



National Forensic  
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An Institution of National Importance  
(Ministry of Home Affairs, Government of India)

## National Forensic Sciences University, Gandhinagar

### School of Cyber Security and Digital Forensics

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#### **Declaration:**

I hereby declare that this assignment is my original work and has not been submitted for any other course or examination.

**Signature of Student:** \_\_\_\_\_ **Date:** 17<sup>th</sup> November, 2025

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# Government Examiners of Questioned Documents (GEQD)

## 1.1 Introduction

The **Government Examiner of Questioned Documents (GEQD)** is India's specialized **forensic authority** responsible for the **scientific examination of disputed documents** to determine their *authenticity, authorship, and integrity*. These may include handwritten notes, typewritten pages, printed materials, stamps, seals, cheques, currency, passports, and other official records.

According to the *UGC MOOC on Forensic Science*, a *questioned document* is one whose genuineness or authorship is uncertain and requires **forensic document analysis**. Established in **1904** as an official post, the GEQD later evolved into a **forensic unit** under the **Ministry of Home Affairs**, now functioning within the **Central Forensic Science Laboratories (CFSLs)**.

The **credibility of its findings** depends on the **knowledge, technical skill, and experience** of the examiners. Since GEQDs often serve as **expert witnesses in courts**, they must also be proficient in **legal procedures and testimony protocols** to ensure their opinions hold evidential value.

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## 1.2 Historical Development

**A) Origin (British Era, 1904):** British Government established the first *Questioned Document Laboratory* to identify handwriting on secret documents linked to the Indian freedom movement. Post created: **Government Handwriting Expert of Bengal**.  
• **Mr. C.R. Hardless**, Superintendent in the Accountant General's Office, Bengal, appointed in **1904**.

**B) Shift and Redesignation (1906):** Laboratory shifted to Shimla and placed under Director, CID. Post redesignated as **Government Examiner of Questioned Documents (GEQD)**.

• **Mr. F. Brewster**, West Bengal CID Officer, succeeded Hardless as GEQD.

**C) Early Scope of Work:** Initially limited to **analysis of secret letters**. Later expanded to include **criminal and civil case documents** (e.g., forgeries, contracts, wills).

**D) World War II Contribution (1939–1945):** Undertook **secret censorship** duties. Specialized in **detection of invisible writings**. Provided **training to military personnel** in document detection techniques.

**E) Historical Significance:** GEQD Shimla recognized as the **world's second-oldest forensic institution**, after Scotland Yard (UK).

**F) Expansion Phase:** Second GEQD established in **Hyderabad (1968)**. Third GEQD established in **Kolkata (1977)**.

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### **1.3 Organizational Structure and Jurisdiction**

The GEQD operates under the **administrative control of the Ministry of Home Affairs (MHA), Government of India**. Initially established as an independent forensic office, the GEQD system has now been integrated into the **Central Forensic Science Laboratories (CFSLs)** to ensure unified standards, advanced infrastructure, and improved coordination across forensic disciplines.

At present, GEQD functions are carried out within **three CFSLs located at Chandigarh, Hyderabad, and Kolkata**, each serving specific zones of the country. These laboratories handle national and inter-state cases involving questioned documents and provide expert opinions to law enforcement agencies, government departments, and the judiciary. The **workflow** within a GEQD/CFSL division follows a systematic and legally governed process:

**Evidence Submission → Registration and Acknowledgement → Scientific Examination and Analysis → Preparation of Expert Report → Court Deposition (Expert Testimony)**

Throughout this process, the **chain of custody** is meticulously maintained to preserve the integrity of evidence. All submissions are sealed, labeled, and documented according to prescribed forensic and legal standards to prevent tampering or contamination. Proper **documentation protocols** including inventory records, examiner signatures, and secure storage ensure the admissibility of the report and its reliability in judicial proceedings.

