



Programme Structure

Sharda School of Allied Health Science

**Bachelor of Science
(Forensic Science)**

Programme Code: SAH0120

Batch: 2023-27



Sharda School of Allied Health Sciences
B.Sc. (Forensic Science)
Batch: 2023-2027
Semester: I

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite
				L	T	P		
THEORY SUBJECTS								
1.		FSU107	Criminology and Crime Scene Investigation	3	1	0	4	Major CC
2.		FSU108	Fingerprints Examination	3	0	0	3	Major DSE
3.		FSU109	Zoology I	3	0	0	3	Minor Elective OE
4.		VAC103	Environmental Management	3	0	0	3	Major VAC
	Practical/Viva-Voce/Jury							
1.		FSU157	Criminology and Crime Scene Investigation (Lab)	0	0	2	1	Major, CC
2.		FSU158	Fingerprints Examination (Lab)	0	0	2	1	Major DSE
3.		FSU159	Forensic Photography	0	1	4	3	Minor SEC
4.		ARP101	Communicative English- 1	0	1	2	2	Minor AEC
TOTAL CREDITS							20	

Sharda School of Allied Health Sciences
B.Sc. (Forensic Science)
Batch: 2023-2027
Semester- II

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite
				L	T	P		
THEORY SUBJECTS								
1.		FSU117	Questioned Documents Examination	3	1	0	4	Major, CC
2.		FSU118	Chemistry I	3	0	0	3	Major, CC
3.		FSU119	Zoology II	3	0	0	3	Minor Elective, OE
4.		VAC120	Understanding India	3	0	0	3	Major VAC
		Practical/Viva-Voce/Jury						
1.		FSU167	Questioned Documents Examination (Lab)	0	0	2	1	Major, CC
2.		FSU168	Chemistry I (Lab)	0	0	2	1	Major, CC
3.		FSU169	Graphology and Handwriting Analysis	0	1	4	3	Minor, SEC
4.		ARP102	Communicative English- II	0	1	2	2	Minor AEC
			TOTAL CREDITS				20	



Sharda School of Allied Health Sciences
B.Sc. (Forensic Science)
Batch: 2023-2027
Semester- III

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite
				L	T	P		
THEORY SUBJECTS								
1.		FSU201	Forensic Biology and Serology	3	1	0	4	Major CC
2.		FSU207	Forensic Anthropology and Odontology	3	1	0	4	Major DSE
3.		FSU208	Chemistry II	3	0	0	3	Major CC
4.		FSU209	Zoology III	3	0	0	3	Minor Elective OE
5.		ARP207	Logical Skill Building and Soft Skills	1	0	2	2	Minor AEC
	Practical/Viva-Voce/Jury							
1.		FSU257	Forensic Biology and Serology Lab	0	0	2	1	Major CC
2.		FSU258	Chemistry III (Lab)	0	0	2	1	Major CC
3.		FSU259	Food Adulteration	0	1	4	3	Minor SEC
4.		RBL001	RBL 1	0	0	4	0	Major DSE
TOTAL CREDITS							21	

Sharda School of Allied Health Sciences
B.Sc. (Forensic Science)
Batch: 2023-2027
Semester- IV

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite
				L	T	P		
THEORY SUBJECTS								
1.		FSU218	Forensic Chemistry	3	1	0	4	Major CC
2.		FSU219	Forensic Toxicology	3	0	0	3	Major DSE
3.		FSU220	Chemistry III	3	0	0	3	Major CC
4.		FSU221	Zoology IV	3	0	0	3	Minor Elective OE
5.		ARP305	Personality Development and Decision Making	1	0	2	2	Minor AEC
Practical/Viva-Voce/Jury								
1.		FSU267	Forensic Chemistry (Lab)	0	0	2	1	Major CC
2.		FSU268	Forensic Toxicology (Lab)	0	0	4	2	Major DSE
3.		FSU269	Chemistry III (Lab)	0	0	2	1	Major CC
4.		RBL002	RBL 2	0	0	4	0	Major DSE
TOTAL CREDITS								19

Sharda School of Allied Health Sciences



B.Sc. (Forensic Science)
Batch: 2023-2027
Semester- V

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite
				L	T	P		
THEORY SUBJECTS								
1.		FSU305	Forensic Medicine and Jurisprudence	3	0	0	3	Major CC
2.		FSU306	Arson and Accident Investigation	3	0	0	3	Major CC
3.		FSU307	Chemistry IV	3	0	0	3	Major CC
4.		FSU308	Analytical Chemistry and Instrumentation I	3	0	0	3	Major DSE
Practical/Viva-Voce/Jury								
1.		FSU352	Forensic Medicine Lab	0	0	4	2	Major CC
2.		FSU353	Arson and Accident Investigation (Lab)	0	0	4	2	Major CC
3.		FSU354	Chemistry IV (Lab)	0	0	2	1	Major CC
4.		RBL003	RBL-3	0	0	2	1	Major DSE
5.		INC001	Industry Connect FSIC	0	0	4	2	Major
TOTAL CREDITS							20	

Sharda School of Allied Health Sciences
B.Sc. (Forensic Science)
Batch: 2023-2027
Semester- VI

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite
				L	T	P		
THEORY SUBJECTS								
1.		FSU315	Forensic Physics	3	0	0	3	Major CC
2.		FSU316	Forensic Ballistics	3	0	0	3	Major CC
3.		FSU317	Analytical Chemistry and Instrumentation II	3	1	0	4	Major CC
4.		FSU318	Zoology V	3	0	0	3	Minor Elective OE
Practical/Viva-Voce/Jury								
1.		FSU362	Forensic Physics Lab	0	0	4	2	Major CC
2.		FSU363	Forensic Ballistics Lab	0	0	4	2	Major CC
3.		RBL004	RBL4	0	0	2	1	Major DSE
4.		CCU108	Community Connect	0	0	4	2	Major
TOTAL CREDITS							20	



Sharda School of Allied Health Sciences
B.Sc. (H) Forensic Science with Research
Batch: 2023-2027
Semester- VII

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite
				L	T	P		
THEORY SUBJECTS								
1.		FSU401	Criminology and Law	3	1	0	4	Major CC
2.		FSU402	Forensic Psychology	3	1	0	4	Major CC
3.		FSU403	Advanced Dermatoglyphics	3	1	0	4	Major DSE
4.		FSU404	Biostatistics and Research Methodology	3	1	0	4	Major DSE
5.		FSU405	Introduction of Biometry	3	1	0	4	Minor Elective OE
Practical/Viva-Voce/Jury								
1.		FSU453	Minor Project	0	0	0	3	Major
TOTAL CREDITS							23	

Sharda School of Allied Health Sciences
B.Sc. (H) Forensic Science with Research
Batch: 2023-2027
Semester- VIII

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite
				L	T	P		
THEORY SUBJECTS								
1.		FSU411	Explosives	3	1	0	4	Major CC
2.		FSU413	Quality Assurance and Accreditation in Forensic Sciences	3	1	0	4	Minor Elective OE
Practical/Viva-Voce/Jury								
1.		FSU463	Major Project	0	0	0	9	Major
TOTAL CREDITS							17	



Sharda School of Allied Health Sciences
B.Sc. (Hons) Forensic Science
Batch: 2023-2027
Semester- VII

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requirement/ Co Requirement
				L	T	P		
THEORY SUBJECTS								
1.		FSU401	Criminology and Law	3	1	0	4	Major CC
2.		FSU402	Forensic Psychology	3	1	0	4	Major CC
3.		FSU403	Advanced Dermatoglyphics	3	1	0	4	Major DSE
4.		FSU404	Biostatistics and Research Methodology	3	1	0	4	Major DSE
5.		FSU405	Introduction of Biometry	3	1	0	4	Minor Elective OE
TOTAL CREDITS							20	

Sharda School of Allied Health Sciences
B.Sc. (Hons) Forensic Science
Batch: 2023-2027
Semester- VIII

S. No.		Subject Code	Subjects	Teaching Load			Credits	Core/Elective Pre-Requisite/ Co Requisite
				L	T	P		
THEORY SUBJECTS								
1.		FSU411	Explosives	3	1	0	4	Major CC
2.		FSU412	Forensic Instrumental Analysis	3	1	0	4	Major CC
3.		FSU413	Quality Assurance and Accreditation in Forensic Sciences	3	1	0	4	Minor Elective OE
4.		FSU414	Cyber and Digital Forensic	3	1	0	4	Major CC
5.		FSU415	Forensic Accounting and Fraud	3	1	0	4	Major CC
TOTAL CREDITS							20	



Course Modules

First Semester

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch:		Semester: I	
Forensic Science			
1	Course Code	FSU107	
2	Course Title	Criminology and Crime Scene Investigation	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	After studying this paper the students will – 1. Get basic concept and characteristic of crime. 2. Understand present crime scenario in India. 3. Learn the application of scientific principles of forensic science for the purpose of CSI.	
6	Course Outcomes	Students will be able to CO1: Know about organizational set up and development of Forensic Science laboratories. CO2: Understand the crime, crime scene and role of investigating officer. CO3: Apply the methods and techniques for evidence collection and crime scene management. CO4: Analyze the importance of criminal courts and their powers along with admissibility of expert evidence. CO5: Evaluate the sections of IPC, CrPC and IEA. CO6: Create the understanding of court procedure with reference to criminal cases	
7	Course Description	The completion of this course helps students in thorough knowledge about the crime, history and development of Forensic Science and crime scene Management.	
8	Outline syllabus		CO Mapping
	Unit 1	Forensic Science	CO1
	A	Definitions and concepts in forensic science. History, Basic principles of Forensic Science, Scope & need of forensic science. Current scenario of forensic science in India. Branches of Forensic Sciences.	
	B	Hierarchical set up and role of Central Forensic Science Laboratories, State Forensic Science Laboratories, Government Examiners of Questioned Documents, Fingerprint Bureaus,	

		National Crime Records Bureau, Bureau of Police Research & Development, Directorate of Forensic Science and Mobile Crime Laboratories. Services of crime laboratories. Basic services and optional Code of conduct for Forensic Scientists, Ethical issue in Forensic Science	
	C	Role of forensic Scientist, Police Officer, Judicial Officers and Medico legal expert. Relationship between Forensic expert and judiciary officer, Importance of FSL, National and International scenario of FSL.	
	Unit 2	Types of Crime	CO2
	A	Definition of crime and history, development, victimology, criminological perspective, characteristics of crime, White collar crime, Professional crime, Organized crime, Present scenario of crime in India.	
	B	Types of Crime and its causes; Definition of Crime Scene, Classification of crime Scene: indoor and outdoor, primary and secondary, macroscopic and microscopic crime scene protection of crime scene and its importance.	
	C	Significance of crime scene, argument and ethics of crime scene, initial response, role of first responding officer, duty management	
	Unit 3	Crime Scene Management	CO3
	A	Definition of crime scene, crimes without scene. Classification of crime scene. Significance of crime scene.	
	B	Physical evidence, Definition, classification of physical evidence, types of physical evidences, sources of physical evidence, significance and values of physical evidence.	
	C	Crime scene management: Introduction to crime scene management, duties of first responding officer at the scene of crime, duties of crime scene investigator, processing of scene of crime: plan of action, protection of scene of crime, photography and video recording of crime scene, sketching of crime scene, searching, collection, preservation, packing of physical evidence, documentation of crime scene, forwarding or dispatch of exhibit in to the laboratory, chain of custody, collection of standard/reference samples.	
	Unit 4	Criminology and Judicial System	CO4, CO6
	A	Introduction to criminology, scope of criminology, Definition of crime, criminal behaviour- types of crimes, causes of crime	

		Penology- Introduction, Theories of Punishment, Types of Punishments, Prisons and Correctional Institutions, Functions and Limitations	
	B	Indian Courts- Introduction, Hierarchy of courts- Powers of courts, types of courts, Defence Council -Admissibility of Expert Testimony –Expert Evidence fallacies- Definition & Value of Expert Testimony.	
	C	Introduction to Criminal justice system in India, Cognizable and non-cognizable offences Introduction to Indian Penal Code (IPC), Criminal Procedure Code (Cr. PC) and Indian Evidence Act (IEA)	
	Unit 5	IPC, CrPC and IEA	CO5
	A	IEA Sections-45, 46, 47, 56, 57, 58, 59,60, 73, 135, 136, 137, 138, 141.	
	B	IPC- Sections-299, 300, 302, 304, 304-B, 307, 308, 309, 351, 352, 375, 376	
	C	Cr. P.C. - 291, 292, 293 Sections - 41, 44, 61, 62, 70	CO6
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	B.R.Sharma : Forensic science in criminal Investigation & Trails.	
	Other References	James.S.H and Nordby J.J: Forensic Science- An introduction to scientific and investigative techniques. Saferstein: Criminalistics - An introduction to Forensic Science.	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	1	1	2	2	1	-	3
CO2	3	2	2	2	2	2	1	1	2	-	1	-
CO3	2	1	-	1	3	2	2	-	2	2	-	2
CO4	1	1	-	1	2	1	2	1	2	2	2	-
CO5	2	3	2	2	2	-	2	2	3	1	-	-
CO6	1	2	2	2	3	2	1	2	-	1	-	2
	1.83	1.83	1.75	1.67	2.33	1.60	1.50	1.60	2.20	1.40	1.50	2.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: I	
1	Course Code	FSU157	
2	Course Title	Criminology and Crime Scene Investigation (Lab)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	After studying this course students will learn 1. Collection and preservation of various evidences. 2. The importance and methods of photography at crime scene. 3. Methods of sketching of crime scene.	
6	Course Outcomes	Students will be able to CO1: Gain knowledge of collection of physical evidences. CO2: Understand the methods of packing and forwarding the different types of evidences from crime scene investigation. CO3: Record the indoor and outdoor crime scene through photography. CO4: Analyze the crime scene by searching, sketching and photography at crime scene. CO5: Evaluate the witness testimony during courtroom trials. CO6: Develop the crime scene investigation methods.	
7	Course Description	The completion of these course students will be able to collect and pack all kind of evidences.	
8	Outline syllabus		CO Mapping
	Unit 1	Crime Scene Management	CO1,CO6
		To Know the Basic Steps of Crime Scene Management Followed by an Investigator. To perform Search Methods Used at Outdoor Scene of Crime. To perform Search Methods Used at Indoor Crime Scene. Collection of Physical Evidences from Crime Scene.	
	Unit 2	Packing and forwarding of evidence	
		Packing of different types of Evidences retrieved from crime scene. Forwarding of different types of Evidences retrieved from crime scene.	CO2
	Unit 3	Photography of Crime Scene	CO3
		Photography of Indoor Crime Scene Photography of Outdoor Crime Scene	

		Photography of Vehicular Crime Scene	
	Unit 4	Sketching of Crime scene	
		Sketching of the Outdoor Scene of Crime i.e. Hit & Run or Drowning. Sketching of the Indoor Scene of Crime i.e. Criminal Trespass or Theft. Sketching of the Indoor Scene of Crime i.e. Homicide. Sketching of the Outdoor Scene of Crime i.e. Suicide.	CO4, CO6
	Unit 5	Crime scene reconstruction	CO5
		Reconstruction of Scene of Crime of a Suicide. Reconstruction of Scene of Crime of a Murder. Report writing in Homicide/suicide crime scene. Examination of witness during courtroom trials.	
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA CE ETE 25% 25% 50%	
	Text book/s*	FSL Laboratory Manual	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	1	3	2	3	2	2	2	1	1	1
CO2	2	3	2	1	2	2	1	-	2	2	-	2-
CO3	1	2	2	3	-	2	2	2	1	2	1	1
CO4	3	2	3	-	2	1	-	3	2	1	1	1
CO5	2	1	3	2	1	2	3	1	1	2	2	2
CO6	-	2	3	2	2	2	1	1	2	-	-	2
	2.00	2.00	2.33	2.20	1.80	2.00	1.80	1.80	1.67	1.60	1.25	1.40

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: I	
1	Course Code	FSU108	
2	Course Title	Fingerprints Examination	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	After studying this paper the students will know – a. The fundamental principles on which the science of fingerprinting is based. b. Fingerprints are the most infallible means of identification. c. The method of classifying criminal record by fingerprints was worked out in India, and by Indians. e. The physical and chemical techniques of developing fingerprints on crime scene evidence	
6	Course Outcomes	Students will be able to CO1: Gain knowledge of history and development of fingerprints. CO2: Understand various patterns of fingerprints. CO3: Apply physical and chemical methods for the development of fingerprints. CO4: Analyze and compare fingerprints on the basis of class and individual characteristics. CO5: Evaluate the admissibility of fingerprint evidence in court of law. CO6: Construct the chemical methods for different fingerprint residues.	
7	Course Description	After the completion of this course students will be able to develop the latent fingerprints and enumerate different fingerprint types and their legal aspects.	
8	Outline syllabus		CO Mapping
	Unit 1	Introduction and History	CO1
	A	General Introduction of Fingerprint Science, History and its Development,	
	B	Origin of Fingerprints, Principles of Fingerprints	
	C	Different patterns of Fingerprints, Identification of Fingerprint, Importance of Fingerprint in crime detection.	
	Unit 2	Types of Fingerprints and Classification	CO2
	A	Pattern area, Core, Delta, Type lines, Ridge characteristics,	
	B	Fingerprint pattern types: Arch (Simple Arch and Tented Arch), Loop (Ulnar Loop and Radial Loop) and Whorl (Plain Whorl and Composites – Twinned Loop, Central Pocket Loop, Lateral Loop and Accidental).	
	C	Henry classification system/Ten Digit Fingerprint classification system.	
	Unit 3	Development of Fingerprints	CO3
	A	Types of Fingerprints at crime scene: Chance or Latent prints, visible prints and plastic prints.	

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	B	Methods of development of latent Fingerprints: Physical Methods– Black Powder, Fluorescent Powders, Magnetic Powder, etc.			
	C	Chemical Methods – Iodine Fuming method, Ninhydrin method, Silver Nitrate method, Cyanoacrylate Method, etc.			CO6
	Unit 4	Recording and Comparison of Fingerprints			CO4
	A	Preserving and lifting of Fingerprints			
	B	Comparison of Fingerprints and basis of comparisons – class and individual characteristics, various types of ridge minutiae.			
	C	Ridge counting and ridge tracing.			
	Unit 5	Legal Aspects of Fingerprints			CO5
	A	Legal aspects and admissibility of fingerprint evidence in court of law.			
	B	Preparation of report			
	C	Testimony of forensic (fingerprint) expert during the trial.			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	1. J.E. Cowger, Friction Ridge Skin, CRC Press, Boca Raton (1983). 2. D.A. Ashbaugh, Quantitative-Qualitative Friction Ridge Analysis, CRC Press, Boca Raton (2000).			
	Other References	C. Champod, C. Lennard, P. Margot an M. Stoilovic, Fingerprints and other Ridge Skin Impressions, CRC Press, Boca Raton (2004). Lee and Gaensleen’s, Advances in Fingerprint Technology, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	3	2	2	2	2	2	2	1	1	1
CO2	3	3	2	-	2	2	1	1	1	2	3	-
CO3	2	2	1	2	-	-	1	3	2	2	1	1
CO4	3	2	3	3	3	-	2	2	1	1	-	2
CO5	2	1	2	1	2	2	3	-	2	-	1	2
CO6	1	3	2	2	1	3	2	2	-	2	2	1
	2.17	2.17	2.17	2.00	2.00	2.25	1.83	2.00	1.60	1.60	1.60	1.40

School: SAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: I	
1	Course Code	FSU158	
2	Course Title	Fingerprints Examination (Lab)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	Learning Objectives: After studying this paper the students will know – a. The method of classifying the fingerprints. b. The physical and chemical techniques of developing fingerprints on crime scene evidence c-To provide knowledge about ridge tracing and ridge counting.	
6	Course Outcomes	Students will be able to CO1: Record plain and rolled fingerprint impressions. CO2: Understand ten digit classification of fingerprints CO3: Apply the fingerprint characteristics for identification. CO4: Analyze core and delta in fingerprint pattern. CO5: Evaluate the methods for latent print development. CO6:Develop the latent print in different condition	
7	Course Description	After the completion of this course students will be able to develop the Latent fingerprints and differentiate between patterns of fingerprints.	
8	Outline syllabus		CO Mapping
	Unit 1	Recording of Fingerprints	CO1
		To record plain fingerprints To record rolled fingerprints	
	Unit 2	Classification and photography	CO2
		To carry out ten digit classification of fingerprints. Photography of Fingerprints in visible light Photography of Fingerprints in UV light	
	Unit 3	Identification of patterns	
		Location of visible & latent fingerprints. Lifting of fingerprints. Lifting of fingerprints by cello tape method To identify different fingerprint patterns. To use different light sources for enhancing developed fingerprints.	CO3,CO6
	Unit 4	Ridge tracing	CO4
		To identify core and delta. To carry out ridge tracing and ridge counting.	
	Unit 5	Developing methods	CO5

		To develop latent finger Prints with black powder method To develop latent finger Prints with fluorescent powder method To develop latent finger Prints with magnetic powder method. To develop latent finger Prints with fuming methods. To develop latent finger Prints with silver nitrate method. To develop latent finger Prints with cyanoacrylate method. Report preparation and Presentation in Courts.			
	Mode of examination	Practical/Viva			
	Weightage	CA	CE	ETE	
	Distribution	25%	25%	50%	
	Text book/s*	Laboratory Manual			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	2	2	2	2	1	1	2
CO2	1	3	2	2	2	2	2	-	2	2	2	2
CO3	2	2	1	3	3	3	3	2	-	1	2	2
CO4	2	3	3	2	2	3	1	1	1	3	1	2
CO5	1	2	2	-	2	1	2	3	2	1	-	1
CO6	2	1	3	2	2	2	2	2	3	2	-	-
	1.67	2.17	2.00	2.20	2.17	2.17	2.00	2.00	2.00	1.67	1.50	1.80

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: I
1	Course Code	FSU159
2	Course Title	Forensic Photography
3	Credits	3
4	Contact Hours (L-T-P)	0-1-4
	Course Status	Compulsory
5	Course Objective	1. To Develop a sense of Photography. 2. To have an overview of Document Photographic Technique. 3. To have the knowledge of digital photography.
6	Course Outcomes	Students will be able to CO1: Know the concept of contact and tricky Photography. CO2: Understand the Photography of Watermark and wire marks. CO3: Apply knowledge of photography techniques – Close up photography, UV, IR for Documents examination. CO4: Analyze the secret writing and fingerprints by photography. CO5: Evaluate and record the evidence in indoor and outdoor crime scenes. CO6: Design the photography methods for indoor and outdoor crime separately
7	Course Description	After the completion of this course the students will be able to understand the different types of document photographic techniques along with this, students will get deep knowledge of Close up photography, UV, IR, Transmitted and oblique light photography.
8	Outline syllabus	CO Mapping
	Unit 1	Camera Study of different parts of camera. Contact and Tricky Photography
	Unit 2	Currency notes photography Photography of currency notes Photography of Watermark and wire marks
	Unit 3	Types of photography Close up photography of Documents Photography under UV and IR Light Transmitted and oblique light photography. To take photographs using different filters.
	Unit 4	Physical evidence photography Photography of Secret Writing Photography of fingerprints Photography of lip prints and ear prints.



