**	**PLO3**	**PLO4**	**PLO5**	**PLO6**	**PLO7**	**PLO8**	**PLO9**	**PLO10**
CLO 1	**3**	**2**	**2**	**3**	**3**	**1**	**-**	**3**	**2**	**1**
CLO 2	**3**	**2**	**2**	**3**	**3**	**1**	**-**	**3**	**2**	**1**
CLO 3	**3**	**2**	**2**	**3**	**3**	**1**	**-**	**3**	**2**	**1**
CLO 4	**3**	**1**	**3**	**1**	**-**	**-**	**-**	**2**	**1**	**2**
CLO 5	**3**	**2**	**1**	**-**	**1**	**-**	**-**	**1**	**1**	**1**

Values to the CLO-PLO matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

CLO–PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-

- Suggested Learning Materials Books:

Sr.No.	Title	Author(s)	Publisher
1	Firearms in Criminal Investigations & Trials	B. R. Sharma	Universal law pub.
2	Principles of Forensic Medicine including Toxicology	Nandy, Apurba	New central book
3	Parikh's Textbook of Medical Jurisprudence Forensic Medicine	Parikh, C K	CBC pub.
4	Fire arms &firensic ballistics 2nd ed.	Gaur, S N	Delhi law house

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- **Online Resources (Open Source)**

Sr. No.	Description of Resource(s)	Web link
1	NPTEL lectures of forensic science	https://nptel.ac.in/
2	SWAYAM online courses of forensic science	https://swayam.gov.in/
3	National Digital Library of India(NDLI) e-books and lecture notes	https://ndl.iitkgp.ac.in/

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M.Sc. Forensic Science SEM II

Course Type	Course Code	Course Title	Teaching-Learning Scheme L-P-T	Total Notional Hours	Course credits
DSE	**P2S02NCFSC03**	Forensic Chemistry	4-0-1	**120**	04

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

- CLO 1: Explain the principles and applications of forensic chemistry in the examination of various forensic exhibits, including preliminary screening, presumptive testing, inorganic analysis, microchemical methods, and standard laboratory procedures.
- CLO 2: Identify, classify, and analyse drugs of abuse and controlled substances, including narcotic drugs, psychotropic substances, designer drugs, and performance-enhancing drugs, while interpreting their forensic significance in criminal investigations.
- CLO 3: Examine and interpret trace evidence and arson-related exhibits through the analysis of cosmetics, fibres, dyes, pigments, petroleum residues, fire debris, and other clue materials using appropriate forensic examination methods and instrumental techniques.
- CLO 4: Perform qualitative and quantitative analysis of chemical substances such as alcoholic and non-alcoholic beverages, illicit liquor, petroleum products, fertilizers, pesticides, insecticides, industrial chemicals, metals, consumer products, and other evidentiary materials using chemical and instrumental techniques.
- CLO 5: Investigate explosive-related incidents by applying forensic methods for the identification, characterization, collection, analysis, and interpretation of explosives, explosive residues, blast effects, improvised explosive devices (IEDs), and post-blast reconstruction of events.

Unit	Course Content	Learning Pedagogies	CLO(s)
I	**FORENSIC CHEMISTRY**: Introduction, types of Cases/ Exhibits, preliminary screening, presumptive test (color & spot test), inorganic analysis, micro-chemical methods for analysis **Examination procedure** involving standard method & instrumental techniques, analysis of beverages: alcoholic & non- alcoholic, country made liquor, illicit liquor & medicinal preparations containing alcohol & drugs as constituents. **Drugs of abuse**: Introduction, Classification, drugs of abuse in sports, Narcotic drugs & Psychotropic Substances, Designer drugs & their Forensic Examination.	Interactive Lectures, Problem-Based Learning, ICT-Enabled Learning, Micro-Projects	CLO1, CLO2
II	**Arson:** Chemistry of Fire, investigation and evaluation of clue material, analysis of arson exhibits by instrumental methods. Management of arson cases. **Analysis of trace evidence**: For cosmetic, shampoo, lipstick, nail paint, perfumes etc, dyes trap related evidence material, pigments, fibers etc. (all with examination methods.) **Examination of Petroleum Products**: Various fractions & their commercial uses, standard methods of analysis of petroleum products for adulterations	Interactive Lectures, Tutorial, Industrial Visit, Experiential Learning	CLO3