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### **1.4 Objectives, Functions and Responsibilities**

The Government Examiner of Questioned Documents (GEQD) is responsible for the scientific examination of questioned or disputed documents to determine their *authenticity, authorship, origin, and integrity*. Its scope covers handwriting and signature analysis, detection of alterations or erasures, examination of paper, ink, and writing materials, verification of printing and impression processes, decipherment of obliterated or damaged text, and authentication of security documents and currency. GEQD uses advanced tools such as the **Video Spectral Comparator (VSC)**, **Electrostatic Detection Apparatus (ESDA)**, **UV/IR imaging**, and **forensic microscopy** to ensure accurate, evidence-based conclusions. The core functions of the GEQD are:

- 1. Handwriting and Signature Identification:** Comparison of questioned writing with known samples to determine authorship by examining letter formations, spacing, rhythm, and writing habits. *Example:* Identifying the author of an anonymous threatening letter.
  - 2. Detection of Forgery and Fabrication:** Determining whether signatures or writings are genuine, traced, simulated, or disguised through analysis of pen pressure, line quality, tremors, & movement patterns. *Example:* Verifying the authenticity of a signature on a cheque or will.
  - 3. Examination of Printed, Typed, and Machine-Generated Documents:** Analysis of typewritten, printed, photocopied, & rubber-stamp impressions to identify their source device or printing process. *Example:* Linking a ransom note to a specific printer.
  - 4. Detection of Alterations, Erasures, and Overwriting:** Identifying mechanical or chemical erasures, additions, overwriting, or substituted entries using instruments like VSC and UV/IR light. *Example:* Detecting a modified amount on a financial document.
  - 5. Decipherment of Obliterated, Hidden, or Damaged Writing:** Recovering content from charred, water-soaked, faded, or deliberately obscured documents using imaging tools and filtered light sources. *Example:* Retrieving text from burnt documents in an arson or fraud case.
  - 6. Determining Sequence of Strokes and Entries:** Establishing the order in which lines, signatures, or entries were made by analyzing intersections, pressure patterns, & ink behavior. *Example:* Identifying whether a signature preceded or followed typed text in an agreement.
  - 7. Physical Matching of Torn or Cut Documents:** Reconstructing shredded, torn, or cut documents and verifying whether pieces originate from the same sheet through edge, fiber, & pattern comparison. *Example:* Matching torn notes found at a crime scene with a suspect's notebook.
  - 8. Estimation of Document or Ink Age:** Providing approximate age indicators of ink, paper, & writing to evaluate whether entries were made contemporaneously. *Example:* Determining if a signature was recently added to an old legal document.
  - 9. Detection of Tampering in Official, Legal, and Financial Records:** Verifying the authenticity of cheques, vouchers, certificates, lottery tickets, and similar documents to detect manipulation or number alteration. *Example:* Identifying an altered serial number on a lottery ticket.

10. **Examination of Counterfeit and Forged Security Documents:** Analyzing currency, passports, visas, licenses, and credit cards using magnification, spectroscopy, and security-feature evaluation to detect counterfeiting. *Example:* Detecting forged travel documents used in cross-border crime.

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## 1.5 Tools, Techniques, and Technology

The GEQD laboratories are equipped with both **traditional and modern scientific instruments** used to examine handwriting, inks, papers, seals, and other document features. While courts generally seek expert opinions rather than precise measurements, these tools help build **data banks** and ensure **scientific accuracy** in examinations.

### A. Optical Equipment

Optical instruments use **light-based visualization and magnification** techniques to examine minute details of questioned documents. The choice of equipment depends on the purpose of analysis.

Tool/Equipment	Purpose/Use
<b>Imaging Devices</b> (Camera, Scanner, Magnifier)	Capture high-resolution images of documents; preserve the scene before any alteration.
<b>Microscopes</b> (Compound, Stereo, Comparison, Polarizing)	Magnify and compare handwriting, ink strokes, paper fibers, and line intersections; detect tracings or pen lifts.
<b>UV–Visible Light Sources (200–800 nm)</b>	Reveal differences in inks, detect erasures, obliterations, and invisible writings.

### B. Chemical and Reagent Analysis

Chemical tests are used to study the **composition and ageing** of inks, paper, and other materials. These involve **solvent extraction, chromatography, and reagent reactions** to identify differences in chemical composition.

Category	Purpose/Use
<b>Solvents &amp; Reagents</b>	Extract and analyze ink components, paper coatings, & bleaching agents.
<b>Chromatography Kits</b>	Separate ink dyes to identify alterations or added entries.

Category	Purpose/Use
<b>Paper Treatment Chemicals</b>	Study physical and chemical ageing of paper or detect chemical erasures.

### C. Specialized Instruments

Advanced instruments provide **non-destructive, high-precision** analysis and help visualize hidden or indented writings.