		Photography of bite marks on body. Photography of footwear impressions. Photography of Tyre and skid Marks							
	Unit 5	Indoor and outdoor photography	CO5,CO6						
		Close up and distant Photography of indoor crime scene Close up and distant Photography of outdoor crime scene Photography of moving objects. To take photographs of crime scene exhibits at different angles. To record video of a crime scene.							
	Mode of examination	Practical/ Viva							
	Weightage Distribution	<table> <tr> <td>CA</td> <td>CE</td> <td>ETE</td> </tr> <tr> <td>25%</td> <td>25%</td> <td>50%</td> </tr> </table>	CA	CE	ETE	25%	25%	50%	
CA	CE	ETE							
25%	25%	50%							
	Text book/s*	1. David R.Redsicker; The Practical Methodology of Forensic Photography- 2nd Ed. CRC Press LLC (2001) 2. R.E. Jacobson, S.F.Ray, G.G.Attridge, The Manual of Photography- Photographic and Digital Imaging , N.R. Oxford.							
	Other References	1. Forensic Digital Imaging and Photography – (2001) by Herbert L. Blitzer and Jack Jacobia Advanced Crime Scene Photography (2010) by Christopher D Duncan							

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	2	2	3	2	1	1
CO2	3	3	1	1	2	-	2	2	2	-	2	2
CO3	3	2	2	3	2	3	-	3	1	1	2	2
CO4	2	3	1	3	3	2	2	3	1	2	2	-
CO5	2	2	3	2	1	2	3	1	1	2	1	1
CO6	1	2	2	2	2	1	3	2	2	2	1	1
	2.17	2.33	1.83	2.00	2.00	1.80	2.40	2.17	1.67	1.80	1.50	1.40

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: I	
1	Course Code	FSU109	
2	Course Title	Zoology I	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	1-To know structure and function of bone, cartilage and muscles. 2-Able to understand the process nervous system. 3-To know complete process of digestive, excretory and respiratory systems.	
6	Course Outcomes	Students will be able to CO1: Describe Tissue structure, Bone, cartilage and muscles. CO2: Understand functioning of reproductive, endocrine and circulatory systems. CO3: Know about the Nervous system of humans. CO4: Analyze the mechanism of digestive and excretory organs. CO5: Evaluate the mechanism and functioning of various parts of respiratory system and respiratory diseases. CO6: Discuss the various diseases of respiratory and nervous system	
7	Course Description	The completion of this course student will be able to know all about human physiology.	
8	Outline syllabus		CO Mapping
	Unit 1	Human Physiology –I	CO1
	A	Tissues Structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous tissue.	
	B	Bone and Cartilage Structure and types of bones and cartilages, Ossification, bone growth and resorption.	
	C	Muscle: Histology of different types of muscle; Ultra structure of skeletal muscle; Molecular and chemical basis of muscle contraction.	
	Unit 2	Human Physiology- II	CO2
	A	Reproductive System: Histology of testis and ovary; Physiology of male and female reproduction; Puberty, Methods of contraception in male and female.	
	B	Endocrine System: Histology of endocrine glands - pineal, pituitary, thyroid, parathyroid, pancreas, adrenal; hormones secreted by them and their mechanism of action.	
	C	Circulatory system and its main features, Human circulatory system.	
	Unit 3	Nervous system	CO3,CO6
	A	Nervous System Structure of neuron, CNS and PNS system.	
	B	Resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers;	

	C	Types of the synapse, Synaptic transmission and, Neuromuscular junction; Reflex action and its types – reflex arc; Physiology of hearing and vision			
	Unit 4	Digestive and excretory system			CO4
	A	Introduction; Structure and function of the human digestive system			
	B	Features of GIT tract; general features of digestion and absorption.			
	C	Introduction to the excretory system, general features of excretory structures and functions. Vertebrate excretory system.			
	Unit 5	Respiratory system			CO5,CO6
	A	Introduction, parts of the respiratory system			
	B	Inhalation and exhalation process, functions of the respiratory system.			
	C	Respiratory diseases: Asthma, COPD (Chronic obstructive pulmonary disease), Pneumonia, TB, Pleural effusion.			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.			
	Other References	Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5 th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	1	1	2	2	2	1	1
CO2	1	2	2	2	1	2	2	3	2	2	1	2
CO3	2	1	1	2	2	2	2	1	1	1	1	1
CO4	1	3	-	3	3	1	-	2	2	2	-	-
CO5	2	2	2	1	-	2	3	-	2	2	-	-
CO6	1	2	3	1	2	2	2	2	1	1	-	-
	1.50	2.00	1.80	1.83	2.00	1.67	2.00	2.00	1.67	1.67	1.00	1.33

		 	
Schools: SET SOL SMFE SBS-BBA SBSR SOE SAP		Batch : 2023-2027	
		Semester: I	
1	Course Code	ARP101	
2	Course Title	Communicative English-1	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
5	Course Objective	To minimize the linguistic barriers that emerges in varied socio-linguistic environments through the use of English. Help students to understand different accents and standardise their existing English. Guide the students to hone the basic communication skills - listening, speaking, reading and writing while also uplifting their perception of themselves, giving them self-confidence and building positive attitude.	
6	Course Outcomes	After completion of this course, students will be able to: CO1 Develop a better understanding of advanced grammar rules and write grammatically correct sentences CO2 Acquire wide vocabulary and punctuation rules and learn strategies for error-free communication. CO3 Interpret texts, pictures and improve both reading and writing skills which would help them in their academic as well as professional career CO4 Comprehend language and improve speaking skills in academic and social contexts CO5 Develop, share and maximise new ideas with the concept of brainstorming and the documentation of key critical thoughts articulated towards preparing for a career based on their potentials and availability of opportunities. CO6 Function effectively in multi-disciplinary teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality	
7	Course Description	The course is designed to equip students, who are at a very basic level of language comprehension, to communicate and work with ease in varied workplace environment. The course begins with basic grammar structure and pronunciation patterns, leading up to apprehension of oneself through written and verbal expression as a first step towards greater employability.	
8	Outline syllabus - ARP 101		
	Unit A	Sentence Structure	CO Mapping

	Topic 1	Subject Verb Agreement	CO1
	Topic 2	Parts of speech	
	Topic 3	Writing well-formed sentences	
	Unit B	Vocabulary Building & Punctuation	
	Topic 1	Homonyms/ homophones, Synonyms/Antonyms	CO1, CO2
	Topic 2	Punctuation/ Spellings (Prefixes-suffixes/Unjumbled Words)	CO1, CO2
	Topic 3	Conjunctions/Compound Sentences	CO1, CO2
	Unit C	Writing Skills	
	Topic 1	Picture Description – Student Group Activity	CO3
	Topic 2	Positive Thinking - Dead Poets Society-Full-length feature film - Paragraph Writing inculcating the positive attitude of a learner through the movie SWOT Analysis – Know yourself	CO3, CO2, CO3
	Topic 3	Story Completion Exercise –Building positive attitude - The Man from Earth (Watching a Full length Feature Film)	CO2, CO3
	Topic 4	Digital Literacy Effective Use of Social Media	CO3
	Unit D	Speaking Skill	
	Topic 1	Self-introduction/Greeting/Meeting people – Self branding	CO4
	Topic 2	Describing people and situations - To Sir With Love (Watching a Full length Feature Film)	CO4
	Topic 3	Dialogues/conversations (Situation based Role Plays)	CO4
	Unit E	Professional Skills Career Skills	
	Topic 1	Exploring Career Opportunities	CO4, CO5
	Topic 2	Brainstorming Techniques & Models	CO4, CO5
	Topic 3	Social and Cultural Etiquettes	CO4, CO5
	Topic 4	Internal Communication	CO4, CO5
	Unit F	Leadership and Management Skills	
	Topic 1	Managerial Skills	CO6
	Topic 2	Entrepreneurial Skills	CO6
9	Evaluations	<i>Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (60% CA and 40% ETE</i>	N/A
10	Texts & References Library Links	<ul style="list-style-type: none"> Blum, M. Rosen. <i>How to Build Better Vocabulary</i>. London: Bloomsbury Publication Comfort, Jeremy (et.al). <i>Speaking Effectively</i>. Cambridge University Press 	

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PS O1	PSO 2	PSO 3
ARP101.1	-	-	-	-	-	-	-	-	1	3		2	-	-	-
ARP101.2	-	-	-	-	-	-	-	-	1	3		2	-	-	-
ARP101.3	-	-	-	-	-	-	-	-	1	3		2	-	-	-
ARP101.4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP101.5	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP101.6	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
									1	2.5	2	2			



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Second semester

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: II	
1	Course Code	FSU117	
2	Course Title	Questioned Documents Examination	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	After studying this paper the students will know – a. The importance of examining questioned documents in crime cases. b. The tools required for examination of questioned documents. c. The significance of comparing hand writing samples. d. The importance of detecting frauds and forgeries by analyzing questioned documents	
6	Course Outcomes	Students will be able to CO1: Know the Nature and Scope of Questioned Documents CO2: Understand the characteristics of handwriting. CO3: Apply the methods for Comparison of paper, ink CO4: Analyze the alterations in documents CO5: Evaluate the counterfeit Indian currency notes. CO6: Create the comparative profile of currency notes of different countries	
7	Course Description	After the completion of this course students will be able to know the basic tool for forensic documents examination. Students will also learn about variations in handwriting and enumerate different security features in important documents.	
8	Outline syllabus		CO Mapping
	Unit 1	Nature and Scope of Questioned Documents	CO1
	A	Definition of questioned documents. Types of questioned documents. Preliminary examination of documents.	
	B	Basic tools needed for forensic documents' examination – video spectral comparator, electrostatic detection apparatus.	
	C	Handling and preservation of Documents	
	Unit 2	Comparison of Documents I	CO2
	A	Comparison of handwriting. Development of individuality in handwriting.	

	B	Natural variations and fundamental divergences in handwritings.	
	C	Class and individual characteristics.	
	Unit 3	Comparison of Documents II	CO3
	A	Merits and demerits of exemplar and non-exemplar samples during comparison of handwriting.	
	B	Standards for comparison of handwriting.	
	C	Comparison of paper, ink, Determining the age of documents.	
	Unit 4	Forgeries I	CO4
	A	Alterations in documents, including erasures, additions, over-writings and obliterations.	
	B	Indented and invisible writings	
	C	Charred documents	
	Unit 5	Forgeries II	CO5,CO6
	A	Examination of counterfeit Indian currency notes.	
	B	Examination of passports, visas and stamp papers.	
	C	Disguised writing and anonymous letters.	
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton (1982). A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, Scientific Evidence in Civil and Criminal Cases, 4th Edition, Foundation Press, New York (1995).	
	Other References	R.N. Morris, Forensic Handwriting Identification: Fundamental Concepts and Principles, Academic Press, London (2000). E. David, The Scientific Examination of Documents – Methods and Techniques, 2nd Edition, Taylor & Francis, Hants (1997).	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	2	1	1	2	2	2	1	2	2
CO2	2	2	3	2	3	2	1	3	1	2	1	1
CO3	2	2	2	1	2	1	2	2	2	-	2	2
CO4	1	1	2	1	-	2	3	-	2	-	2	1
CO5	2	3	3	2	1	2	2	2	2	2	1	-
CO6	2	1	2	3	2	3	2	1	1	2	1	1
	1.83	2.00	2.17	1.83	1.80	1.83	2.00	2.00	1.67	1.75	1.50	1.40

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: II	
1	Course Code	FSU167	
2	Course Title	Questioned Documents Examination (Lab)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	1-Knowledge of documents examination 2-documents analysis methods 3-To provide knowledge about handwriting	
6	Course Outcomes	Students will be able to CO1: Gain the knowledge about characteristics of characteristics. CO2: Understand the methods of comparison of handwriting. CO3: Apply the methods for detection of forgery. CO4: Analyse line quality defects in handwriting. CO5: Examine and evaluate the security features of currency notes CO6: Elaborate the security features of currency notes of different countries	
7	Course Description	After the completion of this course students will be able to compare handwriting samples and enumerate different security features in important documents.	
8	Outline syllabus		CO Mapping
	Unit 1	Handwriting Characteristics	CO1
		To identify handwriting characters. To study natural variations in handwriting Report writing and presentation in court.	
	Unit 2	Comparison of Handwriting	
		To compare handwriting samples. Examination of forged signature. Report writing and presentation in court.	CO2
	Unit 3	Detection of forgery	
		To detect simulated forgery. To detect traced forgery. Differentiation between typed and printed documents. Decipher of secret writing Report writing and presentation in court.	CO3
	Unit 4	Alterations in handwriting	CO4
		To study the line quality defects in handwriting samples.	

		To study alterations To study the obliterations To examine the erasures in handwriting samples. Decipher of mechanically erased writing. Report writing and presentation in court.			
	Unit 5	Examination of currency and passport			
		To examine the security features of currency notes To examine the security features of passports To examine the security features of plastic money. • Report writing and presentation in court.			CO5,CO6
	Mode of examination	Practical/Viva			
	Weightage	CA	CE	ETE	
	Distribution	25%	25%	50%	
	Text book/s*	Laboratory Manual			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	1	3	2	1	1	2	2	1	1	2
CO2	2	3	2	1	1	1	2	3	1	1	2	2
CO3	2	2	2	2	2	2	3	2	2	-	2	-
CO4	1	3	3	2	3	2	3	1	2	2	1	2
CO5	3	2	2	2	2	2	1	2	1	2	2	1
CO6	1	1	2	-	2	1	2	2	2	2	1	-
	1.83	2.17	2.00	2.00	2.00	1.50	2.00	2.00	1.67	1.60	1.50	1.75

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: II	
1	Course Code	FSU118	
2	Course Title	Chemistry I	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	1. Atomic structure, Bohr's theory and its limitations etc. 2. laws of crystallography, liquid state and liquid crystals 3. Different physical properties of states of matter. 4. Basic of organic chemistry and classification of hydrocarbons	
6	Course Outcomes	Students will be able to CO1: Explain molecular activity in different states of matter CO2: Understand the liquid and gas behaviour. CO3: Apply kinetic molecular theory of gas or the quantum mechanical theory of the atom to the solution of general chemistry problem. CO4: Analyze and solve quantitative chemistry problems. CO5: Evaluate and Gain knowledge about isomerism. CO6: Elaborate the stereochemistry and aromaticity	
7	Course Description	The completion of this course students will be able to know about atomic structures, state of matter, fundamental of organic chemistry etc.	
8	Outline syllabus		CO Mapping
	Unit 1	Atomic Structure	CO1
	A	Bohr's theory and its limitations, dual behaviour of matter and radiation, de Broglie relation, Heisenberg Uncertainty principle	
	B	Hydrogen atom spectra. Radial and angular parts of the hydrogenic wavefunctions (atomic orbitals) and their variations for 1s, 2s, 2p, 3s, 3p and 3d orbitals (Only graphical representation).	
	C	Significance of quantum numbers, orbital angular momentum and quantum numbers m_l and m_s . Shapes of s, p and d atomic orbitals, nodal planes. Spin quantum number (s) and magnetic spin quantum number (m_s). Rules for filling electrons in various orbitals, Electronic configurations of the atoms. Stability of half-filled and completely filled orbitals, Anomalous electronic configurations.	
	Unit 2	Liquid and Solid State	CO2

	A	Liquid State: Intermolecular forces, structure of liquids (a qualitative description). Structural differences between solids, liquids and gases. Liquid crystals: Difference between liquid crystal, solid and liquid. Classification, structure of nematic, smectic and cholesteric phases and applications.	
	B	Solid State: Definition of space lattice and unit cell. Laws of crystallography: (i) Law of constancy of interfacial angles (ii) Law of rationality of indices (iii) Law of symmetry – Symmetry elements in crystals	
	C	X-ray diffraction: Derivation of Bragg's equation. Determination of crystal structure of NaCl and KCl. A brief introduction to point defects in crystals. Semiconductors, superconductors and nanomaterials (only qualitative idea).	
	Unit 3	Gaseous State	CO3
	A	Gaseous States: Postulates of kinetic theory of gases, Gas Laws, deviation from ideal behaviour, van der Waals equation of state. Relationship between critical constants and van der Waals constants, the law of corresponding states	
	B	Molecular Velocities: Root mean square, average and most probable velocities.	
	C	Qualitative discussion of the Maxwell's distribution of molecular velocities, collision number, mean free path and collision diameter. Liquefaction of gases	
	Unit 4	Fundamental of Organic Chemistry Physical Effect, Electronic Displacements – I	CO4
	A	Classification of hydrocarbons. Nomenclature, methods of preparations, physical characteristics and chemical reactions of alkanes, cycloalkanes, alkenes and alkynes.	
	B	Electromeric Effect, Resonance and Hyperconjugation. Cleavage of Bonds: Homolysis and Heterolysis	
	C	Structure, shape and reactivity of organic molecules: Nucleophiles and electrophiles. Reactive Intermediates: Carbocations, Carbanions and free radicals. Strength of organic acids and bases: Comparative study with emphasis on factors affecting pK values.	
	Unit 5	Fundamental of Organic Chemistry Physical Effect, Electronic Displacement – II	CO5, CO6
	A	Aromaticity: Benzenoids and Hückel's rule. Stereochemistry Conformations: Ethane, butane and cyclohexane	

	B	Interconversion of Wedge Formula, Newmann, Sawhorse and Fischer representations. Concept of chirality (up to two carbon atoms).			
	C	Configuration: Geometrical and Optical isomerism; Enantiomerism, Diastereomerism and Meso compounds. Threo and erythro; D and L; cis – trans nomenclature; CIP Rules: R/ S (for upto 2 chiral carbon atoms) and E / Z Nomenclature (for up to two C=C systems).			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	M. Barrow: Physical Chemistry Tata McGraw Hill (2007).			
	Other References	Cotton & G. Wilkinson: Basic Inorganic Chemistry, John Wiley, Miessler, G. L. & Donald, A. Tarr. Inorganic Chemistry 3 rd Ed.(adapted), Pearson, 2009 ISBN			

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	1	2	-	-	1	1	1
CO2	2	2	2	2	2	2	1	2	2	1	-	1
CO3	2	2	2	-	1	2	2	2	-	-	2	-
CO4	2	2	2	2	1	1	2	1	-	-	1	-
CO5	2	1	3	1	2	2	3	1	1	1	-	1
CO6	1	1	2	-	2	2	2	2	1	-	-	1
	1.83	1.67	2.00	1.75	1.67	1.67	2.00	1.60	1.33	1.00	1.33	1.00

School: SSAHS		Batch: 2023-2027	
Programme: FSB		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: II	
1	Course Code	FSU168	
2	Course Title	Chemistry I (Lab)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	1. To use purification of organic compound by crystallization. 2. To have an overview of the detection of extra elements in inorganic compounds. 3. To develop knowledge about the end point of HCl by titration.	
6	Course Outcomes	Students will be able to CO1 Understand and prepare the solution with different molarity CO2: Gain knowledge about the estimation of Fe. CO3: Apply the knowledge for the purification of organic compound by crystallization. CO4: Analysis and detection of extra element in inorganic compounds. CO5: Evaluate and determine the end point of HCl by titration with NaOH CO6: Estimate the purity of compound on the basis of titration	
7	Course Description	With the ending of this curriculum students will be having the basic knowledge about different methods like titration and crystallization and also have the overview of detection of organic and inorganic compounds.	
8	Outline syllabus		CO Mapping
	Unit 1	Preparation of solution with different molarity specially NaOH and standardization of NaOH using an indicator. To prepare the N/5 oxalic acid and use it to standardize given NaOH solution. Determination of Zinc(II) by EDTA Method Determination of Nickel(II) by EDTA Method	CO1
	Unit 2	Estimation of Fe(II) ions by titrating it with K ₂ Cr ₂ O ₇ using internal indicator. Estimation of Fe(II) and Fe(III) in a Given Mixture using K ₂ Cr ₂ O ₇ Solution. Determination of Zinc(II) by Potassium Ferrocyanide Method	CO2
	Unit 3	Purification of organic compound by crystallization (from Water).	CO3

	Unit 4	Detection of extra elements in Inorganic Compound			CO4
	Unit 5	To determine the end point of HCl by titration it with NaOH volumetrically			CO5,CO6
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	B.D Khosla- Chemistry Practical book			
	Other References	Ahluwalia- Chemistry Practical Book			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	1	1	2	2	2	2	2	2	1	1	-
CO2	2	3	2	2	2	2	2	2	1	2	2	1
CO3	1	2	2	3	1	2	2	3	1	2	1	1
CO4	3	3	2	2	2	3	3	2	3	1	2	2
CO5	1	2	2	2	1	2	2	1	2	2	1	1
CO6	1	2	3	-	2	2	1	1	2	1	-	-
	1.67	2.17	2.00	2.20	1.67	2.17	2.00	1.83	1.83	1.50	1.40	1.25

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: II	
1	Course Code	FSU119	
2	Course Title	Zoology II	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	After studying this paper the students will be – 1-know the structure and purpose of basic components of cell biology 2- Understand about the types of the cell organelles. 3-able to know the Mendel's law of inheritance and DNA.	
6	Course Outcomes	Students will be able to CO1:Describe the function and composition of plasma membrane CO2: Understand the role of ER, Golgi complex and Mitochondria. CO3: Illustrate about the cyto skeleton and concepts of cell division. CO4: Analyze the concept of law of dominance, Independent Assortment and Mendal's law CO5: Evaluate the Mutations and types of mutation. CO6:Discuss the DNA replication and their process	
7	Course Description	The completion of this course student will be able to know all about cell and cell organelles, cell division.	
8	Outline syllabus		CO Mapping
	Unit 1	Cytology- I	CO1
	A	Ultra-structure of different cell organelles of animal cell: Prokaryotic and Eukaryotic cells,	
	B	Plasma Membrane: Fluid mosaic model	
	C	Various modes of transport across the membrane, mechanism of active and passive transport, endocytosis, and exocytosis.	
	Unit 2	Cytology- II	CO2
	A	Endoplasmic reticulum (ER): types, role of ER in protein synthesis and transportation in animal cell.	
	B	Golgi complex: Structure, Associated enzymes and role of Golgi-complex in animal cell, Lysosomes: Structure, enzyme and their role; polymorphism	
	C	Mitochondria: Mitochondrial DNA; as semiautonomous body, biogenesis, mitochondrial enzymes (only names), role of mitochondria, Ribosomes: Types, biogenesis and role in protein synthesis.	
	Unit 3	Cytology- III	CO3
	A	Cytoskeleton: Microtubules, microfilaments, intermediate filaments, centriole and basal body. Cilia and Flagella	
	B	Nucleus Structure of Nucleus: Nuclear envelope, Nuclear pore complex, Nucleolus Chromatin: Euchromatin and	

		Hetrochromatin, lampbrush chromosomes and polytene chromosomes	
C		Cell Division: Mitosis, Meiosis, Cell cycle and its regulation.	
Unit 4	Genetics- I		CO4
A		Concept of Dominance (Complete, Incomplete, and Co-dominance); Laws of Heredity: Segregation, Independent Assortment, Molecular biology of wrinkled seed; Test Cross, Back Cross.	
B		Mendel's law of inheritance and Multiple Allelism in Human Blood System.	
C		Sex chromosome system and sex determination in Humans	
Unit 5	Genetics- II		CO5,CO6
A		Chemistry of nucleic acids, DNA as genetic materials and Structural variants of DNA.	
B		DNA replication: Process, origin of replication, unwinding of DNA helix, role of primers, elongation.	
C		Mutation and types of mutation, Genetic Anomaly /Disorders/syndrome:- Down Syndrome, Turner's syndrome, Klinefelter syndromes chronic myeloid leukemia and "cri –du –chat" syndrome.	
Mode of examination		Theory	
Weightage Distribution	CA	MTE	ETE
	15%	10%	75%
Text book/s*	Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6 th Edition. John Wiley & Sons. Inc.		
Other References	Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5 th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.		

