Haryana Public Service Commission

Bays No. 1-10, Block-B, Sector-4, Panchkula

ANNOUNCEMENT

It is hereby announced for the information of candidates that the Commission vide announcement dated 13.08.2025 has decided to conduct the Subject Knowledge Test for the posts of **Assistant Directors (DNA, Lie Detection, Cyber Forensic & Toxicology) and Senior Scientific Officer (Cyber Forensic, Scene of Crime, Documents, Physics, Toxicology & NDPS) Advt. No. 07 to 16/2025** on **dated 03/04/06/07 & 08.11.2025** in FSL Madhuban, Karnal, Haryana. The scheme/pattern of exam and syllabus for the said posts are as under:-

Scheme/ Pattern of Exam :-

1. **Subject Knowledge Test**
   a) Time duration of exam: 03 hours.
   b) Syllabus is enclosed.
   c) The medium of exam will be English language.
   d) Total Marks: 150
   e) Paper will be subjective type.
   f) No candidate will be called for the interview /viva-voce test unless he/she secures a minimum of 35% marks in the test.
   g) The number of the candidates called for interview will be three times, including bracketed candidates if any, of the advertised posts provided that they have secured the minimum cut-off marks of 35%.
   h) The weightage of the Subject Knowledge Test will be 87.5%.
2. **Interview**
   a) The weightage of the interview will be 12.5%.
3. The final merit list will be prepared by adding the marks of the Subject Knowledge Test and interview.

Dated: 05/09/2025

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Haryana Public Service Commission
Panchkula

Syllabus for Assistant Directors (DNA, Lie Detection, Cyber Forensic & Toxicology) and Senior Scientific Officer (Cyber Forensic, Scene of Crime, Documents, Physics, Toxicology & NDPS)- Advt. No. 07 to 16/2025 are as under :-

1. Assistant Director (DNA) -Forensic DNA Technology (Advt. No.07/2025)

Examination of Biological Evidences:

Blood and its composition, Haemoglobin and its variants, Physical Properties of blood, Identification of blood & blood Typing. Biochemistry and Genetics of 'ABO' system. Methods of ABO blood grouping from blood stains, Other Blood GroupSystems - Rhesus, MNS, Lutheran, Kell, Duffy, Kidd and Lewis. Differentiation between Human and Non-Human Blood and tests used for its identification. Menstrual blood and its examination (Composition, Significance in Forensics and Analysis).Examination of Semen: Composition, Forensic Significance, Presumptive &Confirmatory tests. Examination of Saliva: Biological Characteristics of Saliva, Forensic Significance, Presumptive &Confirmatory tests. Examination of Urine: Physical Characteristics, Chemical Composition, Analysis, Tests &Forensic Significance; Examination of Vaginal Secretion (Composition and Analysis).Examination of Hair: Structure of Human Hair, Hair Growth Cycle, Biochemistry of Human Hair, Examination of Macroscopic and Microscopic features of human hair, Comparison of Human and Animal Hair, Forensic Significance of hair.

Genetics, Genome organization, Mutations & Repair:

Introduction of plant and animal cells. Mendelian laws of inheritance and its deviations, Types of inheritance (Dominant inheritance, recessive inheritance, sex-linked inheritances, and polymorphic traits) Population genetics (Mendelian Population, gene pool, Hardy- Weinberg equilibrium, deviation from H-W equilibrium, genotypes, phenotypes, multiple alleles, genetic variants), Mitosis, meiosis, sex chromosomes, sex linkage, nondisjunction of X chromosomes, genotypic sex determination, genic sex determination, X –linked recessive inheritance, X-linked Dominant inheritance, Y-linked inheritance.Causes of evolution- admixture, selection, mutation, drift. Genetic Diversity and variations; Haplotype analysis, Various tools for phylogenetic analysis.

Traditional/modern concepts of Gene. Nature of genetic material, Evidence that DNA is the genetic material, Genetic Terminologies (Gene, genome, chromosome, genotype, phenotype, etc.), Human Chromosome and its structure and types. Concept of Nucleic acids, Structures and roles of different types of RNA.Structure of DNA (A,B,Z forms of DNA) Structure of chromatin, chromosome, centromere, telomere, nucleosome, genome organization, chromatin remodelling; types of histones, histone, modifications-methylation, acetylation, phosphorylation and its effect on structure and function of chromatin, DNA methylation, repetitive and non-repetitive DNA sequence, Law of DNA constancy, C value paradox and genome size, Karyotype and ideogram, chromosome banding pattern, types of chromosomes.

