

**BHAKTA KAVI NARSINH MEHTA UNIVERSITY
JUNAGADH 362263**

SYLLABUS



**DEPARTMENT OF CHEMISTRY AND
FORENSIC SCIENCE**

**M.Sc. Forensic Science
Semester I & II**

Under Choice Based Credit System (CBCS)

Effective from November 2020

M.Sc. Forensic Science
Course Framework
Semester I

Course Type	Course Code	Course Title	Hrs of Instruction/ Week	Exam Duration in Hrs.	Component of Marks			Credits
					Internal	External	Total/ Passing	
					Total/ Passing	Total/ Passing		
Core Courses	MSC20FSC101	Fundamentals of Forensic Science	4	2.3	30/12	70/28	100/40	4
	MSC20FSC102	Instrumental Techniques	4	2.3	30/12	70/28	100/40	4
	MSC20FSC103	Forensic Physics and Ballistics	4	2.3	30/12	70/28	100/40	4
	MSC20FSC104	Forensic Chemistry and Toxicology	4	2.3	30/12	70/28	100/40	4
Practical Courses	MSC20FSC105	Practicals	12	10	-	100/40	100/40	6
	MSC20FSC106	Viva voce	-	-	-	50/20	50/20	2
	Total		28				550	24

M.Sc. Forensic Science
Course Framework
Semester II

Course Type	Course Code	Course Title	Hrs of Instruction/ Week	Exam Duration in Hrs.	Component of Marks			Credits
					Internal	External	Total/ Passing	
					Total/ Passing	Total/ Passing		
Core Courses	MSC20FSC201	Forensic Biology and Serology	4	2.3	30/12	70/28	100/40	4
	MSC20FSC202	Forensic Medicine	4	2.3	30/12	70/28	100/40	4
	MSC20FSC203	Fingerprints and Questioned Documents	4	2.3	30/12	70/28	100/40	4
	MSC20FSC204	Digital Evidence and Psychology	4	2.3	30/12	70/28	100/40	4
Practical Courses	MSC20FSC205	Practicals	12	10	-	100/40	100/40	6
	MSC20FSC206	Viva voce	-	-	-	50/20	50/20	2
	Total		28				550	24

SEMESTER-I			
MSC20FSC101	Fundamentals of Forensic Science	4 hrs./Wk	4 Credits
Sr. No.	Course Detail	Inst. Hrs.	
Unit.1	Introduction to Forensic Science I. Definition of Forensic Science, Basic Principles, History and Development, Importance and Scope of Forensic Science in Justice Delivery System, Forensic Laboratories in India, Organizational Structure of Forensic Science Laboratory, Functions and Responsibilities of Forensic Scientists II. Crime and its Types, Crime Scene and its Types, Basics of Criminology and Penology III. Blood Stain Pattern Analysis	10	
Unit.2	Crime Scene Management I. Isolation and Protection of Crime Scene, Documentation of Crime Scene II. Searching of Crime Scene for Physical Evidence; Identification, Collection, Preservation and Packaging of Physical Evidence III. Transportation of Evidence and Chain of Custody	12	
Unit.3	Police, Forensic Science and Court I. Structure of Police, FIR, Contents of a Report, Role of Police in Crime Investigation, Role of Forensic Expert on Crime Scene II. Types of Courts in India, Preparations before a Trial, Admissibility of Evidence and Expert Testimony, Role of Forensic Expert in Court of Law III. Understanding the Law: An Overview on Important Sections from IPC, CrPC and IEA; Basic Introduction to Explosive Substances Act, Excise Act, NDPS Act, Drugs and Cosmetics Act, Essential Commodities Act, Food Safety and Standards Authority of India, etc.	12	
Unit.4	Basics of Statistics and Research Methodology I. Basics of Measures of Central Tendency: Mean, Median and Mode; Uncertainties in Measurements; Probability II. Research: Need, Importance, Types, Process: Defining Problem, Designing Research, Methods of Data Collection, Data Analysis and Processing, Testing of Hypothesis, Interpreting the Results and Conclusion III. Tests of Hypothesis: Test of Significance of Attributes, T-Test, Chi-square Test, etc.	13	
Unit.5	Fundamentals of Quality Management I. Introduction to Quality Assurance and Accreditation, Importance of Quality, Accuracy and Precision in Evidence Handling: Collection, Preservation, Packaging, Storage, Analysis, Transportation and Disposal (Sample Processing and Data Handling)	13	