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	2	2	1	2	2	1	1	2	1
CO2	2	3	2	2	2	2	2	2	2	1	2	-
CO3	1	2	2	2	3	2	3	3	2	2	1	2
CO4	3	3	2	3	2	3	2	1	1	1	-	1
CO5	2	2	3	1	2	2	1	2	2	1	2	1
CO6	1	1	2	2	3	1	2	1	1	-	-	2
	1.83	2.33	2.00	2.00	2.33	1.83	2.00	1.83	1.50	1.20	1.75	1.40

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: II
1	Course Code	FSU169
2	Course Title	Graphology and Handwriting Analysis
3	Credits	3
4	Contact Hours (L-T-P)	0-1-4
	Course Status	Minor Elective (VOC)
5	Course Objective	Learning Objectives: After studying this paper the students will know – a. students should be able to understand the basics of many key areas within this subject. b. Behavioural analysis of person through handwriting and signatures. c-To provide knowledge about features of handwriting and signatures.
6	Course Outcomes	Students will be able to CO1: Observe the handwriting features from many angles. CO2: Identify the personality of a person by hand writing examination CO3: Observe the signature features from many angles. CO4: Analyse the personality of a person by signature examination. CO5: Evaluate the criminality of a person on the basis of graphology. CO6: Predict the unconscious forces which effect the thought and feeling
7	Course Description	Graphology can be used for investigation or in business To read characters/mind reading deeply To impress; to shock; to learn about yourself; to know who likes or who does not like you; friends; family; enemies etc. To guide others in need; to uncover undesirable traits in people like potential employees for example. To see anger issues; tension; deception. To possibly find a potential partner; to avoid the criminal and so much more.
8	Outline syllabus	CO Mapping
	Unit 1	Characteristics of handwriting
		To identify the different characteristics of handwriting Identify the class characteristics of handwriting Identify the individual characteristics of handwriting
	Unit 2	Personality of an individual
		To analysis the personality of a person through handwriting examination Examine various strokes and their relation to personality of an individual Identify the personality from word Spacing Identify the personality from Line Spacing

	Unit 3	Characteristics of signature	CO3,CO6		
		To identify the different characteristics of signature Identify the class characteristics of signature Identify the individual characteristics of signature			
	Unit 4	Personality of a person through signature	CO4		
		To analysis the personality of a person through signature examination Position of signature with the personality Types of signature and relation with personality			
	Unit 5	Identify the criminal behaviour	CO5		
		To investigate the criminality in handwriting. Identify the criminal behaviour by handwriting Identify the type of criminal by handwriting			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	Laboratory Manual			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	-	3	3	3	2	2	3	1	1	2	-	1
CO2	-	2	3	2	3	2	2	1	2	2	-	2
CO3	-	2	2	2	-	1	2	1	1	2	-	2
CO4	-	3	3	3	3	-	3	2	2	2	-	-
CO5	-	2	1	1	2	2	2	1	2	1	-	2
CO6	-	2	3	2	-	2	2	2	1	1	-	1
	0.00	2.33	2.50	2.17	2.50	1.80	2.33	1.33	1.50	1.67	0	1.60



Schools: SET SOL SMFE SBS-BBA SBSR SOE SAP		
		Batch : 2023-2027
		Semester: II
1	Course Code	ARP102
2	Course Title	Communicative English -2
3	Credits	2
4	Contact Hours (L-T-P)	1-0-2
5	Course Objective	To Develop LSRW skills through audio-visual language acquirement, creative writing, advanced speech et al and MTI Reduction with the aid of certain tools like texts, movies, long and short essays.
6	Course Outcomes	<p>After completion of this course, students will be able to:</p> <p>CO1 Acquire Vision, Goals and Strategies through Audio-visual Language Texts</p> <p>CO2 Synthesize complex concepts and present them in creative writing</p> <p>CO3 Develop MTI Reduction/Neutral Accent through Classroom Sessions & Practice</p> <p>CO4 Determine their role in achieving team success through defining strategies for effective communication with different people</p> <p>CO5 Realize their potentials as human beings and conduct themselves properly in the ways of world.</p> <p>CO6 Acquire satisfactory competency in use of Quantitative aptitude and Logical Reasoning</p>
7	Course Description	The course takes the learnings from the previous semester to an advanced level of language learning and self-comprehension through the introduction of audio-visual aids as language enablers. It also leads learners to an advanced level of writing, reading, listening and speaking abilities, while also reducing the usage of L1 to minimal in order to increase the employability chances.

8	Outline syllabus - ARP 102		
	Unit A	Acquiring Vision, Goals and Strategies through Audio-visual Language Texts	CO Mapping
	Topic 1	Pursuit of Happiness / Goal Setting & Value Proposition in life	CO1
	Topic 2	12 Angry Men / Ethics & Principles	
	Topic 3	The King's Speech / Mission statement in life strategies & Action Plans in Life	
	Unit B	Creative Writing	
	Topic 1	Story Reconstruction - Positive Thinking	CO2
	Topic 2	Theme based Story Writing - Positive attitude	
	Topic 3	Learning Diary Learning Log – Self-introspection	
	Unit C	Writing Skills 1	
	Topic 1	Precis	CO2
	Topic 2	Paraphrasing	
	Topic 3	Essays (Simple essays)	
	Unit D	MTI Reduction/Neutral Accent through Classroom Sessions & Practice	
	Topic 1	Vowel, Consonant, sound correction, speech sounds, Monothongs, Diphthongs and Triphthongs	CO3
	Topic 2	Vowel Sound drills , Consonant Sound drills, Affricates and Fricative Sounds	
	Topic 3	Speech Sounds Speech Music Tone Volume Diction Syntax Intonation Syllable Stress	
	Unit E	Gauging MTI Reduction Effectiveness through Free Speech	
	Topic 1	Jam sessions	CO3
	Topic 2	Extempore	
	Topic 3	Situation-based Role Play	
	Unit F	Leadership and Management Skills	
	Topic 1	Innovative Leadership and Design Thinking	CO4
	Topic 2	Ethics and Integrity	CO4
	Unit F	Universal Human Values	
	Topic 1	Love & Compassion, Non-Violence & Truth	CO5
	Topic 2	Righteousness, Peace	CO5
	Topic 3	Service, Renunciation (Sacrifice)	CO5
	Unit G	Introduction to Quantitative aptitude & Logical Reasoning	
	Topic 1	Analytical Reasoning & Puzzle Solving	CO6
	Topic 2	Number Systems and its Application in Solving Problems	CO6
9	Evaluations	<i>Class Assignments/Free Speech Exercises / JAM Group Presentations/Problem Solving Scenarios/GD/Simulations (60% CA and 40% ETE</i>	N/A

10	Texts & References Library Links	<ul style="list-style-type: none"> Wren, P.C.&Martin H. <i>High English Grammar and Composition</i>, S.Chand& Company Ltd, New Delhi. Blum, M. Rosen. <i>How to Build Better Vocabulary</i>. London: Bloomsbury Publication Comfort, Jeremy(et.al). <i>Speaking Effectively</i>. Cambridge University Press. <p>The Luncheon by W.Somerset Maugham - http://mistera.co.nf/files/sm_luncheon.pdf</p>	
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COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO1 0	PO1 1	PO1 2	PS O1	PSO 2	PSO 3
ARP102.1	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
ARP102.2	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
ARP102.3	-	-	-	-	-	-	-	-	1	3	1	2	-	-	-
ARP102.4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP102.5	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP102.6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
									1	2.5	1	2			



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Third semester

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: III
1	Course Code	FSU201
2	Course Title	Forensic Biology and Serology
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	1-Complete and thorough knowledge regarding the various aspects of forensic serology. 2- Develop and apply critical thinking and analytical skill of serology 3-Explains the key concept in examination of blood and other biological fluids.
6	Course Outcomes	Students will be able to CO1: Know the tests for identification of blood stains. CO2: Understand the methods and procedures for identification of seminal stains and other body fluids CO3: Apply the methods of physics and forensic science for Blood spatter analysis CO4: Analyze and differentiate animal and human hair. CO5: determine the individuality with the help of Serogenetic markers CO6: Create knowledge about hair growth, Phases of growth and growth rate
7	Course Description	After the completion of this course students will be able to have the knowledge of differentiation between human and animal remains, about genetics related to Investigation and also all about the body fluids.
8	Outline syllabus	CO Mapping
	Unit 1	Blood Stains
	A	Components of Blood
	B	Identification of blood stains: Presumptive tests- Benzidine test, Phenolphthalein test, Leucomalachite test, Tetra-Methylbenzidine test and O-Tolidine, Luminol test.
	C	Confirmatory tests- Haemochromogen test, Haematin test and Haemin test.
	Unit 2	Seminal Stains and other body fluids
		CO2

A	Composition, functions and morphology of spermatozoa			
B	Identification of seminal stains- Presumptive Tests-Acid Phosphatase Test, Barberios Test and Florence Crystal Test. Confirmatory Test -Sperm Detection.			
C	Body fluids: Forensic significance of other body fluids as Saliva, Sweat and fecal matters, their collection			
Unit 3	Bloodstain Pattern Analysis (BPA):			CO3
A	Biological and physical properties of human blood, Droplet Directionality from bloodstain patterns,			
B	Determination of Point of Convergence and Point of Origin, Impact spatter and mechanisms,			
C	Importance and Legal aspects of BPA.			
Unit 4	Hair			CO4,CO6
A	Hair structure. Hair growth. Phases of growth and growth rate.			
B	Hair characteristics from various body parts. Sex, age and race from hair.			
C	Forensic examination and comparison of hair. Human vs. animal hair. Forensic significance of hair.			
Unit 5	Serogeneticmarkers:			CO5
A	Blood groups– biochemistry and genetics of ABO, Rh, Mn systems			
B	Determination of secretor/non secretor.			
C	Lewisantigen, Bombay Blood group,			
Mode of examination	Theory			
Weightage Distribution	CA	MTE	ETE	
	15%	10%	75%	
Text book/s*	Dr. R. Krishnamurthy- Forensic biology			
Other References	R.Li- Forensic biology			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	1	2	2	1	1	2	2	1	-	2
CO2	3	2	2	2	2	2	1	1	2	-	1	2
CO3	2	1	2	1	3	2	2	1	2	2	1	2
CO4	2	1	2	1	2	2	2	1	2	2	2	1
CO5	2	2	2	2	3	1	2	2	3	1	-	-
CO6	1	2	3	2	3	2	1	2	2	1	2	2
	2.00	1.67	2.00	1.67	2.50	1.67	1.50	1.50	2.17	1.40	1.50	1.80

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: III	
1	Course Code	FSU257	
2	Course Title	Forensic Biology and Serology (Lab)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	Students will know about the difference between human and animal hair. They will also learn about the examination of blood and other biological fluids by chemical tests.	
6	Course Outcomes	Students will be able to CO1: Microscopically examine and differentiate between human and animal hair. CO2: Understand the procedure of Preliminary examination of human blood. CO3: Evaluate the methods of collection, packaging and forwarding of various biological fluids. CO4: Analyze the correlation between impact angle and shape of bloodstains CO5: Apply the methods for preliminary examination of biological fluids. CO6: Elaborate the test on a blood sample and other biological fluid.	
7	Course Description	After the completion of this course students will be able to have the knowledge of human biological samples and determine their presence by chemical tests.	
8	Outline syllabus		CO Mapping
	Unit 1	Hair	CO1
		Microscopic examination of human hair To examine human hair for cortex and medulla. Examination of hair of different domestic animals as cat, dog, cow, horse and goat. Prepare permanent slide of hair. To prepare slides of scale pattern of human hair. To study the effect of burning/singeing on hair. To study the crushing of hair.	CO2, CO6
	Unit 2	Blood and Seminal stains	
		To identify blood samples by chemical tests. To carry out the crystal test on a blood sample.	

		To determine blood group from fresh blood samples. RH factor of human blood To identify seminal stains by chemical tests. To carry out the crystal test on a seminal stains.	
	Unit 3	Biological evidence collection	CO3
		Collection of various biological fluids. Packaging and forwarding of various biological fluids.	
	Unit 4	Blood spatter analysis	CO4
		To study the correlation between impact angle and shape of bloodstain. To identify the point of convergence from the bloodstain patterns.	
	Unit 5	Biological fluids	CO5
		To identify the given stain as saliva. To identify the given stain as urine. To identify the given stain as sweat.	
	Mode of examination	Practical/Viva	
	Weightage	CA	CE
	Distribution	25%	25%
		ETE	50%
	Text book/s*	FSL Manual	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	3	2	2	2	1	1	1
CO2	3	3	2	1	2	2	1	-	2	2	2	1
CO3	1	2	2	2	1	1	2	2	1	2	2	1
CO4	1	1	3	1	2	1	-	3	2	2	1	1
CO5	2	1	3	2	1	2	3	2	1	2	2	2
CO6	2	2	3	2	2	2	1	1	2	2	-	2
	1.83	2.00	2.33	1.83	1.67	1.83	1.80	2.00	1.67	1.83	1.60	1.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: III	
1	Course Code	FSU207	
2	Course Title	Forensic Anthropology and Odontology	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	1- Describe human skeletal system. 2- Personal identification of the individual. 3- To learn about forensic odontology.	
6	Course Outcomes	Students will be able to CO1: Know about human bones and determination of age, sex and stature. CO2: Able to identify the individual by various characteristics. CO3: Apply methods of personal identification. CO4: Analyse the importance of teeth in personal identification. CO5: Evaluate the bite marks and their correlation with the suspected person. CO6: Build the knowledge of Eruption sequence, Gustafson's method, dental anomalies, their Significance in personal identification.	
7	Course Description	After completion of this course student will be able to know about the Investigation and examination of chemicals, toxicological elements.	
8	Outline syllabus		CO Mapping
	Unit 1	Human skeletal system:	CO1
	A	Introduction to Human skeleton, Classification of human bones.	
	B	Determination of Age and sex from human bones.	
	C	Determination of Race and estimation of stature from skeletal remains.	
	Unit 2	Personal Identification – Somatoscopy and Somatometry	CO2
	A	Somatoscopy – observation of hair on head, forehead, eyes, root of nose, nasal bridge, nasal tip, chin, Darwin's tubercle, ear lobes, supra-orbital ridges, physiognomic ear breadth, circumference of head.	
	B	Scar marks and occupational marks.	

	C	Somatometry – measurements of head, face, nose, cheek, ear, hand and foot, body weight, height – Indices – cephalic index, nasal index, cranial index, upper facial index.			
	Unit 3	Facial Reconstruction			CO3
	A	Portrait Parle/ Bertillon system. Photofit / identi kit.			
	B	Facial superimposition techniques –Cranio facial super imposition techniques			
	C	Photographic super imposition			
	Unit 4	Forensic Odontology:			
	A	Development and scope, role in mass disaster			
	B	Types of human teeth and their functions			
	C	Determination of age from teeth: Eruption sequence, Gustafson's method, dental anomalies, their Significance in personal identification.			CO4,CO6
	Unit 5	Bites marks:			CO5
	A	Forensic significance, collection and preservation of bite marks,			
	B	photography of bite marks, and evaluation of bite marks			
	C	Legal aspects of bite marks.			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text books	Reddy,V.R; Dental Anthropology, Inter-India Publication, New Delhi, 1985. 2. Singh, I.P. &Bhasin M.K; A manual of biological Anthropology, Kamla Raj Enterprises, New Delhi, 2004.			
	Other References	Kroeber; Anthropology, Oxford & IBH Publishing Company, New Delhi, 1972. 4. Pickering, R. & Bachman D; The use of Forensic Anthropology, CRC Press, Costa Rica, 2009.			

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	3	2	2	2	3	2	2	1	1	1
CO2	3	3	3	2	2	2	1	1	1	2	1	1
CO3	3	2	1	2	1	2	2	3	3	2	1	1
CO4	3	2	2	3	3	2	2	2	2	2	1	2
CO5	2	1	1	1	2	2	3	-	2	2	1	2
CO6	1	3	2	2	1	3	2	2	-	2	2	1
	2.33	2.17	2.00	2.00	1.83	2.17	2.17	2.00	2.00	1.83	1.17	1.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: III	
1	Course Code	FSU208	
2	Course Title	Chemistry II	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	After studying the students will Able to recognize to write the mechanism of electrophilic aromatics substitution Fundamental understanding and application of thermodynamics. Understand the general trends in chemistry behind s and p block element	
6	Course Outcomes	Students will be able to CO1: Understand the basic of thermodynamics. CO2:Distinguish between spontaneous and non-spontaneous process. CO3:Predict chemical and physical properties of elements and compound in s blocks CO4: Analyze chemical and physical properties of elements and compound in p blocks CO5: Evaluate the concept of aromaticity and the main property of aromatic compounds CO6:Evluate the Friedel-Craft's reaction	
7	Course Description	After the completion of this course students will be able to develop a sense of process of purification of organic compound and also have the knowledge of different chemical compounds in the mixture.	
8	Outline syllabus		CO Mapping
	Unit 1	Chemical Thermodynamics I	CO1
	A	What is thermodynamics? State of a system, state variables, intensive and extensive variables, concept of heat and work, thermodynamic equilibrium, thermodynamic properties, various types of systems and processes.	
	B	First Law of thermodynamics. Calculation of work (w), heat (q), changes in internal energy (QU) and enthalpy (QH) for expansion or compression of ideal gases under isothermal and adiabatic conditions for both reversible and irreversible processes.	
	C	Calculation of w , q , QU and QH for processes involving changes in physical states.	
	Unit 2	Chemical Thermodynamics II	CO2
	A	Various statements of Second Law of thermodynamics, concept of entropy, Gibbs free energy and Helmholtz energy, Calculations of entropy change and free energy change for reversible and irreversible processes under isothermal and adiabatic conditions.	

	B	Criteria of spontaneity. Gibbs – Helmholtz equation. Maxwell's relations.	
	C	Statement of Third Law of thermodynamics and calculation of absolute entropies of substances.	
	Unit 3	Compounds of s block elements	CO3
	A	Concept of multicentre bonding (diborane).	
	B	Structure, bonding and their important properties like oxidation/reduction, acidic/basic nature of the following compounds.	
	C	Their applications in industrial, organic and environmental chemistry.	
	Unit 4	Compound of p block elements	CO4
	A	Hydrides and their classification (ionic, covalent and interstitial), structure and properties with respect to stability of hydrides of p- block elements.	
	B	Hydrides of nitrogen (NH ₃ , N ₂ H ₄ , N ₃ H, NH ₂ OH). Oxoacids of P, S and Cl.	
	C	Halides and oxohalides: PCl ₃ , PCl ₅ , SOCl ₂ and SO ₂ Cl ₂ .	
	Unit 5	Aromatic Hydrocarbons	CO5,CO6
	A	Preparation (Case benzene): from phenol, by decarboxylation, from acetylene, from benzene.	
	B	Sulphonic acid. Reactions: (Case benzene): Electrophilic substitution: nitration, halogenation and sulphonation. Friedel-Craft's reaction (alkylation and acylation). (Upto 4 carbons on benzene).	
	C	Side chain oxidation of alkyl benzenes (Upto 4 carbons on benzene).	
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	Arun Bahl and B. S. Bahl: Advanced Organic Chemistry, S. Chand	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	1	2	1	1	2	2	2	2	2	1	1	2
CO2	1	2	2	2	2	2	2	-	2	2	2	1
CO3	2	2	2	2	2	3	3	2	2	1	2	2
CO4	1	2	3	3	2	2	2	1	1	3	1	2
CO5	1	2	2	2	2	1	1	3	2	1	1	1
CO6	2	1	3	2	2	2	2	2	3	1	1	-
	1.33	1.83	2.17	2.00	2.00	2.00	2.00	2.00	2.00	1.50	1.33	1.60

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: III
1	Course Code	FSU258
2	Course Title	Chemistry II (Lab)
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	After studying this paper the students will know – 1. To develop a sense for purification of organic compound. 2. To have an overview estimate of sodium carbonate. 3. To have the knowledge of different chemical compounds in the mixture.
6	Course Outcomes	Students will be able to CO1: Learn the process of crystallization and distillation. CO2: Estimate different chemical compounds in a mixture. CO3: Differentiate between anions and cations with the help of qualitative analysis. CO4: Understand the estimation of sodium carbonate. CO5: Determine how to estimate carbonate and bicarbonate present in a mixture. CO6: Estimate the percentage of compound in the mixtures of different organic compound
7	Course Description	After the completion of this course students will be able to develop a sense of process of purification of organic compound and also have the knowledge of different chemical compounds in the mixture.
8	Outline syllabus	CO Mapping
	Unit 1	Design the assembly of simple distillation. Purification of especially compounds by crystallization (from water and alcohol) and distillation Filtration/Purification of organic compounds by recrystallization using Alcohol (naphthalene) Filtration/Purification of organic compounds by recrystallization Alcohol-Water (Aspirin from tablet)
	Unit 2	Semi-micro qualitative analysis using H ₂ S of mixtures not more than four ionic species (two anions and two cations and excluding insoluble salts) out of the following: Cations: Al ³⁺ , Ca ²⁺ , K ⁺ , Anions: Cl ⁻ , Br ⁻ , I ⁻ , F. Detection of extra elements (N, S, Cl, Br, I) in organic compounds (containing upto two extra elements).

