Placed at the meeting of
Academic Council
held on 12.12.2019

APPENDIX - A
MADURAI KAMARAJ UNIVERSITY
(University with Potential for Excellence)

Syllabus for New course
B.Sc. (Forensic Science and Criminology)
(CBCS) Semester Pattern
(With Effect from the academic year 2019-2020)
Regulations and Scheme of Examinations

1. INTRODUCTION OF THEPROGRAMME

Forensic Sciences and Criminology includes essential components such as Forensic Pathology, Psychiatry, Psychology, Forensic Medicine and Odontology (Dentistry). It is chiefly laboratory-based science consisting of related elements of Chemistry, Biology, Toxicology, Ballistics, the Science of Fingerprinting, Questioned Documentsand Impressions.

The discipline involves **crime- scene investigation** including fire and explosion scenes and drug laboratories. The subject applies scientific knowledge to aid in the administration of justice, and has no boundaries as far as subjects are concerned; it makes use of all faculties of science, such as Physics, Chemistry, Biology and Medicine, among others.

Technical skill can be developed through the curriculum. However, intelligence and aptitude required in solving a crime by viewing it from various angles needs to be developed by the student through practical exposure. Good academic skills with fundamental knowledge of various fields of science is necessary. The field also demands an eye for detail, strong analytical skills, keen observation and scientific investigations. The ability to work with experts from other fields such as Psychology, Social Science, Non Clinical experts and Statistics is a must. Ideal candidates would be comfortable working both indoors and outdoors, besides possessing the following skillsets:

- Good hold on science subjects (especially Biology andChemistry)
- An enquiringmind
- High degree of accuracy and attention to detail in one's nature ofwork
- Observationskills
- Patience
- Ability to work under pressure for longhours
- Teamspirit

2.Eligibility

Passed Class XII from a recognized Board in sciencestream.

The admission will be done on merit basis taking into consideration the aggregate marks obtained in the following threesubjects:

(i) Physics
(ii) Chemistry

Any one out of Mathematics or Biology in whichever subject the candidate has scored highermarks.

Age

The Maximum limit to admit a candidate in B.Sc Forensic Science and Criminologyis 25 Years and for SC/ST Students 3 Years of relaxation can be given

3. OBJECTIVES OF THEPROGRAMME

The Universal Declaration of Human Rights directs the member nations to create such conditions under which the ideals of free human beings, enjoying civil and political freedom from fear and want, can be achieved. The Constitution of India, through its various articles, strives to ensure security and safety of citizens in accordance with the principles of Universal Declaration of Human Rights. However, crime is a violation of these principles. In a country like India, where majority of population isuneducated, social set up is heterogeneous, public- police relations are not very cordial, poverty isrampant and unemployment widespread, it is not surprising that crime rate is increasingexponentially.

If we have to create conditions conducive to harmonious development, we must mitigate the crime rate. This can best be achieved by relying on the support of forensic science system. Unfortunately, in our country, forensic science is not viewed as a core investigative skill in crime detection. In fact, there is a lack of understanding of the forensic process itself. It isfor this reason that less than 10% of the police cases are, at present, being referred for forensic examination. Less than 5% are solved by the application of forensic science. The rest are solved by third degree method – a practice which the human rights organizations will not allow in days tocome.

In majority of serious crime cases, hi-tech measures are being adopted by perpetrators of crime. The counter measures have to be more sophisticated to surpass them. This calls for strengthening the foundations of forensic science at national level. It is with this aim that we wish to initiate a B.Sc. Course in Forensic Science and Criminology.

The following are the objectives of this course:

1. To emphasize the importance of scientific methods in crime identification anddetection.
2. To disseminate information on the advancements in the field offorensicscience.
3. To highlight the importance of forensic science for perseverance ofthesociety.
4. To review the steps necessary for achieving highest excellence inforensicscience.
5. To generate talented human resource, commiserating with latest requirements of forensicscience.

6. To use technological advancements in the investigation of crimes and itsoccurrences.
7. To provide a platform for students and forensic scientists to exchange views, chalk- out collaborative programs and work in a holistic manner for the advancement offorensicscience.

4. OUTCOME OF THEPROGRAMME

B.Sc. in Forensic Sciences and Criminologyis a 3- year under graduate course which involves the application of scientific knowledge to the investigation of crimes. Professionals in this discipline apply their knowledge of science to analyze the evidence found at a crime scene. An analysis could involve anything from an object at the crime scene, to soil, blood stains, saliva, body fluids, bones, fingerprints, DNA profiling, recovering data from computers, researching new techniques/ technology etc. **B.Sc. Forensic Sciences and Criminology Syllabus** includes essential components such as Forensic Pathology, Psychiatry, Psychology, Forensic Medicine and Odontology (Dentistry),crimininology and socialjustice.

5. CORE SUBJECTPAPER :

All the core papers are mentioned inside the course structure.

6. SUBJECT ELECTIVEPAPER

The subject elective papers are mentioned inside the course structure.

7. NON – MAJOR ELECTIVEPAPER

Non Major Elective paper as prescribed by the Department of Forensic Science approved by the University.

8. UNITIZATION

Each Subject is segregated into five units with each unit consisting of equal distribution of majorconcepts.

9. PATTERN OF SEMESTER EXAM

Examination will be conducted at the end of each semester. Each Semester has two patterns of examination namely Internal (25 marks) and external (75marks).

10. SCHEME FOR INTERNALASSESSMENT

Test	=	10Marks (Average of the best two tests)
Assignment	=	5 marks
Seminar / Group Discussion	=	5 marks
Peer- team – teaching	=	5 marks
Total	=	25 marks

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Internal assessment will be as follows:

11. EXTERNAL EXAM

External Examination will be conducted as semester exams as per University norms with common question paper for all affiliatedcolleges.

12. QUESTION PAPERPATTERN

The exciting Pattern of Question Paper will be as follows.

Time:3Hours **Maximum Marks:75**

Section A: (10*1=10 Marks) Question No: 1 to 10 (Multiple Choice Pattern)

1. Two questions from eachUnit.
2. Four Choices in eachquestions
3. No "None of these:choice.

Section B: (5*7=35 Marks)

1. Answer all Questions either (a) or(b)
2. Answer not exceeding twopages
3. One Question from eachunit.

Section C: (3*10=30 Marks)

Answer should not exceed Four Pages. Answer any Three out of Five (One Question from each Unit).

13. SCHEME FOR EVALUATION

External Evaluation is done at the University level by Central Evaluation Procedure.

14. PASSINGMINIMUM

Passing Minimum for the UG Course is 40% marks in Internal and External Separately.

15. MODELQUESTIONS

FORENSIC BIOLOGY

Time:Three hours **Maximum:75marks**

SECTION A- (10 x 1=10)

Answer ALL questions.

1. While conducting Luminol test, luminol reacts with hydrogen salt andforms:
   (a)Di-anion (b) Cation (c)Anion (d) All of theabove

2. Electrophoresis is mainly usedfor:
   (a) Differentiate the biologicalsample
   (b) To perform the human specific presumptivetests
   (c) DNA isolation from biologicalmaterial
   (d) Separates themolecules

3. Restriction enzymes are used in one of thesetechniques:
(a).Sequencing (b).Genotyping (c).RFLP (d).Polymerization
4. Which of the following statement is false?
(a). Enzymes are differentiated by electrophoresismethod
(b). While DNA sequencing both forward and reverse primers areused
(c). Amplification is done through PCR
(d). ABO blood grouping is mainly used for differentiating individuals
5. The fluorescence examination of the seminal stainsindicates
(a).Pinkcolor (b).Whitecolor (c).Bluecolor (d). Redcolor
6. The presumptive test for semenis
(a) Acidphosphatase test (b). Sodium alphanaphthyltest (c). Napthanildiazotest
(d). Barbituratetest
7. For examination of diatoms sample should collectfrom
(a).Bonemarrow (b).Blood (c).Tissue (d). Epithelialcells
8. A study of relationships between organisms and theirenvironment
(a).Ethnology (b).Ecology (c).Monospecific (d).Monoecious
9. In wild life Forensics, identification of animals doneby
(a).Grouping (b).Feathers (c).Twigs (d). Pug marks
10. Illegal way of traffickinganimals
(a)Kidnapping (b).Poachin(b).Harborin(b).Smuggling

PART B

SECTION-B (5 x7=35)

Answer all Questions by choosing either (a) or (b)

11. A) Describe the identification methods of blood? Forensic significance of biological materials. (OR)B) Describe about the DNA markers and their uses in Forensiccases
12. A) Describe the identification method of Urine andits Forensicsignificance. (OR) B)Explain about the Acid Phosphate Test.
13. A)What are Diatoms. Explain the identification methods of Diatoms and its specificity. (OR)B)What are the different types of timber varieties encountered in forensic cases
14. A) Explain about the Forensic significance of Fiberevidence. (OR) B)Define culpable homicide. When does it amount to murder?
15. A)Define about mitochondrial DNA. What is the forensic significance of mtDNA? (OR)B)Give a detailed account on the experimental method of psychology.

PART C

SECTION-C (3 x10=30)

Answer Any Three Questions

16. Explain the process of protection of biologicalevidence.
17. Write down the process of identification ofblood.
18. Discuss the basic principles of DNAExtraction.
19. What are the characteristics of fingerprints?
20. Write a note on crime scenereconstruction

16. TEACHINGMETHODOLOGY

To enhance the quality of students through creative and effective teaching the following teaching methodologies by classroom teaching methods, Practical training, Power Point Presentation classes, Guest lectures, Demonstrations and Internship for one month after each semester and study tour programmes.

17. TEXT BOOKS

The text books are mentioned below each individual paper.

18. REFERENCEBOOKS

The reference books are mentioned below each individual paper.

19. RETOTALLING AND REVALUATIONPROVISION

Revaluation and re totaling shall be pursued by submission of respective application forms duly filled and authorized by the head of the Institution as per University norms. The applications must reach the University within the stipulated time frame as set by University.

20. TRANSITORY PROVISION

The revision of syllabus shall be done once in three years for better enhancement and updations.