	II. Accreditation: Definition, History, Importance, Process	
	III. Laboratory Management System: Calibration and Handling of Instruments, Evaluation of Apparatus and Materials, Proficiency Testing	
Reference Books 1. Criminalistics: An Introduction to Forensic Science; Author: Richard Saferstein; Publisher: Pearson; ISBN: 978-0-133-45882-4 2. Fundamentals of Forensic Science; Author: Max. M Houck, Jay A. Siegel; Publisher: Elsevier; ISBN: 978-0-12-374989-5 3. Principles and Practices in Contemporary Forensic Sciences; Author: Dr. M. S. Dahiya; Publisher: Shanti Prakashan; ISBN: 978-93-5070-189-8 4. Techniques of Crime Scene Investigation; Author: Barry A. J. Fisher; Publisher: CRC Press; ISBN: 0-8493-1691-X 5. Bloodstain Pattern Analysis; Author: Tom Bevel, Ross M. Gardner; Publisher: CRC Press; ISBN: 978-1-4200-5268-8 6. The Practice of Crime Scene Investigation; Author: B. J. Dorain; ISBN: 9780748406098 7. Ethics and Practices in Forensic Science; Author: Steven A. Koehler, Peggy A. Brown; ISBN: 9781420088939		

SEMESTER-I				
MSC20FSC102		Instrumental Techniques	4 hrs./Wk	4 Credits
Sr. No.	Course Detail			Inst. Hrs.
Unit.1	Separation Techniques: Centrifugation and Electrophoresis I. Centrifugation: Definition, Principle, Types (Clinical, Refrigerated, Ultra Centrifuge: Preparative and Analytical Processes) II. Electrophoresis: Definition, Basic Principle, Factors Affecting the Process, Types (Paper, Gel, PAGE, SDS PAGE)			14
Unit.2	Chromatography I. Definition, Basic Principles and Components of Chromatography: Adsorption, Partition, Size Exclusion Ion Exchange II. Planar Chromatography: Paper Chromatography, Thin Layer Chromatography III. Three Dimensional Chromatography: Column Chromatography, Gas Chromatography, High Performance Liquid Chromatography			10
Unit.3	Spectroscopy I. Introduction to Spectroscopy, Electromagnetic Spectrum, Properties of Electromagnetic Radiation, Types of Spectroscopy II. UV Visible Spectroscopy, X-Ray Spectroscopy III. Dispersive and FTIR Spectroscopy, RAMAN Spectroscopy IV. Atomic Absorption Spectroscopy, Nuclear Magnetic Resonance Spectroscopy			10
Unit.4	Microscopy I. Introduction, Principles: Magnification and Resolution, Types of Microscopy II. Types of Light Microscopes: Compound Microscope, Stereo Microscope, Comparison Microscope, Phase Contrast Microscope, Polarizing Microscope, Fluorescence Microscope and IR Microscope III. Types of Electron Microscopes: Scanning Electron Microscope, Transmission Electron Microscope IV. Types of Probe Microscopes: Scanning Tunneling Microscope, Atomic Force Microscope			14
Unit.5	Hyphenated Techniques I. Gas Chromatography- Mass Spectroscopy, Liquid Chromatography- Mass Spectroscopy II. Inductively Coupled Plasma- Mass Spectroscopy III. SEM-EDX			12

Reference Books

1. Instrumental Methods of Chemical Analysis; Author: Gurdeep R. Chatwal, Sham K. Anand; Publisher: Himalaya Publishing House; ISBN: 978-93-5024-836-2
2. Handbook of Instrumental Techniques for Analytical Chemistry; Editor: Frank Settle; Publisher: Prentice Hall PTR; ISBN: 0-13-177338-0
3. Encyclopedia of Spectroscopy and Spectrometry; Editor: John C. Lindon, George E. Tranter, John L. Holmes; Publisher: Elsevier; ISBN: 0-12-226680-3
4. Gel Electrophoresis: Principles and Basics; Author: Sameh Magdeldin; Publisher: InTech; ISBN: 978-953-51-0458-2
5. Basic Principles of Forensic Chemistry; Author: Javed I. Khan, Thomas J. Kennedy, Donnell R. Christian Jr.; Publisher: Humana Press; ISBN: 978-1-934115-06-0