	Unit 3	Estimation of sodium carbonate using standardized HCl.			CO3
	Unit 4	Estimation of carbonate and hydroxide present together in a mixture. To determine the solubility of an organic acid (oxalic acid) in water at room temperature.			CO4
	Unit 5	Estimation of carbonate and bicarbonate present together in a mixture.			CO5,CO6
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	B.D Khosla- Chemistry Practical book			
	Other References	Ahluwalia- Chemistry Practical Book			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	1	2	2	3	2	1	1
CO2	1	2	2	2	1	2	2	2	3	1	2	2
CO3	1	1	2	2	2	2	3	2	2	1	2	2
CO4	1	1	2	2	3	2	2	2	2	2	2	1
CO5	2	2	2	2	1	2	2	2	1	2	1	1
CO6	1	2	2	2	2	2	3	2	2	2	1	1
	1.33	1.67	2.00	1.83	1.83	1.83	2.33	2.00	2.17	1.67	1.50	1.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: III	
1	Course Code	FSU209	
2	Course Title	Zoology III	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Elective	
5	Course Objective	1- Able to know the basics of microbiology. 2- To get knowledge about phycology, mycology, virology and protozoology. 3- Forensic importance of pollen grains and diatoms.	
6	Course Outcomes	Students will be able to CO1: Know about Bacterial cell structure, nutrition and reproduction. CO2: Understand the general characteristics of Algae and Lichens. CO3: Understand the general characteristics of fungi and protozoa. CO4: Analyze the virus and bacteriophage on the basis of general characteristics. CO5: Evaluate the diatoms and pollen grains in crime investigation. CO6 : Improve knowledge about Lichens, ectomycorrhiza and endomycorrhiza.	
7	Course Description	The completion of this course students will have a knowledge of microbiology along with their culture process and also about carbohydrates, lipids and proteins.	
8	Outline syllabus		CO Mapping
	Unit 1	Microbiology	CO1
	A	Introduction: Microbial nutrition, growth and metabolism.	
	B	Bacteria: General characteristics; Cell structure; Nutritional types	
	C	Reproduction-vegetative, asexual and recombination (conjugation, transformation and transduction).	
	Unit 2	General Phycology	CO2,CO6
	A	Algae: General characteristics	
	B	Algae: Cell structure and components; cell wall, pigment system, flagella; methods of reproduction.	
	C	Lichens: General account, reproduction. Mycorrhiza: ectomycorrhiza and endomycorrhiza.	
	Unit 3	General Mycology and Protozoology	CO3

	A	Fungi: Introduction- General characteristics	
	B	Fungi: Cell wall composition, nutrition, reproduction	
	C	Protozoa: Structure, Classification, Growth, and Development	
	Unit 4	General Virology	CO4
	A	Viruses: Classification and characteristics features of virus	
	B	The general structure of Virus	
	C	Bacteriophage and its multiplication: Lytic and lysogenic cycle	
	Unit 5	Forensic Importance of evidence	CO5
	A	Diatoms- General characteristics, classification and structure	
	B	Pollen grains- General characteristics, classification and structure	
	C	Significance of Diatoms and Pollen grains in crime investigation	
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	1. General Microbiology Stanier, Ingraham and Painter. 2. Environmental Microbiology Maier, Pepper and Garba.	
	Other References	Text Book of Microbiology Ananth Narayan & Panikar	

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	1	2	1	2	2	1	1	2	2	2	1	1
CO2	2	2	2	2	1	2	2	1	2	1	1	1
CO3	2	2	3	2	2	2	2	1	1	1	1	1
CO4	2	1	2	3	1	2	2	2	2	2	2	2
CO5	2	2	3	3	3	2	3	2	2	2	-	1
CO6	1	2	3	2	2	2	2	2	1	1	2	1
	1.67	1.83	2.33	2.33	1.83	1.83	2.00	1.67	1.67	1.50	1.40	1.17

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: III	
1	Course Code	FSU259	
2	Course Title	Food Adulteration	
3	Credits	3	
4	Contact Hours (L-T-P)	0-1-4	
	Course Status	Minor Elective (VOC)	
5	Course Objective	After studying this paper the students will know – a. To educate about common food adulterants and their detection. b. To impart knowledge in the legislative aspects of adulteration. c. To educate about standards and composition of foods and role of consumer	
6	Course Outcomes	Students will be able to CO1: Gain the knowledge about characteristics milk adulteration. CO2: Understand the testing methods of ghee adulteration. CO3: Apply the methods for detection of adulteration in oil and fats. CO4: Analyse spices and condiments adulteration. CO5: Gain the knowledge about the food adulteration CO6: Estimate the sources of adulteration in the edible oils	
7	Course Description	After the completion of this course students will be able to identify the adulteration in the different types of foods and drinks.	
8	Outline syllabus		CO Mapping
	Unit 1	Testing adulteration of Milk and products	CO1
		Detection of cane sugar in milk	
		Detection of starch in milk (Starch- iodide test):	
		Detection of added urea in milk	
		Detection of skimmed milk powder in milk	
	Unit 2	Testing adulteration of Adulteration of Ghee:	CO2
		Detection of Vanaspati in Ghee in Deshi Ghee	
		Detection of Refined vegetable oils in ghee	
	Unit 3	Testing adulteration of oils and fats:	CO3, CO6
		Detection of argemone oil in mustard oil	
		Detection of in mustard oil	
	Unit 4	Testing adulteration of spices and condiments.	CO4
		Detection of Metanil yellow in the turmeric powder	
		To detect the presence of starch of maize, wheat and rice in the turmeric	
		Examination of coriander powder	
		Detect the colored dye in the chilli powder	

	Unit 5	Food adulteration awareness campaign – know your food quality			CO5
		Analysis of consumer redressal through case study			
		Food adulteration awareness campaign			
	Mode of examination	Practical/Viva			
	Weightage	CA	CE	ETE	
	Distribution	25%	25%	50%	
	Text book/s*	Laboratory Manual			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	2	1	1	2	1	2	1	2	2
CO2	3	2	3	1	3	1	1	2	2	2	1	1
CO3	2	2	2	1	2	1	1	2	2	1	1	2
CO4	2	2	1	2	1	3	2	2	3	2	1	1
CO5	2	3	3	2	2	2	2	3	2	2	1	2
CO6	2	1	3	3	2	3	3	1	1	2	1	1
	2.17	2.17	2.17	1.83	1.83	1.83	1.83	1.83	2.00	1.67	1.17	1.50

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: FS		Semester: III	
1	Course Code	ARP207	Course Name: Logical Skills Building and Soft Skills
2	Course Title	Logical Skills Building and Soft Skills	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
	Course Status	Active	
5	Course Objective	To enhance holistic development of students and improve their employability skills. To provide a 360 degree exposure to learning elements of Business English readiness Programme, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To step up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a student will have entered the threshold of his/her 1 st phase of employability enhancement and skill building activity exercise.	
6	Course Outcomes	<p>After completion of this course, students will be able to:</p> <p>CO1: Ascertain a competency level through Building Essential Language and Life Skills</p> <p>CO2: Build positive emotional competence in self and learn GOAL Setting and SMART Goals techniques</p> <p>CO3: Apply positive thinking, goal setting and success-focused attitudes, time Management, which would help them in their academic as well as professional career</p> <p>CO4: Acquire satisfactory competency in use of aptitude, logical and analytical reasoning</p> <p>CO5: Develop strategic thinking and diverse mathematical concepts through building number puzzles</p> <p>CO6: Demonstrate an ability to apply various quantitative aptitude tools for making business decisions</p>	
7	Course Description	This Level 1 blended training approach equips the students for Industry employment readiness and combines elements of soft skills and numerical abilities to achieve this purpose.	

8	Outline syllabus - ARP 207		
	Unit 1	BELLS (Building Essential Language and Life Skills)	CO Mapping
	A	<i>Know Yourself: Core Competence. A very unique and interactive approach through an engaging questionnaire to ascertain a student's current skill level to design, architect and expose a student to the right syllabus as also to identify the correct TNI/TNA levels of the student.</i>	CO1
	B	Techniques of Self Awareness Self Esteem & Effectiveness Building Positive Attitude Building Emotional Competence	CO1, CO2
	C	Positive Thinking & Attitude Building Goal Setting and SMART Goals - Milestone Mapping Enhancing L S R W G and P (Listening Speaking Reading Writing Grammar and Pronunciation)	CO1, CO2,CO3
	Unit 2	Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical	
	A	Syllogism Letter Series Coding, Decoding , Ranking & Their Comparison Level-1	CO4
	B	Number Puzzles	CO5
	C	Selection Based On Given Conditions	CO5
	Unit 3	Quantitative Aptitude	
	A	Number Systems Level 1 Vedic Maths Level-1	CO6
	B	Percentage ,Ratio & Proportion Mensuration - Area & Volume Algebra	CO6
	Unit 4	Verbal Abilities - 1	
	A	Reading Comprehension	CO1
	B	Spotting the Errors	CO2
	Unit 5	Time & Priority Management	
	A	Steven Covey Time Management Matrix	CO3
	B	Creating Self Time Management Tracker	CO3
	Weightage Distribution	<i>Class Assignment/Free Speech Exercises / JAM - 60% Group Presentations/Mock Interviews/GD/ Reasoning, Quant & Aptitude - 40%</i>	
	Text book/s*	<i>Wiley's Quantitative Aptitude-P Anand Quantum CAT - Arihant Publications Quicker Maths- M. Tyra Power of Positive Action (English, Paperback, Napoleon Hill) Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness - Nathaniel Brandon Goal Setting (English, Paperback, Wilson Dobson</i>	

COs	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ARP203.1	-	-	-	-	1	-	-	-	1	3	-	2	-	-	-
ARP203.2	-	-	-	-	1	-	-	-	1	3	-	2	-	-	-
ARP203.3	-	-	-	-	1	-	-	-	1	3	-	2	-	-	-
ARP203.4	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP203.5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP203.6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
	1				1				1	2.5	1	2			



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Fourth Semester

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: IV	
1	Course Code	FSU218	
2	Course Title	Forensic Chemistry	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	1- Able to understand the various types of drugs and chemical substances encountered in an investigation. 2- To develop a basic level of knowledge about explosives. 3- Provides and introduction to the field of alcoholic beverages.	
6	Course Outcomes	CO1: Will be able to describe explosives and their investigation. CO2: Learn about the petroleum products and their analysis. CO3: To learn types of alcoholic beverages. CO4:Analyze the food additives and food adulterants. CO5: Identify the drugs by chemical analysis. CO6: Build knowledge about Barbiturates, Chloral hydrate and tranquilizers, LSD, Cocaine .	
7	Course Description	After completion of this course student will be able to know about the Investigation and examination of explosive evidence, petroleum products, alcoholic beverages and drugs of abuse.	
8	Outline syllabus		CO Mapping
	Unit I	Explosive Investigation	CO1
		Classification of explosives – low explosives and high explosives.	
		Homemade explosives	
		Bomb scene management. Searching the scene of explosion, Post blast residue collection and analysis.	
	Unit II	Petroleum Products	CO2
		Distillation and fractionation of petroleum.	
		Analysis of common petroleum products including, Petrol, Kerosene, Diesel as per BIS specifications.	
		Analysis of traces of petroleum products in forensic exhibits.	
	Unit III	Alcoholic Beverages	CO3
		Definition, classification of liquors based on origin (Indian Made Foreign Liquors, Country Made Liquors and Illicit Liquors)	

		Characteristics of Beer, wines and Whisky, Congeners in alcoholic beverages	
		Chemical analysis of Methanol, Ethanol, Denatured spirit	
	Unit IV	Food adulteration	CO4
		Definition of food and food adulteration, food additives and food adulterants.	
		Detection of common adulterants used in food products by physical and chemical methods	
		Prevention of Food Adulteration Act 1954	
	Unit V	Drugs	CO5
		Introduction and classification of Drugs of Abuse (Narcotics, Stimulants, Depressant and hallucinogens)	
		Analysis of Barbiturates, Chloral hydrate and tranquilizers.	CO6
		Examination of Heroin, Cocaine, LSD, Amphetamine, Benzodiazepines.	CO6
	Mode of examination		
	Weightage	CA	MTE
	Distribution	15%	10%
			ETE
			75%
	Text book/s*	Dr. S. N. Tiwari- Analytical methods in forensic Toxicology, Delvin S.- Explosives	
	Other References	Nicholas T Lappas- Forensic Toxicology	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	2	1	1	2	2	1	1	2
CO2	3	2	2	1	2	2	2	3	1	2	2	2
CO3	2	2	3	3	3	3	2	2	3	1	2	2
CO4	3	3	3	2	3	2	3	3	2	2	2	2
CO5	3	2	2	2	2	2	2	2	2	2	2	1
CO6	1	2	2	1	2	2	2	2	2	2	2	1
	2.33	2.33	2.17	2.00	2.33	2.00	2.00	2.33	2.00	1.67	1.83	1.67

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: IV	
1	Course Code	FSU267	
2	Course Title	Forensic Chemistry (Lab)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	Students will understand about the chemical test for identification of explosive residue and diesel and kerosene. They will learn detection methods of alcohol, food adulterants and drugs of abuse.	
6	Course Outcomes	Students will be able to CO1: Know the chemical test for identification of explosive residue CO2: Understand chemical test for identification of diesel and kerosene. CO3: Apply the various chemical methods for determination of alcohol compounds. CO4: Analyse the adulterants present in edible food products. CO5: Perform colour tests for barbiturates and opiates. CO6: Estimate the adulteration in food by chemical tests.	
7	Course Description	During this course students will perform various chemical tests for the presence of Explosives, petroleum products, alcohol, food adulterants and drugs of abuse.	
8	Outline syllabus		CO Mapping
	Unit 1	<ul style="list-style-type: none"> Processing and Investigation of scene of explosion Photography of scene of explosion Methods of sketching scene of explosion Collection of evidences from the scene of explosion. Packing and forwarding of evidences from the scene of explosion. To carry out chemical tests on explosive substances. To study the components of IED. 	CO1
	Unit 2	<ul style="list-style-type: none"> To carry out analysis of diesel. To carry out analysis of kerosene oil. Preparation of report. 	CO2
	Unit 3	<ul style="list-style-type: none"> To identify ethyl alcohol by chemical tests. To identify ethyl alcohol by breath analyzer To identify methyl alcohol by chemical tests. 	CO3

		<ul style="list-style-type: none"> • Preparation of report. 	
	Unit 4	<ul style="list-style-type: none"> • To determine the adulteration in milk by chemical tests. • To determine the adulteration in milk products by chemical tests. • To determine the adulteration in spices by chemical tests. • To determine the adulteration in ghee and oil by chemical tests. • Preparation of report. 	CO4,CO6
	Unit 5	<ul style="list-style-type: none"> • To perform colour tests for barbiturates. • To perform colour tests for opiates. • To perform colour tests for Benzodiazepines. • To perform colour tests for amphetamines. • Preparation of report. 	CO5
	Mode of examination	Practical/Viva	
	Weightage	CA	CE
	Distribution	25%	25%
			ETE
			50%
	Text book/s*	Forensic Science Laboratory Manual	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	1	2	-	1	1	1	1
CO2	2	3	2	2	2	2	1	2	2	1	1	1
CO3	3	3	3	3	3	3	2	2	2	2	2	1
CO4	2	2	2	2	2	2	3	3	3	2	1	2
CO5	1	2	3	1	2	2	3	2	1	1	2	1
CO6	1	1	2	2	1	2	2	2	1	2	2	1
	2.00	2.17	2.33	2.00	2.00	2.00	2.17	2.20	1.67	1.50	1.50	1.17

School: SSAHS		Batch: 2023-2027	
Programme: FSB		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: IV	
1	Course Code	FSU219	
2	Course Title	Forensic Toxicology	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	1- Able to understand the various types of poisons and their methods of isolation. 2- To develop a basic level of knowledge about the health hazards of animal and vegetable poisons. 3- Provides a basic information about pesticides.	
6	Course Outcomes	CO1: Will be able to describe varied toxicological science & symptoms of different toxins on body when administered. CO2: Learn about the basics of Insecticides and Pesticides. CO3: able to understand the various methods of isolation of poisons. CO4: Introduction to Heavy metals and their isolation from tissue. CO5: Able to determine the signs and symptoms of Animal and Vegetable Poisons. CO6: Build the methods of collection and preservation of toxicological exhibits in fatal and survival cases, medico-legal aspects.	
7	Course Description	After completion of this course student will be able to know about the various types of poisons, their isolation and examination in laboratory.	
8	Outline syllabus		
	Unit I	Introduction and classification of poison	CO1
		Introduction, History and Pioneers (Paracelsus, Mary Blandy James Marsh and M. J. B. Orfila),	
		Introduction and concept of toxicology: LD 50, LC 50, Lethal dose, lethal period, Fatal period and its forensic significance;	
		Poisons: classification of poisons, types of poisoning, Absorption, Metabolism and Excretion of toxins, collection and preservation of toxicological exhibits in fatal and survival cases, medico-legal aspects.	CO6
	Unit II	Insecticides and Pesticides	CO2
		Organophosphorous compounds- Nature, administration, symptoms, post-mortem findings, detection, estimation and medico-legal aspects.	
		Organochloro Compounds- Nature, administration, symptoms, post-mortem findings, detection, estimation and medico-legal aspects.	

		Carbamates- Nature, administration, symptoms, post-mortem findings, detection, estimation and medico-legal aspects.	
	Unit III	Isolation techniques of poisons	CO3
		Isolation methods of chemical substances from viscera and other relevant materials- Non-volatile organic poisons: - Stas-Otto Method, Ammonium Sulphate Method, Tungstate and Acid Digest Method,	
		Toxic cations (Metals)- Dry Ashing & Wet Digestion Methods,	
		Toxic Anions, Dialysis Methods, Total Alcoholic Extract	
	Unit IV	Heavy metals and corrosives	CO4
		Introduction to heavy metal poisoning (Pb, As, Hg, Cd, Zn, Cu), Sign and symptoms, Isolation of heavy metals and their chemical analysis.	
		Corrosive poisons: - Mineral acids- Nitric acid, Hydrochloric acid, Sulphuric acid	
		Strong Base: Potassium hydroxide, Sodium hydroxide	
	Unit V	Animal and Vegetable Poisons	CO5
		Animal poisons: Snake, scorpions and Cantharides.	
		Vegetable Poisons: Dhatura, Oleander, Madar, Abrus precatorius, Castor, Cannabis, Nux vomica, cyanide, etc.	
		Nature, administration, symptoms, post-mortem findings, detection and medico-legal aspects.	
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	Dr. S. N. Tiwari- Analytical methods in forensic Toxicology	
	Other References	Nicholas T Lappas- Forensic Toxicology	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	2	2	2	2	2	1	2
CO2	2	3	2	2	3	3	3	2	1	2	1	1
CO3	3	3	2	1	2	1	3	2	3	3	1	1
CO4	2	2	3	3	2	3	2	2	3	1	2	2
CO5	2	2	3	2	3	1	2	2	3	1	1	1
CO6	1	2	2	2	2	2	1	2	2	2	2	1
	2.17	2.33	2.33	2.17	2.33	2.00	2.17	2.00	2.33	1.83	1.33	1.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: IV	
1	Course Code	FSU268	
2	Course Title	Forensic Toxicology (Lab)	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	Students will know about the identification of metallic and corrosive poisons. They will perform the various chemical tests for insecticides and vegetable poisons.	
6	Course Outcomes	Students will be able to CO1:know the types of evidence found at death scene. CO2:identify metallic poisons. CO3: Analyze Corrosive poisons. CO4: Perform chemical tests for the presence of Insecticides and Pesticides CO5:Identification of different Vegetable Poison by Colour Test CO6: Compile the types of toxins and their examination by chemical tests.	
7	Course Description	During the course students will perform tests for the identification of metallic and corrosive poisons. Insecticides and vegetable poisons will be identified by various methods.	
8	Outline syllabus		CO Mapping
	Unit 1	Heavy Metals I	CO1
		To identify the Arsenic in the given sample	
		To identify the Lead in the given sample	
		To identify the Mercury in the given sample	
	Unit 2	Heavy Metals II	CO2
		To identify the barium in the given sample	
		To identify the Antimony in the given sample	
		To identify the Zink in the given sample	
	Unit 3	Corrosive poisons.	CO3
		To identify Nitric acid	
		To identify Sulphuric acid	
		To identify Hydrochloric acid	
		To identify NaOH and KOH	
	Unit 4	Insecticides and Pesticides	CO4,CO6
		Identification of Organochlorine compounds by Colour Test.	

		Identification of Organophosphate compounds by Colour Test				
		Identification of Carbonates compounds by Colour Test				
	Unit 5	Vegetable Poison			CO5,CO6	
		Identification of Dhatura by Colour Test				
		Identification of oleander by Colour Test				
		Identification of Calotropis by Colour Test				
	Mode of examination	Practical/Viva				
	Weightage Distribution	CA	CE	ETE		
		25%	25%	50%		
	Text book/s*	Laboratory Manual				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	3	2	2	2	1	2	1
CO2	3	2	2	3	3	2	3	2	2	1	2	2
CO3	2	3	3	2	2	2	2	2	1	2	2	3
CO4	3	3	3	2	3	2	2	1	3	3	2	1
CO5	2	2	3	3	2	2	2	2	2	1	2	1
CO6	2	2	1	2	3	1	2	3	3	2	2	2
	2.33	2.33	2.33	2.33	2.50	2.00	2.17	2.00	2.17	1.67	2.00	1.67

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: IV	
1	Course Code	FSU220	
2	Course Title	Chemistry III	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	1-Comparing and contrasting kinetic and potential energy 2-Significance of the no., position in nuclear magnetic resonance spectra. 3-Predict the direction and relative magnitudes of the dipole moments of molecules.	
6	Course Outcomes	CO1: To understand the Important principles and definitions of thermochemistry CO2: To gain knowledge of chemical equilibrium CO3: To understand the meaning of term transition element and gain an appreciation of the characteristic properties of transition element CO4: Elaborate the type of Nucleophilic Substitution. CO5: To understand the reactivity of various alkyl halide . CO6: To analyse bond energy, bond dissociation energy and resonance energy from thermochemical data.	
7	Course Description	After the completion of this course students will be able to evaluate and identify the heat capacity, enthalpy, melting point and mechanisms of preparation of several compounds.	
8	Outline syllabus		CO Mapping
	Unit 1	Thermochemistry	CO1,CO6
	A	Important principles and definitions of thermochemistry. Concept of standard state and standard enthalpies of formations, integral and differential enthalpies of solution and dilution.	
	B	Calculation of bond energy, bond dissociation energy and resonance energy from thermochemical data.	
	C	Variation of enthalpy of a reaction with temperature – Kirchhoff's equation.	
	Unit 2	Chemical Equilibrium	CO2
	A	Free energy change in a chemical reaction. Thermodynamic derivation of the law of chemical equilibrium.	

	B	Distinction between Q_G and $Q_{G\theta}$, Le Chatelier's principle.			
	C	Relationships between K_p , K_c and K_x for reactions involving ideal gases.			
	Unit 3	Transition Elements (3rd series)			CO3
	A	General group trends with special reference to electronic configuration, variable valency, colour, magnetic and catalytic properties, ability to form complexes and stability of various oxidation states (Latimer diagrams) for Mn, Fe and Cu.			
	B	Lanthanides and actinides: Electronic configurations, Oxidation states, colour, magnetic properties.			
	C	lanthanide contraction, separation of lanthanides (ion-exchange method only).			
	Unit 4	Alkyl Halide			CO4
	A	Alkyl Halides: (Upto 5 Carbons) Types of Nucleophilic Substitution (S_N2 , S_N1 and S_Ni) reactions.			
	B	<i>Preparation:</i> from alkenes and alcohols. <i>Reactions:</i> hydrolysis, nitrite & nitro formation, nitrile & iso-nitrile formation.			
	C	Williamson's ether synthesis: Elimination vs substitution.			
	Unit 5	Aryl Halides			CO5
	A	Aryl Halides: <i>Preparation:</i> (Chloro, bromo and iodo-benzene case): from phenol, Sandmeyer & Gattermann reactions			
	B	<i>Reactions (Chlorobenzene):</i> Aromatic nucleophilic substitution (replacement by $-OH$ group) and effect of nitro substituent. Benzyne Mechanism: KNH_2/NH_3 (or $NaNH_2/NH_3$).			
	C	Reactivity and Relative strength of C-Halogen bond in alkyl, allyl, benzyl, vinyl and aryl halides.			
	Mode of examination	Theory			
	Weightage Distribution	CA 15%	MTE 10%	ETE 75%	
	Text book/s*	Vogel's Qualitative Inorganic Analysis, revised, Svehla, Orient Longman. 2. Vogel's Textbook of quantitative Inorganic Analysis (revised), J. Bassett, R.C. Denney, G.H. Heffery and J Mendham, ELBS. 3. Standard Methods of Chemical Analysis, W.W. Scott, The Technical Press. 4. Experimental inorganic Chemistry, W.G. Palmer, Cambridge.			