Instrument	Function/Use
<b>Stereomicroscope</b>	Examines fine surface details such as torn fibers, abrasion marks, or overlapped strokes.
<b>Electrostatic Detection Apparatus (ESDA)</b>	Detects and visualizes <b>indented writings</b> or impressions left on sheets below the original document.
<b>Video Spectral Comparator (VSC)</b>	Uses multi-wavelength light to analyze inks, security features, and paper; differentiates inks and detects alterations.

### D. Integrated Technology Approach

Modern GEQD laboratories combine **digital imaging, optical enhancement, and chemical testing** for comprehensive document analysis. Data from all these tools are integrated to form a **scientifically validated expert opinion**, ensuring reliability and admissibility in court.

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## 1.6 Expertise, Court Testimony, and Emerging Challenges

The effectiveness of the **GEQD** largely depends on the **expertise, integrity, and adaptability** of its forensic professionals. Examiners working in GEQD or CFSL divisions are required to possess **formal education in forensic science**, specialized training in **document examination**, and practical experience in handling diverse evidentiary materials.

The **credibility of an expert's findings** relies on the examiner's **knowledge, technical proficiency, and forensic experience**. Since GEQDs are often summoned as **expert witnesses**, they must be skilled not only in scientific evaluation but also in **courtroom presentation and cross-examination**, ensuring that their reports are **legally admissible**.

**and scientifically defensible.** During testimony, experts present visual comparisons, explain their methods, and justify conclusions drawn from evidence, contributing to judicial decision-making.

With technological advancements, the GEQD faces new challenges such as **digitally forged certificates, AI-generated handwriting, deepfake signatures, and manipulated digital prints**. To counter these, forensic experts are adopting **machine learning tools, hyperspectral imaging, and digital pattern analysis** for enhanced accuracy and automation. The integration of these technologies strengthens the reliability of forensic evidence in both physical and cyber domains.

**Table: Traditional vs. Modern Challenges in Questioned Document Examination**

Aspect	Traditional Challenges	Modern Challenges
<b>Nature of Documents</b>	Handwritten letters, typed papers, seals, cheques	Digitally printed documents, scanned copies, PDFs
<b>Type of Forgery</b>	Manual tracing, ink alterations, erasures	AI-generated handwriting, digital tampering, print manipulation
<b>Tools Used</b>	Microscopes, UV/IR lamps, ESDA	Machine learning models, hyperspectral imaging, digital forensic tools
<b>Scope of Examination</b>	Physical verification and handwriting analysis	Hybrid verification (physical + digital document integrity)
<b>Core Objective</b>	Authorship and authenticity confirmation	Digital–physical consistency and cyber validation

## 1.8 References

- [1] [P10\\_M10200206121202025050.pdf](#)
- [2] [Forensic science, GEQD, FB, NCRB](#)
- [3] [Forensic Sciences Institutions \(CFSLs, SFSLs, GEQD, CFPB, NFSU\) - Forensic Reader](#)

# **Code of Criminal Procedure**

## **1.1 Introduction**

The Code of Criminal Procedure (CrPC) 1973 is a legal statute in India that governs the procedural side of criminal law. It lays down how criminal cases should be investigated, handled, and decided, ensuring that every step follows a lawful and organized method. CrPC defines the process for arrest and detention, guides how trials must take place in court, explains the rules of evidence, and outlines how sentencing should be carried out after a person is found guilty. Overall, it serves as a foundational framework that helps law enforcement agencies, the judiciary, and all parties involved follow a fair, consistent, and transparent system while dealing with criminal matters in the country.

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## **1.2 History**

The Code of Criminal Procedure (CrPC) has long served as India's primary law governing criminal procedural matters. Enacted in 1973 and enforced from 1 April 1974, it established the framework for how offences are investigated, how suspects are apprehended, how evidence is gathered, and how courts decide guilt or innocence. It also outlines procedures for maintaining public order, preventing potential offences, and ensuring financial support for dependents such as wives, children, and parents.

A major reform began on 11 August 2023, when the government introduced a proposal in the Lok Sabha to replace the CrPC with a new law—*Bharatiya Nagarik Suraksha Sanhita (BNSS)*. This proposal was later approved, and on 26 December 2023, the BNSS officially took the place of the CrPC.