SEMESTER-I			
MSC20FSC103	Forensic Physics and Ballistics	4 hrs./Wk	4 Credits
Sr. No.	Course Detail	Inst. Hrs.	
Unit.1	Glass, Soil, Paint I. Introduction to Glass: Manufacturing and Types, Forensic Analysis of Glass: Physical Measurements and Matching, Fracture Analysis, Elemental Analysis, Importance of Glass as Evidence in Forensic Cases II. Introduction to Soil: Process of formation, Composition and Types, Analysis of Soil: Physical and Elemental, Importance of Soil as Evidence in Forensic Cases III. Introduction to Paint: Components and Types, Analysis of Paint in Forensic Cases: Physical, Microscopic, Instrumental; Importance of Paint as Evidence in Forensic Cases	14	
Unit.2	Tool Marks, Tire Marks and Skid Marks, Foot Prints and Gait Pattern I. Definition and Types of Tool Marks; Class Characteristics, Sub-Class Characteristics and Individual Characteristics of Tool Marks; Collection, Preservation, Packaging and Transportation of Tool Marks; Tool Marks Analysis and Importance in Forensic Science II. Tire Marks and Skid Marks: Characteristics of Tread Pattern, Formation of Tire Marks, Skid Marks and Yaw Marks; Collection and Preservation, Analysis of the Collected Evidence and Importance in Forensic Science III. Definition of Foot Prints or Shoe Prints, Formation, Types; Collection, Preservation, Packaging and Analysis of Foot Prints and Shoe Prints. Gait Pattern: Definition, Parameters of a Gait Pattern, Gait Pattern Analysis and Importance in Forensic Science	10	
Unit.3	Introduction to Ballistics I. Introduction to Firearm, Parts of Firearms, History of Firearms; Types of Firearms: Shotguns and Rifled Firearms, Operating of Firearms, Firearms in Forensic Cases: Standard, Country Made, Improvised II. Introduction of Ammunition, Classification and Assembly. Types and Composition of Cartridges, Primers, Propellants, Wads, Lubricants and Projectiles	12	
Unit.4	Types of Ballistics: Internal, External, Target I. Internal Ballistics: Cycle of Operation, Density of Loading, Heat Problems, Pressure Function, Vibration and Jump, Gas Cutting, Barrel Fouling, Recoil II. External Ballistics: Trajectories of Projectiles, Effects of Air Resistance and Gravity, Range, Height, Fall, Angle of Elevation and other Parameters III. Target Ballistics and Wound Ballistics: Effects of Intermediate Target, Nature of Target, Nature of Projectile, Striking Velocity, Striking Angle, Range. Wound Ballistics: Wounding Mechanism, Penetration and Perforation, Characteristics of Entrance and Exit Wounds, Injuries caused by Shots and Bullets	14	
Unit.5	Working in Ballistics Division I. Analysis of GSR: Formation of GSR, Composition of GSR, Location of GSR, Collection Analysis of GSR	10	

	II. Identification of Firearm, Ammunition; Marks on Fired Cartridges, Marks on Fired Bullets, Arm Ammunition Linkage III. Instruments involved in Analysis of Ballistics Exhibits: Comparison Microscope, Borescope, Travelling Microscope, BDAS, IBIS, etc.	
Reference Books 1. Handbook of Firearms and Ballistics; Author: Brian J. Heard; Publisher: Wiley; ISBN: 978-0-470-69460-2 2. Firearms; The Law and Forensic Ballistics; Author: Tom Warlow; Publisher: CRC Press; ISBN: 978-1-4398-1828-2 3. Wound Ballistics; Publisher: Springer; ISBN: 978-3-642-20355-8 4. Explosive Shocks in Air; Author: Hilbert F. Kinney, Kenneth J. Graham; Publisher: Springer; ISBN: 978-3-642-86682-1 5. Principles and Practices in Contemporary Forensic Sciences; Author: Dr. M. S. Dahiya; Publisher: Shanti Prakashan; ISBN: 978-93-5070-189-8 6. Criminalistics: An Introduction to Forensic Science; Author: Richard Saferstein; Publisher: Pearson; ISBN: 978-0-133-45882-4 7. Forensic Examination of Glass and Paint: Analysis and Interpretation; Author: B Caddy; ISBN: 9780748405794 8. Chemical Analysis of Firearms, Ammunition and Gunshot Residue; Author: James Smyth Wallace; ISBN: 9781420069662		