21. SUBJECT AND PAPER RELATEDWEBSITE

The websites are mentioned below the reference books column for every subject

SCHEME OF EXAMINATION
FIRST YEAR -SEMESTER I

S.No	Title of the Paper	Exam Duration	Hour	Credit	Internal	External	Total
1	**Part I Tamil/ Malayalam/ French/Hindi**	3	6	4	25	75	100
2	**Part II English**	3	6	4	25	75	100
	Part III Core Subjects						
3	Introduction to Forensic Science	3	5	4	25	75	100
4	Crime and Society	3	5	4	25	75	100
	Part III Subject Elective						
5	Basic Physics	3	3	3	25	75	100
	Part IV Skill Based Subject						
6	Cyber Forensics	3	3	3	25	75	100
	Part IV Mandatory Subject						
7	Value Education	3	2	2	25	75	100
	Total	**21**	**30**	**24**			700

SEMESTER II

S.No	Title of the Paper	Exam Duration	Hour	Credit	Internal	External	Total
1	**Part I Tamil/ Malayalam/ French/Hindi**	3	6	4	25	75	100
2	**Part II English**	3	6	4	25	75	100
	Part III Core Subjects						
3	Criminology and Criminal JusticeSystem	3	5	3	25	75	100
4	Forensic Psychology	3	5	4	25	75	100
	Part III Subject Elective						
5	Forensic Chemistry	3	3	3	25	75	100
	Part IV Skill Based Subject						
6	Police Investigation andAdministration	3	3	3	25	75	100
	Part IV Mandatory Subject						
7	Environmental Studies	3	2	2	25	75	100
	Total	**21**	**30**	**23**			700

SECOND YEAR- SEMESTER III

S.No	Title of the Paper	Exam Duration	Hour	Credit	Internal	External	Total
1	**Part III Tamil/ Malayalam/ French/Hindi**	3	6	4	25	75	100
2	**Part II English**	3	6	4	25	75	100
	Part III Core Subjects						
3	Forensic Dermatoglyphics	3	4	3	25	75	100
4	Instrumentation in Forensic Science	3	6	4	25	75	100
5	Criminalistics	3	4	3	25	75	100
	Part III Subject Elective						
6	Anthropology	3	2	2	25	75	100
	Part IV Skill Based Subject						
7	Introduction to Biometry	3	2	2	25	75	100
	Total	**21**	**30**	**22**			700

SEMESTER IV

S.No	Title of the Paper	Exam Duration	Hour	Credit	Internal	External	Total
1	**Part IV Tamil/ Malayalam/ French/Hindi**	3	6	4	25	75	100
2	**Part II English**	3	6	4	25	75	100
	Part III Core Subjects						
3	Questioned Documents	3	4	3	25	75	100
4	Forensic Biology	3	6	5	25	75	100
5	Criminal Laws and Special Laws	3	4	3	25	75	100
	Part III Subject Elective						
6	Forensic Serology	3	2	3	25	75	100
	Part IV						
7	Extension Activities	3	2	1	25	75	100
	Total	**21**	**30**	**23**			700

THIRD YEAR -SEMESTER V

S.No	Title of the Paper	Exam Duration	Hour	Credit	Internal	External	Total
	Part III Core Subjects						
1	Forensic Ballistics	3	6	5	25	75	100
2	Forensic Toxicology	3	6	5	25	75	100
	Part III Subject Elective						
3	Accident Investigations	3	6	4	25	75	100
4	Criminal Procedures and Evidence	3	6	4	25	75	100
	Part IV Skill Based Subject						
5	DNA Typing	3	4	3	25	75	100
	Part IV Non Major Elective						
6	Basics of Criminology	3	2	2	25	75	100
	Total	**18**	**30**	**23**			600

SEMESTER VI

S.No	Title of the Paper	Exam Duration	Hour	Credit	Internal	External	Total
	Part III Core Subjects						
1	Victimology	3	6	5	25	75	100
2	Forensic Medicine	3	6	5	25	75	100
	Part III Subject Elective						
3	Dissertation	3	6	5	25	75	100
4	Instrumental Methods - Chemical	3	6	5	25	75	100
	Part IV Skill Based Subject						
5	Counselling and Guidance	3	4	3	25	75	100
	Part IV Non Major Elective						
6	Contemporary Crimes	3	2	2	25	75	100
	Total	18	30	25	150	450	600
	Grand Total		180	140			

PART III - FIRST YEAR

SEMESTER I- CORE SUBJECTS
INTRODUCTION TO FORENSIC SCIENCE

Learning Objectives: After studying this paper the students will know –

a. The significance of Forensic Science to human society.
b. The fundamental principles and functions of forensic science.
c. The divisions in a forensic science laboratory.
d. The working of the forensic establishments in India and abroad.

Unit I: History of Development of Forensic Science in India

Functions of forensic science.Historical aspects of forensic science.Definitions and conceptsin forensic science.Scope of forensic science. Need of forensic science. Basic principles of forensic science.Frye case and Dauber standard.

Unit II: **Tools and Techniques in Forensic Science**

Branches of Forensic Science. Forensic science in international perspectives, including set up of INTERPOL and FBI. Duties of Forensic Scientists.Code of conduct for Forensic Scientists.Qualifications of Forensic Scientists.Data depiction.Report writing.

Unit III: Organizational set up of Forensic Science

Laboratories in India Hierarchical set up of Central Forensic Science Laboratories, State Forensic Science Laboratories, Government Examiners of Questioned DocumentsFingerprint Bureaus, National Crime Records Bureau, Police & Detective Training Schools, Bureau of Police Research & Development, Directorate of Forensic Science and Mobile Crime Laboratories. Police Academies.Police Dogs.Services of Crime Laboratories.Basic Services and Optional Services.

Unit IV: Practical - I

To cite examples of crime cases in which apprehensions arose because of Daubert standards. To review the sections of forensic science at INTERPOL and compare with those in Central Forensic Science Laboratories in India. Include suggestions for improvements if any. To study the annual reports of National Crime Records Bureau and depict the data on different type of crime cases by way of smart art/templates.To write report on different type of crime cases.

Unit V: Practical - II

To review how the Central Fingerprint Bureau, New Delhi, coordinates the working of State Fingerprint Bureaus. To examine the hierarchical set up of different forensic science establishments and suggest improvements.To examine the list of projects undertaken by the Bureau of Police Research and Development and suggest the thrust areas of research in Police Science.To compare and contrast the role of a

Police Academy and a Police Training School.To compare the code of conduct prescribed by different establishments for forensic scientists.

Suggested Readings

1. B.B. Nanda and R.K. Tiwari, *Forensic Science in India: A Vision for the Twenty First Century*, Select Publishers, New Delhi (2001).
2. M.K. Bhasin and S. Nath, *Role of Forensic Science in the New Millennium*, University of Delhi, Delhi (2002).
3. S.H. James and J.J. Nordby, *Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd Edition, CRC Press, Boca Raton (2005).
4. W.G. Eckert and R.K. Wright in *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (ED.), CRC Press, Boca Raton (1997).
5. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
6. W.J. Tilstone, M.L. Hastrup and C. Hald, *Fisher's Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

CRIME AND SOCIETY

Learning Objectives: After studying this paper the students will know –

a. The importance of criminology.
b. The causes of criminal behavior.
c. The significance of criminal profiling to mitigate crime.
d. The consequences of crime in society.
e. The elements of criminal justice system.

Unit I: Basics of Criminology

Definition, aims and scope. Theories of criminal behavior – classical, positivist, sociological.Criminalanthropology.Criminal profiling. Understanding modus operandi.Investigative strategy.Role of media.

Unit II: Crime

Elements, nature, causes and consequences of crime.Deviant behavior. Hate crimes, organized crimes and public disorder, domestic violence and workplace violence.White collar crimes Victimology.Juveniledelinquency. Social change and crime.Psychological Disorders and Criminality.Situational crime prevention.

Unit III: Criminal Justice System

Broad components of criminal justice system.Policing styles and principles.Police's power of investigation.Filing of criminal charges.Community policing.Policing a heterogeneous society.Correctional measures and rehabilitation of offenders.Human rights and criminal justice system in India.

Unit IV: Practical - I

To review past criminal cases and elucidate which theory best explains the criminal behavior of the accused. To review crime cases where criminal profiling assisted the police to apprehend the accused. To cite examples of crime cases in which the media acted as a pressure group. To evaluate the post-trauma stress amongst victims of racial discrimination. To correlate deviant behavior of the accused with criminality (take a specific example). To evaluate victimology in a heinous crime.To examine a case of juvenile delinquency and suggest remedial measures.

Unit V: Practical - II

To evaluate how rising standards of living affect crime rate. To review the recommendations on modernization of police stations and evaluate how far these have been carried out in different police stations. To visit a 'Model Police Station' and examine the amenities vis-à-vis conventional police stations. To examinesteps being taken for rehabilitation of former convicts and suggest improvements. To prepare a report on interrogation cells and suggest improvements.

Suggested Readings

1. S.H. James and J.J. Nordby, *Forensic Science: An Introduction to Scientific and Investigative Techniques*, 2nd Edition, CRC Press, Boca Raton (2005).
2. D.E. Zulawski and D.E. Wicklander, *Practical Aspects of Interview and Interrogation*, CRC Press, Boca Raton (2002).
3. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
4. J.L. Jackson and E. Barkley, *Offender Profiling: Theory, Research and Practice*, Wiley, Chichester (1997).
5. R. Gupta, *Sexual Harassment at Workplace*, LexisNexis, Gurgaon (2014).

SEMESTER-I :SUBJECT ELECTIVE
BASIC PHYSICS

Learning Objectives: After studying this paper the students will know –

- *Estimate errors in measurement.*
- *Select proper material for intended purpose by studying properties of materials.*
- *Analyze surface tension property and properties of fluid*
- *Enhance analytical approach in formulating and solving problems related to different physical situations.*

Unit I:Electrostatics

Boundary conditions and Boundary value problems in electrostatics, The Uniqueness theorem, Laplace and Poisson's equations in electrostatics and their applications, method of electrical images and their simple applications, energy stored in discrete and continuous system of charges.

Unit II:Wave Optics

Methods of formation of coherent sources, Theory of Interference, Fresnel's Biprism, Displacement of Fringes, thin film interference, Newton's ring. Fraunhoffer diffraction at single slit and grating, Rayleigh's criterion of resolution, resolving power of grating.

Unit III:Optical activity and Modern Optics

Production of plane polarized light by reflection and Double refraction, Nicol prism. Optical activity, Fresnel's theory, polarimeter (Laurentz and Biquartz). Principle of fiber optics, numerical aperture, attenuation, dispersion in optical fibers, material dispersion, waveguide dispersion, intermodal and intramodal dispersion, Pulse dispersion in step index fiber, Main components of laser, Einstein's coefficients, He-Ne laser, Nd-YAG laser and their applications.

Unit IV:Properties of Matter and Relativistic Mechanics

Viscosity, Poiseulli's equation, Frame of reference, Michelson-Morley experiment and its implications, Galilean transformation equations, Einstein's postulates, Lorentz transformation equations and their consequences, energy mass relation, relativistic kinetic energy.

Unit V:Quantum Physics

Compton effect, Basic postulates of quantum mechanics, Wave function and its physical admissibility, orthogonality and normalization of wave functions, Heisenberg's uncertainty principle(no derivation) and its applications to (non-existence of electron in nucleus, Bohr's radius), Schrodinger's equation and its application to particle in 1-D box and finite well.

Suggested Readings

1. Classical Mechanics by H.Goldstein, Narosa Publishing Home,, New Delhi.
2. Electronic Principles: A. P. Malvino, TMH
3. Mathematics for Physical Sciences – Mary Boas, John Wiley & Sons
4. Introduction to solid states Physics - Charles, Kittle 7th Edition
5. Introduction to Analysis and Processing of Signals, Paul Lynn, Howard W. (Sams and Company, 1983)
6. Introduction to Electrodynamics, by A.Z.Capri and P.V.PanatNarosa Publishing House.
7. Optics – E.Hecht, A.RGanesan – Pears
8. A. Ghatak, "Optics"
9. N. Subrahmanyam and Brij Lal, "Optics"
10. Jenkins and White, "Fundamentals of Optics"
11. C. Kittle, "Mechanics", Berkeley Physics Course, Vol.- I.
12. A. Beiser, "Concepts of Modern Physics"

SKILL BASED SUBJECT
CYBER FORENSICS

Learning Objectives: After studying this paper the students will know –

In this paper, the implementation models of Network Layer Security protocol IPSec and the various Key management protocols are discussed. The protocols used for Transport Layer security such as SSL and TLS are briefed.

