



MAHATMA GANDHI UNIVERSITY

Kottayam, Kerala

Undergraduate Programmes (HONOURS)
2025 Admission Onwards

SYLLABUS

SIGNATURE COURSE

Name of the College	Jawaharlal Nehru Institute of Arts & Science, Balagram P.O., Idukki		
Faculty/ Discipline	Forensic Science		
Programme	BSc (Hons) Forensic Science		
Course Coordinator	Dr Johnykutty J Ozhukayil		
Contributors	Mr. Abi K S		
Course Name	Introduction to Advanced Forensic Dermatoglyphics		
Type of Course	DSE		
Specialization title	Advanced Forensic Dermatoglyphics		
Course Code	MG3DSEFSCA00		
Course Level	200		
Course Summary	This course aims to empower students with knowledge in forensic examination of Fingerprints. It also enable the student in advanced learning of Dermatoglyphics		
Semester	3	Credits	4
Course Details	Learning Approach	Lecture	Total Hours
	Credits	4	60
Pre-requisites, if any			

Course Outcomes (CO)

Number of COs		5	
CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Explain the scientific foundations, history, and forensic significance of dermatoglyphics in human identification.	U	PO1, PO2
2	Analyze fingerprint, palmprint, and footprint ridge patterns using advanced classification systems and biometric techniques.	A, E	PO1, PO2
3	Apply modern methods of latent print detection, enhancement, preservation, and documentation in forensic investigations	A, An, E	PO1, PO2
4	Interpret dermatoglyphic evidence in criminal, civil, medico-legal, and anthropological contexts with professional ethics	U, An	PO1, PO2, PO6
5	Conduct independent forensic case analysis and prepare expert reports using contemporary digital tools and legal standards.	U, An, E	PO1, PO2, PO6

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	-	-	-	-	-	-	-	-
CO 2	2	3	-	-	-	-	-	-	-	-
CO 3	3	3	-	-	-	-	-	-	-	-
CO 4	2	3	-	-	-	3	-	-	-	-
CO 5	2	3	-	-	-	3	-	-	-	-

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	Introduction to Dermatoglyphics			
	1.1	Meaning, scope, and applications History and development of fingerprint science Embryological basis of ridge formation	5	["1"]
	1.2	Skin ridge anatomy and physiology Types of friction ridge skin: Fingers, palms, soles Uniqueness and permanence of ridge patterns	5	["2"]
	1.3	Role of dermatoglyphics in forensic science Ethical considerations in biometric data usage	5	["2"]
2	Fingerprints in general			
	2.1	Fingerprint pattern types: Loops, whorls, arches Sub-classification systems (Henry, Galton, NCIC) Ridge characteristics (minutiae points), Importance in Forensic Science	5	["2", "3"]
	2.2	Ridge counting and ridge tracing Palmprint and footprint classifications	5	["3"]
	2.3	Dermatoglyphic indices and quantitative analysis Population variations and hereditary aspects of prints Practical exercises in pattern recognition	5	["3", "4"]
3	Fingerprint in crime scene and Development			
	3.1	Types of fingerprints: Patent, latent, plastic Crime scene search strategies for prints	5	["4"]
	3.2	Powders and chemical methods for latent print development Ninhydrin, cyanoacrylate fuming, silver nitrate, iodine methods Alternate light source techniques in identification of prints	5	["3"]
	3.3	Lifting, photographing, and preserving prints Chain of custody and evidence handling	5	["3", "4"]

Module	Units	Course Description	Hrs	CO No.
4		Automated systems and courtroom presentations		
	4.1	Automated Fingerprint Identification Systems (AFIS) Digital scanning and biometric databases Image enhancement software for prints	5	["5"]
	4.2	Pattern comparison and matching algorithms Legal admissibility of fingerprint evidence	5	["5"]
	4.3	Expert witness procedures and courtroom presentation Privacy laws and data protection issues	5	["5"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
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Assessment Types	MODE OF ASSESSMENT Mode of Assessment: Theory
	A. Continuous Comprehensive Assessment (CCA) • Theory - 30 Marks Assignment, Oral Presentations, Quiz, Group Discussions Evaluation: CCA : 30 marks
	B. End Semester Evaluation (ESE) • Theory - 70 Marks Assessment Methods - Total Marks 70 Duration of Examination 2 hours Pattern of examination for Theory Different parts of written examination Part - A, B, C, D Duration of Examination - 2.00 Hrs Pattern of examination for Theory - Non-MCQ Different parts of written examination - Part - A , B , C , D Answer Type: ◦ PART - A ◦ One word - (10 out of 10) - $10 \times 1 = 10$ ◦ PART - B ◦ Short answer - (5 out of 7) - $5 \times 3 = 15$ ◦ PART - C ◦ Short Essays - (5 out of 7) - $5 \times 6 = 30$ ◦ PART - D ◦ Essays - (1 out of 1) - $1 \times 15 = 15$