Mutations and their causes, types of mutation, mutagens, induced mutagenesis, mutation rate, genetic load. Disorders: Phenylketonuria, lactose intolerance, genetic disorders, Haemophilia, thalassemia, sickle cell anaemia, Down's syndrome, Turners syndrome. Molecular Basis and detection of inherited disease, gene mapping and genetic risk assessment, Repair mechanisms.

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DNA & Molecular Genetics:

Central Dogma: Organization of genome in prokaryotes and eukaryotes, Chemical structure of DNA and RNA, DNA replication: Enzymes and accessory proteins, Mechanism of DNA replication in prokaryotes and eukaryotes. Transcription: RNA polymerases, features of prokaryotic and eukaryotic transcription, transport of RNA within eukaryotic cells. Translation: Structure and role of t-RNA in protein synthesis, ribosome structure, genetic code and their properties; translation (initiation, elongation and termination and post translational modifications).

Molecular Biology Techniques: Sanger Sequencing, automated sequencing, Mapping of sequence tagged sites, shotgun sequencing, survey of human genome, Next Generation Sequencing techniques, DNA modifying enzymes, genomic and cDNA libraries, Recombinant DNA Technology & Genetic Manipulations Techniques in Recombinant DNA Technology, Nucleic acid purification, detection & hybridization, pulse field gel electrophoresis, measuring concentration of DNA & RNA, radioactive labelling of Nucleic acids, detection of radio labelled DNA, fluorescence in detection of DNA & RNA, chemical tagging, hybridization of DNA & RNA, southern, northern, & western blotting, FISH, real-time PCR, RAPD, and RACE.

Forensic DNA analysis:

History of DNA fingerprinting, DNA polymorphism, Genes and DNA markers in forensic DNA analysis, Introduction to mitochondrial DNA and its forensic importance, Sexual assault, paternity testing & important case studies of DNA fingerprinting.

DNA extraction, quantification and separation: Techniques and equipment for DNA extraction and purification, Different methods of DNA quantitation, DNA separation and detection techniques, RFLP, Polymerase Chain Reaction (PCR)& its types, STR Genotyping & Result Interpretation. Paternity/maternity indices, sibship indices, Advanced Y-STR and X-STR analysis and its significance in establishing paternal relationships. Phenotypic and ancestry informative markers. DNA Mixtures – Analysis & Interpretation. Databases in DNA Forensics

Non-human DNA testing:

Sources, domestic animal DNA testing, Canine STR Loci and assays, Canine mtDNA Testing, species identification: (mtDNA Cytochrome b gene, mtDNA 12S rRNA gene, mtDNA COI gene), Wildlife DNA testing: genetic markers, geographic origin identification, Microbial Forensics - Microbes of forensic importance, microbial forensics program, epidemiology, Microbial forensic tools. Dynamics of disease transmission, Outbreak Investigation. Deliberate introduction of a biological agent, DNA of microbes in soil for crime detection. Forensic Aspects of Biological Toxins and fungal toxins. Biosensors, use of remote sensing techniques for population study of endangered plants and animal species. DNA banks for endangered animals and DNA database controversies. Forensic Botany - Various types of wood, fruits, seeds and leaves - their identification and matching.

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2. Assistant Director (Lie Detection)
(Advt. No. 08/2025)

Unit-1:

Foundations of Psychology & Forensic Psychology: Definition of Psychology; Historical antecedents of Psychology and trends in the 21st century; Psychology and scientific methods; Psychology in relation to other social sciences and natural sciences; Application of Psychology to societal problems; General/Cognitive Psychology, Abnormal/ Clinical Psychology, Industrial Organizational Psychology, Social and Criminal Psychology; Psychological approaches/ Theories, Criminology & Criminal Justice, Deviance and Crime. Traditional and Contemporary forms of Crime: Children in Conflict with Law Juvenile Crimes, Psychological Theories of Crime; Bowlby, Eysenck, Gottfredson & Hirschi, Conflict; Collaboration and Competition, Discrimination, Stigma and relative Deprivation; Culture & Self and its implications for group. Aggression and Violence; Determinants; Interpersonal and intergroup forms of aggression.