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	2	2	1	2	2	1	1
CO2	2	2	3	2	3	2	2	2	2	3	3	2
CO3	1	1	2	2	2	2	2	1	2	2	2	2
CO4	1	2	2	1	2	3	2	2	2	2	1	-
CO5	2	2	2	2	2	2	2	2	3	2	2	2
CO6	1	2	2	2	3	2	2	2	1	1	2	1
	1.50	1.83	2.17	1.67	2.33	2.17	2.00	1.67	2.00	2.00	1.83	1.60

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: IV	
1	Course Code	FSU269	
2	Course Title	Chemistry III (Lab)	
3	Credits	1	
4	Contact Hours (L-T-P)	0-0-2	
	Course Status	Compulsory	
5	Course Objective	1. To develop the knowledge of determination of heat capacity. 2. Use to estimation of magnesium and zinc by titration using EDTA. 3. To have an overview preparation and mechanism of various reactions.	
6	Course Outcomes	CO1: To evaluate the heat capacity of calorimeter for different volumes. CO2: To identify the melting point of bromination of phenol/ aniline. CO3: Understand the preparation and mechanism of various reactions. CO4: Determine the enthalpy of neutralization of hydrochloric acid with sodium hydroxide. CO5: To understand how to calculate any mixture by titration CO6: Estimate the hardness of water sample	
7	Course Description	After the completion of this course students will be able to evaluate and identify the heat capacity, enthalpy, melting point and mechanisms of several compounds.	
8	Outline syllabus		CO Mapping
	Unit 1	1. Determination of heat capacity of calorimeter for different volumes. 2. To determine the strength of strong acid and weak acid conductometrically by titrating against standard NaOH solution. 3. Study of the variation of mutual solubility temperature with concentration for the phenol-water system and determination of the critical solubility temperature (CST).	CO1
	Unit 2	4. Determination of enthalpy of neutralization of hydrochloric acid with sodium hydroxide.	CO2
	Unit 3	Preparations: Mechanism of various reactions involved to be discussed. Recrystallisation, determination of melting point and calculation of quantitative yields to be done. 5. Bromination of Phenol/Aniline	CO3

		6. Benzoylation of amines/phenols 7. Oxime and 2,4 dinitrophenylhydrazone of aldehyde/ketone	
	Unit 4	8. Estimation of Zn^{2+} by complexometric titrations using EDTA. 9. Estimation of Mg^{2+} by complexometric titrations using EDTA.	CO4
	Unit 5	10. Estimation of total hardness of a given sample of water by complexometric titration.	CO5, CO6
	Mode of examination	Practical/Viva	
	Weightage Distribution	CA 25%	CE 25%
			ETE 50%
	Text book/s*	B.D Khosla- Chemistry Practical book	
	Other References	Ahluwalia- Chemistry Practical Book	

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	2	2	2	1	1	2	2	1	-	1
CO2	3	2	2	2	3	2	1	1	2	1	1	1
CO3	2	2	3	1	3	1	3	2	3	2	1	2
CO4	3	1	2	2	2	1	2	2	2	1	1	1
CO5	2	2	1	2	1	1	1	2	3	1	1	1
CO6	2	2	3	3	2	2	1	1	1	1	2	2
	2.33	1.83	2.17	2.00	2.17	1.33	1.50	1.67	2.17	1.17	1.20	1.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: IV	
1	Course Code	FSU221	
2	Course Title	Zoology IV	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	Students will learn amino acids, carbohydrates and lipids. Students will also understand about nucleic acids and enzymes.	
6	Course Outcomes	Students will be able to CO1: Know about structure and properties of Amino acids. CO2: Understand the Structure and Function of carbohydrates. CO3: Understand the Classification, structures, nomenclature and properties of fatty acids. CO4: Analyze the Structure and properties of purines & pyrimidines Nucleosides & Nucleotides. CO5: Know the classification of enzymes. CO6: Create knowledge about structure and properties lipid, amino acid , nucleic acid.	
7	Course Description	After the completion of this course the students will be able to understand about the Proteins, carbohydrates, amino acids and lipids. They will understand about nucleic acid and enzymes	
8	Outline syllabus		CO Mapping
	Unit 1	Amino acids & Proteins:	CO1,CO6
	A	Structure & Function. Structure and properties of Amino acids, Types of proteins and their classification, Forces stabilizing protein structure and shape.	
	B	Different Level of structural organization of proteins, Purification of proteins and criteria of their purity.	
	C	Denaturation and renaturation of proteins. Fibrous and globular proteins.	
	Unit 2	Carbohydrates:	CO2
	A	Structure and Function: Structure and properties of Monosaccharides, Oligosaccharides and Polysaccharides.	
	B	Homo & Hetero Polysaccharides, Mucopolysaccharides, Bacterial cell wall polysaccharides,	
	C	Glycoprotein's and their biological functions.	
	Unit 3	Lipids:	CO3

	A	Structure and functions – Classification, structures, nomenclature and properties of fatty acids, essential fatty acids.	
	B	Phospholipids structure and properties of different types of phospholipids, sphingomyelins, glycolipids, cerebrosides, gangliosides,.	
	C	Prostaglandins cholesterol – its structure and biological properties, utilization of cholesterol	
	Unit 4	Nucleic acids:	CO4
	A	Structure and functions: Physical & chemical properties of Nucleic acids.	
	B	Structure and properties of purines & pyrimidines Nucleosides & Nucleotides.	
	C	Biologically important nucleotides, Double helical model of DNA structure and forces responsible for its A,B, & Z – DNA, denaturation and annealing of DNA.	
	Unit 5	Enzymes	CO5
	A	Structure of enzyme: holoenzyme, apoenzyme, cofactors, coenzymes and prosthetic group	
	B	Classification of enzymes. Features of active site, substrate specificity, mechanism of action (activation energy, lock and key hypothesis, induced – fit theory), Michaelis – Menten equation, enzyme inhibition and factors affecting enzyme activity.	
	C		
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	Berg, J.M., Tymoczko, J.L. and Stryer, L. (2006) Biochemistry. Vth Edition. W.H. Freeman and Co. • Nelson, D.L., Cox, M.M. and Lehninger, A.L. (2009) Principles of Biochemistry. IV Edition. W.H. Freeman and Co. • Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009) Harper's Illustrated Biochemistry. XXVIII edition. Lange Medical Books/ McGraw-Hill.	

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	3	2	2	2	2	1	2
CO2	2	2	3	3	3	2	2	2	2	2	1	1
CO3	3	3	3	3	3	3	3	2	3	2	2	2
CO4	2	2	3	3	3	2	2	3	3	3	2	2
CO5	2	2	3	2	2	1	3	3	2	1	2	2
CO6	2	1	2	2	1	2	2	2	1	2	2	1
	2.33	2.00	2.67	2.50	2.33	2.17	2.33	2.33	2.17	2.00	1.67	1.67

School: SSAHS		Batch : 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: FS		Semester: IV	
1	Course Code	ARP 306	Course Name : Campus to Corporate
2	Course Title	Campus to Corporate	
3	Credits	2	
4	Contact Hours (L-T-P)	1-0-2	
	Course Status	Active	
5	Course Objective	To enhance holistic development of students and improve their employability skills. Provide a 360 degree exposure to learning elements of Business English readiness Programme, behavioural traits, achieve softer communication levels and a positive self-branding along with augmenting numerical and altitudinal abilities. To up skill and upgrade students' across varied industry needs to enhance employability skills. By the end of this semester, a will have entered the threshold of his/her 4 th phase of employability enhancement and skill building activity exercise.	
6	Course Outcomes	<p>After completion of this course, students will be able to:</p> <p>CO1: Develop a creative resumes, cover letters, interpret job descriptions and interpret KRA and KPI statements and art of conflict management.</p> <p>CO2: Build negotiation skills to get maximum benefits from deals in practical life scenarios.</p> <p>CO3: Develop skills of personal branding to create a brand image and self-branding</p> <p>CO4: Acquire higher level competency in use of logical and analytical reasoning such as direction sense, strong and weak arguments</p> <p>CO5: Develop higher level strategic thinking and diverse mathematical concepts through building analogies, odd one out</p> <p>CO6: Demonstrate higher level quantitative aptitude such as average, ratio & proportions, mixtures & allegation for making business decisions.</p>	
7	Course Description	This penultimate stage introduces the student to the basics of Human Resources. Allows the student to understand and interpret KRA KPI and understand Job descriptions. A student also understands how to manage conflicts, brand himself/herself, understand relations and empathise others with level-4 of quant, aptitude and logical reasoning	

8	Outline syllabus - ARP 306		
	Unit 1	Ace the Interview	CO MAPPING
	A	HR Sensitization (Role Clarity KRA KPI Understanding JD) Conflict Management	CO1
	B	Negotiation Skills Personal Branding	CO3, CO4
	C	Uploading & Curating Resumes in Job Portals, getting Your Resumes Noticed Writing Cover Letters Relationship Management	CO1, CO3
	Unit 2	Introduction to APTITUDE TRAINING- Reasoning- Logical/ Analytical	
	A	Sitting Arrangement & Venn Diagrams Puzzles Distribution Selection	CO4
	B	Direction Sense Statement & Conclusion Strong & Weak Arguments	CO4
	C	Analogies, Odd One out Cause & Effect	CO5
	Unit 3	Quantitative Aptitude	
	A	Average , Ratio & Proportions, Mixtures & Allegation	CO6
	B	Geometry-Lines, Angles & Triangles	CO6
	C	Problem of Ages Data Sufficiency - L2	CO6
	Unit 4	Verbal Abilities-4	
	A	Antonyms and Synonyms	CO1
	B	Idioms and Phrases	CO2
	Unit 5	Problem Solving and Case Studies	
	A	Real time Case Study Solving Exercises	CO4
	B	Intra student Mock Situation Handling Exercises	CO4
	Evaluation Weightage	(CA)Class Assignment/Free Speech Exercises / JAM - 60% (ETE) Group Presentations/Mock Interviews(MIP's)/GD/ Reasoning, Quant & Aptitude- 40%	
	Text book/s*	<i>Wiley's Quantitative Aptitude-P Anand Quantum CAT - Arihant Publications Quicker Maths- M. Tyra Power of Positive Action (English, Paperback, Napoleon Hill) Streets of Attitude (English, Paperback, Cary Fagan, Elizabeth Wilson) The 6 Pillars of self-esteem and awareness - Nathaniel Brandon Goal Setting (English, Paperback, Wilson Dobson</i>	

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
ARP302.1	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.2	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.3	-	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.4	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.5	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
ARP302.6	1	-	-	-	-	-	-	-	1	2	1	2	-	-	-
									1	2	1	2			



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Fifth Semester

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: V
1	Course Code	FSU305
2	Course Title	Forensic Medicine and Jurisprudence
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Type	Compulsory
5	Course Objective	1- Describe medico Legal aspects of death 2- Enumerate medico legal importance of wound 3- Explain the sign and symptoms of asphyxia deaths
6	Course Outcomes	CO1: Able to describe all changes in body after death CO2: Able to differentiate between somatic and molecular death CO3: Apply the various methods for determination of time since death. CO4: Analyse the wound to determine the age of wound CO5: Evaluate the symptoms of asphyxia death. CO6: Build knowledge Forensic Medicine and Medical Jurisprudence and medicolegal death examination
7	Course Description	After completion of this course student will be able to know about the Forensic Medicine and Medical Jurisprudence. They will know about post mortem changes after death.
8	Outline syllabus	CO Mapping
	Unit 1	Inquest
	A	Definition of Forensic Medicine and Medical Jurisprudence
	B	Types of Inquest-Police inquest, Magistrate's inquest, Coroner's inquest and Medical Examiner System
	C	Documentary evidence:-Medical certificates, medical reports, dying declaration and dying deposition.
	Unit 2	Death
	A	Death: Definition, types; somatic
	B	cellular and brain-death
	C	Sudden natural and unnatural deaths.
	Unit 3	Determination of Time Since Death
	A	Immediate changes, Early Changes: Livor mortis, Rigor mortis and Algor mortis.
	B	Late Changes: Putrefaction, mummification, adipocere and maceration, Post-mortemartefacts.
	C	Medico legal Death Investigation: Aspects of death scene analysis by a medical examiner, including Autopsy procedures, unidentified remains, mass disaster investigations.

Unit 4	Injuries:	CO4
A	Wounds, Bruises Abrasions,	
B	Lacerations, Incised wounds, Stab wounds	
C	Burns and scalds, ante-mortem and post-mortem injuries.	
Unit 5	Asphyxial deaths:	CO5
A	Definition, causes, types	
B	hanging, strangulation, suffocation and drowning	
C	Medico-legal significance of hanging, strangulation, suffocation and drowning, post-mortem appearances	
Mode of examination	Theory	
Weightage Distribution	CA 15%	MTE 10%
		ETE 75%
Text book/s*	Reddy, V.R; Dental Anthropology, Inter-India Publication, New Delhi, 1985. Singh, I.P. & Bhasin M.K; A manual of biological Anthropology, Kamla Raj Enterprises, New Delhi, 2004.	
Other References	Kroeber; Anthropology, Oxford & IBH Publishing Company, New Delhi, 1972. Pickering, R. & Bachman D; The use of Forensic Anthropology, CRC Press, Costa Rica, 2009.	

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	1	1	2	1	2	-	2
CO2	3	2	2	2	3	2	2	1	3	1	2	2
CO3	1	3	2	1	2	2	3	3	3	2	1	2
CO4	3	1	2	2	2	1	2	2	2	2	2	1
CO5	3	3	3	3	1	2	2	3	3	1	1	0
CO6	2	2	3	3	1	2	1	1	1	1	2	2
	2.50	2.17	2.50	2.17	1.83	1.67	1.83	2.00	2.17	1.50	1.60	1.50

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: V	
1	Course Code	FSU352	
2	Course Title	Forensic Medicine (Lab)	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	Students will know about the identification of metallic and corrosive poisons. They will perform the various chemical tests for insecticides and vegetable poisons.	
6	Course Outcomes	Students will be able to CO1:know the types of evidence found at death scene. CO2:identify metallic poisons. CO3: Analyze Corrosive poisons. CO4: Perform chemical tests for the presence of Insecticides and Pesticides CO5:Identification of different Vegetable Poison by Colour Test CO6: Compile the types of toxins and their examination by chemical tests.	
7	Course Description	During the course students will perform tests for the identification of metallic and corrosive poisons. Insecticides and vegetable poisons will be identified by various methods.	
8	Outline syllabus		CO Mapping
	Unit 1	Personal Identification	CO1
		To Perform Somatometric measurement in living subjects	
		To conduct portrait parle	
		To carry out craniometric measurements of human skull	
	Unit 2	Skeletal System	CO2
		To study identification and description of bones and their measurements.	
		To estimate stature from long bone length.	
		To determine of age and sex from mandible	
	Unit 3	Forensic Odontology	CO3
		Eruption sequence of temporary and permanent teeth	
		To prepare dentition chart	
		Evidence Collection from Bite Mark Victim, Accused Biter	

		To analyze and preserve bite marks			
	Unit 4	Injury and Medico-legal Postmortem			CO4,CO6
		Preparation of injury report.			
		Preparation of medical certificate			
		Preparation of Panchnama report			
		Recording of statement of witnesses			
		Preparation of post-mortem report			
	Unit 5	Death			CO5,CO6
		Investigation of death scene			
		Protection and management of the death scene			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	Laboratory Manual			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	3	3	2	3	2	2	3	2	2	2
CO2	3	2	2	2	2	2	2	2	2	2	2	1
CO3	3	2	2	2	3	2	2	2	2	2	2	2
CO4	1	1	2	3	2	1	1	3	2	2	1	1
CO5	2	3	3	2	2	2	3	2	1	2	2	2
CO6	2	2	3	2	2	2	2	2	2	1	1	2
	2.17	2.17	2.50	2.33	2.17	2.00	2.00	2.17	2.00	1.83	1.67	1.67

School: SSAHS		Batch: 2023-2027	
Programme: FSB		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: V	
1	Course Code	FSU307	
2	Course Title	Chemistry IV	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	1- Able to describe the state of chemical equilibrium 2- To understand key features of co-ordination compound 3- Understand the properties of alcohol, ethanol and ether	
6	Course Outcomes	CO1: Able to understand the concept of solution and ionic equilibrium CO2: Able to understand the theories of coordination chemistry such as VBT and CFT CO3:Able to understand the properties and preparation of various alcoholic compounds CO4:Able to understand the properties and preparation of various phenolic compounds CO5: Able to understand the properties and preparation of various ether compounds. CO6: Estimate the Structural and stereoisomerism in complexes with coordination numbers	
7	Course Description	After completion of this course student will be able to know about the equilibrium, pH and also examination of alcohol, ether & ethanol.	
8	Outline syllabus		CO Mapping
	Unit 1	SOLUTIONS AND IONIC EQUILLIBRIA	CO1
	A	Thermodynamics of ideal solutions: Ideal solutions and Raoult's law, deviations from Raoult's law – non-ideal solutions. Vapor pressure-composition and temperature-composition curves of ideal and non-ideal solutions	
	B	Distillation of solutions. Lever rule. Azeotropes. Partial miscibility of liquids: Critical solution temperature; effect of impurity on partial miscibility of liquids. Immiscibility of liquids. Principle of steam distillation. Nernst distribution law and its applications, solvent extraction.	
	C	Strong, moderate and weak electrolytes, degree of ionization, factors affecting degree of ionization,	

		ionization constant and ionic product of water. Ionization of weak acids and bases, Ph scale, common ion effect, Salt hydrolysis-calculation of hydrolysis constant, degree of hydrolysis and Ph for different salts. Buffer solutions. Solubility and solubility product of sparingly soluble salts – applications of solubility product principle	
	Unit 2	COORDINATION CHEMISTRY AND CRYSTAL FIELD THEORY	CO2,CO6
	A	Valence Bond Theory (VBT): Inner and outer orbital complexes of Cr, Fe, Co, Ni and Cu (coordination numbers 4 and 6)	
	B	Structural and stereoisomerism in complexes with coordination numbers 4 and 6.	
	C	Drawbacks of VBT. IUPAC system of Nomenclature. Crystal Field Theory: Crystal field effect, Octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry. Factors affecting the magnitude of Spectrochemical series. Comparison of CFSE for Oh and Td complexes, Tetragonal distortion of octahedral geometry. Jahn-Teller distortion. Square planar coordination	
	Unit 3	ALCOHOLS	CO3
	A	<i>Preparation:</i> Preparation of 1 3 alcohols: using Grignard reagent, Ester hydrolysis, Reduction of aldehydes, ketones, carboxylic acid and esters	
	B	<i>Reactions:</i> With sodium, HX (Lucas test), esterification,	
	C	Oxidation (with PCC, alk. KmnO ₄ , acid. Dichromate, con. HNO ₃). Oppeneauer oxidation <i>Diols:</i> (Upto 6 Carbons) oxidation of diols. Pinacol-Pinacolone rearrangement	
	Unit 4	PHENOLS	CO4
	A	<i>Preparation:</i> Cumene hydroperoxide method, from diazonium salts.	
	B	<i>Reactions:</i> Electrophilic substitution: Nitration, halogenation and sulphonation. Reimer – Tiemann Reaction,	
	C	Gattermann-Koch Reaction, Houben – Hoesch Condensation, Schotten – Baumann Reaction	
	Unit 5	ETHERS	CO5
	A	Aliphatic Ethers	
	B	Aromatic Ethers	
	C	Cleavage of Ethers with HI	
	Mode of examination	Theory	

	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	Morrison, R. N. & Boyd, R. N. Organic Chemistry, Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). • Finar, I. L. Organic Chemistry (Volume 1), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). • Finar, I. L. Organic Chemistry (Volume 2: Stereochemistry and the Chemistry of Natural Products), Dorling Kindersley (India) Pvt. Ltd. (Pearson Education). • Eliel, E. L. & Wilen, S. H. Stereochemistry of Organic Compounds; Wiley: London, 1994.			
	Other References	Kalsi, P. S. Stereochemistry Conformation and Mechanism; New Age International, 2005.			

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	3	3	3	3	3	2	3	3	1	2
CO2	3	3	3	2	2	2	2	2	1	2	1	1
CO3	2	2	2	2	2	3	2	3	3	2	2	2
CO4	2	3	2	3	3	2	2	2	2	3	2	2
CO5	2	1	1	1	2	2	3	3	2	2	1	2
CO6	1	3	2	2	1	3	1	2	3	2	2	1
	2.00	2.33	2.17	2.17	2.17	2.50	2.17	2.33	2.33	2.33	1.50	1.67

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: V
1	Course Code	FSU354
2	Course Title	Chemistry IV (Lab)
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	1- Understand the properties of alcohol, ethanol and ether 2- Able to understand the complexometric titrations using EDTA 3- Able to understand the acetylation of phenols, vanillin, salicylic acid etc.
6	Course Outcomes	CO1: To describe the concept of complexometric titration CO2: To estimate the hardness of water using complexometric titration CO3: Examination of alcohol, ethanol and ether. CO4: To calculate value of pH, pOH and OH CO5: To perform the Acetylation of phenolic derivatives. CO6: Predict phenols (β -naphthol, vanillin, salicylic acid) by using conventional method.
7	Course Description	After completion of this course student will be able to know about the equilibrium, pH and also examination of alcohol, ether & ethanol.
8	Outline syllabus	
	Unit 1	1. Functional group tests for alcohols 2. Functional group test for Phenol 3. Functional group test for carboxylic acid 4. Functional group test for Amines 5. Functional group test for ketone
	Unit 2	6. Determine the hardness of water using complexometric titration
	Unit 3	1. Determine the pH of various solution: Such as acid, Base salt. 2. To determine dissociation constant of acetic acid using pH meter
	Unit 4	9. Acetylation of one of the following compounds: phenols (β -naphthol, vanillin) by using conventional method

	Unit 5	10.Acetylation of salicylic acid by using conventional method			CO5,CO6
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	B.D Khosla- Chemistry Practical book			
	Other References	Ahluwalia- Chemistry Practical Book			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	1	2	1	1	2	2	2	2	2	1	1	0
CO2	1	2	2	2	2	1	1	-	2	2	2	1
CO3	2	2	2	1	2	3	3	2	2	1	0	2
CO4	1	2	3	1	1	2	2	0	2	2	1	1
CO5	1	2	2	2	2	1	2	1	2	1	1	1
CO6	2	1	3	2	2	2	2	2	3	1	1	-
	1.33	1.83	2.17	1.50	1.83	1.83	2.00	1.40	2.17	1.33	1.00	1.00

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: V
1	Course Code	FSU306
2	Course Title	Arson and Accident investigation
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Type	Compulsory
5	Course Objective	After studying this paper the students will know – The method of searching, collecting, preserving and analyzing arson evidence. The concept of road crash investigation and method of searching, collecting, and analysis of evidence in road accident cases.
6	Course Outcomes	Students will be able to CO1: Know the chemistry of fire and difference between fire and arson. CO2: Understand the procedure for the collection of evidence in fire and arson cases. CO3: Get information about process and provisions of road crash investigation. CO4: Analyze the scene of road accident and collection of evidence. CO5: Evaluate the evidence to determine the reasons of road crash. CO6: Construct the procedure of fire debris and post flashover burning and information from smoke staining.
7	Course Description	The study enhances ability of investigating officer in arson and road investigation cases.
8	Outline syllabus	CO Mapping
	Unit 1	Fire and Arson
	A	Chemistry of fire, Fire Triangle, Fire Tetrahedron, cause of fire and origin of fire.
	B	Material and Chemicals use in initiating fire
	C	Arson: Legal Definition, Arson motives, difference between Arson and Fire, Forensic and legal Concepts
	Unit 2	Arson Investigation
	A	Fire scene patterns. Location of point of ignition. Searching the fire scene. Collection and preservation of arson evidence.
	B	Analysis of fire debris. Analysis of ignitable liquid residue. Post-flashover burning.
	C	Scientific investigation and evaluation of clue materials. Information from smoke staining.