SEMESTER-I			
MSC20FSC104	Forensic Chemistry and Toxicology	4 hrs./Wk	4 Credits
Sr. No.	Course Detail	Inst. Hrs.	
Unit.1	Introduction I. Introduction to Forensic Chemistry, Working of Chemistry Division in FSL II. Analysis of Chemicals in Bribe Trap Cases III. Fibers: Introduction, Classification, Collection and Analysis: Physical, Chemical (Non-destructive and Destructive tests), Instrumental IV. Inks: Composition, Collection and Analysis (Chemical Analysis and Age Estimation)	12	
Unit.2	Food and Beverages I. Definition and Motives of Adulteration, Use of Adulterants in Different Food Products, Analysis of Food Samples for Detection of Adulteration II. Types of Beverages: Alcoholic and Non-Alcoholic; Types of Liquor: Analysis of Ethanol and Methanol; Types of Non-Alcoholic Beverages and Analysis III. Working of Prohibition and Possession Division	10	
Unit.3	Petroleum Products, Fire and Arson I. Introduction and Types of Petroleum Products, Adulteration of Petroleum Products, Collection and Preservation of Samples. Physical and Chemical Analysis of Petroleum Products: Petrol, Kerosene, Diesel, etc. II. Introduction to Fire, Types of Heat Transfer, Process of Combustion and Chemistry of Fire, Types of Fire. Arson: Types of Arsonists, Types of Incendiary Devices, Arson Scene Management, Analysis of Arson Residue III. Definition and Process of Explosion, Types of Explosives; Types and Working Mechanisms of IEDs, Explosion Scene Management and Explosion Residue Analysis	14	
Unit.4	NDPS I. Definition, Classification and Characterization of Drugs, Effects of Drugs on Human Body and Withdrawal Symptoms II. Biotransformation of Drugs; Dependence and Tolerance; Drug Toxicity III. Clandestine Labs and Analysis of Drugs	12	
Unit.5	Toxicology I. Introduction to Toxicology and Forensic Toxicology, Classification of Poisons II. Biotransformation of Poisons and Toxicity III. Extraction and Isolation Process and Analysis of Poisons; Common Cases of Poisoning in India	12	
Reference Books			

1. Firearms in Criminal Investigations and Trials; Author: B. R. Sharma; Publisher: Universal Law and Publishing Company
2. Explosive Shocks in Air; Author: Hilbert F. Kinney, Kenneth J. Graham; Publisher: Springer; ISBN: 978-3-642-86682-1
3. Medical Jurisprudence, Forensic Medicine and Toxicology; Author: K. S. N. Reddy; Publisher: CBS Publishers; ISBN: 978-81-239-2646-9
4. Principles of Forensic Medicine Including Toxicology; Author: Apurba Nandy; Publisher: New Central Book Agency; ISBN: 978-81-7381-064-0
5. Principles and Practices in Contemporary Forensic Sciences; Author: Dr. M. S. Dahiya; Publisher: Shanti Prakashan; ISBN: 978-93-5070-189-8
6. Criminalistics: An Introduction to Forensic Science; Author: Richard Saferstein; Publisher: Pearson; ISBN: 978-0-133-45882-4
7. Analytical and Practical Aspects of Drug Testing in Hair; Author: Pascal Kintz; ISBN: 9780849364501
8. Forensic Investigation of Explosions; Author: James Michael Curran; ISBN: 9781420088267
9. Fire Investigation; Author: N Nic Daeid; ISBN: 9780415248914