References

- 1. Dermatoglyphics Manglik, R. (2023). Dermatoglyphics. EduGorilla Publication.
- 2. Textbook of Forensic Science Shrivastava, P., Lorente, J. A., Srivastava, A., Badiye, A., & Kapoor, N. (Eds.). (2023). Textbook of forensic science. Springer Singapore.
- 3. Forensic Science. Identification of Fingerprints Javaid, N. (2023). Forensic science: Identification of fingerprints. GRIN Verlag.

Suggested Readings

- 4. Biometric Analysis and Forensic Science: Tools for Identification and Investigation Pasupuleti, M. K. (2024). Biometric analysis and forensic science: Tools for identification and investigation. National Education Services.
- 5. Advanced Biometric Technologies in Forensic Science: Tools for Precision Identification and Investigation Pasupuleti, M. K. (2024). Advanced biometric technologies in forensic science: Tools for precision identification and investigation. In Biometric analysis and forensic science: Tools for identification and investigation (pp. 130-139). National Education Services.

Affidavit

- We, Jawaharlal Nehru Institute of Arts & Science, Balagram P.O., Idukki and Dr Johnykutty J Ozhukayil, retain the copyright of this syllabus and expressly prohibit its distribution in complete form to any institution outside our own.
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DRAFT

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Faculty/ Discipline	Forensic Science								
Programme	BSc (Hons) Forensic Science								
Course Coordinator	Dr Johnykutty J Ozhukayil								
Contributors	Mr. Abi K S								
Course Name	INTRODUCTION TO DERMATOGLYPHICS AND RIDGE BIOLOGY								
Type of Course	DSE								
Specialization title	Advanced Forensic Dermatoglyphics								
Course Code	MG4DSEFSCA00								
Course Level	200								
Course Summary	This course aims to empower students with knowledge in forensic examination of Fingerprints. It also enable the student in advanced learning of Dermatoglyphics and ridge biology								
Semester	4	Credits	4						
Course Details	<table><tr><td>Learning Approach</td><td>Lecture</td><td>Total Hours</td></tr><tr><td>Credits</td><td>4</td><td>60</td></tr></table>			Learning Approach	Lecture	Total Hours	Credits	4	60
	Learning Approach	Lecture	Total Hours						
Credits	4	60							
Pre-requisites, if any	Nil								

Course Outcomes (CO)

Number of COs		5	
CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Explain principles and scope of dermatoglyphics, Explain history and importance of fingerprint science	U	PO1, PO2
2	Discuss fingerprint identification principles and analyse anatomy of friction ridge skin	A, E	PO1, PO3, PO4
3	Analyse embryological development of ridge patterns	A, An	PO1, PO2
4	Classify fingerprint patterns scientifically, Apply fingerprint classification methods	U, An	PO1, PO2
5	Demonstrate fingerprint recording techniques	U, A	PO1

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	2	-	-	-	-	-	-	-	-
CO 2	2	-	3	2	-	-	-	-	-	-
CO 3	3	2	-	-	-	-	-	-	-	-
CO 4	2	2	-	-	-	-	-	-	-	-
CO 5	2	-	-	-	-	-	-	-	-	-

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Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1		History and development of Fingerprint		
	1.1	Definition and scope, History and development, Ancient methods of identification	5	["1"]
	1.2	Development of fingerprint science Fingerprint pioneers in the world.	5	["1"]
	1.3	Evolution in India and abroad, Applications in forensic science	5	["1"]
2		Skin and ridge anatomy		
	2.1	Structure of skin Epidermis and dermis- Layers of skin	5	["2"]
	2.2	Sweat pores and glands Ridge morphology	5	["2"]
	2.3	Ridge characteristics Comparative examination	5	["1"]
3		Embryonic development and classification		
	3.1	Embryonic skin development, Genetic influences, Environmental influences	5	["3"]
	3.2	Arches, loops and whorls, Core and delta, Ridge counting , Pattern interpretation	5	["4"]
	3.3	Single digit classification Ridge tracing, Ridge counting	5	["4"]
4		Modern classification		
	4.1	Henry system NCIC classification	5	["5"]
	4.2	Rolled and plain impressions Preservation methods	5	["5"]
	4.3	Documentation procedures and Court presentation	5	["5"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
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Assessment Types	MODE OF ASSESSMENT Mode of Assessment: Theory
	A. Continuous Comprehensive Assessment (CCA) • Theory - 30 Marks Assignment, Oral Presentations, Quiz, Group Discussions Evaluation:
	B. End Semester Evaluation (ESE) • Theory - 70 Marks Assessment Methods - Total Marks 70 Duration of Examination 2 hours Pattern of examination for Theory Different parts of written examination Part - A, B, C, D Duration of Examination - 2.00 Hrs Pattern of examination for Theory - Non-MCQ Different parts of written examination - Part - A , B , C , D Answer Type: ◦ PART - A ◦ One word - (10 out of 10) - $10 \times 1 = 10$ ◦ PART - B ◦ Short answer - (5 out of 7) - $5 \times 3 = 15$ ◦ PART - C ◦ Short Essays - (5 out of 7) - $5 \times 6 = 30$ ◦ PART - D ◦ Essays - (1 out of 2) - $1 \times 15 = 15$