	Unit 3	Road Crash Investigation	CO3
	A	Process and Provisions- Objectives, Responsibilities of the Investigation Officer at the Scene, series of events description,	
	B	Identifying Contributory and Precipitating Factors	
	C	Legal provisions of Motor Vehicle Act	
	Unit 4	Investigation Procedures:	CO4
	A	Expert Response required at the scene and their specific roles.	
	B	Protecting the scene, caring for the injured, searching the scene and vehicular,	
	C	Recording the scene: photography and measuring and sketching the accident scene, collection of evidences.	
	Unit 5	Evidence Evaluation:	CO5
	A	Vehicle damage, tire marks, skid marks, sideslip marks, yaw marks, debris	
	B	Mechanical inspection of the vehicle: examination of accelerator, brake system, body damage of vehicle, horn, lights, mirrors, air bags, steering systems, tires condition	
	C	Assessing the injury patterns in accident cases, victim identification and post mortem findings.	
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	T.S. Ferry, Modern Accident Investigation and Analysis, Wiley, New York (1988). D. Lowe, The Tachograph, 2nd Edition, Kogan Page, London (1989). J.D. DeHaan, Kirk's Fire Investigation, 3rd Edition, Prentice Hall, New Jersey (1991).	
	Other References	T.L. Bohan and A.C. Damask, Forensic Accident Investigation: Motor Vehicles, Michie Butterworth, Charlottesville (1995). S.C. Batterman and S.D. Batterman in Encyclopedia of Forensic Sciences, Volume 1, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000). W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	2	1	2	3	2	1	1
CO2	3	3	2	2	2	2	2	3	2	2	2	2
CO3	1	1	2	3	2	2	3	2	2	1	2	2
CO4	2	2	3	2	3	1	2	2	2	2	2	1
CO5	2	2	2	3	1	3	3	3	1	2	2	2
CO6	1	2	3	2	2	3	3	2	2	2	1	1
	1.83	2.00	2.33	2.17	2.00	2.17	2.33	2.33	2.00	1.83	1.67	1.50

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: V
1	Course Code	FSU353
2	Course Title	Arson and Accident investigation (Lab)
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	After completing this course students will learn about the investigation procedure in Arson and road investigation cases. Students will also learn about the methods of evidence collection and further analysis of evidence in laboratory.
6	Course Outcomes	Students will be able to CO1: Know the methods for lifting of tire marks from accident scene. CO2: Understand the procedure to identify the patterns of skid and scuff marks. CO3: estimate the speed of the vehicle from skid marks. CO4: Analyze the scene and prepare a report on a major road accident. CO5: Evaluate the fire and arson scene, collect the evidence and analyze in the laboratory. CO6: Build knowledge about fire debris and road accident cases.
7	Course Description	Students will learn the searching, collection and analysis of evidence on arson cases and road accident cases.
8	Outline syllabus	CO Mapping
Unit 1	Processing and investigation of Road crash	CO1,CO6
	Processing and Investigation of road traffic accidents Photography of crash site Methods of sketching the crash site Photography of Tire Marks Photography of Skid Marks To lift tire marks. To lift skid marks.	
Unit 2	Evidence collection	CO2
	Collection of evidences from the crash site. Packing and forwarding of evidences from the crash site. To study the pattern of skid marks. To study the pattern of scuff marks	

Unit 3	Skid marks		CO3		
	To estimate the speed of the vehicle from skid marks. Development and lifting of foot prints, fingerprints from crash site				
Unit 4	Reconstruction of accident cases				
	Reconstruction of crash site. To prepare a report on a highway accident. To prepare a report on accident in on busy road.		CO4		
Unit 5	Fire and arson				
	Searching of fire scene Collection and preservation of arson evidence Analysis of fire debris Preparation of report		CO5,CO6		
Mode of examination	Practical/Viva				
Weightage	CA	CE	ETE		
Distribution	25%	25%	50%		
Text book/s*	Lab Manual				

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	1	3	2	1	1	2	2	2	1	1
CO2	2	1	3	2	1	2	2	1	2	1	0	1
CO3	2	2	3	1	2	3	3	3	1	0	1	1
CO4	3	3	2	3	2	2	2	2	2	2	2	2
CO5	2	2	3	3	3	2	3	2	3	2	-	1
CO6	1	2	3	2	2	3	2	2	1	1	2	2
	2.00	2.00	2.50	2.33	2.00	2.17	2.17	2.00	1.83	1.33	1.20	1.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: V	
1	Course Code	FSU308	
2	Course Title	Analytical Chemistry and Instrumentation I	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	1-Able to understand the various types of biological instrumental techniques. 2- To develop a basic level of knowledge about the principals of biological instruments. 3-Provides the analytical aspect and interpretation of data.	
6	Course Outcomes	CO1: Will be able to describe various types of basic chromatographic techniques. CO2: Learn about the specialized chromatographic techniques. CO3: To understand the concept electrophoresis and its application. CO4: To learn various electrophoresis techniques and their applications. CO5: Able to learn basic principles of sedimentation and centrifugation techniques. CO6: Discuss about different biological instruments as well as serological techniques.	
7	Course Description	After completion of this course student will be able to know about the various instrumental techniques and their forensic applications.	
8	Outline syllabus		
	Unit I Chromatography I	Chromatography: General principles of Chromatography, Partition coefficient and concept of theoretical plates,	CO1,CO6
		Classification of Chromatographic Methods, Adsorption and Partition Chromatography and others	CO1,CO6
		Paper Chromatography and Thin Layer Chromatography: Theoretical principles, instrumentations and technique, Forensic applications.	CO1,CO6
	Unit II Chromatography II	Ion Exchange Chromatography, Affinity Chromatography: Basic Principle, Instrumentation and Forensic applications.	CO2
		HPLC and GC: Basic principle and types of column and detectors, Instrumentation.	CO2
		HPLC and GC: Forensic applications.	CO2
	Unit III Electrophoresis	Basic Principle of electrophoresis, Gel electrophoresis, discontinuous gel electrophoresis, SDS-PAGE, Native and denaturing gels.	CO3

		Agarose gel electrophoresis, buffer systems in electrophoresis. Electrophoresis and blotting of proteins and nucleic acids, detection and identification.			CO3
		Isoelectric Focusing of proteins.			CO3
	Unit IV Serological Techniques	Introduction of antigen and antibody, basic principle of Antigens and antibodies reaction Basic principles of immunoassay, Radioimmunoassay (RIA), Application of Immunoassay in Forensic biological science.			CO4,CO6
		Immunoelectrophoresis (ELISA), Basics principle and procedure.			
		Molecular Techniques: DNA Extraction, PCR Techniques: Principle, Types, applications			CO4
	Unit V Centrifuge Techniques	Basic principles of sedimentation Various types of centrifuges and rotors.			CO5
		Density gradient centrifugation, differential centrifugation			CO5
		Forensic Application of centrifugation techniques.			CO5
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	R.Chatwal&K.Anand. Instrumental Method of Chemical Analysis. Himalaya Publishing House PVT.LTD			
	Other References	Skoog Douglas A.Principles of Instrumental Analysis Seventh Edition. Publisher: Cengage Learning India			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	2	3	1	1	2	3	3	1	1	1
CO2	3	2	3	1	3	2	2	2	2	2	1	1
CO3	2	3	2	2	2	1	2	2	2	1	1	2
CO4	3	3	1	2	3	3	2	3	3	2	1	1
CO5	1	3	3	2	2	2	2	3	2	1	2	2
CO6	2	1	3	3	2	3	3	1	3	1	1	1
	2.17	2.50	2.33	2.17	2.17	2.00	2.17	2.33	2.50	1.33	1.17	1.33



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Sixth Semester

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VI	
1	Course Code	FSU315	
2	Course Title	Forensic Physics	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	1- Able to apply modern methods of forensic analysis in lab 2- In communicating or defending forensic evidence in oral or written 3- To provide depth knowledge related to tool marks	
6	Course Outcomes	CO1: To describe foot prints and tier print impressions CO2: Able to examine the all types of tool marks. CO3: To understand the types and composition of paint and soil evidence. CO4: To understand the types, composition and analysis of glass evidence. CO5: To learn about natural and manmade fibers. CO6: Creat knowledge about Birefringence, Fluorescence to identify fibres	
7	Course Description	After the completion of this course the students will be able to understand the Investigation and examination of footprint, tire marks, obliterated marks and their restoration.	
8	Outline syllabus	CO Mapping	
	Unit 1	Types of physical evidence, Nature, collection, preservation & forwarding of physical evidence for scientific examinations.	CO1
		Footprints: Introduction of Foot prints– types of Foot prints – Surface & Sunken Footprint Recording & Casting of Foot prints– Comparison of Footprints- Examination of footprints. Gait pattern analysis- Gait pattern scan and its principles Determination of personality by gait analysis.	CO1
		Investigation of Road Accident crime scene: Examination of scene, Victim and the vehicle, Collection of the evidence, Tyre marks/prints and skid marks: Significance, Nature, location, collection and evaluation	CO1
	Unit II TOOL MARKS-	TOOL MARKS- Types of tool marks- compression marks, striated marks, combination of compression and striated marks, repeated marks, class characteristics and individual characteristics,	CO2
Tracing and lifting of marks, Photographic examination of tool marks and cut marks on clothes and walls etc.		CO2	
Restoration of erased / obliterated marks- Method of making-cast, punch, engrave; methods of obliteration, method of restoration- etching (etchings for different metals), magnetic, electrolytic etc., recording of restored marks – restoration of marks on wood, leather, polymer etc.		CO2	
	Unit III	Types of paint and their composition, cases involve, Collection and preservation of paint evidences	CO3

	Paint and Soil	Microscopic analysis of paint pigments, micro-chemical analysis-solubility test, Chemical and instrumental analysis of paint evidences.			CO3
		Types and composition of soil, sample preparation, removal of contaminants, colour, molecular particle size distribution, turbidity test, pH measurements, microscopic examination, density gradient analysis, ignition-loss test, elemental analysis, interpretation of soil evidence.			CO3
	Unit IV Glass	Types of glass and their composition			CO4
		Physical properties of Glass: Colour, fluorescence, refractive index, density, specific gravity			CO4
		Matching and comparison. Forensic examinations of glass fractures-rib marks, hackle marks, cone fracture, concentric and radial fractures, 3R rule. Examination and elemental analysis of glass evidence, immersion method, Backe line method			CO4
	Unit V Fibres	Classification and types of Fibres, Textile Fibers, Yarns, Fabric construction, Fabric characteristics, Microscopy characteristic, Birefringence, Fluorescence Microscopy, Colors in textile, Color Assessment, Chemical properties.			CO5,CO6
		Difference between natural and man-made fibers.			CO5,CO6
		Fiber analysis: Fibre comparison, chemical examination and Forensic significance.			CO5,CO6
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	R Ramachandran. Scientific Techniques In criminal investigation			
	Other References	Saferstein: Criminalistics-An Introduction to Forensic Science			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	3	2	2	2	2	1	1	1
CO2	3	2	2	2	2	2	2	3	2	2	2	2
CO3	2	3	3	3	3	3	2	2	3	1	2	2
CO4	3	3	2	2	3	2	3	3	2	2	2	1
CO5	3	2	3	2	2	3	2	2	2	3	1	1
CO6	2	2	2	2	2	2	2	2	2	2	2	1
	2.50	2.50	2.17	2.33	2.50	2.33	2.17	2.33	2.17	1.83	1.67	1.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VI	
1	Course Code	FSU316	
2	Course Title	Forensic Ballistics	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	1- Able to apply modern methods of forensic analysis in lab 2- To provide information of different branches of forensic ballistics 3- To provide depth knowledge related to firearm	
6	Course Outcomes	CO1: To learn history and development of firearms and ammunition. CO2 To understand the phenomenon and parameters of Internal Ballistics. CO3: To understand the phenomenon External Ballistics and factors affecting the bullet in air. CO4: Able to determine the wound ballistics. CO5: To analyze the evidence and determination of range of fire. CO6: Construct methods to analyse different types of marks produced during firing process on cartridge as well as GSR examination.	
7	Course Description	After the completion of this course the students will be able to understand the Investigation of firearm cases and examination of Bullet, cartridge and gunshot residue.	
8	Outline syllabus	CO Mapping	
	Unit I	History and development of firearms and Ammunition	CO1
		History and mechanism of Muzzleloaders (Match lock, Wheel lock, Flint lock firearms), Briefs of Pinfire, Rimfire and Centre fire systems of firearms. Classification of firearms.	
		Ammunition – Types of ammunition characteristics of different types of cartridges and bullets.	
		Primers and priming compounds. Projectiles. Head stamp markings on ammunitions.	
	Unit II	Internal Ballistics	CO2
		Definition, ignition of propellants, shape and size of propellants, manner of burning	
		Various factors affecting the internal ballistics: lock time, ignition time, barrel time, Erosion, corrosion and gas cutting.	
		Theory of recoil, methods for measurement of recoil.	
	Unit III	External Ballistics	CO3
		Bullet Drop in the flight, Use of sight to compensate for bullet drop, Influence of Earth on Trajectory, Angle of Fall, Ballistic Coefficient and Air resistance-base drag, Sectional Density	
		Maximum effective range, Drift, Yaw, Precession, Nutation,	
		Terminal velocity, Ballistics tables, measurements of trajectory parameters, Escape velocity & Ricochet.	

	Unit IV	Terminal/wound Ballistics			CO4
		Definition, Effect of projectile on hitting the target: function of Bullet shape, striking velocity, striking angle and nature of target			
		Tumbling of bullets, effect of instability of bullet, effect of intermediate targets, function of bullet shape, striking velocity, striking angle and nature of target,			
		Brief introduction to Cavitations (Temporary and Permanent)			
	Unit V	Examination of Firearms and ammunition			CO5,CO6
		Firearm Evidence – Matching of bullets and cartridge cases, Different types of marks produced during firing process on cartridge– firing pin marks, breech face marks, chamber marks, extractor, ejector marks and Bullet-number/ direction of lands and grooves, striation marks.			CO5,CO6
		Determination of Range of Fire- burning, scorching, blackening, tattooing and metal fouling shots dispersion and GSR distribution, time of firing.			
		Gunshot Residues/ Powder Residues: Composition of GSR, GSR Distribution, Location, source and collection of GSR, Analysis of GSR: spot test, chemical test, identification of shooter and instrumental techniques involved of GSR Analysis			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	Jauhri, M. 1980 : Monograph on Forensic Ballistics, Govt. Of India Publication, New Delhi. Burrad, 1951 : The Identification of Firearms and Forensic Ballistics..			

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	3	2	2	2	2	3	3	3	2	2	1	2
CO2	2	3	3	3	3	2	2	2	1	2	1	1
CO3	3	3	2	2	2	3	3	2	3	2	2	2
CO4	3	2	2	3	3	2	2	3	2	2	3	3
CO5	2	2	3	3	2	2	3	1	2	1	2	2
CO6	2	1	2	2	1	2	2	2	1	2	2	1
	2.50	2.17	2.33	2.50	2.17	2.33	2.50	2.17	1.83	1.83	1.83	1.83

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VI	
1	Course Code	FSU362	
2	Course Title	Forensic Physics (Lab)	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1- Able to apply modern methods of forensic analysis in lab 2- In communicating or defending forensic evidence in oral or written 3- To provide depth knowledge related to firearm	
6	Course Outcomes	CO1:To gain knowledge about determining the gait pattern and foot print. CO2: Lifting and Casting of Tyre/Foot Wear Impressions CO3: To compare paint samples and soil samples. CO4: To identify and compare tool marks and grass fractures. CO5: comparison of fired bullets and fired cartridge case. CO6: Estimate the gunshot residue with different techniques.	
7	Course Description	After the completion of this course the students will be able to understand the Investigation and examination of footprint, tire marks, obliterated marks and their restoration along with fire-arm evidences and also understand the aspects of photography.	
8	Outline syllabus		CO Mapping
	Unit 1	Foot print and gait pattern	CO1
		To determine the footprint To determine the gait pattern.	
	Unit 2	Lifting and casting of impression evidence	
		Lifting and Casting of Tyre prints Lifting and Casting of Foot Wear Impressions. Photography of tyre prints and foot prints To compare cloth samples/Fibre by physical matching.	CO2
	Unit 3	Paint and soil evidence	
		To compare paint samples by physical matching method. To compare paint samples by chemical methods. To compare soil samples microscopically. To compare soil samples by turbidity test. To compare soil samples by density gradient method	CO3
	Unit 4	Glass evidence	
		To identify and compare tool marks. Identification of Glass Fractures. To compare glass samples by refractive index method.	CO4

	Unit 5	Restoration of erased / obliterated marks			
		Restoration of erased marks			CO5,CO6
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	-Lab manual			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	3	2	2	3	2	2	2	2	2	2	1	2
CO2	2	3	2	2	3	3	3	2	1	2	2	2
CO3	3	3	3	2	2	2	3	3	3	3	3	1
CO4	3	2	3	3	3	3	3	3	2	1	2	2
CO5	2	3	3	2	3	1	2	2	3	2	1	1
CO6	1	2	2	2	2	2	1	2	2	2	2	1
	2.33	2.50	2.50	2.33	2.50	2.17	2.33	2.33	2.17	2.00	1.83	1.50

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VI	
1	Course Code	FSU363	
2	Course Title	Forensic Ballistics (Lab)	
3	Credits	2	
4	Contact Hours (L-T-P)	0-0-4	
	Course Status	Compulsory	
5	Course Objective	1- Able to apply modern methods of forensic analysis in lab 2- In communicating or defending forensic evidence in oral or written 3- To provide depth knowledge related to firearm	
6	Course Outcomes	CO1:To gain knowledge about determining the gait pattern and foot print. CO2: Lifting and Casting of Tyre/Foot Wear Impressions CO3: To compare paint samples and soil samples. CO4: To identify and compare tool marks and grass fractures. CO5: comparison of fired bullets and fired cartridge case. CO6: Estimate the gunshot residue with different techniques.	
7	Course Description	After the completion of this course the students will be able to understand the Investigation and examination of footprint, tire marks, obliterated marks and their restoration along with fire-arm evidences and also understand the aspects of photography.	
8	Outline syllabus		CO Mapping
	Unit 1	Firearms	CO1
		Study of Muzzle loading Firearms	
		Study of Breech loading Firearms	
		Study of Head stamp marking	
	Unit 2	Cartridge	
		To compare the rifled and shotgun cartridge.	CO2
		To compare cartridge of rifle and handgun.	
		To compare centre fire and rim fire cartridge.	
	Unit 3	Comparison of Bullet and Cartridge	CO3
		To carry out the comparison of fired bullets and test bullet.	
		To carry out the comparison of fired cartridge and test cartridge case.	
	Unit 4	Gun Shot Residue	CO4
		Collection of GSR particles	
		Analysis of Inorganic components of GSR	
		Analysis of Organic components of GSR	
	Unit 5	Case studies in Ballistics	CO5,CO6

		Investigate any one case in Forensic Ballistics			
	Mode of examination	Practical/Viva			
	Weightage Distribution	CA	CE	ETE	
		25%	25%	50%	
	Text book/s*	-Ballistics Lab Manual			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	2	2	1	3	2	2	2	1	2	1
CO2	3	2	2	3	3	2	3	3	2	1	2	2
CO3	2	3	2	2	2	3	2	2	1	2	1	3
CO4	3	3	3	3	3	2	3	3	2	3	2	1
CO5	3	2	3	3	2	2	3	2	2	2	2	2
CO6	2	1	1	2	3	1	2	3	3	2	2	2
	2.50	2.33	2.17	2.50	2.33	2.17	2.50	2.50	2.00	1.83	1.83	1.83

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VI	
1	Course Code	FSU318	
2	Course Title	Zoology V	
3	Credits	3	
4	Contact Hours (L-T-P)	3-0-0	
	Course Type	Compulsory	
5	Course Objective	1- Able to understand about types of immune cells, lymphoid and myeloid. 2- Able to understand the structure of antigen and antibody. 3- Able to understand complete process of vaccination.	
6	Course Outcomes	CO1: Able to describe the immunity and immune system CO2: Identify membrane bound organelles in eukaryotic cell. CO3: Illustrate about the antigens and immunoglobulins. CO4: Know about development of Immunity to infection CO5: Able to describe the concept of hypersensitivity. CO6: Know the working of immunity system along with vaccines and vaccination.	
7	Course Description	The completion of this course students will be able to know all about immunity and body immune system	
8	Outline syllabus		CO Mapping
	Unit 1	Immunology- I	CO1,CO6
	A	Introduction to Immunity: Innate immunity, Adaptive immunity.	
	B	Cell and organs of the immune system: Types of immune cells, lymphoid and myeloid, Primary and secondary lymphoid organs.	
	C	Cell-mediated and humoral immune responses Humoral immunity: Antigen, Function of B cell Cell-mediated immunity: Function of T-Cells	
	Unit 2	Immunology -II	CO2
	A	Antigens: Antigenicity and immunogenicity, Immunogens,	
	B	Factors influencing immunogenicity, Band T-Cell epitopes	
	C	Immunoglobulins: Antibody structure and function, antibody isotypes, Applications Monoclonal antibodies.	
	Unit 3	Immunology -III	CO3
	A	Hypersensitivity: Type-I hypersensitivity- allergens, mast cell degranulation	
	B	mediators of type-I reaction, Type-II-antibody mediated cytotoxic	
	C	Type-III and Type IV hypersensitivity.	
	Unit 4	Immunity to infection	CO4
	A	immunity to different organisms,	
	B	Pathogen defence strategies, avoidance of recognition.	

	C	Autoimmune diseases, Immunodeficiency-AIDS.			
	Unit 5	Vaccines & Vaccination			CO5,CO6
	A	Adjuvants, cytokines, DNA vaccines, recombinant vaccines, bacterial vaccines, viral vaccines,			
	B	vaccines to other infectious agents, passive & active immunization.			
	C	Introduction to immunodiagnostics – RIA, ELISA.			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6 th Edition. John Wiley & Sons. Inc.			
	Other References	Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5 th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.			