SEMESTER-I			
MSC20FSC105	Forensic Practical	12 hrs./Wk	6 Credits
SR. No.	Practical Detail	Lab Hours	
1	Unit I	3	
	1. Isolation and Protection of Indoor Crime Scene 2. Isolation and Protection Outdoor Crime Scene 3. Documentation of Indoor Crime Scene 4. Documentation of Outdoor Crime Scene 5. Collection, Preservation and Packaging of Evidence on Crime Scene 6. Reconstruction of Indoor Crime Scene 7. Reconstruction of Outdoor Crime Scene		
2	Unit II	3	
	1. A Study on Principle and Working of Light Microscopes 2. A Study on Principle and Working of Electron Microscopes 3. Separation of Various Samples Using Centrifuge 4. Separation of Various Samples Using Electrophoresis 5. Separation of Various Samples Using TLC/ Paper Chromatography 6. Separation of Various Samples Using GC/ HPLC/Column Chromatography 7. Sample Identification Using UV-Visible Spectrophotometer 8. Sample Identification Using IR Spectrophotometer		
3	Unit III	3	
	1. Physical Matching of Broken Objects 2. Analysis of Soil Samples 3. Analysis of Tire Marks 4. Footprints and Gait Pattern Analysis 5. Study on Types of Firearms 6. A Study on Marks Produced on Fired Cartridges and Bullets 7. GSR Analysis		
4	Unit IV	3	
	1. Analysis of Samples in Bribe Trap Cases 2. Analysis of Arson Residue 3. Analysis of Fibres 4. Ink Analysis using TLC 5. Analysis of Petroleum Products 6. Analysis of Food Products		

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SYLLABUS



**DEPARTMENT OF CHEMISTRY AND
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M.Sc. Forensic Science
SEMESTER II**

Under Choice Based Credit System (CBCS)

Effective from November 2020

SEMESTER-II			
MSC20FSC201	Forensic Biology and Serology	4 hrs./Wk	4 Credits
Sr. No.	Course Detail	Inst. Hrs.	
Unit.1	Introduction of Basics of Biology I. Structure and Function of Human and Animal Cells II. Basics of Human Physiology and Anatomy: Study of Different Systems in Human Body III. Basics of Immunology: First Line Defense, Second Line Defense, Third Line Defense, Hypersensitivity, Auto Immune Diseases IV. Overview on Macromolecules: Carbohydrates, Proteins, Lipids, Nucleic Acids	12	
Unit.2	Working of Biology and Serology Division I. Introduction to Body Fluids: Characteristics and Composition of Blood, Saliva, Urine, Semen, Vaginal Fluid, Vomit, Sebum, Cerumen, etc. II. Qualitative tests for Body Fluids III. Blood grouping from Blood, Blood Stains and Other Body Fluids, Species Identification from Animal Blood; Detailed Study on Types of Blood Groups and Hemoglobin IV. Structure of Hair, Difference Between Animal and Human Hair, General Characteristics of Hair, Analysis of Hair Samples	14	
Unit.3	Working of DNA Division I. DNA Replication and Protein Synthesis II. Collection and Preservation of DNA Samples in Forensic Cases III. Extraction and Isolation of DNA from the Forensic Exhibits IV. Use of Molecular Markers and PCR in Forensic Science	12	
Unit.4	Wildlife and Forensic Cases I. Entomology: Definition, Types, Life Cycle of Insects involved in Estimation of Time Since Death and Importance of Forensic Entomology II. Wildlife Forensics: Introduction to Wildlife Management and Value of Wildlife, Importance of Wildlife, Importance of National Parks and Sanctuaries; Wildlife Protection Act III. Introduction to parts of plants, Study on Plants of Tobacco, Tea, Opium, Cannabis and Poisonous Plants; Introduction to Palynology and Starch Grains	12	
Unit.5	Anthropology and Odontology I. Introduction to Anthropology and Anthropometry, Forensic Anthropology, Importance in Personal Identification	10	

