

**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	2.30	30/12	70/28	100/40	4
	MSC20FSC102	Instrumental Techniques	4	2.30	30/12	70/28	100/40	4
	MSC20FSC103	Forensic Physics and Ballistics	4	2.30	30/12	70/28	100/40	4
	MSC20FSC104	Forensic Chemistry and Toxicology	4	2.30	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	2.30	30/12	70/28	100/40	4
	MSC20FSC202	Forensic Medicine	4	2.30	30/12	70/28	100/40	4
	MSC20FSC203	Fingerprints and Questioned Documents	4	2.30	30/12	70/28	100/40	4
	MSC20FSC204	Digital Evidence and Psychology	4	2.30	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. Role of Forensic Experts on Crime Scene and Court Trials III. Recent Advancements in Forensic Science	10	
Unit.2	Crime Scene Management I. Crime and its Types, Crime Scene and its Types, Basics of Criminology and Penology II. Isolation and Protection of Crime Scene, Documentation of Crime Scene III. Searching of Crime Scene for Physical Evidence; Identification, Collection, Preservation and Packaging of Physical Evidence IV. 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 II. Types of Courts in India, Preparations before a Trial, Admissibility of Evidence and Expert Testimony III. Understanding the Law: An Overview on Important Sections from IPC 1860, CrPC 1974 and IEA 1872; Basic Introduction to Explosive Substances Act 1908, Explosives Act 1883, Excise Act 1944, NDPS Act 1985, Drugs and Cosmetics Act 1940, Essential Commodities Act 1955, 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 (NABL), Importance of Quality, Accuracy and Precision in Evidence Handling: Collection, Preservation,	13	

	Packaging, Storage, Analysis, Transportation and Disposal (Sample Processing and Data Handling) II. Accreditation: Definition, History, Importance, Process III. Laboratory Management System: Calibration and Handling of Instruments, Validation of Methods, 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, Interpretation of Spectra II. UV Visible Spectroscopy, X-Ray Spectroscopy III. Dispersive and FTIR Spectroscopy, RAMAN Spectroscopy			10
Unit.4	Microscopy I. Introduction, Principles: Magnification and Resolution, Types of Microscopy; Micrometry 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 and Recent Advancements I. Gas Chromatography- Mass Spectroscopy, Liquid Chromatography- Mass Spectroscopy II. Inductively Coupled Plasma- Mass Spectroscopy III. SEM-EDX IV. Atomic Absorption Spectroscopy, Nuclear Magnetic Resonance Spectroscopy			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: Composition and Types, Forensic Examination of Glass: Physical Measurements and Matching, Fracture Examination, Elemental Analysis, Case Studies II. Introduction to Soil: Process of formation, Composition and Types, Examination of Soil: Physical and Elemental, Cases Studies III. Introduction to Paint: Components and Types, Examination of Paint in Forensic Cases: Physical, Microscopic, Instrumental; Case Studies	14	
Unit.2	Tool Marks, Tyre 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; Examination of Tool Marks; Case Studies II. Tyre Marks and Skid Marks: Characteristics of Tread Pattern, Formation of Tyre Marks, Skid Marks and Yaw Marks; Collection and Preservation, Examination and Case Studies III. Definition of Foot Prints or Shoe Prints, Formation, Types; Collection, Preservation, Packaging and Examination of Foot Prints and Shoe Prints. Gait Pattern: Definition, Parameters of a Gait Pattern, Gait Pattern Examination and Case Studies	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 (Range of Firing, Range of Firearm), Height, Fall, Angle of Elevation and other Parameters III. Terminal: 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 I.II. Qualitative and Quantitative Analysis I.III. Case Studies	12	
Unit.2	Food and Beverages I. Definition and Motives of Adulteration, Use of Adulterants in Different Food Products, Examination of Food Samples (Dairy Products and Spices) 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 (Tea, Coffee, etc.) 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 Incendiary Devices, Scientific Protocols of Fire/Arson Scene Investigation, Examination of Fire/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 of Narcotic Drugs and Psychotropic Substances, Effects of Drugs on Human Body and Withdrawal Symptoms II. Biotransformation of Drugs; Dependence and Tolerance; Drug Toxicity III. Investigation of Clandestine Labs and Analysis of Narcotic Drugs (Color Tests, TLC)	12	
Unit.5	Toxicology I. Introduction to Toxicology and Forensic Toxicology, Classification of Poisons II. Biotransformation of Poisons/ Drugs and Toxicity III. Antidotes: Types, Action Mechanism VI. Extraction and Isolation Process and Analysis of Poisons; Poison Information Centers in India and Case Studies	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. Examination of Soil 3. Examination of Tyre Marks 4. Examination of Footprints and Gait Pattern 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. Examination of Samples in Bribe Trap Cases 2. Examination of Fire/Arson Residue 3. Ink Analysis using TLC 4. Analysis of Petroleum Products 5. Analysis of Food Products			