Unit-2:

Biology of Behaviour: Anatomy of the brain; Major anatomical sub-divisions of the human brain, surface, interior, cortical and sub-cortical regions, neurons, synapses, left & right hemispheric functions, Brodmann Cortical Areas, Wernicke Area, Anatomical connectivity, blood supply and CSF system, Neurobiology of Sensory and Motor Systems; The organization of sensory system in terms of receptors, relay neurons, Thalamus and cortical processing of different sensations. Mechanism of sensation and perception.

Development of Human Behaviour: Growth and development; Principles of development, Role of genetic and environmental factors in determining human behaviour, Influence of cultural factors in socialization; Life span development-Characteristics, development tasks, promoting psychological well-being across major stages of the life span.

Unit-3:

Personality: Definition and concept of personality; Theories of personality (psychoanalytical, socio-cultural, interpersonal, developmental, humanistic, behaviouristic, trait and type approaches); Measurement of personality (projective tests, pencil-paper test); The Indian approach to personality; Training for personality development; Latest approaches like big 5 factor theory; The notion of self in different traditions.

Intelligence and Aptitude: Concept of intelligence and aptitude, Nature and theories of intelligence-Spearman, Thurstone, Gulford Vernon, Sternberg and J.P. Das; Emotional Intelligence, Social intelligence, measurement of intelligence and aptitudes, concept of IQ deviation 1 Q, constancy of 1 Q; Measurement of multiple intelligence; Fluid intelligence and crystallized intelligence.

Attitudes, Values and Interests: Definitions of attitudes, values and interests; Components of attitudes; Formation and maintenance of attitudes. Measurement of attitudes, values and interests. Theories of attitude changes, strategies for fostering values. Formation of stereo-types and prejudices; Changing other's behaviour, Theories of attribution; Recent trends.

Language and Communication: Human language-Properties, structure and linguistic hierarchy, Language acquisition-predispotion, critical period hypothesis; Theories of Language development-Skinner and Chomsky; Process and types of communication-effective communication training.

Unit-4:

Sensation, Attention and Perception: Sensation: concepts of threshold, absolute and difference thresholds, signal-detection and vigilance; Factors influencing attention including set and characteristics of stimulus; Definition and concept of perception, biological factors in perception; Perceptual organization- influence of past experiences, perceptual defence-factor influencing space and depth perception, size estimation and perceptual readiness; The plasticity of perception; Extrasensory perception; Culture and perception, Subliminal perception.

Learning: Concepts and theories of learning (Behaviourists, Gestaltalist and Information processing models). The processes of extinction, discrimination and generalisation. Programmed learning, probability learning, self-instructional learning, concepts, types and the schedules of reinforcement, escape, avoidance and punishment, modelling and social learning.

Memory: Encoding and remembering: Shot-term memory, Long-term memory, Sensory memory, Iconic memory, Echoic memory: The Multistore model, levels of processing; Organization and Mnemonic techniques to improve memory; Theories of forgetting: decay, interference and retrieval failure: Metamemory; Amnesia: Anterograde and retrograde.

Thinking and Problem Solving: Piaget's theory of cognitive development; Concept formation processes; Information processing. Reasoning and problem solving. Facilitating and hindering factors in problem solving. Methods of problem solving: Creative thinking and fostering creativity; Factors influencing decision making and judgement; Recent trends. Motivation and Emotion: Psychological and physiological basis of motivation and emotion; Measurement of motivation and emotion; Effects of motivation and emotion on behaviour; Extrinsic and intrinsic motivation; Factors influencing intrinsic motivation; Emotional competence and the related issues.

Unit-5:

Problem of social integration & Community Psychology:

The concept of social integration; the problem of caste, class, religion and language conflicts and prejudice. Nature and manifestation of prejudice between the in-group and out-group; Casual factors of such conflicts and prejudices. Psychological strategies for handling the con-flicts and prejudices. Measures to achieve social integration. Definition and concept of Community Psychology. Use of small groups in social action. Arousing Community consciousness and action for handling social problems. Group decision making and leadership for social change. Effective strategies for social change. Application of Psychology to disadvantaged groups: The concepts of disadvantaged, deprivation social, physical, cultural and economic consequences of disadvantaged and deprived groups. Educating and motivating the disadvantaged towards development; Relative and pro-longed deprivation.