III	**Quantitative & qualitative Forensic Analysis** of Organic & Inorganic Industrial Products, Chemical Fertilizers, Insecticides, Pesticides, Metallic & Non-metallic products, consumer items such as gold, silver, tobacco, salts, acids, alkalis.	Interactive Lectures, Tutorial, Industrial Visit, Experiential Learning	CLO4
IV	**Explosives:** classification, composition and characteristics of explosives, pyro-techniques, IEDs, explosion process and affects, types of hazards, effect of blast wave on structures, human etc., specific approach to scene of explosion, post-blast residue collection, reconstruction of sequence of events, evaluation and assessment of scene of explosion, systematic examination of explosives and explosion residue in the laboratory using chemical and instrumental techniques in the laboratory and interpretation of results.	Interactive Lectures, Tutorial, Industrial Visit, Experiential Learning	CLO5

Assessment Methodologies/Tools

(A)Internal Assessment

Formative assessment(30Marks)

- Quiz
- Assignment, Self-learning, and Term work
- Seminar/Presentation
- Regularity

(b) Summative Assessment (20Marks)

- MidTermExamination:20Marks

(B) External Assessment

- Term EndExamination:50Marks
- **Weight age of Learning Efforts for Assessment**

Unit	Aligned Cos	Total Learning Hours	pproximate weight age(Marks) to Learning levels (BT)			tal Marks
			Remember (R)	Understanding (U)	Analyse & above (A)	
I	CLO1 CLO2	30	1	1	11	13
II	CLO2 CLO3	32	0	1	11	12
III	CLO4	28	0	1	11	12
IV	CLO5	30	1	1	11	13
		120	**2**	**4**	**44**	**50**

- Assessment and Evaluation

Sr. No.	Assessment/Evaluation	Component	Weight age (%)
1	Continuous Internal Evaluation	Seminars, Assignments, Quizzes, Class Regularity,	50
2	End-Semester Examination	Written Exam/Practical Exam Project Evaluation (Report, Presentation, Viva)	50

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- **CLOs – PLOs Matrix**

CLO	PLO									
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO 1	3	2	2	3	3	1	-	3	2	1
CLO 2	3	2	2	3	3	1	-	3	2	1
CLO 3	3	2	2	3	3	1	-	3	2	1
CLO 4	3	1	3	1	-	-	-	2	1	2
CLO 5	3	2	1	-	1	-	-	1	1	1

Values to the CLO-PLO matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

CLO–PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-

- Suggested Learning Materials Books:

Sr. No.	Title	Author(s)	Publisher
1	Criminalistics: An Introduction to Forensic Science	Richard Saferstein	Pearson education
2	Crime Scene Management	M. S. Dahiya	Shanti prakashan
3	Forensic Science in Criminal investigation	B. R. Sharma	Universal law pub.
4	Working procedure manual on chemistry(Directorate of Forensic Science)	Directorate of Forensic Science (DFS)	MHA,GOI
5	Forensic Toxicology manual (Directorate of Forensic Science)	Directorate of Forensic Science (DFS)	MHA,GOI
6	Narcotic drugs & Substance abuse	Debasis Baghchi	Gyan pub.