Unit I: Fundamentals and Concepts

Fundamentals of computers Hardware and accessories – development of hard disk, physical construction, CHS and LBA addressing, encoding methods and formats.Memory and processor.Methods of storing data.Operating system.Software.Introduction to network, LAN, WAN and MAN.Computer Crimes definition and types of computer crimes.Distinction between computer crimes and conventional crimes.Reasons for commission of computer crimes.Breaching security and operation of digital systems.

Unit II:Computer virus, and computer worm

Trojan horse, trap door, super zapping, logic bombs. Types of computer crimes – computer stalking, pornography, hacking, crimes related to intellectual property rights, computer terrorism, hate speech, private and national security in cyber space. An overview of hacking, spamming, phishing and stalking. Computer Forensics Investigations:Seizure of suspected computer. Preparation required prior to seizure.Protocol to be taken at the scene.Extraction of information from the hard disk.

Unit III:Treatment of exhibits.

Creating bitstream of the original media.Collection and seizure of magnetic media.Legal and privacy issues.Examining forensically sterile media.Restoration of deleted files.Password cracking and E-mail tracking.Encryption and decryption methods.Tracking users.

Unit V: Practical - I

To identify, seize and preserve digital evidence from crime scenes. To detect deletions, obliterations and modifications of files using encase software. To trace routes followed by e-mails and chats. To identify the IP address of the sender of e-mails. To demonstrate concealment techniques using cryptographic PGP.

Unit V: Practical - II

To identify encrypted files.To identify hidden files.To use digital signatures for securing e-mail and online transactions.To acquire data from PCs/laptops/HDDs/USBs, pen drives, memory cards and SIM cards. To use symmetric and asymmetric keys for protection of digital record.To carry out imaging of hard disks.

Suggested Readings

1. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
2. Nelson, Phillips, Enfinger, Steuart, "Computer Forensics and Investigations", Cengage Learning, India Edition, 2008.
3. John R.Vacca, "Computer Forensics", Cengage Learning, 2005
4. Richard E.Smith, "Internet Cryptography", 3rd Edition Pearson Education, 2008.
5. MarjieT.Britz, "Computer Forensics and Cyber Crime": An Introduction", 3rd Edition, Prentice Hall, 2013.

PART-IV MANDATORY SUBJECT :VALUE EDUCATION

Common Syllabus as per Madurai Kamaraj University

PART-III :SEMESTER II - CORE SUBJECTS CRIMINOLOGY AND CRIMINALJUSTICE SYSTEM

Learning Objectives: After studying this paper the students will know –

The aim of the Course is to impart knowledge and develop skills relating to application of criminological and penological thoughts in the administration of criminal justice system.

Unit - I:Introduction

Criminology, Crime - definitions; historical perspectives; nature, origin and scope Criminology as a social science, relations with other social sciences, medicine and law.

Unit - II :Schools of Criminology

Pre-classical, Neo-Classical, Positive, Cartographic, Biological and Constitutional Schools.

Unit - III :Criminal Justice System

Criminal Justice System structure of Criminal Justice in India. Role of legislature, police, judiciary and prison system in Criminal Justice; co-operation and co-ordination among the various sub systems of criminal justice system.

Unit - IV : Sociological Theories

Differential Association theory, Group Conflict Theory, Containment Theory, Subculture Theory, Labeling Theory.

Unit - V:Psychological Theories

Theories of personality - Freud, Murray and Catell.Theories of learning - Pavlov, Skinner, Thorndike, Kohler and Bandura Theories of Motivation - Maslow, Hersberg, Atkinson and McClelland.

Suggested Readings

1. Siddique, A (1993), Criminology, Problems and Perspectives (2nd ed.) Lucknow, Eastern Book House.
2. Chockalingam, K. (1997). 'Kuttraviyal' (Criminology) in Tamil, Chennai. Parvathi Publications.
3. Conklin, J.E. (2001), Criminology, Macmillan Publishing Company.

4. Sutherland, H.E., &Cressey, D.R. (1974), Principles of Criminology, Philadelphia : Lippincott.
5. George Vold and Thomas J. Bernard (1986), Theoretical Criminology, New York : Oxford University Press.
6. Walter C. Reckless (1967), The Crime Problem, Bombay :Vakols, Feffner&Simson P. Ltd.
7. Titus Reid (1982), Crime & Criminology, New York : Holt, Rinehard&Winstoon.
8. Richard Quinney and John Wildeman (1977),
ThenProblem of Crime - A critical introduction to criminology, London : Harper & Row.
9. Carson R.C. and James N. Butcher (1992), Abnormal psychology and Modern Life, Harper Collinns Publisher Inc.
10. Fathali M. Hoghaddam (1998) Social Psychology : Exploring Universals Across Cultures, New York: W.H.Freeman and Company.
11. Garett H.E. (1961) General Psychology, New Delhi :Eurasia Publishing House Ltd.

FORENSIC PSYCHOLOGY

Learning Objectives: 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.

eThe tools and techniques required for detection of deception.

a The critical assessment of advanced forensic techniques like polygraphy, narco analysisand brain electrical oscillation signatures.

Unit 1: Basics of Forensic Psychology

Definition and fundamental concepts of forensic psychology and forensic psychiatry.Psychology and law.Ethical issues in forensic psychology.Assessment of mental competency.Mental disorders and forensic psychology.Psychology of evidence – eyewitness testimony, confession evidence.Criminal profiling.Psychology in the courtroom, with special reference to Section 84 IPC.

Unit II: Psychology and Criminal Behavior

Psychopathology and personality disorder.Psychological assessment and its importanceserial murderers.Psychology of terrorism. Biological factors and crime – social learning theories, psycho-social factors, abuse. Juvenile delinquency – theories of offending (social cognition, moral reasoning), Child abuse (physical, sexual, emotional), juvenile sex offenders, legal controversies.

UnitIII: Detection of Deception

Tools for detection of deception – interviews, non-verbal detection, statement analysis, voice stress analyzer, hypnosis. Polygraphy – operational and question formulation techniques, ethical and legal aspects, the guilty knowledge test. Narco analysis and brain electrical oscillation signatures – principle and theory, ethical and legal issues.

Unit IV: Practical - I

To prepare a report on relationship between mental disorders and forensic psychology.To review a crime case involving serial murders. Comment on the psychological traits of the accused. To cite a crime case involving a juvenile and argue for and against lowering the age for categorizing an individual as juvenile.To study a criminal case in which hypnosis was used as a means to detect deception. To prepare a case report on thematic appreciation test.

Unit V: Practical - II

To prepare a case report on Minnesota multiphasic personality inventory test.To prepare a case report on thematic appreciation test. To prepare a case report on word association test. To prepare a case report on Bhatia's battery of performance test of intelligence. To cite a criminal case in which narco analysis was used as a means to detect deception.

Suggested Readings

1. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, *Scientific Evidence in Civil and Criminal Cases*, 4th Edition, The Foundation Press, Inc., New York (1995).
2. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
3. J.C. DeLadurantey and D.R. Sullivan, *Criminal Investigation Standards*, Harper & Row, New York (1980).
4. J. Niehaus, *Investigative Forensic Hypnosis*, CRC Press, Boca Raton (1999).
5. E. Elaad in *Encyclopedia of Forensic Science, Volume 2,* J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

SUBJECT ELECTIVE
FORENSIC CHEMISTRY

Learning Objectives: After studying this paper the students will know –

a. The methods of analyzing trace amounts of petroleum products in crime scene evidence.

b. The methods of analyzing contaminants in petroleum products.

c. The method of searching, collecting, preserving and analyzing arson evidence.

d. The classification of explosives, including the synthesis and characterization of representative analogs.

e. The significance of bomb scene management.

f. The techniques of locating hidden explosives.

g. The classification and characteristics of the narcotics, drugs and psychotropic substances.

Unit I: Petroleum and Soil Analysis

Distillation and fractionation of petroleum.Commercial uses of different petroleum fractions.

Analysis of petroleum products.Analysis of traces of petroleum products in forensic exhibits.

Comparison of petroleum products. Adulteration of petroleum products and Soil analysis

Unit II: Arson

Chemistry of fire.Conditions for fire.Fire scene patterns.Location of point of ignition.Recognition of type of fire.Searching the fire scene.Collection and preservation of arson evidence.Analysis of fire debris.Analysis of ignitable liquid residue.Post-flashover burning.

Scientific investigation and evaluation of clue materials.Information from smoke staining.

Unit III: Classification of explosives

Low explosives and high explosives.Homemade explosives.Military explosives.Blasting agents.Synthesis and characteristics of TNT, PETN and RDX.Explosion process. Blast waves.

Bomb scene management.Searching the scene of explosion.Mechanism of explosion. Post blast residue collection and analysis. Blast injuries. Detection of hidden explosives.

Unit IV Chemical analysis

Carry out analysis of Petrolium products, analysis of soil,Analysis of arson accelerators and to separate explosives using thin layer chromatography.

Unit V:Prepare a case report on arson :Case report on bomb scene Case report on industrial hazards.

Suggested Readings

1 J.D. DeHaan, *Kirk's Fire Investigation*, 3rd Edition, Prentice Hall, New Jersey (1991).

2. A.A. Moenssens, J. Starrs, C.E. Henderson and F.E. Inbau, *Scientific Evidence in Civil and Criminal Cases*, 4th Edition, The Foundation Press, Inc., New York (1995).
3. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
4. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation,* CRC Press, Boca Raton (2013).
5. S. Ballou, M. Houck, J.A. Siegel, C.A. Crouse, J.J. Lentini and S. Palenik in *Forensic Science,* D.H. Ubelaker (Ed.), Wiley-Blackwell, Chichester (2013).

SKILL BASED SUBJECT

POLICE INVESTIGATIONAND ADMINISTRATION

Learning Objectives: After studying this paper the students will know –

• To identify specific periods related to the origins of Indian police and their developments

• To examine the historical development and present organization and administration of Police departments

• To examine early forms of investigative methods, its evolution and developmental processes

• To examine the origins, meaning, development, experiences and the record of community policing

• To examine the organizational development issues and future developments in police management

• To describe how specific theories of crime control affect the police (i.e., routine activities, Deterrence, environmental criminology)

UNIT-I Fundamentals of Policing

History of Indian Police - Police Administration concepts:Hierarchy, Rank and File Structure, Power & Authority, Spanof Control, UNIT y of Command Recruitment and Training.Superintendence, control, organization, and management ofpolice. .PoliceAct o f 1861 - Police reforms National Police Commission recommendations (NPC), 1979, Model police act of NPC.