Unit-6:

Psychological well-being, Mental Disorders & Therapeutic Approaches: Concept of health, ill health, positive health, well-being, factors influencing positive health, well-being; lifestyle and quality of life; Happiness disposition; Concept of normality and abnormality; Introduction to DSM & ICD classification: Clinical features & causal factors of major psychiatric conditions; Schizophrenia, Bipolar, Anxiety & Depression, Personality Disorders & Disorders of Childhood and Adolescence Psychopathy & Sociopathy, Psychopathology of Addiction and sexual disorders, Mental and behavioural disorders due to psychoactive sub-stance use, Autism, Aspersers, Conduct disorder, ODD, ADHD and other childhood psychiatric conditions. Psychodynamic therapies, Behaviour therapies, Client centered therapy, Cognitive and Humanistic approaches, Indigenous therapies (Yoga, Meditation), Biofeedback therapy,

Prevention and rehabilitation of the mentally ill; dealing with children and adolescence, adult victims, old-age victims, disabled person, juveniles; Neurocriminology; Fostering mental health.

Unit-7:

Psychology of Personality & Psychological Assessments: Definition, type, trait theories, psychoanalytical theories, learning and behavioural theories, and humanistic theories of personality, Case history; mental status examination; rationale of psychological assessment; lie detection techniques; Polygraph, Brain Mapping, LVA & Narcoanalysis, Tests of Cognitive Functioning. Bender Gestalt Test (BGT), Seguin Form Board Test (SFBT), Wechsler Memory Scale; Stroop Test, Raven's Progressive Matrices; Wechsler Intelligence Scale (WAIS). Eysenck's Personality Questionnaire, Rottor's Locus of Control Scale, Bell's Adjustment Inventory (students' and adults"), Temperament and Characteristic Inventory (TCI). Five Factor Inventory (Neo-FFI), Millon's Clinical Multiphasic Inventory, MCMI-III. Projective Tests - Rorschach Ink Blot Test, Sentence Completion Test (SCT), Thematic Apperception Test (TAT). Draw-a-Person Test / Human Figure Drawing Test (HFDT); Rating Scales Introduction to Rating Scales, Characteristic & Type, Self-rated and observer-rated scales of different clinical conditions such as Schizophrenia, Anxiety, Depression, Mania, OCD, Phobia, etc.

Unit-8:

Forensic Assessment, Investigation and Interviewing & Interrogation:

HCR-20: Assessing Risk for Violence, Classification of Violence Risk (COVR), Carlson Psychological Survey (CPS), Jesness Inventory- Revised (JI-R), The MacArthur Competence Assessment Tool Criminal Adjudication, Rogers Criminal Responsibility, Assessment Scales (R-CRAS), Sexual A violence Risk (SVR-20) etc.; Difference between interview & interrogation, Objectives of interview, interviewing techniques, types of interview, characteristics of structured and unstructured interview, interviewing skills (micro skills), open-ended questions, clarification, reflection, facilitation and confrontation, silences in interviews, verbal and non-verbal components.

Unit-9: Application of Psychology in:

Work Place and Organizational Behaviour: Personnel selection and training. Use of Psychological tests in the industry. Training and human resource development. Theories of work motivation. Herzberg, Maslow, Adam Equity theory, Porter and Lawler, Vroom; Leadership and participatory management, Advertising and marketing; Stress and its management, Ergonomics; consumer psychology; Managerial effectiveness; Transformational leadership; Sensitivity training; Power and politics in organizations.

Economic development: Achievement motivation and economic development. Characteristics of entrepreneurial behaviour. Motivating and Training people for entrepreneurship and economic development; Consumer rights and consumer awareness, Government policies for promotion of entrepreneurship among youth including women entreprenures. Entrepreneur-ship through e-commerce.

Psychology of Gender: Issues of discrimination, Management of diversity; Glass ceil-ing effect, Self-fulfilling prophesy, Women and Indian society.

Environmental Awareness: Environmental Psychology effects of noise, pollution and crowding. Population Psychology: Psychological consequence of population explosion and high population density. Impact of rapid scientific and technological growth on degradation of environment.