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## **1.3 Objectives and Principles**

The CrPC is designed to define the procedure of criminal justice in India in a structured and principled manner. Its first objective is to lay down a precise framework for investigation, inquiry and trial so that each step from reporting a crime to final adjudication follows the law. It also seeks to safeguard fairness and accountability, ensuring that neither the State nor the accused operates outside legal boundaries thereby protecting rights enshrined under the Constitution. A further purpose is to strike an appropriate balance between empowering the police and securing citizens' safeguards, avoiding arbitrariness in arrests or detentions. The statute further aims at uniformity across India in criminal procedures so that all courts and law-enforcement agencies operate under common rules and standards. Above all, the CrPC includes the principles of natural justice every individual is presumed innocent until proven guilty, and actions are taken only in accordance with law and reason, not through caprice.

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## **1.4 Structure and Components**

The CrPC first outlines the hierarchy of criminal courts in India to ensure cases move in an organized manner. At the top is the Supreme Court, followed by the High Courts, then the district-level Sessions Courts. Below them are Judicial Magistrates for minor offences and Executive Magistrates for preventive or administrative duties. This structure ensures cases go to the proper authority and appeals flow smoothly through the system.

After establishing the court framework, the Code explains how information about a crime should be recorded. It lays out the process for filing a First Information Report (FIR) when a cognizable offence is reported. To avoid delays in urgent situations, the law also allows a Zero-FIR, which can be registered at any police station regardless of where the crime occurred; it is later sent to the appropriate jurisdiction for investigation. Along with this, the CrPC classifies offences to guide how police and courts should respond. Bailable offences allow the accused to secure bail as a right, while non-bailable offences leave the decision to the court. The Code also distinguishes between cognizable offences, where police can act without a warrant, and non-cognizable offences, which require a magistrate's permission to proceed.

The CrPC then details the procedures for summons, warrants, arrests, and bail, ensuring that every action restricting personal liberty follows legal safeguards. It outlines the manner in which police can arrest an individual, how summons and warrants must be issued, and the conditions under which bail can be granted. Once a case moves into the investigative stage, the Code lays down the steps police must follow, such as gathering evidence, recording statements, conducting searches, and preparing the final report for submission to the court.

After investigation, the CrPC describes how charges should be framed and how different types of trials must be conducted. Summons trials are used for minor offences, warrant trials for more serious offences, and sessions trials for grave crimes requiring the jurisdiction of the Sessions Court. Each trial type follows its own structure so that the procedure matches the seriousness and complexity of the case.

The final components of the CrPC deal with judgments, sentencing, appeals, & revisions. It sets guidelines for how courts should write judgments, decide punishments, and allow parties to challenge decisions if they believe an error has occurred. These safeguards ensure that no decision is final without the option of review. The Code also includes important victim-centered provisions such as maintenance for dependents, compensation for victims of crime, and other protective measures that reinforce the humane side of criminal justice. Together, these elements form a complete framework that governs how criminal cases are handled from the moment a crime is reported to the final resolution.

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## **1.5 Importance & impact on justice system**

The CrPC forms the backbone of India's criminal justice system by providing the procedures that guide every stage of a criminal case. Its provisions protect individual liberty by ensuring that no person is arrested, investigated, or tried without following due process. By laying down uniform rules for evidence, trials, and judicial decisions, the CrPC ensures that cases are handled fairly and consistently across the country. It clearly defines the duties of the police, prosecution, and courts, helping each institution function within its legal boundaries. At the same time, the Code strengthens public order by preventing misuse of authority and ensuring that the power of the State is exercised responsibly and transparently.

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## **1.6 Problems, limitations & need for reform, Replacement by BNSS 2023 and its relevance**

The CrPC developed several limitations that made it less effective for today's criminal justice needs. Many of its provisions were designed in a colonial era and did not align with modern forms of crime, especially those involving digital evidence, cyber offences, and electronic communication. This gap contributed to slower judicial processes, frequent procedural delays, and an overall lack of technological integration. Its language and administrative structure were also complex, making implementation difficult and time-consuming. To address this, the Bharatiya Nagarik Suraksha Sanhita (BNSS) 2023 was introduced as its replacement. The BNSS brings in modern features such as digital FIRs, electronic summons, and recognition of electronic and digital evidence. It sets mandatory timelines for investigation and updates the language of the law while placing stronger emphasis on victim rights and transparency. Together, these reforms aim to build a faster, more efficient, and citizen-centric criminal justice system.