UNIT –II Organization and structure of Indian Police

Structure of State Police – District Police – City Police –Special Police battalions; Intelligence Branch, Crime Branch(CID) – Directorate of Vigilance and AntiCorruption. Central Police Organizations - IB, CBI, CISF, CRPF, RPF,RAW, NIA, NSG etc. Police research and Crime Statistics Organizations BPR & D,

Organizational setup of policestations, working system of Town & City police statio ns,Village police, Railway and Armed Police. International Criminal Police Organization (INTERPOL).

UNIT –III Police Investigation: Procedures and functions

First Police information Report, Investigation of Scene ofCrimes sketching, Searching, Collection, preservation andtransportation of physical clues to the experts. Ch arge sheet, Investigation of cognizable and non-cognizable offences,Investigation of Robbery, Dacoity, Theft,House breaking

Unit-IV: Police Duties and Powers

Arrest, search, locking up and remand of suspected and accused persons. Conducting various types of raids – Prohibition, gambling, Narcotics and PITA – Procedure to be followed and precautions to be taken while suspected hide outs of Criminals/ Terrorists.

UNIT –V Investigation of sexual offenses and crime against women

Sexual assault against children (BOCSO act)

Domestic violence, Dowry death, Trafficking. Unnatural death.

Suggested Readings

1. Misra K.K. (1987). Police Administration in Ancient India, K.K. Publications.

2. SrivastavaAparna (1999). Role of Police in Changing Society, APH Publishing House.
3. Guharoy J. T. (1999). Policing in the 21st Century Indian Institute of Public Administration.
4. Gupta, Anandswarup (2007). Crime and Police in India, Agra: SahityaBhavan.
5. Banerjee, D (2005). Central Police Organization, Part I & Part II, New Delhi: Allied
6. Publishers, Pvt, Ltd.
7. Pandy, Police Administration
8. R.R., Deb, Police Administration

PART-IV MANDATORY SUBJECT :ENVIRONMENTAL STUDIES

Common Syllabus as per Madurai Kamaraj University

SECOND YEAR :SEMESTER III
FORENSIC DERMATOGLYPHICS

Learning Objectives: 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 world's first fingerprint bureau was established in India.
d. 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.
f. The significance of foot, palm, ear and lip prints.

Unit I: Basics of fingerprinting

Introduction and history, with special reference to India.Biological basis of fingerprints.Formation of ridges.Fundamental principles of fingerprinting.Types of fingerprints. Fingerprint patterns. Fingerprint characters. Plain and rolled fingerprints.Classification method for fingerprint record keeping.Automated Fingerprint Identification System.

Unit II: Development of Fingerprints

Latent prints. Constituents of sweat residue.Latent fingerprints' detection by physical and chemical techniques.Mechanism of detection of fingerprints by different developing reagents.Application of light sources in fingerprint detection.Preservation of developed fingerprints.

UnitIII: Other Impressions

Importance of footprints. Casting of foot prints, Electrostatic lifting of latent foot prints. Lip prints - Nature, location, collection and examination of lip

prints. Ear prints and their significance.Palm prints and their historical importance.

Unit IV: Practical - I

To enumeratewith the aid of diagrams,different types of fingerprint patterns and fingerprint characters. To record plain and rolled Fingerprints.Toidentify core and delta in sample fingerprints.To detect of fingerprints by powder method.To detect fingerprints by ninhydrin method.

Unit V: Practical – II

Lifting of Footprint, Study of Lip print, Palm print, Ear print and Bite marks

Suggested Readings

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).
3. C. Champod, C. Lennard, P. Margot an M. Stoilovic, Fingerprints and other Ridge Skin Impressions, CRC Press, Boca Raton (2004).
4. Lee and Gaensleen's, Advances in Fingerprint Technology, 3rd Edition, R.S. Ramotowski (Ed.), CRC Press, Boca Raton (2013).

SEMESTER III
INSTRUMENTATION IN FORENSIC SCIENCE

Learning Objectives: After studying this paper the students will know –

a. The importance of chromatographic and spectroscopic techniques in processing crime scene evidence.
b. The utility of colorimetry, electrophoresis and neutron activation analysis in identifying chemical and biological materials.
c. The significance of microscopy in visualizing trace evidence and comparing it with control samples.
d. The usefulness of photography and videography for recording the crime scenes.

Unit I: Instrumentation

Sample preparation for chromatographic and spectroscopic evidence.Chromatographic methods.Fundamental principles and forensic applications of thin layer chromatography, gas chromatography and liquid chromatography.Spectroscopic methods.Fundamental principles and forensic applications of Ultraviolet visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy, atomic emission spectroscopy and mass spectroscopy. X-ray spectrometry. Colorimetric analysis and Lambert-Beer law.Electrophoresis – fundamental principles and forensic applications.Neutron activation analysis – fundamental principles and forensic applications.

Unit II:Microscopy

Fundamental principles. Different types of microscopes. Electron microscope.Comparison Microscope.Forensic applications of microscopy**.**

Unit III: Forensic photography

Basic principles and applications of photography in forensic science.3D photography.Photographic evidence.Infrared and ultraviolet photography.Digital photography.Videography.Crime scene and laboratory photography.

Unit IV: Practical - I

To carry out thin layer chromatography of ink samples**.**To carry out separation of organic compounds by paper chromatography. To identify drug samples using UV-Visible spectroscopy.

Unit V: Practical - II

To take photographs using different filters.To take photographs of crime scene exhibits at different angles.To record videography of a crime scene.

Suggested Readings

1. D.A. Skoog, D.M. West and F.J. Holler, *Fundamentals of Analytical Chemistry*, 6th Edition, Saunders College Publishing, Fort Worth (1992).
2. W. Kemp, *Organic Spectroscopy*, 3rdEdition, Macmillan, Hampshire (1991).
3. J.W. Robinson, *Undergraduate Instrumental Analysis*, 5th Edition, Marcel Dekker, Inc., New York (1995).
4. D.R. Redsicker, *The Practical Methodology of Forensic Photography*, 2nd Edition, CRC Press, Boca Raton (2000).

PAPER-5 :CRIMINALISTICS

Learning Objectives: After studying this paper the students will know –

a. The methods of securing, searching and documenting crime scenes.
b. The art of collecting, packaging and preserving different types of physical and trace evidence at crime scenes.
c. The legal importance of chain of custody.
d. The tools and techniques for analysis of different types of crime scene evidence.

Unit I: Crime Scene Management

The methods of securing, searching and documenting crime scenes.Types of crime scenes – indoor and outdoor. Securing and isolating the crime scene. Crime scene search methods. Safety measures at crime scenes. Legal considerations at crime scenes.

Unit II:Documentation of Crime Scenes

Documentation of the crime scenes- photography, videography, sketching and recording notes. Duties of first responders at crime scenes.Coordination

between police personnel and forensic scientists at crime scenes. The evaluation of 5Ws (who?, what?, when?, where?, why?) and 1H (how?). Crime scene logs. Soil evidence – importance, location, collection and comparison of soil samples.Cloth evidence – importance, collection, analysis of adhering material.Matching of pieces.Toolmark evidence. Classification of toolmarks. Forensic importance of tool marks. Collection, preservation and matching of tool marks. Restoration of erased serial numbers and engraved marks.Forensicgemmology

Unit III: Crime Scene Evidence

Classification of crime scene evidence – physical and trace evidence.Locardprinciple.Collection, labeling, sealing of evidence.Hazardous evidence.Preservation of evidence.Chain of custody.Reconstruction of crime scene.

Unit IV: Examination of Glass, Paint, Fibre

Glass evidence – collection, packaging, analysis.Matching of glass samples by mechanical fit and refractive index measurements.Analysis by spectroscopic methods. Fracture analysis and direction of impact.Paint evidence – collection, packaging and preservation. Analysis by destructive and nondestructive methods. Importance of paint evidence in hit and run cases.Fibre evidence – artificial and man-made fibres. A collection of fiber evidence.Identification and comparison of fibres.

Unit V: Practical

To compare paint samples by physical matching method. To compare paint samples by thin layer chromatography method. To compare glass samples by refractive index method. To identify and compare tool marks. To compare cloth samples by physical matching.

Suggested Readings

1. 1. M. Byrd, Crime Scene Evidence: A Guide to the Recovery and Collection of Physical Evidence, CRC Press, Boca Raton (2001).
2. T.J. Gardener and T.M. Anderson, Criminal Evidence, 4th Ed., Wadsworth, Belmont (2001).
3. S.H. James and J.J. Nordby, Forensic Science: An Introduction to Scientific and Investigative Techniques, 2nd Edition, CRC Press, Boca Raton (2005).
4. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, Techniques of Crime Scene Investigation, CRC Press, Boca Raton (2013).

PART –III :SUBJECT ELECTIVE ANTHROPOLOGY

Learning Objectives: After studying this paper the students will know –

a) *Importance of forensic anthropology in identification of persons.*
b) *Different techniques of facial reconstruction and their forensic importance.*
c) *Significance of somatoscopy and somatometry.*
d)

Unit 1: Significance of Forensic Anthropology

Scope of forensic anthropology.Study of human skeleton.Nature, formation, and identification of human bones.Determination of age, sex, stature from skeletal material.

Unit II: Personal Identification – Somatoscopy and Somatometry

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. Scar marks and occupational marks.Somatometry – measurements of head, face, nose, cheek, ear, hand and foot, body weight, height. Indices ‗ cephalic index, nasal index, cranial index, upper facial index.

UnitIII :Facial Reconstruction

Portrait Parle/ Bertillon system.Photofit/identi kit.Facial superimposition techniques.Craniofacial super imposition techniques – photographic super imposition, video superimposition, Roentgenographic superimposition.

Use of somatoscopic and craniometric methods in reconstruction.Importance of tissue depth in facial reconstruction.Genetic and congenital anomalies – causes, types, identification and their forensic significance.

UNIT IV: PRACTICALS - I

To determine of age from skull and teeth.To determine of sex from skull.To determine sex from pelvis.To study identification and description of bones and their measurements.To investigate the differences between animal and human bones.

UNIT V: PRACTICALS - II

To perform somatometric measurements on living subjects.To carry out craniometric measurements of human skull.To estimate stature from long bone length.To conduct portrait parley using photofit identification kit.

Suggested Readings

4. M.Y. Iscan and S.R. Loth, The scope of forensic anthropology in, *Introduction to Forensic Sciences*, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
5. D. Ubelaker and H. Scammell, *Bones*, M. Evans & Co., New York (2000).
6. S.Rhine, *Bone Voyage: A Journey in Forensic Anthropology*, University of Mexico Press, Mexico (1998).

SKILL BASED SUBJECT

INTRODUCTION TO BIOMETRY

Learning Objectives: After studying this paper the students will know –

a) *The basis of biometry.*
b) *The classification of biometric processes.*
c) *The importance of behavioral biometry.*

Unit I: Fundamental Aspects

Definition, characteristics and operation of biometric system.Classification of biometric systems – physiological and behavioral.Strength and weakness of physiological and behavioral biometrics.

Unit II: Multimodal biometrics. Key biometric processes – enrollment, identification and verification.Positive and negative identification.

UnitIII:Performance measures used in biometric systems – FAR, FRR, GAR, FTA, FTE and ATV. Biometric versus traditional technologies.

