



DEPARTMENT OF GENETICS  
MAHARSHI DAYANAND UNIVERSITY,  
ROHTAK-124001, INDIA

(‘A’ Grade State University established under Haryana Act No. XXV of 1975)  
Web site: <http://www.mdurohtak.ac.in>

**PhD Course Work in Forensic Science**

**Scheme of Examination of PhD (Course Work) Examination (Jan, 17 to Dec, 17)**

Paper No.	Nomenclature of the Paper	Internal Assessment	Theory	Seminar (if any)	Max. Marks
17FSCPC1	Research Methodology	20	80	-	100
17FSCPC2	Statistics Analysis & Computers	20	80	-	100
17FSCPC3	Techniques in Forensic Science	20	80	-	100
17FSCPC4	Review writing and presentation/Seminar	-	50	50	100
			Grand	Total	400

## SYLLABUS OF THE PhD COURSE WORK(Forensic Science)

17FSCPC1

### **RESEARCH METHODOLOGY**

Marks: 80.

Time Allowed: 3 hrs.

#### **INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus carrying equal marks. Section E will consist of ten short answer type questions which will cover the entire syllabus uniformly. Short answer type questions (not more than five lines or fifty words) shall carry two marks each.

#### **INSTRUCTIONS FOR THE CANDIDATE**

Candidates are required to attempt one question each from the sections A, B, C and D of the question paper and the entire section E.

##### **UNIT-A**

Meaning of Research in Forensic Sciences - Purpose, Characteristics and Types of Research - Process of Research - Formulation of objectives - Formulation of Hypotheses - Types of Hypotheses - Methods of testing Hypotheses - Research plan and its components - Methods of Research (Survey, Observation, case study, experimental, historical and comparative methods) - Difficulties in Forensic Biological, Forensic Chemical, Forensic Physical and Computer forensic research.

##### **UNIT-B**

Identification and formation of research problem (Hypothesis). Elements in research methodology: Research design (CRD, RBD, and LSD). Scientific database: Science Direct and Pubmed.

##### **UNIT-C**

Ethical, legal, social and scientific issues in Forensic research. A brief idea about the funding agencies such as DSF, DST, DBT, ICMR, CSIR and UGC. Role of IPR in Research and Development.

##### **UNIT-D**

Writing of Research Proposal, Report and Research Paper: Meaning and types - Stages in preparation - Characteristics - Structure - Documentation: Footnotes and Bibliography - Editing the final draft-Evaluating the final draft- Checklist for a good proposal/report/research paper. Basic knowledge of organizing conferences, symposia, workshop, exhibition etc.

Suggested Books:

- 1) Research Methodology- G.R. Basotia and K.K. Sharma.
- 2) Research Methodology- C.H. Chaudhary, RBSA Publication

**Marks: 80.**

**Time Allowed: 3 hrs.**

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**UNIT-A**

**Types of Data: Basic concepts of frequency distribution, Measure of central values-Mean, median and mode, Measures of dispersion, range, mean deviation and standard deviation Correlation and Regression analysis**

**Probability: Theory, Classical definition of Probability, Basic terms – Events, Trails, Mutually exclusive events, Favourable events, Exhaustive events etc, Baye’s Theorems of probability, Addition Theorem, Multiplication Theorem, Conditional Probability & Coincidence Probabilities.**

**UNIT-B**

**Variance – Coefficient of Variation, Moment, Skewness and kurtosis, binomial, distribution, Normal distribution, hyper geometric distribution, correlated measurements**

**Discriminating power – Derivation, evaluation of evidence by discriminating powers Combination of independent systems, correlated attributes, Transfer of evidence – likelihood ratio, probability of guilt correspondence probabilities, direction of transfer**

**UNIT-C**

**Tests of hypothesis – Tests of significant of attributes, Z-test of significance and coefficient of correlation, Small sample test, T-test, Paired Test, Chi-square test, F test of equality of variance, Large sample test, Normal test.**

**UNIT-D**

**Computer and Internet basics; Introduction and need of Computers, Operating system and basics of Windows, User Interface, File management, File Transfer (ftp, WSftp), DOS, UNIX, Difference between presentation and document, introduction to Notepad, MS-Office word, MS-Excel, Power Point, Opening Documents and Closing documents, introduction to Paint and Photoshop. Computer Communication and Internet, Electronic mails, Communication on Internet, Surfing the Internet,**