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	2	1	2	2	2	1	3	2	1	2
CO2	2	2	3	3	3	2	2	2	2	3	3	2
CO3	3	1	2	2	2	3	3	1	3	3	2	2
CO4	3	3	2	3	3	3	3	2	2	2	2	1
CO5	2	3	3	2	2	2	2	3	3	2	2	2
CO6	2	2	2	2	3	2	2	2	1	1	2	1
	2.33	2.17	2.33	2.17	2.50	2.33	2.33	1.83	2.33	2.17	2.00	1.67

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VI	
1	Course Code	FSU317	
2	Course Title	Analytical Chemistry and Instrumentation II	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	1- Able to understand the various types of physical instrumental techniques. 2- To develop a basic level of knowledge about the principals of spectroscopy and microscopy. 3- Provides the analytical aspect and interpretation of data.	
6	Course Outcomes	CO1: Will be able to describe analytical methods for qualitative and quantitative analysis. CO2: Learn about the basics of spectroscopy. CO3: To understand the working mechanism of spectroscopic techniques. CO4: To learn concept of microscopy and various types of microscopes and their applications. CO5: Able to learn basic concepts of Electro chemical analysis. CO6: Discuss about gravimetric and titrimetric analysis	
7	Course Description	After completion of this course student will be able to know about the spectroscopy, microscopy and electrochemical techniques.	
8	Outline syllabus		
	Unit I:	Introduction	CO1
		Methods of Analysis – Accuracy, precision, Qualitative, quantitative and instrumental methods.	CO1
		Principal,types of instrumentation, advantages and disadvantages of instrumental methods.	CO1
		Steps involved in chemical analysis, types of analytical methods, qualitative and quantitative analysis.	CO1
	Unit II	Spectroscopy I	CO2
		Definition and Fundamentals of Spectroscopy, Energy, properties of electromagnetic radiation (EMR)	CO2
		General features of spectroscopy, interaction of EMR with matter. Spectrometers, molecular energy levels.	CO2
		Types of molecular transitions, applications.	CO2
	Unit III	Spectroscopy II	CO3

		Ultraviolet-Visible Spectroscopy: Basic Principle, Beer-Lambert's laws, Deviations from Beer's Law – Chemical, instrumental and real deviations. Instrumentation – Radiation source, monochromators, detectors. Single and double beam spectrophotometer	CO3		
		Infrared Spectroscopy: Basic Principle and theory, origin of spectra and examination of IR spectra, Instrumentation, FTIR spectrometer,	CO3		
		Forensic applications	CO3		
	Unit IV	Microscopy	CO4		
		Foundational theories of light and optics used in Forensic microscopy Concept of resolution and magnification, Phase contrast, dark field, differential interference contrast, Fluorescence Microscopy: Theory and basic principles , Magnification and Resolution	CO4		
		Principles of Compound, Comparison, Fluorescence, Polarized, Stereo microscope	CO4		
		forensic application of microscopes			
	Unit V	Electro chemical analysis:	CO5,CO6		
		Introduction and classification of electrochemical methods	CO5,CO6		
		Gravimetric analysis: Basic principle types and procedure, Gravimetric calculations and its forensic application	CO5,CO6		
		Titrimetric analysis: General aspect, types and the calculation and its application	CO5,CO6		
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	R.Chatwal&K.Anand. Instrumental Method of Chemical Analysis. Himalaya Publishing House PVT.LTD			
	Other References	Skoog Douglas A.Principles of Instrumental Analysis Seventh Edition. Publisher: Cengage Learning India			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	3	2	2	2	1	2	2	2	1	2
CO2	3	2	3	2	3	3	2	1	3	1	2	2
CO3	1	3	2	3	2	2	3	3	3	2	1	3
CO4	3	1	2	2	2	1	2	2	2	2	2	1
CO5	2	3	2	3	2	3	2	3	3	2	2	0
CO6	2	3	3	2	1	2	2	2	1	1	2	2
	2.17	2.33	2.50	2.33	2.00	2.17	2.00	2.17	2.33	1.67	1.67	1.67

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch:		Semester: VI
1	Course Code	INC008
2	Course Title	FSIC
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	To create a platform to enhance the industry-academia interaction To give exposure to the industry to our faculty members and students To bridge the gap between industry and academia
6	Course Outcomes	CO1: Enhanced role of the university across industries in the form of knowledge creation, learning, training, consultancy CO2: To give real-time exposure to our faculties about industry environment CO3: Developing an understanding of various real-time problems, latest updates, technological advancements, and best practices of the industry CO4: Establishing corporate connections and strong networking CO5: To make our students industry-ready.
7	Course Description	The university offers a Faculty-Student Industry Connect (FSIC) course for the holistic development and empowerment of students and faculties to gain more practical insights and exposure to the industry. FSIC will support the curriculum by amplifying, supplementing, and filling in the gaps related to industry exposure, if any. In addition, FSIC will help students and faculty to enrich their knowledge and skills about the various practices of the industry by making industry visits, working on live projects with the industry, and solving the real-time problems of the industry.
8	Outline syllabus	

Guidelines:

For Students:

1. It is mandatory for every student to get registered for the two-credit FSIC course offered by the school/department.
2. Students pursuing UG Programmes are required to enroll in this course in the 2nd or 3rd year.
3. Students pursuing PG Programmes are required to enroll in this course in the 2nd or 3rd semester.
4. Attendance for a minimum of two visits to the same industry/organization will be marked as a requisite for the completion of the FSIC course. Students will be required to submit geotagged pics for both visits.

5. As FSIC is a two-credit course, it is essential for students to clear/complete the FSIC course.
6. A student shall be graded for the FSIC course.
7. If a student fails in the FSIC course, the student will get the grade “F” and need to repeat the course with the succeeding batch. Only final-year students will be allowed to appear in the summer batch.
8. The student shall be issued a course completion certificate by the school/department after Passing the course.

II. For School/Department:

1. Individual schools/departments must appoint an FSIC coordinator for the smooth Functioning of the FSIC course at the school/departmental level.
2. The FSIC is mandatory for all the non-council courses but even then for council based courses this course may be given as Value Added Course (VAC)
3. The school/department FSIC coordinator should ensure students’ enrolment in the FSIC course.
4. Industry/organization visit slots must be mapped on the timetable. The slot can be given on iCloud if the specific visit by any team should be intimated to the FSIC coordinator, one week in advance.
5. The FSIC coordinator will allot a minimum of 2-3 students to every faculty member of the school/department.
6. The FSIC coordinator will ensure that every faculty member with their allotted students must visit a minimum twice the same industry/organization to get better insights into the industry/organization.
7. The school/department should get it mapped FSIC on PeopleSoft.
8. FSIC course details along with an evaluation scheme must be designed for this course.
9. For the FSIC course, course outcomes (COs) must be created and mapped with POs & PSOs of the Programme. Approval is required from the Office of the Dean of Academic Affairs.
10. FSIC brochure must be prepared by the school/department.
11. Attendance records and assessment records should be maintained properly and on a regular basis.
12. The school/department FSIC coordinator must inform students about the requisites (regular attendance and passing the exam) for the completion of the course.
13. On completion of the course, students will be issued a course completion certificate.
14. The FSIC Course Execution Process.

Evaluation Scheme:

The evaluation scheme of the FSIC course will be as follows:

Continuous Evaluation (CE)	Industry Visit Report	Viva - Voce	Total
80 %	10 %	10 %	100 %



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Semester seven

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch:		Semester: VII
1	Course Code	FSU401
2	Course Title	Criminology and Law
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	To provide students understanding the concept of crime, criminology, their theories, the factors that contribute to a person becoming anti-social and the laws related to forensic context.
6	Course Outcomes	CO1: Define the concept of crime, various theories of crime and the factors responsible for the crime. CO2: Understanding the concept of criminology, victimology, crime against women and factors responsible for it. CO3: Outline the concept of penology, punishments and its types, prison and prisoners, youth crime and the factors responsible for it. CO4: Analyze the role of IPC, Cr PC and IEA in criminal justice system CO5: Evaluate the laws of IPC, Cr PC and IEA related to forensic proceedings. CO6: Create understanding about process of police investigation in cognizable and non-cognizable offences.
7	Course Description	The course “criminology and law” aims at developing basic understanding about crime, criminology, their theories and factors responsible for it. This course encompasses victimology, penology, punishments, prison and prisoners. Moreover, this course is focused on the laws of IPC, CrPC and IEA relating to the forensic proceedings. The knowledge of crime, criminology and law empowers students’ knowledge and skills as a tool for mental and social wellbeing.
8	Outline syllabus	CO Mapping
	Unit 1	Concept of crime:
	A	Definition of crime Types, Theories of crime,
	B	characteristics and causes of crime,
	C	Crime prevention and management, FIR
	Unit 2	CRIMINOLOGY I:
	A	Criminology- definition and scope, Nature of criminology Criminology vs. criminal justice , Importance of criminology,
	B	Schools of criminology: Victimology- victim and victimization
	C	Types of victimization, Roles of victim in crime, Victimological theories Crime against women, Legal provisions for female
	Unit 3	CRIMINOLOGY II:
	A	Penology- definition, nature and scope, Punishment- significance, concept, aims and types, Theories of punishment Sentencing- principles, policies and procedure, Capital punishment

B	Prison types and classification of prisoners, Evolution and development of prison system in India. Probation- concept and scope, Probation in India- probation of offender's act, Parole- Meaning and scope.	CO3
C	Youth and crime- genesis of youth crime, Trends and characteristics of crime among youth, Typology of youth criminals, Juvenile delinquency	CO3
Unit 4	Introduction to Indian law:	CO4
A	Indian penal code- definition and scope Essential elements of crime- Actus Reus and Mens Rea Punishments and general exceptions .	CO4
B	CrPC- Importance of criminal procedure Hierarchy, powers and duties of criminal courts	CO4
C	Fundamental rights article 20,21,22., Indian Evidence Act (IEA) Expert, Expert witness, Expert testimony	CO4
Unit 5	Laws related to forensic Proceedings:	CO5
A	Indian penal code- General idea of sections- 300,302,304B,307,319,320,375,377,378,420,441,463,489A,499,503,511	CO5
B	Criminal Procedure Code: General idea of sections: 291-93, 154,155,161,164,172,173,174,176,230-31,	CO5,CO6
C	Indian Evidence Act: General idea of sections: 32, 45,45A,46, 47,47A 57, 58,59,60,62,63,73, 135, 136, 137, and 159	CO5,CO6
Mode of examination	Theory	
Weightage Distribution	CA 15%	MTE 10%
		ETE 75%
Text book/s*	1. M.K., Child, I.L and Barry, H., A Cross- cultural Study of Correlates of Crime, Journal of Abnormal and Social Psychology, 1963. 2. Bajpai, G.S., Development without Disorders, Vishwavidyalaya Prakashan, Sagar (M. P.), 2002. 3. Ellis, L. and Walsh, Criminology – A Global Perspective, Allyn, and Bacon, Boston, 2000. 4. M. Meguire, R. Morgan & R. Reiner; Oxford Handbook of Criminology, 2 nd ed. Biddles Ltd, Lyon, 1997. 5. Ram Ahuja, Criminology; Rewal Pub. Jaipur, 2000.	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO 1	3	2	2	3	1	2	2	1	3	3	2	1
CO 2	2	2	2	2	2	2	1	2	2	2	3	1
CO 3	3	2	3	3	1	2	2	3	1	3	1	2
CO 4	2	3	3	3	2	3	1	2	-	2	2	-
CO 5	2	3	2	2	1	3	2	-	2	3	2	1
CO6	3	3	3	3	-	3	2	2	2	2	3	2
	2.50	2.50	2.50	2.67	1.40	2.50	1.67	2.00	2.00	2.50	2.17	1.40



School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: VII
1	Course Code	FSU402
2	Course Title	Forensic Psychology
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	After studying this paper the students will know – a. The overview of forensic psychology and its applications. b. The legal aspects of forensic psychology. c. The significance of criminal profiling. d. The importance of psychological assessment in gauging criminal behavior. e The tools and techniques required for detection of deception. f. The critical assessment of advanced forensic techniques like polygraphy, narcoanalysis and brain electrical oscillation signatures.
6	Course Outcomes	Students will be able to CO1:Describe key concepts, principles and ethical issues in forensic psychology. CO2:Understand the psychology of evidence. CO3:Apply Psychological assessment and criminal profiling. CO4:Analyze the theories of Juvenile delinquency. CO5: Evaluate the deception using polygraphy and narcoanalysis CO6:Build the biological and social factors to assess the criminal psychology
7	Course Description	After the completion of this course the students will be able to know all about psychology used for Investigation.
8	Outline syllabus	CO Mapping
	Unit 1	Basics of Forensic Psychology I:
	A	Definition and fundamental concepts of forensic psychology and forensic psychiatry
	B	Psychology and law. Ethical issues in forensic psychology.
	C	Assessment of mental competency.
	Unit 2	Basics of Forensic Psychology II:
	A	Mental disorders and forensic psychology.
	B	Psychology of evidence – eyewitness testimony, confession evidence. Criminal profiling.
	C	Psychology in the courtroom, with special reference to Section 84 IPC.
	Unit 3	Psychology and Criminal Behaviour
		CO3

	A	Psychopathology and personality disorder.	
	B	Psychological assessment and its importance. Serial murderers. Psychology of terrorism.	
	C	Biological factors and crime – social learning theories, psycho-social factors, abuse.	
	Unit 4	Juvenile delinquency	CO4
	A	Theories of offending (social cognition, moral reasoning)	
	B	Child abuse (physical, sexual, emotional)	
	C	Juvenile sex offenders, legal controversies.	
	Unit 5	Detection of Deception	CO5,CO6
	A	Tools for detection of deception – interviews, non-verbal detection, statement analysis, voice stress analyzer, hypnosis.	
	B	Polygraphy – operational and question formulation techniques, ethical and legal aspects, the guilty knowledge test.	
	C	Narco analysis and brain electrical oscillation signatures – principle and theory, ethical and legal issues.	
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	C.T.Morgan- Introduction to Psychology	
	Other References	R.J. Cohen- Psychological Testing and assessment	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	1	3	3	2	2	2	2	1	1	1
CO2	3	2	2	2	2	2	2	3	2	2	2	1
CO3	2	2	3	3	3	3	2	2	2	1	1	2
CO4	3	3	2	2	3	2	1	2	2	2	2	1
CO5	2	2	3	3	2	2	1	2	2	2	1	2
CO6	2	2	2	2	2	2	2	2	2	2	2	1
	2.33	2.33	2.17	2.50	2.50	2.17	1.67	2.17	2.00	1.67	1.50	1.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch:		Semester: VII	
1	Course Code	FSU403	
2	Course Title	Advanced Dermatoglyphics	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	To provide students understanding the concept of fingerprints, different types and techniques used for recording the fingerprint, the procedure for searching fingerprints, collection and preservation techniques and methods for comparison. It make students approachable for their advanced for learning latest methods for fingerprint development.	
6	Course Outcomes	CO1 : Define fundamentals and history of forensics dermatoglyphics CO2 : Understand the various methods of collection of fingerprints found at crime scene CO3 : Apply various methods for detection of fingerprints CO4 : Analyze various techniques for comparison of fingerprint pattern CO5: Evaluate the use of biometric in fingerprint science. CO6: Plan the Advancements in development of latent fingerprints and evaluation with the use of modern technology.	
7	Course Description	The course “Fundamentals of Dermatoglyphics Examination” aims at developing understanding about fingerprint examination, their techniques and procedures for documenting and developing. This course encompasses the procedure for comparison. Moreover, this course is focused on edgeoscopy and poroscopy.	
8	Outline syllabus		CO Mapping
	Unit 1	Introduction to Fingerprints	
	A	Definition Historical development of fingerprint science Ridges and its formation Formation of fingerprints	CO1
	B	Fundamental principles of fingerprint science Fingerprint pattern and its types Fingerprint ridge characteristics	CO1
	C	Composition of fingerprint residue Poroscopy and its significance Edeoscopy and its significance	CO1
	Unit 2	Collection and Classifying Fingerprints	
	A	Types of fingerprints on surface Methods for collection of fingerprints- deceased and live persons	CO2
	B	Single digit fingerprint classification Ten- digit and advanced fingerprint classification	CO2

C	Ridge Counting and Ridge Tracing Cataloguing of Fingerprint Record	CO2
Unit 3	Methods for development of Fingerprints	
A	Detection of Latent Fingerprints by Physical techniques Detection of Latent Fingerprints by Chemical techniques	CO3, CO6
B	Mechanism of Detection of Fingerprints by different Developing reagents	CO3, CO6
C	Different light source applications in fingerprint detection Preservation of developed fingerprints	CO3, CO6
Unit 4	Comparison Protocols	
A	Class and individual characteristics (Galton's details) different ridge characteristics	CO4
B	Standards of proof Role and Function of Automatic Fingerprint Identification System (AFIS)	CO4
C	Comparison criteria for Poroscopy and Edgescopy.	CO4
Unit 5	Advancements in Fingerprint Science	
A	AFIS vs IAFIS Biometric Identification Micro X-ray Fluorescence	CO5, CO6
B	Color changing films utilized in developing Fingerprints Developments of prints from metal objects Development of prints from washed surface	CO5, CO6
C	Non-invasive techniques of Fingerprint development	CO5, CO6
Mode of examination	Theory	
Weightage Distribution	CA MTE	ETE
	15% 10%	75%
Text book/s*	James, S.H and Nordby, J.J. (2003) Forensic Science: An introduction to scientific and investigative techniques CRC Press, Saferstein : Criminalistics (1976) Prentice Hall Inc., USA.	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	1	3	2	1	2	2	2	2	2	2
CO2	2	3	2	2	3	2	-	3	2	2	3	2
CO3	3	1	2	3	2	2	1	3	1	2	3	2
CO4	2	3	2	1	2	3	2	-	3	2	2	3
CO5	2	-	3	3	1	2	3	3	3	3	2	2
CO6	-	3	2	2	3	2	3	-	1	-	2	3
	2.20	2.40	2.00	2.33	2.17	2.00	2.20	2.75	2.00	2.20	2.33	2.33

School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: BFS		Semester: VII
1	Course Code	FSU404
2	Course Title	Biostatistics and Research methodology
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Status	Compulsory
	Course Objective	1. To enable students, comprehend research issues 2. To enable students to identify research questions and formulate research hypothesis 3. To equip students with various techniques of research design and data collection 4. To enable students to synthesize qualitative and quantitative data crunching techniques
	Course Outcomes	CO1: To understand the basic concepts and methods of research. CO2: To enable students comprehend research issues CO3: To apply the application of descriptive statistics on data. CO4: To equip students with various techniques of research design and data collection CO5: To enable students to synthesize quantitative data crunching techniques CO6: To enable students to synthesize qualitative data crunching techniques
	Course Description	To help the students to understand the basic principles of biostatistics & research methodology and applied to draw the inferences from the data.
Outline syllabus		CO Mapping
Unit 1	Introduction to Research	CO1, CO2
A	<ul style="list-style-type: none"> Meaning of research, Types of research Research Process 	CO1, CO2
		CO1, CO2
		CO1, CO2
B	Literature Review <ul style="list-style-type: none"> Literature review basics Primary data Secondary data and exploration 	CO1, CO2
		CO1, CO2
		CO1, CO2
C	Theoretical Framework and Hypothesis Formulation	CO1, CO2
	<ul style="list-style-type: none"> Types of variables Exogenous and Endogenous variables Formulation of Hypothesis and Research question 	CO1, CO2
		CO1, CO2
		CO1, CO2

Unit 2	Research Design	CO2,CO3
A	<ul style="list-style-type: none"> Types of Research design Instrument design, Scale formation 	CO2,CO3
B	<ul style="list-style-type: none"> Basics Biostatistics 	CO1, CO3
C	<ul style="list-style-type: none"> Methods of data collection Questionnaires creation Sampling Design 	CO2,CO3
Unit 3	Data Analysis & Interpretation	
A	<ul style="list-style-type: none"> Descriptive Analysis 	CO3,CO4
B	<ul style="list-style-type: none"> Normality tests 	CO2,CO3
C	<ul style="list-style-type: none"> Outlier tests. 	CO1, CO3
	<ul style="list-style-type: none"> Hypothesis testing 	CO3,CO4
Unit 4	Referencing	CO2,CO3
A	<ul style="list-style-type: none"> APA format MLA format 	CO4,CO5
B	<ul style="list-style-type: none"> Harvard Style IEEE format 	CO2,CO3
C	<ul style="list-style-type: none"> Report Writing 	CO4,CO5
Unit 5	Ethical Practices in Research	CO2,CO3
A	<ul style="list-style-type: none"> Plagiarism 	CO5,C06
B	<ul style="list-style-type: none"> Introduction to plagiarism software 	CO5,C06
C	<ul style="list-style-type: none"> Legal, Governmental and other norms 	CO5,C06
Mode of examination		Theory/Jury/Practical/Viva
Weightage Distribution	CA	MTE
	15%	10%
Text book/s*	1. Research Methodology- CR Kothari 2. Statistics in Medicine-Colton-Little Brown. Boston	
Other References	1. Adler, Stier and Clark, How it's done: An Invitation to Social Research 2. Cooper, Schindler, Social Sciences Research Methods: How to start and finish your thesis, book, or article	

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	POS2	PSO3
CO1	2	3	3	2	3	3	2	3	2	3	3	2
CO 2	2	3	2	3	2	3	2	2	3	3	3	2
CO.3	2	2	1	3	3	2	3	2	2	2	1	1
CO 4	3	2	3	2	2	2	2	3	3	3	2	2
CO 5	2	2	2	3	1	3	3	3	2	1	1	1
CO 6	1	2	3	2	2	2	2	2	1	2	2	1
	2.00	2.33	2.33	2.50	2.17	2.50	2.33	2.50	2.17	2.33	2.00	1.50

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VII	
1	Course Code	FSU405	
2	Course Title	Introduction to Biometry	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Minor Elective	
5	Course Objective	After studying this paper the students will know – 1. The basis of biometry. 2. The classification of biometric processes. 3. The importance of behavioral biometry.	
6	Course Outcomes	Students will be able to know CO1: Understand the fundamental aspects and classification of biometric system CO2: Understand the biometric procedure. CO3: Compare the Biometric and traditional technologies CO4: Analyse the biometric system based on physiological traits CO5: Evaluate the significance of biometric on the basis of behavioural traits. CO6: Discuss the Strength and weakness of physiological and behavioural biometrics.	
7	Course Description	The completion of this course student will be able to know all about biometric systems.	
8	Outline syllabus		CO Mapping
	Unit 1	Fundamental Aspects	CO1
	A	Definition, characteristics and operation of biometric system.	
	B	Classification of biometric systems – physiological and behavioral.	
	C	Strength and weakness of physiological and behavioural biometrics.	
	Unit 2	Multimodal biometrics	CO3
	A	Multimodal biometrics. Key biometric processes – enrollment, identification and verification.	
	B	Positive and negative identification.	
	C	Performance measures used in biometric systems – FAR, FRR, GAR, FTA, FTE and ATV.	
	Unit 3	Biometric versus traditional technologies:	CO4

	A	Biometric versus traditional technologies for identification			
	B	Fingerprints and Palm prints			
	C	Anthropometry, Portrait Parle'			
	Unit 4	Physiological Biometrics			CO3,CO6
	A	Physiological Biometrics Fingerprints, palm prints			
	B	Iris, retina,			
	C	Geometry of hand and face.			
	Unit 5	Behavioural Biometrics			CO5
	A	Behavioural Biometrics Handwriting			
	B	Signatures, Keystrokes			
	C	Gait and voice.			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	1. S. Nanavati, M. Thieme and R. Nanavati, Biometrics, Wiley India Pvt. Ltd. (2002).			
	Other References	2. P. Reid, Biometrics for Network Security, New Delhi (2004). 3. J.R. Vacca, Biometric Technologies and Verification Systems, Butterworth-Heinemann, Oxford (2007).			