Unit IV: Physiological Biometrics

Fingerprints, palm prints, iris, retina, geometry of hand and face.

Unit V: Behavioral Biometrics

Handwriting, signatures, keystrokes, gait and voice.

Suggested Readings

1. S. Nanavati, M. Thieme and R. Nanavati, *Biometrics*, Wiley India Pvt. Ltd. (2002).
2. P. Reid, *Biometrics for Network Security*, New Delhi (2004).
3. J.R. Vacca, *Biometric Technologies and Verification Systems*, Butterworth-Heinemann, Oxford (2007).

SEMESTER IV

QUESTIONED DOCUMENTS

Learning Objectives: 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.

Unit I: Nature and Scope of Questioned Documents

Definition of questioned documents.Types of questioned documents. Preliminary examination of documents.Basic tools needed for forensic documents' examination – ultraviolet, visible, infrared and fluorescence spectroscopy, photomicrography, microphotography, visible spectral comparator, electrostatic detection apparatus.Determining the age and relative age of documents.

Unit II: Comparison of Documents

Comparison of handwriting.Development of individuality in handwriting.Natural variations and fundamental divergences in handwritings.Class and individual characterstics.Merits and demerits of exemplar and non-exemplar samples during comparison of handwriting.Standards for comparison of handwriting.Comparison of paper, ink, printed documents, typed documents, Xeroxed documents.

Unit III: Forgeries

Alterations in documents, including erasures, additions, over-writings and obliterations.Indented and invisible writings.Charred documents. Examination of counterfeit Indian currency notes, passports, visas and stamp papers. Disguised writing and anonymous letters.

Unit IV: Practicals - I

To identify handwriting characters. To study natural variations in handwriting. To compare handwriting samples. To detect simulated forgery. To detect traced forgery.

Unit V: Practicals - II

To study the line quality defects in handwriting samples. To examine the security features of currency notes, passports and plastic money. To study alterations, obliterations and erasures in handwriting samples. To cite a case wherein Section 45 of Indian Evidence Act was invoked, seeking expert opinion for authentication of handwriting and/or signatures. To cite a case wherein Section 489A of the Indian Penal Code was invoked in context of fake currency.

Suggested Readings

1. O. Hilton, Scientific Examination of Questioned Documents, CRC Press, Boca Raton (1982).
2. 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).
3. R.N. Morris, Forensic Handwriting Identification: Fundamental Concepts and Principles, Academic Press, London (2000).
4. E. David, The Scientific Examination of Documents – Methods and Techniques, 2nd Edition, Taylor & Francis, Hants (1997).

FORENSIC BIOLOGY

Learning Objectives: After studying this paper the students will know –

a) *The significance of biological and serological evidence.*
b) *The forensic importance of hair evidence.*
c) *The importance of biological fluids – blood, urine, semen, saliva, sweat and milk – in crime investigations.*
d) *How wildlife forensics aid in conserving natural resources.*
e) *How forensic entomology assists in death investigations.*
f)

Unit I: Biological Evidence

Nature and importance of biological evidence.Significance of hair evidence.Transfer, persistence and recovery of hair evidence.Structure of human hair.Comparison of hair samples.Morphology and biochemistry of human hair. Comparison of human and animal hair.Types and identification of microbial organisms of forensic significance.Identification of wood, leaves, pollens and juices as botanical evidence. Diatoms and their forensic significance.

Unit II: Wildlife Forensics

Fundamentals of wildlife forensic.Significance of wildlife forensic.Protected and endangered species of animals and plants.**:**Illegal trading in wildlife items, such as skin, fur, bone, horn, teeth, flowers and plants. Identification of physical evidence pertaining to wildlife forensics. Identification of pug marks of various animals.

Unit III: Forensic Entomology

Basics of forensic entomology.Insects of forensic importance.Collection of entomological evidence during death investigations.

Unit IV: Practicals - I

To examine hair morphology and determine the species to which the hair belongs. To prepare slides of scale pattern of human hair.To examine human hair for cortex and medulla.To carry out microscopic examination of pollen grains.

Unit IV: Practicals - II

To carry out microscopic examination of diatoms.To cite a crime case in which diatoms have served as forensic evidence. To prepare a case report on forensic entomology. To prepare a case report on problems of wildlife forensics.

Suggested Readings

1. L. Stryer, *Biochemistry*, 3rd Edition, W.H. Freeman and Company, New York (1988).
2. R.K. Murray, D.K. Granner, P.A. Mayes and V.W. Rodwell, *Harper's Biochemistry*, APPLETON & Lange, Norwalk (1993).
3. S. Chowdhuri, *Forensic Biology*, BPRD, New Delhi (1971).
4. R. Saferstein, *Forensic Science Handbook*, Vol. III, Prentice Hall, New Jersey (1993).
5. G.T. Duncan and M.I. Tracey, Serology and DNA typing in, *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).

SEMESTER IV

CRIMINAL LAWS AND SPECIAL LAWS

Learning Objectives: After studying this paper the students will know –

a) *Elements of Criminal Procedure Code related to forensic science.*
b) *Acts and provisions of the Constitution of India related to forensic science.*

c) *Acts governing socio-economic crimes.*

d) *Acts governing environmental crimes.*

Unit I:Introduction to Criminal Laws and Salient Features of Constitution of India

Definitions – Vices, sin, tort and crime – History of criminal law – Constitution, Indian Penal Code and Indian Evidence Act – Nature and Scope Constitution of India and its Supremacy – History of Constitution of India – Preamble – Citizenship – Fundamental Rights – Directive Principles of State Policy – Executive, Legislature andJudiciary

Unit II: Selected Sections of Indian Penal Code (IPC)

Abetment – Criminal Conspiracy – Offences against the State: Waging or attempting to wage war against the state, Sedition – Offences against public tranquility: Unlawful assembly, rioting and affray – Offences relating to religion – Offences affecting the human body: Murder, suicide, hurt, kidnapping and rape– Offences against Property: Theft, Extortion, Robbery, Dacoity, Forgery, False document, Criminal breach of trust – Offences relating to marriage: Cruelty by husband, bigamy, adultery and defamation – Criminal intimidation – Insult and annoyance

Unit III: Selected Sections of Criminal Procedure Code

Definitions under Code of Criminal Procedure, 1973 – Organizational set up of judiciary in India – Constitution of criminal courts and officers – Jurisdiction and powers of criminal courts – Court of Sessions – Judicial magistrates – Executive magistrates – Public Prosecutors – Informal courts (NyayaPanchayat and LokAdalats) – Complaint – Inquiry – Investigation – Police report – Public prosecutor – Defence counsel – Arrest – Bail – Search – Seizure – Trialprocesses

Unit IV Selected Sections of Indian Evidence Act

Definitions – Concepts – Fact in issue – Relevant fact – Evidence: Proved, disproved, admissibility and relevancy – Relevant evidence in statement form: Admission confessions, dying declarations and expert opinions Conspiracy evidence – Approver evidence – Presumptions of law Presumptions of fact – Burden of proof – Examination in-chief – Cross-examination andre-examination– Impeaching the credit of witness

Unit V Special Laws

Protection for Chidren Sexual Offences Act (POCSO), Goondas Act, Civil Rights Protection Act, Protection for Women from Domestic, Norchotic Drugs and Psychotropic Substances Act (NDPS), Human Rights Act, Right to Information Act (RTI)

Suggested Readings

1. D.A. Bronstein, Law for the Expert Witness, CRC Press, Boca Raton (1999).
2. Vipa P. Sarthi, Law of Evidence, 6th Edition, Eastern Book Co., Lucknow (2006).
3. A.S. Pillia, Criminal Law, 6th Edition, N.M. TripathiPvt Ltd., Mumbai (1983).
4. R.C. Nigam, Law of Crimes in India, Volume I, Asia Publishing House, New Delhi (1965).
5. (Chief Justice) M. Monir, Law of Evidence, 6th Edition, Universal Law Publishing Co. Pvt. Ltd., New Delhi (2002).

SUBJECT ELECTIVE
FORENSIC SEROLOGY

Learning Objectives: After studying this paper the students will know –

a. *Thesignificance of serological evidence.*
b. *The importance of biological fluids – blood, urine, semen, saliva, sweat and milk – in crime investigations.*
c. *The usefulness of genetic markers in forensic investigations.*
d. *The forensic importance of bloodstain patterns*

Unit I: Forensic Importance of Body fluids

Common body fluids.Composition and functions of blood.Collection and preservation of blood evidence.Distinction between human and non-human blood.Determination of blood groups. Antigens and antibodies Forensic characterization of bloodstains. Typing of dried stains.Blood enzymes and proteins.Semen.Forensic significance of semen.Composition, functions and morphology of spermatozoa.Collection, evaluation and tests for identification of semen.Individualization on the basis of semen examination.Composition, functions and forensic significance of saliva, sweat, milk and urine.Tests for their identifications.

Unit II: Genetic Marker Analysis

Cellular antigens.ABO blood groups.Extracellular proteins and intracellular enzymes.Significance of genetic marker typing data.Sexual assault investigations.

Unit III: Bloodstain Pattern Analysis

Bloodstain characteristics. Impact bloodstain patterns.Cast-off bloodstain patterns. Projected bloodstain patterns. Contact bloodstain patterns. Blood trails. Bloodstain drying times. Documentation of bloodstain pattern evidence.Crime scene reconstruction with the aid of bloodstain pattern analysis.

Unit IV: Practicals– I

To determine blood group from fresh blood samples.To determine blood group from dried blood sample.To carry out the crystal test on a blood sample. To identify blood samples by chemical tests.

Unit V: Practicals – II

To identify the given stain as saliva.To identify the given stain as urine.To carry out cross-over electrophoresis.Tostudy the correlation between impact angle and shape of bloodstain.To identify the point of convergence from the bloodstain patterns.

Suggested Readings

1. W.G. Eckert and S.H. James, *Interpretation of Bloodstain Evidence at Crime Scenes*, CRC Press, Boca Raton (1989).
2. G.T. Duncan and M.I. Tracey in *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).

3. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).

PART- V :EXTENSION ACTIVITIES

Common Syllabus as per Madurai Kamaraj University

THIRD YEAR :SEMESTER – V

FORENSIC BALLISTICS

Learning Objectives: After studying this paper the students will know – a. The classification of firearms and their firing mechanisms.

b. The methods of identifying firearms.

c. The characteristics of ammunition.

d. The importance of firearm evidence.

e. The nature of firearm injuries.

f. The methods for characterization of gunshot residue.

Unit I: Firearms

History and development of firearms.Classification of firearms.Weapon types and their operation. Firing mechanisms of different firearms.Internal ballistics – Definition, ignition of propellants, shape and size of propellants, manner of burning, and various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting. External Ballistics – Vacuum trajectory, effect of air resistance on trajectory, base drag, drop, drift, yaw, shape of projectile and stability, trajectory computation, ballistics coefficient and limiting velocity, Measurements of trajectory parameters, introduction to automated system of trajectory computation and automated management of ballistic data.

Terminal Ballistics – 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, influence of range. Ricochet and its effects, stopping power.