References

- Javaid, N. (2023). Forensic science: Identification of fingerprints. GRIN Verlag.

Suggested Readings

- Textbook of Forensic Science Shrivastava, P., Lorente, J. A., Srivastava, A., Badiye, A., & Kapoor, N. (Eds.). (2023). Textbook of forensic science. Springer Singapore. Forensic Science. Identification of Fingerprints

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SYLLABUS									
SIGNATURE COURSE									
Name of the College	Jawaharlal Nehru Institute of Arts & Science, Balagram P.O., Idukki								
Faculty/ Discipline	Forensic Science								
Programme	BSc (Hons) Forensic Science								
Course Coordinator	Dr Johnykutty J Ozhukayil								
Contributors	Mr. Abi K S								
Course Name	ADVANCED FINGERPRINT PATTERN INTERPRETATION								
Type of Course	DSE								
Specialization title	Advanced Forensic Dermatoglyphics								
Course Code	MG5DSEFSCA00								
Course Level	300								
Course Summary	This course aims to empower students with knowledge in forensic examination of Fingerprints. It also enable the student in advanced learning of fingerprint pattern identification								
Semester	5	Credits	4						
Course Details	<table><tr><td>Learning Approach</td><td>Lecture</td><td>Total Hours</td></tr><tr><td>Credits</td><td>4</td><td>60</td></tr></table>			Learning Approach	Lecture	Total Hours	Credits	4	60
	Learning Approach	Lecture	Total Hours						
Credits	4	60							
Pre-requisites, if any	Nil								

Course Outcomes (CO)

Number of COs		5	
CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Identify ridge characteristics and minutiae, Explain forensic applications of dermatoglyphics	U	PO1, PO2
2	Apply fingerprint evidence in investigations, Compare fingerprint patterns accurately	A, E	PO1, PO3, PO4
3	Evaluate distortions in fingerprint impressions	A, An	PO1, PO2
4	Assess reliability and error factors, Analyse role in personal identification	U, An	PO1, PO2
5	Evaluate legal admissibility of fingerprint evidence	U, A	PO1

*Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	-	-	-	-	-	-	-	-
CO 2	2	-	3	2	-	-	-	-	-	-
CO 3	2	3	-	-	-	-	-	-	-	-
CO 4	3	2	-	-	-	-	-	-	-	-
CO 5	2	-	-	-	-	-	-	-	-	-

'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1		Ridge characteristics		
	1.1	Ridge characteristics in detail, Identify ridge characteristics and minutiae, Minutiae types, Ridge endings	5	["1"]
	1.2	Bifurcations, Islands and bridges, Ridge path deviations	5	["1"]
	1.3	Crime scene fingerprints, Latent, patent and plastic prints	5	["2"]
2		Comparison procedures		
	2.1	Comparison procedures, ACE-V method	5	["2"]
	2.2	Similarities and dissimilarities, Standards of identification in fingerprints	5	["2"]
	2.3	Biometric security in real world- Banking security, Biometric authentication, Identity fraud prevention	5	["3"]
3		Damages in Fingerprint and role of fingerprints in Mass casualty		
	3.1	Damages in fingerprints-Pressure distortion, Smudging Occupational marks	5	["3"]
	3.2	Scarred fingerprints, Temporary alterations	5	["3"]
	3.3	Fingerprints in Mass disaster identification , Burnt and decomposed bodies	5	["4"]
4		Errors in analysis		
	4.1	Errors- False positives, False negatives, Human factors	5	["4"]
	4.2	Admissibility in court, Expert testimony, Ethical issues	5	["5"]
	4.3	Human rights concerns, Legal standards	5	["5"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
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Assessment Types	MODE OF ASSESSMENT Mode of Assessment: Theory
	A. Continuous Comprehensive Assessment (CCA) • Theory - 30 Marks Assignment, Oral Presentations, Quiz, Group Discussions Evaluation: CCA : 30 marks
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SIGNATURE COURSE									
Name of the College	Jawaharlal Nehru Institute of Arts & Science, Balagram P.O., Idukki								
Faculty/ Discipline	Forensic Science								
Programme	BSc (Hons) Forensic Science								
Course Coordinator	Dr Johnykutty J Ozhukayil								
Contributors	Mr. Abi K S								
Course Name	FINGERPRINT EXAMINATION AND BIOMETRICS								
Type of Course	DSE								
Specialization title	Advanced Forensic Dermatoglyphics								
Course Code	MG6DSEFSCA00								
Course Level	300								
Course Summary	This course aims to empower students with knowledge in forensic examination of Fingerprints. It also enable the student in advanced learning of Fingerprints and biometric systems								
Semester	6	Credits	4						
Course Details	<table><tr><td>Learning Approach</td><td>Lecture</td><td>Total Hours</td></tr><tr><td>Credits</td><td>4</td><td>60</td></tr></table>			Learning Approach	Lecture	Total Hours	Credits	4	60
	Learning Approach	Lecture	Total Hours						
Credits	4	60							
Pre-requisites, if any	Nil								