- **Online Resources (Open Source)**

Sr. No.	Description of Resource(s)	Web link
1	NPTEL lectures of forensic science	https://nptel.ac.in/
2	SWAYAM online courses of forensic science	https://swayam.gov.in/
3	National Digital Library of India(NDLI)–e-books and lecture notes	https://ndl.iitkgp.ac.in/

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M.Sc. Forensic Science SEM II

Course Type	Course Code	Course Title	Teaching-Learning Scheme L-P-T	Total Notional Hours	Course credits
DSE	**P2S02NCFSC04**	Criminology	2-0-0	**60**	02

- **Course Learning Outcomes (CLOs)**
  On completion of this course, students will be able to:
- **CLO 1:** Explain the fundamental concepts, scope, nature, historical development, and interdisciplinary relationships of criminology, including major theories and perspectives related to crime and criminal behaviour.
- **CLO 2:** Analyze the concept of crime and criminality by examining legal definitions, motives, intentions, and social perspectives of crime, crime trends in India, and the social and economic impacts of criminal activities.
- **CLO 3:** Evaluate the principles of victimology and human rights by assessing victim typologies, victimization patterns, constitutional protections, human rights frameworks, and laws safeguarding vulnerable groups in India.
- **CLO 4:** Classify and assess different forms of crime and offenders, including conventional crimes, white-collar crimes, cybercrimes, organized crimes, terrorism, juvenile delinquency, female offending, and various categories of offenders.
- **CLO 5:** Examine the relationship between crime, society, and the environment by analyzing urban and rural crime patterns, crime prevention strategies, environmental design principles, urban regeneration, and the impact of surveillance systems such as CCTV and street lighting on crime control.

Unit	Course Content	Learning Pedagogies	CLO(s)
I	**Introduction** Criminology: Definition, Scope & Nature-Sub-areas of Criminology, Historical Development- Criminology as a science-Criminology & other Social Sciences. Crime, a Fact of Life- Crime in India- Crime: Consensus View, Conflict View & Interactionist view- Legal Definition- Intention & motive – Sin & Crime – Costs of Crime- Case Analysis. **Victimology and Human Rights** **Victimology:** Definition and scope, History, Types: Positivist, Radical and Critical Role and Functions of Victimologists. Demographic characteristics; Victims of violent crimes, typologies of victims.	Interactive Lectures, Experiential Learning, Collaborative e Learning, Experiential Learning	**CLO1-CLO5**
II	**Human Rights:** Definition, Historical Development, U. N. Universal Declaration of Human Rights. Constitution of India- Fundamental Rights, Salient Features in the Code of Criminal Procedure, The Scheduled Castes and the Scheduled Tribes (Prevention of Atrocities Act, 1), The Rights of Children in India. **Crime Typology** Conventional Crimes, White Collar Crimes, Cyber Crimes, Organized Crimes, Victimless Crimes, Terrorism. Definition, Classification: Generic- IPC, Occasional Offenders, Professional Offenders, Chronic Offenders, Violent Offenders,	Experiential Learning, Research-Oriented Learning, Collaborative Learning, Case-Based Learning	**CLO1-CLO5**

	Specific- Types of Robbery, Rapists, Killer, Terrorists. Female Offenders- Juvenile Offenders. crime & urbanization, crime in rural areas, re-creating rural qualities in urban environments, crime & urban regeneration, key principles for sustainably safe places, boundaries & edges. CCTV & street lighting effects on crime.		

Assessment Methodologies/Tools

(A)Internal Assessment

(a) Formative assessment(15Marks)

- Quiz
- Assignment, Self-learning, and Termwork
- Seminar/Presentation
- Regularity

(b) Summative Assessment (10Marks)

- MidTermExamination:10Marks

(B) External Assessment

- TermEndExamination:Marks:25Marks

Unit	Aligned COs	Total Learning Hours	Approximate weightage (Marks)to Learning levels (BT)			Total Marks
			Remember (R)	Understanding (U)	Application/ Analyze& above (A)	
I	**CLO1-CLO5**	30	**01**	**01**	**10**	12
II	**CLO1-CLO5**	30	**01**	**01**	**11**	13
		60	**02**	**02**	**21**	**25**