Unit II: Ammunition

Types of ammunition.Constructional features and characteristics of different types of cartridges and bullets.Primers and priming compounds.Projectiles.Headstamp markings on ammunitions. Different types of marks produced during firing process on cartridge – firing pin marks, breech face marks, chamber marks, extractor and ejector marks.

Unit III: Firearm Evidence

Matching of bullets and cartridge cases in regular firearms. Identification of bullets, pellets and wads fired from improvised, country made firearms. Automated method of bullet and cartridge case comparison.Determination ofrange of fire and time of fire.Mechanisms of formation of gunshot residues.Methods of analysis of gunshot residues from shooting hands and targets, with special reference to clothing.Identification and nature of firearms injuries.Reconstruction with respect to accident, suicide, murder and self defence.

Unit IV: Practicals – I

To describe, with the aid of diagrams, the firing mechanisms of different types of firearms. To correlate the velocity of bullet with the impact it produces on the target.To correlate the striking angle of the bullet with the impact on the target. To estimate the range of fired bullets. To carry out the comparison of fired bullets. To carry out the comparison of fired cartridge cases.

Unit V: Practicals – II

To identify gunshot residue. To correlate the nature of injuries with distance from which the bullet was fired. To differentiate, with the aid of diagram, contact wounds, close range wounds and distant wounds.

Suggested Readings

1. B.J. Heard, *Handbook of Firearms and Ballistics*, Wiley and Sons, Chichester (1997).
2. W.F. Rowe, Firearms identification, *Forensic Science Handbook*, Vol. 2, R. Saferstein (Ed.), Prentice Hall, New Jersey (1988).
3. A.J. Schwoeble and D.L. Exline, *Current Methods in Forensic Gunshot Residue Analysis*, CRC Press, Boca Raton (2000).
4. E. Elaad in *Encyclopedia of Forensic Science, Volume 2*, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).

FORENSIC TOXICOLOGY

Learning Objectives: After studying this paper the students will know –

a. The significance of toxicological studies in forensic science.
b. The classification of poisons and their modes of actions.
c. The absorption of poisons in body fluids.
d. The forensic identification of illicit liquors.
e. The classification and characteristics of the narcotics, drugs and psychotropic substances.
f. The menace of designer drugs.
g. The methods of identifying and purifying narcotics, drugs and psychotropic substances.

Unit 1: Basics of Toxicology

Significance of toxicological findings. Techniques used in toxicology. Toxicological analysis and chemical intoxication tests.Postmortem Toxicology.Human performance toxicology.Dose-response relationship. Lethal dose 50 and effective dose 50.

Unit II: Poisons

Classification of poisons.Physico-chemical characteristics and mode of action of poisons.Accidental, suicidal and homicidal poisoningsSigns and symptoms of common poisoning and their antidotes.Collection and preservation of viscera, blood and urine for various poison cases.Identification of biocides and metal salts in body fluids.Metabolism and excretion of poisons. Application of immunoassays in forensic work.Animal poisons.

Snake venom.Mode of action.Carbon monoxide poisoning. Vegetable poisons. Poisonous seeds, fruits, roots and mushrooms.Beverages. Alcoholic and non-alcoholic illicit liquors.Analysis and identification of ethyl alcohol.Estimation of ethyl alcohol in blood and urine.Proof spirit.Crime scene management in illicit liquor cases.

Unit III: Narcotics, Drugs and Psychotropic Substances

Definition of narcotics, drugs and psychotropic substances.Broad classification – Narcotics, stimulants, depressants and hallucinogens.General characteristics and common example of each classification.Natural, synthetic and semi-synthetic narcotics, drugs and psychotropic substances.Designer drugs. Tolerance, addiction and withdrawal symptoms of narcotics, drugs and psychotropic substancesCrime scene search for narcotics, drugs and psychotropic substances – searching a suspect, searching a dwelling, searching a vehicle.Clandestine drug laboratories. Collection and preservation of drug evidence.Testing of narcotics, drugs and psychotropic substances.Isolation techniques for purifying narcotics, drugs and psychotropic substances – thin layer chromatography, gas-liquid chromatography and high performance liquid chromatography. Presumptive and screening tests for narcotics, drugs and psychotropic substances.Microcrystalline testing of drugs of abuse.Analysis of narcotics, drugs and psychotropic substances in breast milk, saliva, urine, hair and antemortem blood. Drugs and driving. Dope tests.Analysis of narcotics, drugs and psychotropic substances in postmortem blood. Postmortem changes affecting the analysis of narcotics, drugs and psychotropic substances.

Unit IV: Practicals – I

To identify biocides. To identify metallic poisons. To identify organic poisons.To identify ethyl alcohol.

To identify methyl alcohol.To carry out quantitative estimation of ethyl alcohol.

Unit V: Practicals – II

To prepare iodoform.To identify drugs of abuse by spot tests. To perform color tests for barbiturates.

To separate drugs of abuse by thin layer chromatography.

Suggested Readings

1. R. Saferstein, *Criminalistics*, 8th Edition, Prentice Hall, New Jersey (2004).
2. F.G. Hofmann, *A Handbook on Drug and Alcohol Abuse*, 2nd Edition, Oxford University Press, New York (1983).
3. S.B. Karch, *The Pathology of Drug Abuse*, CRC Press, Boca Raton (1996).
4. A. Poklis, Forensic toxicology in, *Introduction to Forensic Sciences*, 2nd Edition, W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
5. A.W. Jones, Enforcement of drink-driving laws by use of per se legal alcohol limits: Blood and/or breath concentration as evidence of impairment, *Alcohol, Drug andDriving*, **4**, 99 (1988).
6. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

SUBJECT ELECTIVE
ACCIDENT INVESTIGATIONS

Learning Objectives: After studying this paper the students will know –

a. A broad understanding of accident investigation
b. Readily applicable accident investigation procedures
c. How to collect, analyse and communicate data
d. A robust understanding of RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations, 1995)
e. An understanding of strategies and methods of assessment
f. An understanding of strategies to ensure the organisation learns from safety failure

Unit I: Motor Vehicle Accidents

Accident scene.Sources of forensic information. Eyewitness accounts. Extent of vehicle damage.Visibility conditions.Photographs of accident site.Estimation of speed. Tire marks, skid marks, scuff marks. Maintenance of vehicles.Abandoned vehicles.Importance of air bags.Railway accidents.

Unit II: Accident Analysis

Pre-crash movement.Post-crash movement.Collision model.Gauging driver's reaction.Occupants's kinematics.Types of injuries resulting from accident.Biomechanics of injuries. Hit and run investigations. Trace evidence at accident sites.

Unit III: Tachographs

Forensic significance of tachograph data.Tachograph charts. Principles of chart analysis.Accuracy of speed record.Tire slip effects. Falsification and diagnostic signals.Route tracing.

Unit IV: Motor vehicles act

Salient features of the active applications of the act in investigations of accident cases, Drunken Driving, breathalyzer, alcohol level in the blood, sweat, urine.

Unit V: Practicals

To lift tire marks. To study the pattern of skid marks.To study the pattern of scuff marks.To estimate the speed of the vehicle from skid marks.To prepare a report on a major road accident.To prepare a report on a major train accident.

Suggested Readings

1. T.S. Ferry, *Modern Accident Investigation and Analysis*, Wiley, New York (1988).
2. D. Lowe, *TheTachograph*, 2nd Edition, Kogan Page, London (1989).
3. T.L. Bohan and A.C. Damask, *Forensic Accident Investigation: Motor Vehicles*, Michie Butterworth, Charlottesville (1995).

4. 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).

PAPER-4: CRIMINAL PROCEDURES AND EVIDENCE

Learning Objectives: After studying this paper the students will know –

Crime is a phenomenon studied by several disciplines from several perspectives and methodologies. Criminal Procedure is being taught as a compulsory paper at the level of LL.B. today. However, a much wider perspective is being given through Honors Paper as this is a subject which has constitutional undertones and jurisprudential importance. A study of comparative criminal procedure helps students develop an ecumenical approach and broadens their vision. It inspires them renew and revise their laws to be in tune with developed systems. This paper mainly focuses on Criminal Procedure in India and Law relating to Evidence. The paper is taught with reference to India.

Unit I: Origin

Origin of Criminal Procedure definitions under Code of Criminal Procedure, 1973 – Hierarchical organization of judiciary in India – Constitution of criminal courts and officers – Jurisdiction and powers of criminal courts –Court of Sessions – Judicial magistrates – Executive magistrates – Public Prosecutors – Informal courts (NyayaPanchayat and LokAdalats)

Unit II:Pre-trial Processes

Constitutional perspectives: Articles 14, 20 and 21 – Organization of police, prosecutor and defense counsel – Arrest: Distinction between cognizable and non-cognizable offences – Warrant and summons – Absconder status – Rights of arrested persons under Cr.P.C and Article 22 (2) of the Constitution of India – Search: General principles of search, search with and without warrant and police search during investigation – Seizure – Constitutional aspects of validity of search and seizure proceedings – Security: Nature andprocedures

Unit III:Trial Processes

Commencement of proceedings: Complaint, inquiry, framing of charges, form and content of charge – Bail: General principles and cancellation of bails – Anticipatory bail – Preliminary pleas to bar trial – Remand – Jurisdiction – Time limitations – Pleas of autrefois acquit and autrefois *convict* – Fair trial – Concept of fair trial – Presumption of innocence – Venue of trial – Constitutional interpretation of Article 21 as a right to speedy trial – Trial before a Court of Session: Procedural steps and substantiate rights – Accusatorial and inquisitorial systems – Summarytrial

Unit IV:Evidence in Criminal Cases

Definitions – Concepts – Fact in issue – Relevant fact – Evidence: Proved, disproved,

admissibility and relevancy – Relevant evidence in statement form:Admission confessions, dying declarations and expert opinions – Conspiracy evidence – Approver evidence – Presumptions of law – Presumptions of fact – Burden of proof Examination in-chief – Cross-examination andre-examination– Impeaching the credit of the witness.

Unit V:Judgements

Judgementspost-conviction orders in lieu of punishment – Appeals – Reference and revisions– Transfer of criminal cases – Suspension of sentence – Execution – Remission – Commutation of sentence – Disposal of property – Acquittal – Bonds – Fine – Imprisonment

Suggested Readings

1. K.N. ChandrsekharanPillai (Rev.), R.V. Kelkar's Criminal Procedure (5th ed., 2008)
2. K.I. Vibhute (Ed.), Criminal Justice (1st ed., 2004)
3. Robert L. Packer, The Limits of Criminal Sanction (1968)
4. Glanville Williams, The Proof of Guilt (1963).
5. Inbau, Thompson and Sowle, Criminal Justice Vol. II, Foundation Press (1968).
6. Blond, Neil C., Criminal Procedure (2009)
7. Bloom, Robert M . ; Brodin, Mark S., Criminal Procedure: The Constitution and the Police 6th ed.(2010)
8. Lippman, M athew, Criminal Procedure (2011)
9. Singer, Richard G., Criminal Procedure II: From Bail to Jail, 2nd ed. (2011)
10. Walker, Samuel., The New World Of Police Accountability1st Ed.
11. ShankerSen, Enforcing Police Accountability through Civilian oversight, Sage (2010)
12. Wakefield, Alison & Fleming, Jenny, The Sage Dictionary Of Policing 1s t Ed.