II. Introduction to Odontology and Forensic Odontology, Introduction to Human Dentition: Structure and Types of Teeth and Age of Eruption and Ossification, Diseases in Teeth and Identification of Individuals

Reference Books

1. Fundamentals of Forensic DNA Typing; Author: John M. Butler; Publisher: Elsevier; ISBN: 978-0-12-374999-4
2. An Introduction to Forensic Genetics; Author: William Goodwin, Adrian Linacre, Sibte Hadi; Publisher: Wiley; ISBN: 978-0-470-01025-9
3. Forensic Biology; Editor: Max M. Houck; Publisher: Elsevier; ISBN: 978-0-12-800647-4
4. Forensic Entomology: An Introduction; Author: Dorothy Gennard; Publisher: Wiley; ISBN: 978-0-470-68902-8
5. Fundamentals of Forensic Anthropology; Author: Linda L. Klepinger; Publisher: Wiley; ISBN: 978-0-471-21006-1
6. Medical Jurisprudence, Forensic Medicine and Toxicology; Author: K. S. N. Reddy; Publisher: CBS Publishers; ISBN: 978-81-239-2646-9
7. Principles of Forensic Medicine Including Toxicology; Author: Apurba Nandy; Publisher: New Central Book Agency; ISBN: 978-81-7381-064-0
8. Principles and Practices in Contemporary Forensic Sciences; Author: Dr. M. S. Dahiya; Publisher: Shanti Prakashan; ISBN: 978-93-5070-189-8
9. Forensic Examination of Hair; Author: Taylor and Francis
10. Forensic Science in Wildlife Investigations; Author: Adrian Linacre; ISBN: 9780849304101

SEMESTER-II			
MSC20FSC202	Forensic Medicine	4 hrs./Wk	4 Credits
Sr. No.	Course Detail	Inst. Hrs.	
Unit.1	Death Scene Investigation: I. Introduction to Death, Types of Death, Causes of Death	12	
	II. Importance of Medico-legal Investigation on Death Scenes and Processing of a Death Scene.		
	III. Postmortem Changes in the Body: Immediate Signs, Early Signs, Late Signs		
Unit.2	Asphyxial Deaths I. Introduction to Asphyxia and Classification of Asphyxial Deaths	12	
	II. Detailed Study on Violent Asphyxial Deaths: Hanging, Stangulation, Suffocation, Drowning and Its Medico-legal Importance.		
Unit.3	Mechanical Injuries Mechanical Injuries: Introduction and Classification: Abrasions, Bruises and Contusions, Lacerations, Incisions, Stab Wounds and Defence Wounds	10	
Unit.4	Thermal Injuries and Accidental Injuries Involving Vehicles I. Thermal Injuries due to Heat and Cold	14	
	II. Injuries due to Road Accidents, Hit and Run, Railway and Aircraft Injuries		
Unit.5	Injuries due to Explosion, Electrocution and Firearms I. Injuries due to Explosion	12	
	II. Firearm Injuries: Perforations and Penetrations		
	III. Injuries due to Electrocution		
Reference Books			
1. Medical Jurisprudence, Forensic Medicine and Toxicology; Author: K. S. N. Reddy; Publisher: CBS Publishers; ISBN: 978-81-239-2646-9			
2. Principles of Forensic Medicine Including Toxicology; Author: Apurba Nandy; Publisher: New Central Book Agency; ISBN: 978-81-7381-064-0			
3. Principles and Practices in Contemporary Forensic Sciences; Author: Dr. M. S. Dahiya; Publisher: Shanti Prakashan; ISBN: 978-93-5070-189-8			
4. Forensic Entomology: An Introduction; Author: Dorothy Gennard; Publisher: Wiley; ISBN: 978-0-470-68902-8			
5. Fundamentals of Forensic Anthropology; Author: Linda L. Klepinger; Publisher: Wiley; ISBN: 978-0471-21006-1			
6. Bitemark Evidence; Author: B. J. Dorian; ISBN: 97808415271827			