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SYLLABUS



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

Under Choice Based Credit System (CBCS)

Effective from November 2020

SEMESTER-II				
MSC20FSC201		Forensic Biology and DNA Fingerprinting	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			12
	III. Basics of Immunology: Introduction to Antigen, Antibodies, Types of Immunoglobulin, Haptens; Antigen Antibody Reactions; Hypersensitivity			
	IV. Overview on Macromolecules: Carbohydrates, Proteins, Lipids, Nucleic Acids			
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.			14
	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			
Unit.3	DNA Fingerprinting I. DNA Replication and Protein Synthesis			12
	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 (STR, VNTR, etc.) and PCR in Forensic Science			
Unit.4	Wildlife and Forensic Cases II. Wildlife Forensics: Introduction to Wildlife Management and Value of Wildlife, Importance of Wildlife, Importance of National Parks and Sanctuaries; Wildlife Protection Act			12
	III. Introduction to parts of plants, Study on Plants of Tobacco, Tea, Opium, Cannabis and Poisonous Plants; Introduction to Palynology and Starch Grains			
Unit.5	Entomology I. Entomology: Definition, Types, Life Cycle of Insects involved in Estimation of Time Since Death and Importance of Forensic Entomology			10
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: 978-0471-21006-1
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 Investigation: I. Introduction to Death, Types of Death, Causes of Death, Estimation of Time Since Death 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			12
Unit.2	Asphyxial Deaths I. Introduction to Asphyxia and Classification of Asphyxial Deaths II. Detailed Study on Violent Asphyxial Deaths: Hanging, Stangulation, Suffocation, Drowning and Its Medico-legal Importance.			12
Unit.3	Mechanical Injuries I. Mechanical Injuries: Introduction and Classification: Abrasions, Bruises and Contusions, Lacerations, Incisions, Stab Wounds and Defence Wounds II. Thermal Injuries due to Heat and Cold III. Injuries due to Road Accidents, Hit and Run, Railway and Aircraft Injuries IV. Injuries due to Explosion V.Injuries due to Electrocution			14
Unit.4	Crimes Against Women and Child Abuse I. Bride Burning and Dowry Deaths, Domestic Violence, Rape, etc. II. Abortion, Infanticide			10
Unit.5	Anthropology and Odontology I. Introduction to Anthropology and Anthropometry, Forensic Anthropology, Importance in Personal Identification 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			12
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, Formation of Ridges and Furrows, Composition and Secretion of Sweat 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. Examination of Signature Forgeries 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 IV. Instruments: VSC, ESDA, etc.	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	Modern Methods of Investigation	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, LVA	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 for Speaker Recognition, 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 Breitingner; 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 Macro- molecules: Carbohydrates, Lipids, Proteins 2. Tests for Detection of Blood and Blood Grouping 3. Tests for Detection of Saliva, Semen and Urine 4. Analysis of Hair Samples: Cross Section, Scale Pattern 5. A Study on Pollen Grains and Plant Materials		
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		
3	Unit III	3	
	1. Collection of Plain and Rolled Prints 2. Development of Fingerprints Using Powder and Chemical Methods 3. Examination of Fingerprints 4. Comparison of Fingerprints using Galton's Details 5. Preliminary Examination of Documents 6. Handwriting Analysis: Estimation of Disguise or Forgery 7. Examination of Signature Forgeries 8. Examination 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 6. A Study on Security of Social Media Accounts 7. Collection and Packaging of Digital Evidence		

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