SKILL BASED SUBJECT
DNA TYPING

Learning Objectives: After studying this paper the students will know –

a) *The basic principle of DNA analysis.*
b) *The forensic significance of DNA typing.*
c) *The importance of short tandem repeats and restriction fragment length polymorphism in DNA technique.*
d) *Role of DNA typing in parentage testing.*

Unit -I: Basic Principles

DNA as biological blueprint of life - Extraction of DNA for analysis - Quantitation of DNA – yield gel quantitation and slot blot quantitation. Mitochondrial DNA – sequence analysis.

Unit- II: Forensic DNA Typing

Collection of specimens.Polymerase chain reaction – historical perspective, sequence polymorphisms, individualization of evidence.Short tandem repeats (STR) – role of fluorescent dyes, nature of STR loci.Restriction fragment length polymorphism (RFLP) – genetic markers used in RFLP, typing procedure and interpretation of results.Touch DNA.

Unit -III: Parentage Testing

Principles of heredity.Genetics of paternity. DNA testing in disputed paternity. Mendelian laws of parentage testing.Mathematical basis of parentage identification.Missing body cases.Reference populations and databases.

Unit- IV: Personal identification

Allele frequency determination.Hardy-Weinberg law.Probability determination in a population database.

Unit -V: Practicals

To carry out the separation of amino acids by thin layer chromatography.To carry out *extraction of DNA from body fluids.*To preparation of gel plates for electrophoresis.To carry out electrophoresis for separation of enzymes. To prepare a report on the role of DNA typing in solving paternity disputes.

Suggested Readings

1. J.M. Butler, *Forensic DNA Typing*, Elsevier, Burlington (2005).
2. K. Inman and N. Rudin, *An Introduction to Forensic DNA Analysis*, CRC Press, Boca Raton (1997).
3. H. Coleman and E. Swenson, *DNA in the Courtroom: A Trial Watcher's Guide*, GeneLex Corporation, Washington (1994).
4. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

NON-MAJOR ELECTIVE
BASICS OF CRIMINOLOGY

Learning Objectives: After studying this paper the students will know –

a. The importance of criminology.
b. The causes of criminal behavior.
c. The significance of criminal profiling to mitigate crime.
d. The consequences of crime in society.
e. The elements of criminal justice system.

Unit - I: Introduction

Criminology, Crime - definitions; historical perspectives; nature, origin and scope - Criminology as a social science, relations with other social sciences, medicine and law.

Unit - II : Schools of Criminology

Pre-classical, Neo-Classical, Positive, Cartographic, Biological and Constitutional Schools.

Unit - III: Criminal Justice System

Structure of Criminal Justice in India. Role of legislature, police, judiciary and prison system in Criminal Justice; co-operation and co-ordination among the various sub systems of criminal justice system.

Unit - IV : Sociological Theories

Differential Association theory, Group Conflict Theory, Containment Theory, Subculture Theory, Labeling Theory.

Unit - V: Psychological Theories

Theories of personality - Freud, Murray and Catell.Theories of learning - Pavlov, Skinner, Thorndike, Kohler and Bandura Theories of Motivation - Maslow, Hersberg, Atkinson and McClelland.

Reference

a. Siddique, A (1993), Criminology, Problems and Perspectives (2nd ed.) Lucknow, Eastern Book House.
b. Chockalingam, K. (1997). 'Kuttraviyal' (Criminology) in Tamil, Chennai. Parvathi Publications.
c. Conklin, J.E. (2001), Criminology, Macmillan Publishing Company.
d. Sutherland, H.E., &Cressey, D.R. (1974), Principles of Criminology, Philadelphia : Lippincott.
e. George Vold and Thomas J. Bernard (1986), Theoretical Criminology, New York : Oxford University Press.
f. Walter C. Reckless (1967), The Crime Problem, Bombay :Vakols, Feffner&Simson P. Ltd.
g. Titus Reid (1982), Crime & Criminology, New York : Holt, Rinehard&Winstoon.
h. Richard Quinney and John Wildeman (1977), The
i. Problem of Crime - A critical introduction to criminology, London : Harper & Row.
j. Carson R.C. and James N. Butcher (1992), Abnormal psychology and Modern Life, Harper Collinns Publisher Inc.
k. Fathali M. Hoghaddam (1998) Social Psychology : Exploring Universals Across Cultures, New York: W.H.Freeman and Company.

l. Garett H.E. (1961) General Psychology, New Delhi :
m. Eurasia Publishing House Ltd.

SEMESTER VI :PART III CORE SUBJECTS
VICTIMOLOGY

Learning Objectives: After studying this paper the students will know –

The Objectives of this paper is to familiarize the students of Criminology with the functioning of the various institutions of the criminal justice system and juvenile justice system. The students are expected to make observational visits to a police station, a court of criminal trial, prisons, observation home, Juvenile Justice Board, Special home for boys and Special home for girls, Crime Records Bureau, Police Control Room, Vigilance Home, Institutions for the treatment of drug addicts, institutions assisting the victims of crime, including women and child victims. The students will undertake the visits under the guidance of a faculty and will prepare a detailed report for evaluation for the final examination. Along with this each student should complete a minimum of three case studies and present it before the examiners.

UNIT-I:VictimologyBasics

Victimology: Basic Concepts - Historical development of Victimology. Meaning and Definition of victim. National and International concern for victims of crime – UN Amnesty International - UN Declaration of Basic Principles of Justice for Victims of Crime and Abuse of Power, 1985. Handbook of Justice for Victims, 1998. Guide for Policy Makers, 1998. USA - Patterns of Criminal Victimization - Role of victims in Criminal Occurrence, Victim – Offender relationship. Impact of Victimization– Physical and financial impact.

UNIT -II: Perspectives on Victimizationz

Criminological perspectives: repeat victimization, routine activities, lifestyle exposure, fear of crime, victimization surveys including cost of crime. Psychological perspectives: Effects of crime on victims (including PTSD, resilience, posttraumatic growth and anger) and the way victims are viewed. Legal perspectives: Rights of the Crime Victims – Victim in the criminal Justice System, Need and Significance of Victim oriented Justice System. Sociological perspectives: analysis of social reaction to crime and victimization over the Ages, the importance of feminist and critical theory and the development of the victim Movement and victim advocacy.

UNIT -III: Individual and Mass victimization

Victims of traditional crime. Women victims - Dowry, battered women, Rape and other kinds of Sexual harassment - Child abuse.Cyber Crime Victimization of Women and Children.Trafficking in women and children. Victims of abuse of power, Genocide, Crimes against humanity, Internally Displaced persons, Victims of War - Child Soldiers, Refugees.

UNIT -IV: Criminal Justice System and Victims

CJS and victim relationship: Collaborator or evidence - Victim & Police: Lodging of FIR & recording of statement - Deposition & cross-examination in courts. – Secondary

Victimization by the criminal justice system and the society– Role of judiciary in Justice for victims. Creating awareness among the criminal justice professionals and the public on victim issues.

UNIT -V: Victim Assistance

Alternative services for crime victims – victims support Services in the developed countries – Victim support services in India. Types of assistance. Offender Restitution Programs - Victim Witness Programs – Crisis Intervention – Victim Advocacy – Introduction to Restorative Justice and Principles of Restorative Justice – Victim compensation and restitution. Compensation for victims of crime: Indian Scenario. Advantages and disadvantages of Criminal Justice – based victim support schemes-AllWomenPoliceStations-.RoleofNGOsandProfessionalassociations, ISV, WSV, Child Line, One Stop Shop and National Organization for Victim Assistance (NOVA).

Suggested Readings

1. Chockalingam, K. 1985, Readings in Victimology, Raviraj Publications, Chennai.
2. Fattah, E.A. 1991. Understanding Criminal Victimization, Scarborough, Ont.: Prentice
3. Hall Canada.
   3Gottfredson, M. R. 1984. Victims Of Crime: The Dimensions Of Risk, Home Office
4. Research And Planning Unit, Report No. 81, London: Hmso.
   4. Gupta M.C., Chockalingam K., and JayatilakGuha Roy 2001, Child Victims of Crime-
5. Problems and Perspectives. Gyan Publishing House, New Delhi.
   5. Karmen, A. 1990. Crime Victims: An Introduction to Victimology, (2nd Edition).
6. Montery, Ca: Brooks/Cole.
   6. Madhava Soma Sundaram, P., Jaishankar, K., &Ramdoss, S. (2008). Crime Victims
7. and Justice: An Introduction to Restorative Principles. New Delhi: Serials Publications.
8. Mawby, R.I. And Gill, M.L. 1987. Crime Victims: Needs, Services And The Voluntary
9. Sector, London: Tavistock.
   8. Rajan, V.N., 1981, Victimology in India, Allied Publishers Pvt Ltd., New Delhi
   9. Ronel, N., Jaishankar, K., &Bensimon, M. (2008). Trends and Issues inVictimology. New Haven, UK: Cambridge Scholars Publishing.
10. Shapland, J., Willmore, J. And Duff, P. 1985. Victims In The Criminal Justice System, London: Gower.
11. Shekhar .B Toward A Victim Justice System – A New Vision of Justice for Crime Victims ISBN : 978-81-906687-3-6 University Publication, ManonmaniamSundaranar University, Tirunelveli. Tamil Nadu, December, 2015.

12. Shekhar .B. Creating a safe space for Women & Child Victims of Crime ISBN:978-81-906687-2- 96 University Publication, ManonmaniamSundaranar University, Tirunelveli.Tamil Nadu, 2015. 13. Shekhar .B. Dimensions of Violations & Victimization(ed). Page- 395-406, ISBN No: 978-93- 81402-27-6 Publication.

Division, ManonmaniamSundaranar University, November 2012.
13. Vijaya.S&Shekhar .B Victimisation Survey among Adolescents of Three Districtsin Tamil Nadu, with Somasundaram, Vijaya .S. University Publication,Manonmaniam Sundaranar University, Tirunelveli.Tamil Nadu, January, 2016.Syllabus of M.Sc., Criminology and Criminal Justice Science (from 2017-2018 onwards) ManonmaniamSundaranar University, Tirunelveli Page 18

FORENSIC MEDICINE

Learning Objectives: After studying this paper the students will know –

a. The duties of the first responding officer who receives a call on homicide or suicide case.
b. The steps involved in processing the death scene.
c. The importance of ascertaining whether the crime was staged to appear as suicide or accident.
d. The importance of bloodstain patterns in reconstructing the crime scene.
e. The importance of autopsy.
f. The importance of forensic odontology

Unit I: Death Investigations

Fundamental aspects and scope of forensic medicine.Approaching the crime scene of death.Obtaining first hand information from the caller.Rendering medical assistance to the victim, if alive.Protecting life. Recording dying declaration.Identifying witnesses and, if possible, suspect. Interviewing onlookers and segregating possible witnesses.

Suspect in custody – initial interrogation and searching for evidence. Miranda warning card.Assessing the crime scene.Request for forensic team.Importance of command post and log book.Management of crowd and media.Importance of taking notes.Items to be a part of noting.