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Educational Field: Learning styles. Gifted, retarded, learning disabled and their training. Training for improving memory and better academic achievement. Personality development and

value education. Educational, vocational guidance and Career counselling. Use of Psychological tests in educational institutions; Effective strategies in guidance programmes.

Impact of Information Technology and Mass Media:
The present scenario of information technology and the mass media boom and the role of psychologists. multilevel marketing. Impact of TV and fostering value through IT and mass media. Psychological consequences of recent developments in Information Technology. Me-dia influences on pro and anti-social behaviour. Impact of social media and smart devices

Military Psychology: Devising psychological tests for defence personnel for use in selection, Training, counseling; training psychologists to work, with defence personnel in promoting positive health; Human engineering in defence.

Sports Psychology: Psychological interventions in improving performance of athletes and sports, persons participating in Individual and Team Games, Drug abuse & doping in sports.

Psychology of Terrorism: Motivations, behaviours, social identity, group dynamics, perceived grievances, ideological beliefs, violent extremism, psychological aspects of radicalization & deradicalization

Rehabilitation: Primary, secondary and tertiary prevention programmes role of psychologists. Organising of services for rehabilitation of physically, mentally and socially challenged persons including old persons. Rehabilitation of persons suffering from substance abuse, juvenile delinquency, criminal behaviours. Rehabilitation of victims of violence. Rehabilitation of HIV/AIDS victims, the role of social agencies.

Unit-10:

Research & Developments in Psychology & Research Methods: Types of research: Descriptive, evaluative, diagnostic and prognostic; Methods of Research: Survey, observation, case-study and experiments; Characteristics of experimental design and non-experimental designs; quasi-experimental designs; Focussed group discussions, brain storming, grounded theory approach, Major steps in psychological research (problem statement, hypothesis formulation, research design, sampling, tools of data collection, analysis and interpretation and report writing); Fundamental versus applied research; Methods of data collection (interview, observation, questionnaire and case study). Research Designs (Ex-post facto and experi-mental). Application of statistical techniques (t-test, two-way ANOVA, correlation and re-gression and factor analysis).

Issues and Perspectives in Modern Contemporary Psychology: Computer application in the psychological laboratory and psychological testing; Artificial intelligence; Psychocybernetics;

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3. Assistant Director & Senior Scientific Officer (Cyber Forensic) (Advt. No. 09/2025 & 11/2025)

UNIT 1:

Basics of Computers: Definition, evolution, types of computers, components of a computer, Primary and secondary Storage Devices, Input and Output (I/O) devices, Understanding Disk, Volume, and Partition, HDD and SSD Structures, Number Systems and Logical Operations, Operating System, Boot Process, Process and Memory Management, Windows OS Architecture - FAT and NTFS File Systems. Understanding and Analysing FAT and NTFS File Systems, registry and log-based forensic analysis, concept of Event log analysis

UNIT 2:

Computer Network: Basic concepts of Computer Network and its types, understanding network architecture: client-server, peer-to-peer, Network Topology: Bus, Star, Ring, and Mesh, Network Interface Controller (NIC), Open System Interconnection (OSI) and TCP/IP reference model, Protocols and functionalities of each layer, types of connections, networking devices, wired vis wireless networks: Communication devices: switch, router, gateway and others, concept of Internet and Internet Service Provider (ISP), Domain Names, Secure transmission, Prosy. Virtual Private Network (VPN), mailing protocols and file transfer protocols.

UNIT 3:

Cybercrimes and their types, Concepts of Information Security, identifying a cyber threat, and the need for Incident Response and Incident prioritisation. Classification of Digital Devices, their technical architecture and components, and connectivity of such digital devices. Security and vulnerabilities associated with these devices.

Investigation of cybercrime: Branches of Digital Forensics, Investigation of digital crime scenes, maintaining proper documentation, and chain of custody. Standard Operating Procedures for Handling, Preservation, Acquisition, packaging, labelling & Transportation of electronic evidence, digital data acquisition tools, identifying and collecting data from relevant digital sources such as hard drives, mobile devices, network logs, cloud storage, or email servers, hash value generation, Methods of Data Recovery and Carving, analytical techniques for analyzing digital data such as metadata examination, keyword searches, timeline creation, log correlation, or pattern analysis using specialized software. Tools used for analysis and evaluation of digital evidences.