**Suggested Books:**

- 1) Elements of Biostatistics in Health Science- W. Daniell.
- 2) Statistical Methods for Research: S. Singh et al (1988) Central Publishing Ludhiana.
- 3) Fundamental of Statistics – D. N. Enhance.
- 4) Statistical Methods: S.P. Gupta. S. Chand Publication
- 5) Fundamentals of Biostatistics- Khan and Khanna, Ukaz Publication
- 6) Biostatistical analysis- Zerold and Jar.
- 7) C.S. French "Data Processing and Information Technology", BPB
- 8) Publications 1998
- 9) P.K Sinha `Computer Fundamentals`, BPB Publications, 1992
- 10) Guy Hart-Davis "The ABCs of Microsoft Office 97 Professional edition",
- 11) BPB Publications, 1998
- 12) Karl Schwartz, "Microsoft Windows 98 Training Guide", 1998

17FSCPC3

**TECHNIQUES IN FORENSIC SCIENCE**

Marks: 80.

Time Allowed: 3 hrs.

**INSTRUCTIONS FOR THE PAPER SETTER**

The question paper will consist of five sections A, B, C, D and E. Section A, B, C and D will have two questions from the respective sections of the syllabus carrying equal marks. Section E will consist of ten short answer type questions which will cover the entire syllabus uniformly. Short answer type questions (not more than five lines or fifty words) shall carry two marks each.

**INSTRUCTIONS FOR THE CANDIDATE**

Candidates are required to attempt one question each from the sections A, B, C and D of the question paper and the entire section E.

**UNIT-A - (Introduction to Forensic Science)**

Forensic Science Laboratories, Need and Scope of Forensic Science, Basic Principles of Forensic Science, Branches of Forensic science, and Future research perspectives in Forensic Science

**UNIT- B – (Advanced Forensic Chemical Techniques)**

Need of chemical analysis in Forensic investigations, Brief Introduction to Chromatographic techniques: TLC, HPTLC and GC techniques, with special reference to qualitative and quantitative analysis. Brief Introduction to Spectroscopic techniques: Overview and Forensic applications of UV-VIS and FTIR, Forensic Applications: Mass Spectrometry, AAS and X-ray techniques in forensic analysis

**UNIT-C - (Advanced Forensic Biological Techniques)**

Need of biological analysis on Forensic Science, Electrophoretic Techniques: Theory, General Principles and Forensic applications. DNA Fingerprinting Techniques: RT-PCR and RFLP, PCR, AFLP-PCR, Combined DNA Index System (CODIS).

**UNIT-D – (Advanced Forensic Physical Techniques)**

Role of Microscopy in Forensic Science Investigation: Light and Scanning Microscopes, Comparison Microscopy, Profiling and Automated Finger print Identification Systems (AFIS), Video spectral comparator (VSC), Introduction to NIBIN and IBIS, Advanced Computer and Cyber forensic tools, Forensic Psychological techniques and their legal prospectus, methods of Criminal

**Suggested Books:**

1. Nanda, B.B. and Tewari, R.K. (2001) : Forensic Science in India : A vision for the twenty first century Select Publisher, New Delhi.
2. Saferstien : Forensic Science, Handbook, Vol. I, II & III, Prentice Hall Inc. USA.
3. Saferstein : Handbook of Forensic Science (Vol-I to III), 1976, Prentice Hall Inc., USA.
4. Deforest, Gansellen & Lee : Introduction to Criminalistics.
5. Sharma, B.R. : Forensic Science in Criminal Investigaion and Trials, Central Law Agency, Allahabad, 1974.
6. Lee & Gaensslen : Advances in Forensic Science, (Vol. 2) Instrumental Analysis.
7. Settle, F.A.: Handbook of Instrumental Techniques for Analytical Chemistry, Prentice Hall, 1997.
8. Ellen, D (1997) : The scientific examination of Documents, Methods and techniues. 2nd ed., Taylor & Francis Ltd.
9. Willard (1986) Instrumental Methods of Analysis, CBS Publishers & Distributors.

**17FSCPC4    REVIEW WRITING AND PRESENTATION/SEMINAR**

**Marks: 100**

**Each student will submit a review report on any general topic of forensic science or area of interest in forensic science which will carry 50 marks and student will also give a presentation/seminar of the same which will also carry 50 marks.**

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