POs Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	1	2	3	2	2	2	2	2	2	2	1
CO2	1	2	1	2	3	2	3	1	2	2	2	2
CO3	2	3	2	3	2	3	2	3	1	3	2	1
CO4	2	2	3	2	3	2	2	2	3	2	2	2
CO5	2	3	2	3	2	1	3	2	1	2	2	2
CO6	1	2	3	1	2	2	2	2	2	1	3	2
	1.67	2.17	2.17	2.33	2.33	2.00	2.33	2.00	1.83	2.00	2.17	1.67



School: SSAHS		Batch: 2023-2027
Programme:		Bachelor of Science (Forensic Science)
Branch: Forensic Science		Semester: VII
1	Course Code	FSU453
2	Course Title	Minor Project
3	Credits	3
4	Contact Hours (L-T-P)	0-0-6
	Course Type	Minor Elective



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Semester Eight

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VIII	
1	Course Code	FSU411	
2	Course Title	Explosive	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	To learn the kinetics and thermochemistry of explosives. To gain knowledge of the explosion effects and manufacturing of different explosives. To understand analysis of various explosive residues.	
6	Course Outcomes	Students will be able to CO1: The classification of explosives, including the synthesis and characterization of representative analogs. CO2: Understand the development of primary and secondary explosive. CO3: The significance of bomb scene management. CO4: Chemical examination of explosive residues. CO5: Understand the legal aspect of explosive substances CO6: Plan instrumentation examination of explosive residues	
7	Course Description	On the completion of the course the student will be able to learn the kinetics and thermochemistry of explosives. They also gain knowledge of the explosion effects and manufacturing of different explosives. They will also gain knowledge about the analysis of various explosives residues.	
8	Outline syllabus		CO Mapping
	Unit 1	History of Explosives and its Composition, Classification and Characteristics	CO1
	A	Definition of Explosives, Definition as per Indian Explosive Acts. History of explosives, classification of explosives,	
	B	Chemistry of explosives and characteristics of high and low explosives.	
	C	What is an Explosion, Basic types of Explosions, Explosives and their effects, Detonation Velocity, Deflagration, High-order Detonation, Low-order Detonation.	
	Unit 2	Development of Explosives and Detonators:	CO2
	A	Development of black powder, picric Acid, tetrazene, lead azide, lead styphnate, nitroglycerine, mercury	

		fulminate, nitrocellulose, dynamite, ammonium nitrate, Gelatines, emulsion, slurries. ANFO.	
	B	Development of military explosives: picric acid, tetryl, TNT, PETN, RDX and HMX.	
	C	Introduction, plain and electric detonators, delay detonators, detonating and safety fuse, high explosive mixtures.	
	Unit 3	Location, Collection and disposal of explosives residues:	CO3
	A	Bomb Scene Investigation: Documentation, Collection of different type of pre and post blast explosive material (IEDs, fireworks, home-made bombs, traps bombs and letter bombs) and preservation of explosive residues	
	B	Blast Materials from crime scene and their safety handing. Role of Bomb Squad, Use of field kit for detection of explosives or explosion residues Specific approach to scene of explosion (Evaluation and assessment)	
	C	Reconstruction of sequence of events, Evaluation and assessment of scene of explosion. Disposal of an explosive device, dispatch of explosive device and exploded material. Do's and Don'ts. Case studies related to explosives.	
	Unit 4	Examination of Explosive Residue	CO4, CO6
	A	Systematic examination of explosives and explosion residues by using chemical	
	B	Examination of explosives by instrumental techniques: TLC, HPLC, X-ray imaging and interpretation of results	
	C	Vapor detection method: adsorption and concentration of explosive vapors	
	Unit 5	Legal Aspects	CO5
	A	Explosives Act 1984, (Definition, Powers of Central Govt. and Licensing Authority, Offences and Penalties)	
	B	Section 286 of IPC, 1860, (Negligent conduct with respect to explosive substance)	
	C	Explosive Substances Act 1908, (Definition, Offences and Penalties).	
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	1. Mukhopadhyay, Raghupati and Datta, Sriparna-engineering chemistry	

		2. Robert A. Sickler-Explosive Principles _ An Essential Guide to Understanding Explosives and Detonations-Paladin Press (1992) 3. Engineering Design Handbook - Principles of Explosive Behavior_-U.S. Army Materiel Command 4. JehudA. Yinon, Shmuel Zitrin, R Belcher, D Betteridge and L Meites (Auth.) - The Analysis of Explosives-Pergamon (1981) 5. Development of Analysis Methods to Detect the Use of Explosives and Chemical Warfare Agents 6. THE EXPLOSIVE SUBSTANCES ACT, and IPC	
	Other References	1. Jacqueline_Akhavan/ The_Chemistry of Explosives(book.cc) Elsevier	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	2	3	2	1	2	1	2	1	3	2
CO2	3	2	3	1	2	3	2	2	3	3	3	2
CO3	2	3	2	3	1	1	3	1	2	1	2	3
CO4	3	3	2	2	3	2	2	3	3	2	2	1
CO5	3	2	3	3	1	2	2	1	2	2	3	2
CO6	3	3	2	2	2	2	1	2	2	3	2	2
	2.67	2.50	2.33	2.33	1.83	1.83	2.00	1.67	2.33	2.00	2.50	2.00

School: SSAHS		Batch: 2023-27
Programme:		Bachelor of Science (Forensic Science)
Branch:		Semester: VIII
1	Course Code	FSU412
2	Course Title	Forensic Instrumental Analysis
3	Credits	4
4	Contact Hours (L-T-P)	3-1-0
	Course Type	Compulsory
5	Course Objective	To impart knowledge of the various instruments used in the analysis of different substances encountered during a criminal investigation, their methods of sample analysis and forensic applications.
6	Course Outcomes	CO1: Conceptual understanding of laws, principle and instrumentation of various types of spectroscopies and its forensic applications. CO2: Explain the laws, principle and instrumentation of distillation and chromatographic techniques and its forensic applications. CO3: To apply the principle and instrumentation of different types of column chromatography and their forensic significance. CO4: To analyze the knowledge of centrifugation and electrophoretic techniques for separation and identification of biomolecules/complex mixtures. CO5: To evaluate the principles of microscopy and different immunochemical interactions in forensic context. CO6: Forensic applications of Compound, Comparison, Fluorescence, Polarized, Stereo microscope and immunological techniques.
7	Course Description	The course “forensic instrumental analysis” aims at developing a thorough knowledge and understanding of various types of instrumentation, their forensic applications, their method of sample analysis and the different types of detectors used for detecting the various substances.
8	Outline syllabus	CO Mapping
	Unit 1	INSTRUMENTAL METHODS- PHYSICAL
	A	Spectroscopy- Introduction, electromagnetic spectrum, various sources of radiation UV-visible, infrared, atomic absorption/emission spectroscopy
	B	Forensic application of spectroscopy
	C	Atomic and molecular spectra – energy level, quantum number, energy states, molecular orbitals
	Unit 2	INSTRUMENTAL METHODS- CHEMICAL (I)
	A	Distillation- principle and working
	B	Chromatography- theory and principles Thin layer chromatography (TLC) Paper chromatography
	C	Forensic applications of chromatographic techniques
	Unit 3	INSTRUMENTAL METHOD- CHEMICAL (II)
	A	Gas chromatography (GC)- working principle, ray diagram, instrumentation

	B	HPLC- working principle, ray diagram, instrumentation	CO3
	C	HPLTC- working principle, ray diagram, instrumentation Forensic applications of detectors	CO3
	Unit 4	INSTRUMENTAL METHOD- BIOLOGY (I)	
	A	Electrophoresis- theory and principle, instrumentation Low voltage, high voltage, gel electrophoresis, capillary electrophoresis.	CO4
	B	Forensic application of electrophoretic techniques	CO4
	C	Centrifugation techniques- basic principle Types of centrifugation Forensic application of centrifugation	CO4
	Unit 5	INSTRUMENTAL METHOD- BIOLOGY (II)	
	A	Immunochemical techniques- general principle Types- RIA, MIA, ELISA Forensic application of Immunochemical techniques	CO5,CO6
	B	Microscopy- theory and basic principle Forensic applications of Compound, Comparison,	CO5
	C	Fluorescence, Polarized, Stereo microscope.	CO5,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA MTE ETE	
		15% 10% 75%	
Text book/s*	1. Settle, F.A.: Handbook of Instrumental Techniques for Analytical Chemistry, Prentice Hall, 1997. 2. R J Mayer and J H Walker., Immunochemical Methods in Cell and Molecular Biology Academic Press, London. 1987. 3. Reiner Westermeier Electrophoresis in Practice: A Guide to Methods and Applications of DNA and Protein Separations, Fourth Edition. First published:25 October 2004. 4. G.R Chatwal & S.K Anand; “Instrumental Methods of Chemical Analysis”, Himalaya Publ. House, 2004.		

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	2	3	3	3	3	2	2	3	2	2	2
CO2	2	3	2	2	2	2	2	3	2	3	2	2
CO3	3	2	2	3	2	1	2	3	2	2	3	3
CO4	2	3	2	2	1	3	3	2	3	2	2	2
CO5	3	2	3	3	2	3	1	2	3	1	1	2
CO6	2	3	3	2	3	2	3	1	3	2	2	3
	2.33	2.50	2.50	2.50	2.17	2.33	2.17	2.17	2.67	2.00	2.00	2.33

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch:		Semester: VIII	
1	Course Code	FSU413	
2	Course Title	Quality Assurance and Accreditation in Forensic Sciences	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	To obtain basic conceptual knowledge of quality and their managements protocols. To obtain quality accreditations from different organizations.	
6	Course Outcomes	CO1 :: Define quality management and accreditation in FSLs CO2 :: To understand the quality assurance and audits in FSLs CO3 :: Estimate quality management requirements in FSLs CO4 :: To analyze quality technical requirements in FSLs CO5 :: Evaluate the role and importance of assessor CO6:: Build knowledge of Agencies for setting guidelines for NABL and BIS	
7	Course Description	The course encompasses the different methods for obtaining quality standards in FSLs and how the accreditation procedures incurred. It also focuses on audits and role of assessors.	
8	Outline syllabus		CO Mapping
	Unit 1	Introduction to Quality Management	CO1
	A	Definition of Quality Importance of Quality Management Need of maintaining Quality in FSLs	CO1
	B	Definition of Accreditation Need and importance of Accreditation Process of Accreditation	CO1
	C	Agencies for setting guidelines for quality National Accreditation Board of Laboratories, International Laboratory Accreditation Co-operation, Asia Pacific Laboratory Accreditation Co-operation, American Society of Crime Laboratory Directors, International Organization for Standardization, Bureau of Indian Standards.	CO1,CO6
	Unit 2	Quality Management System in Forensic Science	CO2
	A	Quality Manual, Quality Manager, Total Quality	CO2
	B	Quality Assurance, Quality Control, Quality Planning	CO2
	C	Internal Audits Definition, Objectives, planning of audit, Implementation of internal audits, Follow up of corrective action Records and reports of internal audits, Additional unscheduled audits.	CO2
	Unit 3	Quality Management Requirements	CO3
	A	Quality management set up in FSLs, Organizational Document control	CO3

	B	Subcontracting of tests and calibrations, Control of Non-conforming testing / calibration work	CO3
	C	Corrective and preventive actions, Management Review	CO3
	Unit 4	Quality Technical Requirements	CO4
	A	Test and calibration methods Validation studies of new methods Measurement of uncertainty	CO4
	B	Maintenance of equipment's and calibration Evaluation of reagents and materials	CO4
	C	Sample handling and sample disposal Interpretation Total quality management, training, conferences	CO4
	Unit 5	Assessor and its Importance	CO5
	A	Role of Assessor Procedure- Assessor Assignment Assessment Procedure- New applicant laboratories	CO5
	B	On-site Assessment Pre -Assessment visit	CO5
	C	Assessor's Guide for formulating NABL recommendations Procedure- Conducting and Closing meeting	CO5,CO6
	Mode of examination	Theory	
	Weightage Distribution	CA MTE ETE	
		15% 10% 75%	
	Text book/s*	J A Siegel, P.J Saukko (2000) Encyclopaedia of Forensic Sciences Vol. I, II and III, Acad. Press. NABL -, Guide for Internal audit and Management Review for Laboratories. NABL-210, Assessor Guide Issue No.3, 1.5.2002. DFSS: Manuals of Forensic Sciences.	

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	1	2	3	2	3	3	2
CO2	2	3	2	2	3	2	2	2	3	1	2	2
CO3	1	1	2	2	2	3	1	3	2	2	1	1
CO4	3	2	3	2	3	2	3	2	3	1	2	1
CO5	2	3	3	3	2	3	2	2	2	2	1	2
CO6	2	1	3	2	2	2	2	1	2	3	2	2
	2.00	2.17	2.50	2.33	2.50	2.17	2.00	2.17	2.33	2.00	1.83	1.67

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VIII	
1	Course Code	FSU414	
2	Course Title	Digital and Cyber Forensic	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	1. To provide and understanding computer forensic fundamentals 2. Apply the methods for preservation of digital evidence 3. Identify methods for data recovery	
6	Course Outcomes	Students will be able to CO1: Know the basics of computers Hardware and accessories CO2: Understand the Memory and processor and network, LAN, WAN and MAN. CO3: Understand the types of computer crimes. CO4: Gain knowledge about hacking, spamming, phishing and stalking. CO5: Evaluate and investigate the cases related to digital and cyber crime. CO6: Plan the Password cracking and E-mail tracking methods	
7	Course Description	After the completion of this course the students will be able to understand about the cyber forensic their investigation & examination.	
8	Outline syllabus		CO Mapping
	Unit 1	Fundamentals and Concepts I	CO1
	A	Fundamentals of computers Hardware and accessories – development of hard disk, physical construction	
	B	CHS and LBA addressing	
	C	Encoding methods and formats.	
	Unit 2	Fundamentals and Concepts II	CO2
	A	Memory and processor. Methods of storing data.	
	B	Operating system. Software.	
	C	Introduction to network, LAN, WAN and MAN.	
	Unit 3	Computer Crimes I	CO3
	A	Definition and types of computer crimes. Distinction between computer crimes and conventional crimes.	
	B	Reasons for commission of computer crimes. Breaching security and operation of digital systems.	
	C	Computer virus, and computer worm – Trojan horse, trap door, super zapping, logic bombs.	

	Unit 4	Computer Crimes II	CO4
	A	Types of computer crimes – computer stalking, pornography, hacking, crimes related to intellectual property rights	
	B	Computer terrorism, hate speech, private and national security in cyber space.	
	C	An overview of hacking, spamming, phishing and stalking.	
	Unit 5	Computer Forensics Investigations	CO5,CO6
	A	Seizure of suspected computer. Preparation required prior to seizure. Protocol to be taken at the scene. Extraction of information from the hard disk.	
	B	Treatment of exhibits. Creating bit stream of the original media. Collection and seizure of magnetic media. Legal and privacy issues. Examining forensically sterile media.	
	C	Restoration of deleted files. Password cracking and E-mail tracking. Encryption and decryption methods. Tracking users.	
	Mode of examination	Theory	
	Weightage Distribution	CA 15%	MTE 10%
			ETE 75%
	Text book/s*	R.K. Tiwari, P.K. Sastry and K.V. Ravikumar, <i>Computer Crimes and Computer Forensics</i> , Select Publishers, New Delhi (2003).	
	Other References	C.B. Leshin, <i>Internet Investigations in Criminal Justice</i> , Prentice Hall, New Jersey (1997). R. Saferstein, <i>Criminalistics</i> , 8 th Edition, Prentice Hall, New Jersey (2004). E. Casey, <i>Digital Evidence and Computer Crime</i> , Academic Press, London (2000).	

Pos Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	2	3	2	2	2	1	2	2	2	2	2	1
CO2	2	2	2	2	2	2	3	2	1	2	1	2
CO3	2	2	2	3	1	3	2	3	2	2	1	1
CO4	3	3	3	2	2	1	1	1	3	1	2	2
CO5	2	2	2	2	1	2	3	3	2	2	1	2
CO6	1	3	2	3	2	1	2	1	2	1	1	1
	2.00	2.50	2.17	2.33	1.67	1.67	2.17	2.00	2.00	1.67	1.33	1.50

School: SSAHS		Batch: 2023-2027	
Programme:		Bachelor of Science (Forensic Science)	
Branch: Forensic Science		Semester: VIII	
1	Course Code	FSU415	
2	Course Title	Forensic Accounting and Fraud	
3	Credits	4	
4	Contact Hours (L-T-P)	3-1-0	
	Course Type	Compulsory	
5	Course Objective	By the end of the course students are able to <ol style="list-style-type: none"> 1. Understand both the pervasiveness and the causes of fraud and white-collar crime in our society 2. Examine the types of fraud and fraud schemes that affect business enterprises, 3. Explore methods of fraud detection and prevention, and increase their ability to recognize potential fraudulent situations. 	
6	Course Outcomes	Students will be able to CO1: Understand the forensic accounting and its application CO2: Apply the fraud examination techniques to identify fraud and other irregularities; CO3: Analyse financial statement fraud and interpret evidentiary material CO4: Apply the analytical techniques and principles in investigation of different types of corruption and the prevention of fraud. CO5: complete fraud examinations that meet judicial standards of investigation; CO6: Document and effectively communicate the results of forensic analysis related to valuations, financial reporting fraud and other litigation issues.	
7	Course Description	This course explores the forensic accountant's role in today's economy. Topics covered include fraud detection and fraud investigation techniques, valuation of closely held businesses, lost profits analyses, and various types of litigation support services. Fundamental legal concepts governing expert witness testimony are also examined, and students are required to quantify economic damages in cases.	
8	Outline syllabus		CO Mapping
	Unit 1	Introduction to Forensic Accounting	CO1
	A	Signs of Fraud, Looking for Suspects – Evaluating Fraud – Tips, Confronting Suspects – Skills of a Fraud	

		Investigator – Differences between Audits and Investigations	
	B	Conducting a Fraud Investigation Beginning the Investigation: Assessing the Engagement, Making Recommendation, Budgeting and Cost Control, Engagement Letters	
	C	Managing the Case: Importance of Credentials, Management and Supervision of Staff, Work Programmes and Checklist, Document Management, Preserving Evidence, File Maintenance, Investigative Software	
	Unit 2	Introduction to Fraud Examination	CO2
	A	Professional Standards – Searching for Fraud: Analytical Review, Key Financial Ratios, Write-offs, Adjustments and Miscellaneous, Manual Disbursements	
	B	Looking for Frauds in little things – Sources of Information: Who Acquires Information, Internal Records, Private Records, Internet and Search Engines –	
	C	Investigative Techniques: Corporate Background Checks, Individual Background Checks, Searching for Friends, Family and Associates, Surveillance, Digital Data Analysis, Computer Forensics, Interviewing Witnesses and Suspects, Confirmation with Customers and Vendors	
	Unit 3	Investigation of Asset Misappropriation Schemes I:	CO3
	A	Cash Receipts Schemes, Disbursement Schemes, Noncash Schemes	
	B	– Investigation of Financial Statement Fraud: Revenue Overstatement, Channel Stuffing, Round-Tripping, Asset Overstatement, Liability and Expense Understatement, Reserve Manipulation	
	C	Misrepresentation or Omission of Information, Improper Recording of Mergers and Acquisitions, Off-Balance-Sheet Items.	
	Unit 4	Investigation of Asset Misappropriation Schemes II	CO4
	A	Accounting: Involves Judgements and Estimates, Earnings Management	
	B	Investigation of Corruption Schemes: Bribes, Kickbacks, Extortion and Conflict of Interest, Related Party Transactions, Money Laundering, Foreign Corrupt Practices Act	
	C	Prevention and Detection – Investigation of External Fraud Schemes: Corporate Espionage, Investment Schemes, Pyramid or Ponzi Schemes, Securities Fraud, Hidden Income or Assets – Insurance Fraud – Bankruptcy Fraud	
	Unit 5	Reporting and Litigation	CO5, CO6

	A	Background Information, Investigation Procedures, Opinions, Attachments, Draft Reports, Unfavorable Opinions			
	B	Follow-up to the Fraud Investigator's Work – Being an Expert Witness, Preparing for Testimony, Deposition Testimony, Trial Testimony			
	C	Other Issues: Moving forward as a Company, Preventing Future Frauds, Marketing a Fraud Investigation Practice, Competing with Other Firms, Conducting a Global Investigation, Professional Liability Issues, Reducing Fraud with Investigation			
	Mode of examination	Theory			
	Weightage Distribution	CA	MTE	ETE	
		15%	10%	75%	
	Text book/s*	<ol style="list-style-type: none"> 1. Joshi A.: Students' Handbook on Forensic Accounting, pub Fraudexpress Media 2012 2. Padmarathi C.: Forensic Accounting and Fraud Investigation, pub ICAI 3. Silverstone H and Sheetz, M.: Forensic Accounting and Fraud Investigation for Non-Experts 4. Tommie W. Singleton, Singleton A. J., Bologna G. Jack, Lindquist R. J.: Fraud Auditing and Forensic Accounting, John Wiley & Sons, 3rd ed. , 2006 5. Manning G.A.: Financial Investigation and Forensic Accounting, CRC Press, 1999 6. Kranacher Mary-Jo, Riley R., Joseph T.: Forensic Accounting and Fraud Examination, John Wiley & Sons, 2010 7. Woodget, B.W. and Cooper, D.: Samples and Standards, ACOL Series, Willey 1987 			
	Other References	<ol style="list-style-type: none"> 1. Ross, J.: Total Quality Management, Vanity Book, Intl, 1995 2. Dux, J.P.: Hand Book of Quality Assurance for Anal. Chem. Laboratory, Van Nostrand, 1986 			

POs COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3
CO1	3	2	1	3	2	2	2	3	1	1	1	2
CO2	2	3	2	2	2	3	2	2	2	0	1	2
CO3	2	1	2	3	3	2	1	3	2	1	3	1
CO4	1	3	2	3	2	1	2	2	2	2	2	2
CO5	2	2	2	3	2	1	2	2	3	1	1	1
CO6	3	2	2	2	3	3	1	3	2	1	2	2
	2.17	2.17	1.83	2.67	2.33	2.00	1.67	2.50	2.00	1.00	1.67	1.67



School: SSAHS		Batch: 2023-27
Programme:		Bachelor of Science (Forensic Science)
Branch:		Semester: VIII
1	Course Code	FSU463
2	Course Title	Major Project
3	Credits	9
4	Contact Hours (L-T-P)	
	Course Type	Compulsory