SEMESTER-II			
MSC20FSC203	Fingerprints and Questioned Documents	4 hrs./Wk	4 Credits
Sr. No.	Course Detail	Inst. Hrs.	
Unit.1	History and Development of Fingerprint Science, Types of Fingerprint Patterns I. History of Fingerprints, Composition of Sweat, Secretion of Sweat, Formation of Ridges and Furrows II. Henry's 10-digit Classification System III. Other Fingerprint Classification Systems, Role of Fingerprints in Modern Systems, Role of Fingerprint Bureau	12	
Unit.2	Types of Fingerprints, Collection and Analysis I. Types of Fingerprints found on Crime Scene, Collection of Plain and Rolled Prints for Control Samples II. Detection and Development of Fingerprints: Powder and Chemical Techniques; Collection of Fingerprints III. Comparison and Identification of Fingerprints IV. Introduction to AFIS	14	
Unit.3	Questioned Documents I. Definition and Types of Documents, Nature and Problems of Document Examination, Collection of Control Samples II. Handling and Marking of Documents, Preliminary Examination of Documents	12	
Unit.4	Handwriting and Signature Analysis I. Basic Principles of Handwriting Analysis, Analysis of Handwriting: Class and Individual Characteristics II. Types of Signature Forgeries and Analysis III. Identification of Disguised Writings and Anonymous letters	12	
Unit.5	Forgeries I. Alterations in Documents: Addition, Deletion, Obliteration, Substitution, Built Up Documents II. Analysis of Counterfeit Documents: Currency, Passport, Seals and Stamps, Credit and Debit Cards III. Types of Forgeries and Estimation of Age of Documents	10	

Reference Books

1. Fingerprints: Analysis and Understanding; Author: Mark A. Hawthorne; Publisher CRC Press; ISBN: 978-1-4200-6864-1
2. Foundations of Forensic Document Analysis: Theory and Practice; Author: Michael Allen; Publisher: Wiley; ISBN: 978-1-118-72993-9
3. Principles and Practices in Contemporary Forensic Sciences; Author: Dr. M. S. Dahiya; Publisher: Shanti Prakashan; ISBN: 978-93-5070-189-8
4. Criminalistics: An Introduction to Forensic Science; Author: Richard Saferstein; Publisher: Pearson; ISBN: 978-0-133-45882-4
5. Scientific Examination of Documents: Methods and Techniques; Author: D Ellen; ISBN: 9780748405671
6. Fingerprints and Other Ridge Skin Impressions; Author: C Champod, C J Lennard, P Margot, M Stoilovic; ISBN: 9780415271752

SEMESTER-II			
MSC20FSC204	Digital Evidence and Psychology	4 hrs./Wk	4 Credits
Sr. No.	Course Detail	Inst. Hrs.	
Unit.1	Introduction to Cyber Crime I. Introduction to Cyber Crime and Types of Cyber Crime II. Types of Digital Evidence, Collection of Evidence in Cyber Crimes III. Incident Response and Cyber Forensics Investigation; Tools and Equipments used in Digital Cases	14	
Unit.2	Psychology I. Introduction to Psychology, Psychiatry and Forensic Psychology II. Methods for Psychological Analysis: Polygraph, BEOS, Narco Analysis	10	
Unit.3	Photography I. Introduction to Photography, Working of Camera and Types of Lenses, Development of Photographs, Types of Camera, Parameters of Photography II. Digital Photography III. Crime Scene Photography: Progression of Photography, Cardinal Rules	14	
Unit.4	Voice Production Theory I. Vocal Anatomy, Basics of Sound, Voice and Speech; Speech Production Theory II. Basic Parameters of Speech, Characteristics of Speech Signal	10	
Unit.5	Voice Analysis and Audio Video Authentication I. Analysis of Speech Samples, Representation of Speech Signal, Fourier Analysis II. Audio-Video Tape Authentication	12	