- **Assessment Methodologies/Tools**

Sr. No.	Assessment/Evaluation	Component	Weightage (%)
1	Continuous Internal Evaluation	Seminars, Assignments, Quizzes, Class Regularity,	50
2	End-Semester Examination	Written Exam/Practical Exam Project Evaluation (Report, Presentation, Viva)	50

(B)CLOs–PLOs Matrix

CLO	PLO/PSO									
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PSO1	PSO2
CLO1	3	3	2	2	2	2	2	2	2	2
CLO2	3	2	3	2	2	2	2	2	3	2
CLO3	2	3	2	2	3	2	2	2	3	3
CLO4	3	2	3	2	3	2	3	2	3	2
CLO5	3	3	3	3	3	2	3	2	2	3

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M.Sc. Forensic Science SEM II

Values to the **CLO-PLO** matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

CLO–PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-

- Suggested Learning Materials Books:

Sr.No.	Title	Author(s)	Publisher
1	White-cells crimes	Girish Mishra	Gyan pub.
2	Forensic Criminology	Patherick Wayne H	Elsevier
3	Female Criminality in India	Anju Bajpai	Rawat pub.
4	Forensic Victimology: Examining violent crimes victims in investigative & legal context	Turvey Brent E	Elsevier
5	Policy & planning in Criminology	Atri,Parvesh K	Anmol pub.

- **Online Resources (Open Source)**

Sr. No.	Description of Resource(s)	Web link
1	NPTEL lectures of forensic science	https://nptel.ac.in/
2	SWAYAM online courses of forensic science	https://swayam.gov.in/
3	National Digital Library of India(NDLI)-e-books and lecture notes	https://ndl.iitkgp.ac.in/

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M.Sc. Forensic Science SEM II

Course Type	Course Code	Course Title	Teaching-Learning Scheme	Total Notional Hours	Course credits
			L-P-T		
DSE	**P2S02NCFSC05**	Practicals based on Finger prints & Law (Criminal Justice System) and Forensic Ballistics	0-8-0	**120**	04

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

- **CLO 1:** Demonstrate the ability to search, locate, and document fingerprints at crime scenes using standard forensic procedures.
- **CLO 2:** Develop latent fingerprints using physical methods such as powder and magnetic powder techniques.
- **CLO 3:** Develop latent fingerprints using chemical reagents and alternate light source techniques for visualization and enhancement.
- **CLO 4:** Perform preservation, lifting, photography, and documentation of fingerprint evidence while maintaining the chain of custody.
- **CLO 5:** Record plain and rolled fingerprints and classify them using the Henry Classification System.
- **CLO 6:** Identify fingerprint patterns, perform ridge tracing and ridge counting, and recognize individual ridge characteristics for personal identification.
- **CLO 7:** Compare and evaluate fingerprint impressions obtained from crime scenes with known specimens for forensic identification.
- **CLO 8:** Conduct qualitative analysis of explosive residues and perform forensic examination of arson-related exhibits using appropriate chemical methods.
- **CLO 9:** Detect, extract, identify, and analyze narcotic drugs, psychotropic substances, pesticides, and other toxic substances from forensic exhibits.
- **CLO 10:** Demonstrate knowledge of the construction, functioning, and forensic examination of Improvised Explosive Devices (IEDs) while following laboratory safety and evidence-handling protocols.

	Course Content	Learning Pedagogies	CLO(s)
	1. Searching of Fingerprints at Crime Scene. 2. Fingerprints development using powder method. 3. Fingerprints development using chemical methods. 4. Fingerprints development using various light sources. 5. Preserving & lifting of Fingerprints. 6. To perform Henry Classification. 7. To take plain & rolled Fingerprints. 8. To identify patterns. 9. To perform ridge tracing & ridge counting. 10. To identify ridge characteristics. 11. To compare Fingerprints found at crime scene. 12. Qualitative Analysis of Explosive Residues. 13. Detection & Determination of Narcotic & Psychotropic Substances. 14. Extraction & Identification of various drugs.	Experiential learning, Problem-Based Learning, Research-Oriented Learning, Collaborative Learning	CLO1-CLO10

	15. Detection of pesticides from viceras. 16. Analysis of arson exhibits by chemical method. 17. To study construction of IEDs.		

