



Department of Criminology and Forensic Science
Dr. Harisingh Gour Vishwavidyalaya
Sagar MP-470003, India



Ph.D. Syllabus

(Course Work)

2021 – 2022

Forensic Science



DEPARTMENT OF CRIMINOLOGY AND FORENSIC SCIENCE
(School of Applied Sciences)
DR. HARISINGH GOUR VISHWAVIDYALAYA
(A Central University)
Sagar (MP)



DEPARTMENT OF CRIMINOLOGY & FORENSIC SCIENCE
DR. HARISINGH GOUR VISHWAVIDYALAYA, SAGAR (M.P.)
(A CENTRAL UNIVERSITY)

Ph.D. – FORENSIC SCIENCE
(A 2 years – 4 Semester Ph.D. Programme)

1. Ph.D – Forensic Science is a 4 Semester (2 years) Ph.D. programme providing knowledge and developing skills in the disciplines of Forensic Sciences.
2. This Ph.D. programme shall have a “Choice Based Credit System” (CBCS).
3. There shall be total 12 Core *Theory* papers of 4 credits each; 06 Core *Practicals* of 02 credits each; 06 *Elective* Papers of 03 credits each for total 78 Credits. In addition. There shall be one *Project* of 06 Credits. A Candidates needs to pass them during the tenure of 04 Semesters.
4. There shall be 04 Electives from the parent department whereas remaining 02 Electives need to be opted from the other educational department of the University.
5. Each **Core / Elective** paper shall be of 100 Marks and shall have the following examination pattern in each Semester :

S.No.	Name of Exam	Duration	Total Number	Marks	Total Marks
1	Quiz	30 minutes	03	05	3x5 = 15
2.	Mid Semester (First & Second)	01 hour	02	12 + 13	25
3.	End Semester (Final Exam)	03 hours	01	60	60

Thus total marks of CIE: 15 + 12 + 13 = 40; Total Marks of each paper 40 + 60 = 100

6. A candidate is required to pass separately in each **Core / Elective / Practical / Project**.
7. A candidate needs to score a minimum of 4 GPA (Grade Point Average) in every paper to pass the paper. A score of less than 4 GPA in any two previous Semesters shall deprive the student of regular admission in the next Semester.
8. An effort shall be made to take the students to an educational tour to expose them to institution of excellence in the field.

Moreover an attachment of more than 15 days but less than 45 days in Forensic and other institution may be provided to students for hands on experience.



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Scheme of
Ph.D. Course Work in Forensic Science
(2021-22)

Ph.D. Course Work

S.No.	Course Code	Course	L	T	P	c	Credits
1.	FSC-CC-141	Research Methodology	4	-	-	4	4
2.	FSC-CC-142	Forensic Science	4	-	-	4	4
3.	FSC-CC-144	Research and publication ethics	2	-	-	2	2
4.	Choose one Course & Practical from below:						
	FSC-EC-141	Chemistry and Toxicology	4	-	-	4	4
	FSC-EC-142	Biology and Serology	4	-	-	4	
	FSC-EC-143	Documents, Computer Forensics and Impressions	4	-	-	4	
5.	FSC-CC-143	Review of Published Research Work	4	-	-	4	4

Total Credits -18



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School of Applied Sciences



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Ph. D Course Work in Forensic Science
(2021-22)

Paper Code: FSC-CC-141-Research Methodology

1. Meaning, Objective and Significance of Research

Types of Research (Formulative and Exploratory Studies, Descriptive and Preparation Studies, Experimental Studies).

Significance of Research, Ethical Issue in Research, Research Problem, Selecting a Problem, Meaning and Need of a Research Design, Important Concept of Good Design, Different Research Designs.

2. Hypothesis: What is Null Hypothesis, Null and Alternative Hypothesis. Basic Concept and Procedure of Hypothesis Testing, Errors in Hypothesis (Type I and II Errors), Research, Question, Critical Region (One Tail And Two Tail Regions), P-Values Degrees of Freedom, Level of Significance.

3. Sampling and Data Management: Provability and Non-Probability Sampling, Different Types of Sample Designs, Selection of Size of Sample, Source of Sampling and Non-Sampling Errors. Meaning and Type of Data, Collection of Primary Data, Sources of Secondary Data, Observation Methods (Participant and Non-Participants). Questionnaires Methods, Interview Method, Case Study Method (Schedule).

4. Literature Survey: Purpose of Literature Survey, Sources of Literature, Search Procedures and Collection Introduction of Impact Factor, ISIS, Citation Index, H-Index.