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## **1.7 Major sections one must know**

- 1. BNSS Section 176 – Procedure for Investigation:** Defines the structured steps of investigation. It lays out how evidence must be collected, preserved, and documented, and introduces clear timelines to prevent delays.
- 2. BNSS Section 178 – Power to Hold Investigation:** Clarifies the authority of police officers to begin and conduct investigations. It allows jurisdiction flexibility, preventing delays caused by territorial disputes.
- 3. BNSS Section 180 – Examination of Witness by Police:** Provides updated rules for questioning witnesses. It allows digital/audio-video recording of statements and protects witness identity in sensitive cases.

#### **4. BNSS Sections 105 & 185 – Mandatory Videography of Search and Seizure**

**S.105:** Makes video recording compulsory during search operations.  
**S.185:** Requires videography of seizure of property or evidence. This modernization ensures transparency and reduces allegations of tampering.

**5. BNSS Section 184 – Medical Examination of Victims of Rape:** Ensures a timely and sensitive medical examination by registered medical practitioners. Medical samples must be collected, documented, and sent to authorities without delay.

**6. BNSS Sections 193 & 194 – Police Report / Final Report / Charge Sheet:** Sets a clear structure for the police report and allows digital submission. Mandatory annexures include evidence lists, statements, forensic reports, and all supporting documents.

**7. BNSS Section 197 – Inquiry and Trial:** Provides detailed guidelines for initiating inquiry or trial. Specifies judicial responsibilities and introduces time-bound steps to avoid unnecessary delay.

**8. BNSS Section 329 – Report of Government Scientific Experts:** Recognizes forensic science experts and gives legal validity to their reports. Courts can rely on these reports without requiring the expert to appear repeatedly.

**9. BNSS Section 35 – Electronic Communication for Summons and Processes:** Allows summons, warrants, and notices to be issued via email, SMS, or official digital portals, reducing delays and improving efficiency.

**10. BNSS Section 173 – Digital FIR / E-FIR / Zero-FIR:** Permits FIR registration electronically for specific categories of offences. A major improvement over CrPC, especially for urgent or online crimes.

**11. BNSS Section 185(2) – Mandatory Forensic Investigation for Serious Offences:** For offences punishable with imprisonment of 7+ years, a forensic team must visit the crime scene, collect samples, and prepare a scientific report.

**12. BNSS Section 349 – Time-Bound Judgment and Appeals:** Judgment must be delivered within 45 days after the trial ends. Appeals must be disposed of within 90 days, promoting faster justice.

**13. BNSS Section 258 – Trial in Absence of Proclaimed Offender:** If the accused deliberately absconds or evades court, the trial can continue without them, preventing misuse of the system.

**14. BNSS Section 360 – Witness Protection & Video-Link Examination:** Allows witnesses to appear through video-conferencing. This reduces intimidation, cuts travel time, and speeds up the trial process.

**15. BNSS Section 479 – Release of Undertrials:** Mandates periodic review of undertrial prisoners. First-time offenders may be released after serving one-third of the maximum possible punishment, reducing overcrowding in jails.

**16. BNSS Section 474 – Use of Electronic Devices for Recording Evidence:** Allows courts to record evidence using electronic devices such as laptops, audio systems, and digital tools. Modernizes courtroom procedures and reduces paperwork; crucial for cybercrime, financial crime, and digital evidence-heavy cases.

**17. BNSS Section 530 – Online Delivery of Copies, Orders, and Documents:** Permits courts to deliver certified copies of orders, FIRs, charge sheets, and judgments through digital platforms. Removes dependency on physical copies, speeds up access to court documents, and supports e-courts integration.

**18. BNSS Section 230 – Attachment & Confiscation of Property (Digital/Proceeds of Crime):** Strengthens procedures for attaching or confiscating property obtained through criminal activity, including digital assets. Extremely relevant for cybercrimes, crypto frauds, money laundering, and financial scams.

**19. BNSS Section 532 – Electronic Case Management System:** Mandates courts and police to use an electronic case-tracking system for updates, scheduling, and records. Ensures transparency, reduces missing files, and helps victims track case progress online.

**20. BNSS Section 86 – Detention Beyond 24 Hours only through Digital Approval:** Police must seek approval from a magistrate electronically if physical appearance is not possible. Prevents illegal detention, improves oversight, and allows judicial supervision in real time even in remote or urgent situations.

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## 1.8 References

- [1] [Final\\_BNSS.pdf](#)
- [2] [Ministry of Home Affairs | Government of India](#)
- [3] [The Bharatiya Nagarik Suraksha Sanhita, 2023: Object, Purpose, and History - LawArticle](#)