Incident Handling Process, Real-time log capture and analysis, Botnet identification, and Counteraction, Enterprise Solutions for Incident Response and Recovery. Timeline Analysis

Malware Handling, Report Writing, standards to perform a live response, live data collection on Microsoft Windows systems & Unix-based systems, types of network monitoring, setting up a network monitoring system, network data analysis, collecting logs generated from network events.

UNIT 4:

Information Security: Confidentiality, Integrity, and Availability (CIA) Triad, Authentication, Authorization, Non-repudiation, concepts of Cryptography & Steganography, Symmetric and Asymmetric algorithms, Hashing Algorithms, Cryptanalysis, Digital Signature, Digital Certificate, Certifying Authorities (CA). steganalysis and its challenges. Vulnerability Assessment and Penetration Testing (VAPT), vulnerability v/s weakness, types of vulnerabilities, Common Vulnerabilities and Exposures (CVEs), Common Vulnerability Scoring System (CVSS), vulnerability assessment tools and techniques, penetration testing and its methods/tools.

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UNIT 5:

Mobile Forensics: Basics of mobile devices, Mobile communications, resource constraints and challenges, types of acquisitions, rooting & jail-breaking. Android OS architecture and file system, app permissions, logging mechanism in Android phone, types of artefacts, tools and technologies for Android forensics, challenges & limitations of Android forensics. IOS: iPhone OS (iOS) architecture, iOS file system, iOS app permissions, logging in iOS, tools & technologies for iOS forensics, challenges & limitations of iOS forensics. Forensic analysis of Pagers, Wearable devices, and other smart gadgets, CDR (Call Detail Record) Analysis, handling hoax calls, voice over IP (VoIP) technology, and calls.

UNIT 6:

Network forensics: Crimes committed within or targeting computer networks: challenges involved in acquiring evidences from a computer network, analyzing logs from network devices, Internet Protocol Detail Record (IPDR) analysis; Network Packet Analysis; analysis of server logs; role of Security Information and Event Management (SIEM) and firewall in network forensics;

Wireless communications: Wi-Fi, Bluetooth, Near Field Communication (NFC), and other methods of wireless communications, Cloud Forensics: definition of cloud, architecture, and types of clouds, containers, Docker, virtualization, analyzing and investigating cloud logs.

UNIT 7:

Memory Forensics: acquisition, analysis, and interpretation of volatile memory (RAM), overview of memory structures, types of data stored in RAM, and the significance of memory analysis in identifying malware, running processes, network connections, and system artifacts, memory acquisition tools and techniques, use of analysis frameworks like Volatility and Rekall, detection of rootkits and hidden processes, extraction of encryption keys, and identification of suspicious behaviours. Challenges and legal considerations in memory forensics.

UNIT 8:

Open-Source Intelligence and Social Media Profiling: an introduction to OSINT, its importance in digital forensics, and the ethical and legal considerations involved, the techniques and tools for collecting, analyzing, and validating data from websites, forums, and social media platforms, identifying digital footprints, tracking user activities, analyzing metadata, and understanding behavioural patterns across platforms like Facebook, Twitter, Instagram, and Linkedle. The use of OSINT tools and frameworks: geolocation, reverse image searches, threat assessment, and cybercrime detection. Fake news detection and analysis.

UNIT 9:

Multimedia Forensics: Introduction to speaker recognition, Speaker profiling. Tools and techniques for audio examination, Introduction to Audio Authentication, and audio enhancement techniques.

Video/Image Forensics- Introduction to video analysis: frame extraction, frame by frame analysis, shot by shot analysis, Video/image processing and enhancement, Video/image authentication, technical aspects of the video image files, collection, handling, and preservation of video/image files. Introduction to CCTV Forensics

UNIT 10:

Introduction to Disaster Recovery (DR) planning, Identification of potential disaster status, DR Strategies, Plans for Business Resumption, Category to Cyber-crime, Cyber Law, IT Act 2000 and its amendments, International Cyber Laws, Cyber Ethics, Child Sexual Abuse Material related to the cyber domain, various acts related to social media, privacy and security on the cyber domain, NIST, STQC, BIS and SWGDE guidelines for digital evidences. Auditing Standards and Frameworks: ISO/IEC standards, COBIT framework, SOC/NOC Compliance,

DPDP Act, 79-A certification process, importance of digital evidence as per BNS, BNSS and BSA. Legal admissibility of digital evidence in Indian Courts, Report writing for cases involving digital evidence.