5. Research Proposal Writing: Problem Definition and Formulation, Design, Objective, Hypothesis Formulation, Population Identification, Measurement Procedure, Table Output, Introduction Reviews, Key Elements, Experimental Methods Used, Measurement Procedure Used, Result, Discussion, Conclusions, Referencing Formats for Books, Journals and Other Literature, Paper Writing, Format of Paper Writing in Journal, Thesis Writing Formats.



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3. Judd, C.M. Smith, E.R. and Kidder, L.H. (1986): Research Methods in Social Relations. New York, Harcourt Brace Jovanovich.
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Paper Code: FSC-CC-142-Forensic Science

1. Basic Principles of Forensic science
Nature & Scope of Forensic Science
Organizational Structure of Forensic Institutions & Laboratories
Ethics in Forensic Science
Relation of Forensic Scientists with Police & Courts
2. Nature of Physical Evidence in Forensic Science
Type of Physical Evidences their Collection & Preservation
Forwarding Medicine & Jurisprudence
3. General Forensic & Emerging Trends in:-
Forensic Chemistry & Toxicology
Forensic Biology & Serology
Forensic Medicine & Jurisprudence
4. General Forensic & Emerging trends in:-
Forensic Documents, Fingerprints & Impressions
Forensic Ballistics
Computer Forensics
5. Elementary Idea about Popular Forensic Techniques
Narco Analysis
Voice analysis
DNA Analysis
Brain Finger Printing



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1. Saferstein: Criminalistics- An Introduction to Forensic Science. Prentice hall Inc, USA (1995).
2. James, S. H. and Nordby, J. J; Forensic Science; An introduction to specific and Investigative Techniques. CRC Press, USA (2003).
3. O'Hara & Osterberg: An Introduction to Criminalistics.
4. Lee, Honry: Advances in Forensic Science.
5. Sharma J D: Apradh ka Vigyanik Anveshan.
6. Sharma B R; Forensic Science in Criminal Investigation and trials
7. Mordby, J Deed Reckoning- The Art of Forensic Science Detection. CRC Press LLC, Boca Raton FL, CRC Press (2000)
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Paper Code: FSC-CC-144-Research and publication ethics

ANNEXURE

Syllabus in detail

THEORY

• **RPE 01: PHILOSOPHY AND ETHICS** (3 hrs.)

1. Introduction to philosophy: definition, nature and scope, concept, branches
2. Ethics: definition, moral philosophy, nature of moral judgements and reactions

• **RPE 02: SCIENTIFIC CONDUCT** (5 hrs.)

1. Ethics with respect to science and research
2. Intellectual honesty and research integrity
3. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP)
4. Redundant publications: duplicate and overlapping publications, salami slicing
5. Selective reporting and misrepresentation of data

• **RPE 03: PUBLICATION ETHICS** (7 hrs.)

1. Publication ethics: definition, introduction and importance
2. Best practices/standards setting initiatives and guidelines: COPE, WAME, etc.
3. Conflicts of interest
4. Publication misconduct: definition, concept, problems that lead to unethical behavior and vice versa, types
5. Violation of publication ethics, authorship and contributorship
6. Identification of publication misconduct, complaints and appeals
7. Predatory publishers and journals

PRACTICE



- **RPE 04: OPEN ACCESS PUBLISHING** (4 hrs.)
 1. Open access publications and initiatives
 2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
 3. Software tool to identify predatory publications developed by SPPU
 4. Journal finder/ journal suggestion tools viz.JANE, Elsevier Journal Finder, Springer Journal Suggester etc.

- **RPE 05: PUBLICATION MISCONDUCT** (4 hrs.)
 - A. Group Discussions (2hrs)**
 1. Subject specific ethical issues, FFP, authorship
 2. Conflicts of interest
 3. Complaints and appeals: examples and fraud from India and abroad
 - B. Software tools (2hrs)**

Use of plagiarism software like Turnitin, Urkund and other open source software tools

- **RPE 06: DATABASES AND RESEARCH METRICS** (7 hrs.)
 - A. Databases (4hrs)**
 1. Indexing databases
 2. Citation databases: Web of Science, Scopus etc.
 - B. Research Metrics (3hrs)**
 1. Impact Factor of journal as per Journal Citation Report, SNIP, SJR,IPP, Cite Score
 2. Metrics: h-index, g index, i 10 index, altmetrics