Reference Books

1. Principles of Forensic Audio Analysis; Author: Robert C. Maher; Publisher: Springer; ISBN: 978-3-319-99452-9
2. Investigating Computer Related Crime; Author: Peter Stephenson; Publisher: CRC Press; ISBN: 0-8493-2218-9
3. Digital Forensics and Cyber Crime; Author: Frank Breitinger; Publisher: Springer; ISBN: 978-3-030-05486-1
4. Computer Forensics and Digital Investigation; Author: Suzzane Widup; Publisher: McGraw Hill Education; ISBN: 978-0-07-180792-0
5. Forensic Computer Crime Investigation; Author: Thomas A. Johnson; ISBN: 9780824724351
6. Forensic Speaker Recognition; Author: P. Rose; ISBN: 9780415271827
7. Principles and Practices in Contemporary Forensic Sciences; Author: Dr. M. S. Dahiya; Publisher: Shanti Prakashan; ISBN: 978-93-5070-189-8
8. Criminalistics: An Introduction to Forensic Science; Author: Richard Saferstein; Publisher: Pearson; ISBN: 978-0-133-45882-4
9. Forensic Psychology: A Very Short Introduction; Author: David Canter; Publisher: Oxford University Press; ISBN: 978-0-19-955929-3
10. Criminal Psychology and Forensic Technology; Editor: Grover Maurice Godwin; Publisher: CRC Press; ISBN: 0-8493-2358-4

SEMESTER-II			
MSC20FSC205	Practical	12 hrs./Wk	6 Credits
Sr. No.	Practical Detail	Lab Hours	
1	Unit I	3	
	1. Qualitative Analysis of Macromolecules: Carbohydrates, Lipids, Proteins 2. Tests for Detection of Blood and Blood Grouping 3. Tests for Detection of Saliva, Vomit and Urine 4. Analysis of Hair Samples: Cross Section, Scale Pattern 5. A Study on Pollen Grains and Plant Materials 6. Estimation of Stature and Errors: Live Anthropometry		
2	Unit II	3	
	1. Stature Estimation from Long Bones 2. Age Estimation from Bones 3. Sex Estimation from Skull and Pelvis 4. Analysis of Diatoms 5. A Study on Postmortem Characteristics in Asphyxial Deaths 6. A Study on Degrees of Burns		
3	Unit III	3	
	1. Collection of Plain and Rolled Prints 2. Development of Fingerprints Using Powder Methods 3. Analysis of Fingerprints by Henry's 10-digit Classification System 4. Comparison of Fingerprints using Galton's Details 5. Preliminary Examination of Documents 6. Handwriting Analysis: Estimation of Disguise or Forgery 7. Signature Analysis 8. Analysis of Counterfeit Documents: Currency, Passports, Credit/Debit Cards		
4	Unit IV	3	
	1. Photography of Indoor Crime Scene 2. Photography of Outdoor Crime Scene 3. Segregation of Voice Samples 4. A Study on Inter Speaker Variation 5. A Study on Intra Speaker Variation		

Bhakta Kavi Narsinh Mehta University Junagadh

M.Sc. Forensic Science SEM-1 and SEM-2

Question Paper Pattern

(Effective from November 2020)

Unit-1 [14 marks]

Answer **ALL** questions

Q.1 (a)	1 Question of 4 Marks OR 2 Questions of 2 Marks Each.	4 Marks
Q.1 (b)	Answer any two question out of three.	10 Marks
(1)		5
(2)		5
(3)		5

Unit-2 [14 marks]

Answer **ALL** questions

Q.2 (a)	1 Question of 4 Marks OR 2 Questions of 2 Marks Each.	4 Marks
Q.2 (b)	Answer any two question out of three.	10 Marks
(1)		5
(2)		5
(3)		5

Unit-3 [14 marks]

Answer **ALL** questions

Q.3 (a)	1 Question of 4 Marks OR 2 Questions of 2 Marks Each.	4 Marks
Q.3 (b)	Answer any two question out of three.	10 Marks
(1)		5
(2)		5
(3)		5

Unit-4 [14 marks]

Answer **ALL** questions

Q.4 (a)	1 Question of 4 Marks OR 2 Questions of 2 Marks Each.	4 Marks
Q.4 (b)	Answer any two question out of three.	10 Marks
(1)		5
(2)		5
(3)		5

Unit-5 [14 marks]

Answer **ALL** questions

Q.5 (a)	1 Question of 4 Marks OR 2 Questions of 2 Marks Each.	4 Marks
Q.5 (b)	Answer any two question out of three.	10 Marks
(1)		5
(2)		5
(3)		5