Documenting the death scene.Processing evidence.Evaluation of injuries.Importance of canvass form. Indexing the death investigation.Handling buried body cases – search for buried bodies, methods of exhumation.Suicide cases – evaluating the type of injuries, gauging the psychological state of victim, suicide notes.

Unit II: Autopsy

Forensic pathology.Medico-legal aspects of death.Causes of death.Determination of time since death.Investigation of sexual offences.Death by drowning.Injuries.Types and classification of injuries.Antemortem and post mortem injuries.Aging of injuries.Artificial injuries.

Unit III: Forensic Odontology

Development, scope and role of forensic odontology in mass disaster and anthropology.Types of teeth and their comparative anatomy. Bite marks. Forensic significance of bite marks. Collection, preservation and photography of bite marks evidence. Legal aspects of bite marks.Estimation of age from teeth.

Unit IV: Practical – I Autopsy - Witnessing and Report writing of Post mortem
Unit V: Practical - II
To design a questionnaire for the first responder to the death scene.To design a protocol to deal with the media at the crime scene.To design a checklist for the forensic scientists at the death scene.To design a canvass form giving description of an unidentified victim. To analyze and preserve bite marks.

Suggested Readings

1. K. Smyth, *The Cause of Death*, Van Nostrand and Company, New York (1982).
2. M. Bernstein, Forensic odontology in, *Introduction to Forensic Sciences*, 2nd Ed., W.G. Eckert (Ed.), CRC Press, Boca Raton (1997).
3. J. Dix, *Handbook for Death Scene Investigations*, CRC Press, Boca Raton (1999).
4. H.B. Baldwin and C.P. May in, *Encyclopedia in Forensic Science*, *Volume 1*, J.A. Siegel, P.J. Saukko and G.C. Knupfer (Eds.), Academic Press, London (2000).
5. V.J. Geberth, *Practical Homicide Investigation*, CRC Press, Boca Raton (2006).
6. T. Bevel and R.M. Gardner, *Bloodstain Pattern Analysis*, 3rd Edition, CRC Press, Boca Raton (2008).
7. W.J. Tilstone, M.L. Hastrup and C. Hald, Fisher's, *Techniques of Crime Scene Investigation*, CRC Press, Boca Raton (2013).

SUBJECT ELECTIVE

Dissertation

The dissertation will be based on a research topic in Forensic Science/Criminology. The topic will be assigned in consultation with police and forensic science establishments, giving due consideration to the problem areas faced by these institutions. The students will be expected to undertake extensive field work, in collaboration with mobile police laboratories.

INSTRUMENTAL METHODS- CHEMICAL

Learning Objectives: After studying this paper the students will know –

a) Understand the principles of methods and analytical instruments used in analysis of biological samples
b) Be able to apply these principles including analytical instrument operation to analysis of sample in the laboratory situation.
c) Interpret data and to clearly communicate findings in the form of written reports.

Unit-ISeperation Techniques

General idea and basic principle of distillation, Various types of distillation techniques. Sample treatment techniques – Centrifuge, Filtration, Evaporation, Crystallization. Solvent extraction technique like LLE, SPE, micro SPE

Unit-IIChromatographic Techniques

Theory of chromatography, Classification of chromatography,General idea on planar chromatography,Column chromatography, Adsorption, Partition chromatography,General principles and working of Planer chromatography: TLC, PC, HPTLC Forensic Application of planar chromatography

Unit-III Instrumental Techniques

General principles and working of Column Chromatography Selection of mobile phase, column and detectorsIon-exchange chromatography.Briefidea onworking of HPLC, GC, Ion Exchange Chromatography, Exclusion (Permeation) chromatography, Affinity chromatography.Forensic Application of column chromatography.

Unit-IVElectrophoretic techniques

General principles, Classification of electrophoresis.Factorsaffectingelectrophoresis, Preparative, Horizontal, Vertical, two dimensional electrophoresisBrief ideaofLow voltageelectrophoresis,Highvoltageelectrophoresis,Gelelectrophoresis, Isoelectric focusingGeneral idea and workingof Capillary Electrophoresis Forensic Application of electrophoresis, electrochemical techniques.

Unit-V Spectroscopy

Mass Spectrometry (MS): Principle and Instrumentation, Correlation of MS with molecular structure.brief idea about the various forms of Mass Spectrometry, Coupling MS with GC, Application of MS in Forensic Science.

Suggested Readings

1. Hodge, J.E. and Hofreiter, B.T., 1962. In : Methods in Carbohydrate Chemistry (eds. Whistler, R.L. and Be Miller, J.N.). Academic Press, New York
2. Hoisington, D., Khairallah, M. and Gonzalez-de-Leon, D., 1994. Laboratory Protocols: CIMMYT Applied Biotechnology Center. Second Edition, Mexico, D.F.: CIMMYT.
3. Lowry, O.H., Rosebrough, N.J., Farr, A.L. and Randall, R., 1951. J. Biological Chemistry 193: 265
4. Maniatis *et al* ., Molecular cloning. Protocol for extraction of genomic DNA from swine solid tissues.
5. Mattoo, R.L., 1970, Indian Journal of Biochemistry 7: 82
6. Promega Notes on Rapid isolation of high quality genomic DNA from various sources (pdf)
7. Richard Pattern. Tufts-New England Medical Centre, Molecular Cardiology Research, Boston, MA Centrhttp://www.abcam.com/index.html?pageconfig=resource&rid=11473
8. http://www.med.upenn.edu/mcrc/parmacek_lab/SouthernBlot-singlecopy.shtml
9. http://www.cabri.org/guidelines/animal/AHC9833123Ap6.html
10. http://www.abcam.com/ps/pdf/protocols/direct%20elisa%20protocol.pdf

SKILL BASED SUBJECT
COUNSELLING AND GUIDANCE

Learning Objectives: After studying this paper the students will know –

- To develop willingness for choices and changes to face need challenges.
- To minimize the mismatching between education and employment and help in the efficient use of manpower and motivate the youth for self-employment.
- To identify and motivate the students from weaker sections of society and help the students in their period of turmoil and confusion.
- To ensure the proper utilization of time spent outside the classrooms and help in tackling problems arising out of student explosion.

UNIT- I:Guidance

Meaning and definition of guidance, aims and importance of guidance, basic principles of guidance, group guidance - Psychological bases of guidance: Intelligence aptitude, interest, personality Organization of guidance services, follow up services in guidance evaluation of guidance services.

UNIT- II:Counselling

Introduction to Counselling: Meaning, Definition, Need and Importance of counselling and professional ethics in counselling. Basic Principles of Counselling: Participation, Individualization, Confidentiality, communication, acceptance, self-confidence, self-awareness and other principles governing the counselling relationship.

UNIT-III:Types of Counselling

Types of Counselling- Individual, Group & Family Counselling, Counselling process, Interview and it significance in counselling - Use of observation in counselling and understanding of emotions in counselling.Qualities of a Counsellor.

UNIT-IV:Techniques

Techniques of group counseling, strategies and structure - barriers to effective counselling sessions; counselling evaluation.

UNIT-V:Components

Components of effective Counselling: Personality of the counsellor's skills - Role and functions of the counsellor in schools, industries, family, hospital & rehabilitation institution. Effectiveness of counselling and guidance in the treatment of offenders and victims.

Suggested Readings

1. Bordin,E.S.: Psychological counseling IInd Editor, McGraw Hill, 1968
2. Charles J.O. Leary, Counselling couples and Families - A person centred Approach, Sage Publications, New Delhi 1999.
3. Colin Feltham, Controversies in psychotherapy and counselling, Sage Publications, New Delhi, 1999.

4. Don C. Locke, Jane, E. Mayers, Edwin L. Hess, The Hand Book of Couselling, Sage Publications, International Educational & Professional Publishers, New Delhi, 2001.
5. Humphereys,H.A. and Traxler,Q.E.: Guidance Services, Science Research Associates, Chicago, 1954
6. Jones, A.J.: Principles of Guidance, sixth ed., McGraw Hill, New York, 1970
7. Keith Tudor, Group Counselling, Sage Publications, New Delhi, 1999.
8. Rao, S.N.: Counselling Psychology Tata McGraw Hill, New Delhi, 1992
9. Richard Nelson - Jones, Introduction to Counselling skills Text and Activities, SagePublications, New Delhi, 2000.
10. Tara Chand Sharma, Modern Methods of Guidance and Counselling. Sarup & Sons,NewDelhi, 2002.

NON-MAJOR ELECTIVE
CONTEMPORARY CRIMES

Learning Objectives: After studying this paper the students will know –

• To explore how forensic accounting, practices and forensic audit would enhance fraud prevention and detection in India.

• To understand proven that educational level is affecting the effectiveness of use of techniques of fraud prevention and detection.

UNIT-I Cyber Crime:

Cyber Crimes and Cyber assisted Crimes – Hacking – Phreaking – Phishing – Online Harassment. Evolution of crimes in Social Media - Technology and Crime-ElectronicMonitoring. Cyber Criminology - Cyber Victimology– GPS –Bitcoin – Cryptography- Space Transition theory.

UNIT-II Organized Crime

Meaning of organized crime- Racketeering, Contract killings, drug trafficking, corruption, smuggling, extortion, loan sharking, human trafficking, money laundering, bootlegging, arms trafficking, gambling, funding illegally, murder, tax evasion and forger, Sand mafia.

UNIT-III Corporate Crimes

Meaning of organized crime - White Collar Crime – Mallaya's Financial Scandals-Punjab National Bank : Niravmodi's Scam - The case of Cognizant Technology Solutions -Saradha Group Financial scandal

UNIT-IV Environmental Crimes

Environmental Crimes-Difference between Sanctuary and National Park-UN Environment Programme - The Ministry of Environment, Forest and Climate Change– Indian Forest Service -Wild animal trafficking- electronic waste mismanagement-

Indiscriminate logging – Finning - Dumping in rivers and aquifers - Hunting endangered species-Crime Prevention through Environmental Design(CPTED)- Green Criminology- Tuticorin Sterlite Copper's Plant vs People of Tamilnadu.

UNIT-V Terrorism

Meaning of Terrorism and Insurgency, Types of Terrorism, Role of Indian Army, Indian Navy & Indian Air force, National Counter Terrorism Centre, Al- Qaeda- Twin tower attack – Maoist –Naxalites- ISIS – MAFIA-Mumbai Serial Bomb Blasts- Delhi Serial Bomb Blast-Godhra train burning-Mumbai Train Blast - Indian Parliament Attack-Coimbatore Bombings-Pulwama attack.

Suggested Readings

1. John S Dempsey: Introduction to Private Security.
2. Clifton L Smith & David J Brooks: Security Science.
3. Karen M. Hess: Introduction to Private Security.
4. Robert H. Deatherage: Security operations.
5. Mary Kaldor&LavorRangelov: The Handbook of Global Security Policy.
6. Paleri: National Security: Imperatives and Challenges.
7. Robert, Edward & David C Walters: Introduction to Security 8. P.J Ortmeier: Public Safety and Security Administration.

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