- **Weightage of Learning Efforts for Assessment**

Subjects	Aligned CLOs	Total Learning Hours	Approximate weightage(Marks)to Learning levels (BT)			Total Marks
			Remember (R)	Understanding (U)	Application/ Analyze & above (A)	
Practical -1	CLO1 –CLO10	120	03	03	44	50
		120	03	03	44	50

- **Assessment Methodologies/Tools**

(A)Internal Assessment

(a) Formative assessment(20Marks)

- Method of Working
- Viva
- Regularity
- Journal Writing

(b) Summative Assessment (30Marks)

- MidTermPracticalExamination:30Marks

(B)External Assessment

- TermEndPracticalExamination:50Marks

●Assessment and Evaluation

Sr.No.	Assessment/Evaluation	Component	Weightage (%)
1	Continuous Internal Evaluation	Journal/record book, oral quiz, Periodic tests, Laboratory Regularity	50
2	End-Semester Examination	ctical Exam/Project Evaluation (Report, Presentation, Viva)	50

- **CLOs – PLOs Matrix**

CLO	PLO									
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
CLO1	3	2	3	1	1	1	2	2	1	1
CLO2	3	1	3	1	1	1	1	2	2	1
CLO3	2	3	2	1	2	1	2	2	1	1
CLO4	2	2	3	1	1	2	1	2	2	2
CLO5	2	2	3	1	2	1	1	3	1	1
CLO6	3	3	2	1	1	2	1	2	1	1
CLO7	3	3	2	1	1	1	1	2	2	2
CLO8	2	3	2	2	2	2	1	3	2	1
CLO9	2	3	2	1	1	1	1	2	1	1
CLO10	1	2	1	3	2	2	3	2	3	2

SARDAR PATEL UNIVERSITY

Vallabh Vidyanagar

NAAC 'A' Grade (10-01-2023 To 09-01-2028)

NEP-2020 aligned Curriculum with effect from Academic Year 2026-27

M.Sc. Forensic Science SEM II

Values to the **CLO-PLO** matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

CLO–PLO correlation	Value
Strong	3
Moderate	2
Low	1
No correlation	-

- Suggested Learning Materials Books:

Sr.No.	Title	Author(s)	Publisher
1	Indian Civilization and the Science of Fingerprints	G.S. Sodhi and Jasjeet Kaur	Publications Division, M/O Information & Broadcasting, Govt. of India
2	Textbook of Forensic Fingerprints-A Practical Approach in Criminal Justice System	R. Chandra, Rakesh Mia, Sunita Rani, and Vijay Panchal	IIP Books
3	Practical Pharmacognosy and Phytochemistry	Sushilkumar A. Shinde, Nilesh M. Bhopale, Sarin A. Chavhan, and Karunakar Shukla	Vallabh Prakashan (Delhi, India)

- **Online Resources (Open Source)**

Sr. No.	Description of Resource(s)	Web link
1	Forensic laboratory procedures of DFSS	https://dfss.nic.in
2	Training handbooks of NFSU	https://nfsu.ac.in

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Course Type	Course Code	Course Title	Teaching-Learning Scheme	Total Notional Hours	Course credits
			L-P-T		
DSE	**P2S02NCFSC06**	Practicals based on Forensic Chemistry and Criminology	0-8-0	**120**	04

- **Course Learning Outcomes (CLOs)**

On completion of this course, students will be able to:

- **CLO 1:** Identify and describe the various parts, mechanisms, and functional components of different types of firearms.
- **CLO 2:** Examine and determine the physical and dimensional characteristics of ammunition components, including caliber, diameter, wads, and cartridge cases.
- **CLO 3:** Analyze and classify fired bullets based on class and individual characteristics for forensic identification.
- **CLO 4:** Perform examination and comparison of fired cartridge cases using firearm identification techniques.
- **CLO 5:** Detect, collect, and evaluate Gunshot Residue (GSR) from different surfaces using appropriate forensic methods.
- **CLO 6:** Determine shot number and ammunition characteristics from the size, weight, and physical features of pellets and shots.
- **CLO 7:** Apply comparison microscopy and other forensic techniques for the identification and matching of bullets and cartridge cases.
- **CLO 8:** Interpret ballistic evidence and correlate firearm, ammunition, and GSR findings for forensic investigation and reporting.
- **CLO 9:** Demonstrate safe handling, storage, and examination procedures for firearms and ammunition in laboratory settings.
- **CLO 10:** Prepare and present scientific observations, measurements, and conclusions related to firearms and ballistic evidence in accordance with forensic standards.

Course Content	Learning Pedagogies	CO(s)
1. To study various parts of Firearms. 2. To determine Different Characteristics of Ammunition Parts Caliber, Diameter, Wads, 12 Bore Cartridge Case. 3. Examination & Comparison of Fired Bullet. 4. Examination & Comparison of Fired Cartridge Cases. 5. To Establish Presence of GSR on Different Surfaces. 6. To Determine Shot Number from Size & weight of Shots.	Experiential Learning, Mini Research Task, Research-Oriented Learning, Collaborative Learning	CLO1-CLO10

- **Weightage of Learning Efforts for Assessment**

Subjects	Aligned CLOs	Total Learning Hours	Approximate weightage (Marks)to Learning levels (BT)			Total Marks
			Remember (R)	Understanding (U)	Application/ Analyze & above (A)	

Practical -2	CLO1 –CLO10	120	03	03	44	50
		120	03	03	44	50

- **Assessment Methodologies/Tools**

(A)Internal Assessment

(a)Formative assessment (20Marks)

- Method of Working
- Viva
- Regularity
- Journal Writing

(b) Summative Assessment (30Marks)

- MidTermPracticalExamination:30Marks

(B)External Assessment

- Term End Practical Examination:50Marks

●Assessment and Evaluation

Sr.No.	Assessment/Evaluation	Component	Weightage (%)
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CLO4	2	2	3	1	1	2	1	2	2	2
CLO5	2	2	3	1	2	1	1	3	1	1
CLO6	3	3	2	1	1	2	1	2	1	1
CLO7	3	3	2	1	1	1	1	2	2	2
CLO8	2	3	2	2	2	2	1	3	2	1
CLO9	2	3	2	1	1	1	1	2	1	1
CLO10	1	2	1	3	2	2	3	2	3	2

Values to the **CLO-PLO** matrix are assigned **by judging the importance of the particular CLO** in relation to the **PLOs**.

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M.Sc. Forensic Science SEM II

- Suggested Learning Materials Books:

Sr.No.	Title	Author(s)	Publisher
1	Fire Arms and Forensic Ballistics	S. N. Gaur (Revised by B.C. Jauhari & S.N. Gaur)	Delhi Law House / Eastern Book Company (EBC)
2	Identification of Firearms and Forensic Ballistics	Ravinder Kumar	Selective & Scientific Books
3	Handbook of Forensic Ballistics	Dr. Renu Tyagi and Dr. Arvind Kumar	Selective & Scientific Books (2024 Edition)

- **Online Resources (Open Source)**

Sr. No.	Description of Resource(s)	Web link
1	e-PG Pathshala (UGC)	https://epgp.inflibnet.ac.in
2	Forensic laboratory procedures of DFSS	https://dfss.nic.in
3	National Digital Library of India (NDLI)	https://ndl.iitkgp.ac.in