UNIT 11:

Advancement in cyber forensics: Introduction to the fundamental concepts of Artificial Intelligence (AI) and Machine Learning (ML), data pre-processing, supervised and unsupervised learning techniques, and their application in anomaly detection, malware classification, and intrusion detection systems, use of Al in image, video, and audio forensics, natural language processing (NLP) for analyzing textual evidence such as emails or chat logs, forensic toolkits powered by AL/ML ethical considerations, and challenges such as data bias, false positives in forensic investigations. Concept of Blockchain for digital evidence integrity, cloud forensics, loT forensics, crypto currency, deep fake technology, drone forensics, Metaverse and deep web/dark web investigations.

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4. Assistant Director & Senior Scientific Officer (Toxicology)
(Advt. No. 10/2025 & 15/2025)

Introduction to Forensic Science: Definitions, History and Development Crime Scene Management and Investigation: Collection, Preservation, Packing and Forwarding of Physical and Trace evidences for analysis. Legal and Court Procedure pertaining to Expert Testimony Forensic Statistics: Mean, Mode, Median, Correlation and Regression analysis, Null Hypothesis, Variance, t-test, Chi. Square test. Type of Data, Measure of Central Tendency, Dispersion of Data. Correlation, Probability and Proof

Role of analytical chemistry: classification of analytical methods classical and instrumental, Types of instrumental analysis, selecting an analytical method, Neatness and cleanliness. Laboratory operations and practices. Analytical balance. Techniques of weighing, errors Volumetric glassware: cleaning and calibration of glassware. Sample preparation: dissolution and decompositions. Gravimetric techniques, Selecting and handling of reagents, Laboratory note books, Safety in the analytical laboratory

Introduction to Toxicology: definition and history, concepts of forensic toxicological examination and as significance, Laws relating to poisoning. poisons and their classification, methods of administration of poison, Mode of action, Diagnosis and management of poisoning cases, Heavy Metal poisoning and Metal antagonists, lead, mercury, arsenic. Organophosphorous. Organochloro. Carbamate pesticides and Pyrethroids poisoning cases. Environmental impact on insecticides, Drug dependence and its management, Clinical toxicology. Action and administration of Drugs and Poisons Different methods of extraction of drugs and poisons, clean up procedures and analysis.

Collection and preservation of biological evidences (viscera and for body fluids) and circumstantial evidences in fatal and survival cases, Submission of samples to the laboratory, postmortem examination, specific analysis plan/approach to toxicological examinations of poisoning samples. Classification of matrices. Isolation and Extraction of poison drug by various classical and modern methods using instrumental techniques

Qualitative analysis: Sample preparation, dissolution, digestion and fusion, Nature of trace analysis, spot tests and spectroscopic methods, Screening tests commonly engaged in chemical and toxicological analysis of alcohol, drugs, pesticides, poisons and their metabolites than autopsied samples, blood and urine samples. Quantitative analysis: Volumetric and Gravimetric analysis.

Solvent extraction: Advantage and application, Derivation of the relation between the percentage extraction and number of extraction, relation between distribution ratio and distribution coefficient, quantitative treatment of neutral chelate in extraction systems, pH extraction curve, masking agent, salting out technique, multiple extractions, solid phase extraction.

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5. Senior Scientific Officer (Scene of Crime)
(Advt. No. 12/2025)

Crime Scene Management

Introduction to Crime Scene Management- Definition of Crime, Essentials of a crime, Causes and consequences of crime, Theories of Crimes. Various types of crime: White Collar Crimes Economic Crimes, Organized crimes, Environmental Crimes, Cyber Crimes, Terrorism, Victimless Crimes, Hate Crimes, Honour Crimes; Criminal behaviour and theories; Modus Operandi; Criminal profiling; Corpus Delicti. Basic Concepts of Victimology. Juvenile delinquency. Social change and crime.