Course Outcomes (CO)

Number of COs		5	
CO No.	Expected Course Outcome	Learning Domains *	PO No
1	Classify fingerprint patterns scientifically, Identify fingerprint classification methods and development of fingerprints	U	PO1, PO2
2	Collection and preservation of fingerprints, report writing	A, E	PO1, PO3, PO4
3	Biometric and emerging technologies in dermatoglyphics	A, An	PO1, PO2
4	Demonstrate the operational principles of AFIS	U, An	PO1, PO2
5	Evaluate emerging technologies and artificial intelligence applications in biometric systems	U, A	PO1

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CO-PO Articulation Matrix

CO/PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10
CO 1	2	3	-	-	-	-	-	-	-	-
CO 2	2	-	3	2	-	-	-	-	-	-
CO 3	2	3	-	-	-	-	-	-	-	-
CO 4	2	3	-	-	-	-	-	-	-	-
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'0' is No Correlation, '1' is Slight Correlation (Low level), '2' is Moderate Correlation (Medium level) and '3' is Substantial Correlation (High level).

Course Content

Content for Classroom transaction (Units)

Module	Units	Course Description	Hrs	CO No.
1	fingerprint evidence			
	1.1	Types of fingerprint evidence Visible prints Plastic prints, Latent prints	5	["1"]
	1.2	Development- Powder methods Iodine fuming Ninhydrin method	5	["1"]
	1.3	Cyanoacrylate fuming Fluorescent methods Cyanoacrylate fuming Fluorescent methods	5	["1"]
2	Collection methods			
	2.1	Collection methods- Lifting techniques Photography Tape lifting	5	["2"]
	2.2	Packaging and sealing, Evidence labelling, Chain of custody	5	["2"]
	2.3	Report writing , Court presentation of reports	5	["2"]
3	Biometrics in fingerprint			
	3.1	Types of biometrics Fingerprint biometrics Iris and face recognition	5	["3"]
	3.2	Authentication systems Security applications	5	["3"]
	3.3	AFIS principles Data acquisition Minutiae extraction	5	["4"]

Module	Units	Course Description	Hrs	CO No.
4		Enhancement methods and AI		
	4.1	Image enhancement, Contrast adjustment , Noise reduction	5	["4"]
	4.2	Ridge extraction Digital comparison	5	["5"]
	4.3	AI in biometrics Mobile biometrics Cloud databases	5	["5"]

Teaching and Learning Approach	Classroom Procedure (Mode of transaction) Lecturing, ICT Enabled Learning, Experiential learning, Participatory learning. Discussion.
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References

- Perkins, J. L. (2021). The forensic analysis, comparison, and evaluation of friction ridgeskin impressions. Wiley.
- Saferstein, R. (2020). Criminalistics: An introduction to forensic science (13th ed.). Pearson.

Suggested Readings

- Sharma, B. R. (2014). Forensic science in criminal investigation and trials (5th ed.). Universal Law Publishing.
- Siegel, J. A., Saukko, P. J., & Houck, M. M. (Eds.). (2017). Encyclopedia of forensic sciences (2nd ed.). Academic Press.
- Sodhi, G. S., & Kaur, J. (2001). Fingerprint identification. Deep & Deep Publications.
- Tiwari, R. K., & Nandy, A. (2017). Forensic science in India: A vision for the twenty-first century. Selective & Scientific Books

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