References

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- MacIntyre, Alasdair (1967) A Short History of Ethics. London.
- P. Chaddah (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN;978-9387480865
- National Academy of Sciences National Academy of Engineering and Institute of Medicine. (2009) . On Being a Scientist: A Guide to Responsible Conduct in Research : Third Edition. National Academies Press.
- Resnik, D.B. (2011) What is ethics in research & why is it important. National Institute of Environmental Health Sciences, 1-10 Retrieved from <https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>
- Beall, J. (2012) . Predatory publishers are corrupting open access. Nature, 489(7415), 179-179. <https://doi.org/10.1038/489179a>
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Paper Code: FSC-EC-141 -Chemistry and Toxicology

1. Forensic Chemistry and Scope

Classification of Drugs
Classification of Psychotropic & Toxic Substances
General Idea and Basic Principle of Distillation,
Types of Distillation Techniques
Sample Treatment Techniques: Centrifuge, Filtration, Evaporation, Crystallization,
Distribution Law, Solvent Extraction Technique like LLE, SPE, Micro SPE

2. Examination & Analysis of:

Opium & Opiates
Cannabis Drugs
Stimulant Drugs
Tranquillizers and Plant Poisons
Depressants & Anti- Depressants

3. Poisons:

Types of Poisoning, Action of Poison, Factors Modifying the Action of Poison
Antidote to Some Common Poisons, Isolation & Extraction of Poisons from Various Forensic Exhibits, Extraction Methods.

4. Chromatographic Techniques

Theory & Classification of Chromatography
General Idea on PC, TLC, Column, GLC,
HPLC & HPTLC

5. General Idea of

Visible & UV Spectrophotometry
IR-FTIR
Mass Spectrophotometry, GC-MS, Emission Spectroscopy
X-Ray Diffraction Technique, Atomic Absorption Spectrophotometry & NAA



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3. Connors. ,A Text Book of Pharmaceuticals analysis, Interscience, New York, 1975.
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Paper Code: FSC-EC-142 -Biology & Serology

- 1. Amino Acids:** Definition, Classification, General Properties and Section
Proteins: Definition Classification, General Properties, Section & Detection
Carbohydrates: Definition, Classification and Detection
- 2. Basic Concepts Of Genetics:** Mendel's Law of Genetics, Genotypes, Phenotypes and Mutation biochemical Markers of Individuality: General Understanding, Classification of Markers, Biochemical Basis of Genetic Variation
- 3. Serum Genetic Markers in Blood and Other Biological Fluids:**
Identification of Blood & Other Body Fluids
Typing of Blood
Determination of Species
General Idea about Forensic Entomology
- 4. DNA Profiling**
Structure of DNA, Variation in DNA, Polymorphism in DNA,
Basis of DNA Typing
RFLP& PCR Based Typing of DNA
Electrophoresis Technique
Protein Polymorphism & Electrophoresis
Isoelectric Focusing
- 5. Forensic Botany:**
Diatoms- Types, Morphology, Isolation & Identification
Study & Identification of Pollen Grains
Examination of Paper & Pulp
Isolation, Classification & Identification of Microbial Organism



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Paper Code: FSC-EC-143-Documents, Computer Forensics & Impression

1. Computer Forensics:

Cyber Crime; Definition, Crimes on Internet, Hacking, Worms, Cookies
Encryption and Decryption Method
Image Processing and Pattern Recognition Framework
Software for Protection of Data & Security
Softwares in Detection of Various Aspects of Cyber Crime

2. Network Security, Multilayer Security, Intrusion Triangle

Cryptography and Steganography
Role of Ultraviolet and Infrared Rays, Detection of Alteration in Documents
Video Spectral Comparators and its Application in Document Examination
Electrostatic Detection Apparatus and its Application

3. Documents

Documents & Their Types, Paper, Inks and Writing Instruments
Alteration in Documents and Their Examination
Examination of Typed & Printed Documents
Handwriting, Their Characteristics and Examination
Decipherment, Indented Writings and Disguised Writing
Digital Documents

4. Fingerprints:

Fingerprints Pattern & Classification, Preservation and Development Of
Latent Prints, Examination of Finger Prints
Fingerprint Comparators
Automated Fingerprint Identification System (AFIS)
U.V. Light and Chemicals in Location of Fingerprints

5. Other Impressions:

Foot & Footwear Prints, Casting and Their Comparison
Gait Pattern, Skid Marks



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Paper Code: FSC-CC-143-Review of Published Research Work

Course Coordinator/Instructor: Prospective Supervisor

There shall be an Evaluation Committee to evaluate the Review of published Research. The evaluation process shall involve seminar presentation by the candidate followed by viva-voce on the presentation.

The Ph.D. student shall be required to submit two copies of typed/ written record. The distribution of marks for the review of published research will be as follows:

Presentation/seminar - 50 Marks

Viva-voce - 50 Marks

Total - 100 Marks