Related Laws: Provisions of Code of Criminal Procedure- FIR, Complaint, Sec. 291, 292, 293, Framing of Charges, Bailable and Non-Bailable offense, cognizable and non-cognizable offense, summons, warrant, Investigation, inquiry, and trial. Important Provisions of Indian Evidence Act, 1872- Section 32, 45, 46, 47, 57, 58, 60, 65, 65B, 73, 135, 136, 137, 159. Important Provisions of Indian Penal Code, 1860- Definitions, General Exceptions, Relevant provisions. IPC 302, 304, 306, 307, 309, 375, 376, 377, 498 and Cr PC 174. Medico-Legal Aspects – PM report, Dying Declaration, Exhumation& Expert Testimony. The Criminal Procedure (Identification) Act, 2022.

Forensic Science: Definition, Basic, Principles & Significance, History & Development of Forensic Science, Organizational structure of Forensic Science, Frye case and Daubert standard, labs in Central & State, DFSS/ CFSL/ SFSL/ GEQD/ FPBs establishment & expansion, Hierarchical set up of Central Forensic Science Laboratories, State Forensic Science Laboratories, Branches of Forensic science, Police structure, Organization set up of police structure.

Crime Scene Management and Reconstruction: Defining the Scene of crime, managing a crime scene & its hierarchy, Role of First Responding Officers, Securing the Crime scene, Documentation/ Note taking of crime scene, crime scene Photography, Camera & other photography tools, Sketch drawing of scene of crime, Search Patterns of a crime scene, use of video and CCTV, collection of clue materials, Chain of custody. Crime Scene Reconstruction, Importance of Pattern Evidence in Reconstruction: Bloodstain Pattern Analysis for Reconstruction, Gait Pattern Analysis, Glass Fracture Patterns, Fire Burn Patterns, Fingerprints & Footprints on crime scene, Tire, and Skid Mark Patterns, Crime or suspect Vehicle identification.

Report writing and court testimony: General aspects of the report, Processing of the report, Panchnama, admissibility of expert's testimony, pre-court preparation and court appearance, examination in chief, cross-examination, and re-examination, ethics and bias in forensic science.

Crime Detection Devices: types of crime scene kits, their applicability and utility on crime scene, mobile forensic labs, Alternative Light Sources, UV, IR, X-Rays, lasers and its types, their nature and applications, Detective Dyes, Neutron Radiography, Speed Detection Devices, Tools: Basic Kits, Investigator's Kit, Tools used in Mobile laboratory. Digital Imaging of Crime Scene, 3-D scanning technique, Tele forensic Technology for crime scene investigation, Technology innovation in crime scene management, 3D simulation of crime scene, Automatic evidence marker.

Important Organizations: Police Academies, National Investigation Agency, Anti-terrorist Squad, Police & Detective Training Schools, Government of Questioned Documents Examiners,

Fingerprint Bureaus, National Crime Records Bureau, National Investigation Agency, Central Bureau of Investigation, Crime and Criminal Tracking Network & Systems, Research and Analysis Wing, INTERPOL, Bureau of Police Research & Development, and other agencies involved in the criminal investigations, agencies referred for the additional information and requisite examinations.

Analysis and estimation of illicit liquor including methyl, ethyl alcohol denatured spirit, acetone. chloroform and ether in body fluids, blood and urine. Analysis of petroleum products in biological specimens. Post-mortem Examination and PM changes in poison cases. Inseets and animal poisons and their examination. Plant Poisons and their examination Dhatura, Papaver Somniferum, Atropa balladona, Marking nut, Nux-Vomica, Oleander. Aconite, Abrus, Cannabis Sativa, Coca, Croton and various poisonous toxalbumins and plant fungi, Metallic poisons: As, Sb, Ph. Ba, Cu, Hg, Zn and Thallium, Toxicological analysis of decomposed materials.

Forensic pharmacological studies: absorption, distribution, pharmacokinetics and metabolism, pathways of drug metabolism, drug toxicity, excretion of drugs and poisons. Detection of poison on the basis of their metabolic studies

Spectroscopy: Principles, Technique, Instrumentation and Applications, Atomic Absorption Spectroscopy, Mass Spectrometry, Raman Spectroscopy. NAA, NMR, UV-Visible, IR Spectroscopy, Fluorescence, X-ray fluorescence spectrometry (XRF), inductively coupled plasma atomic emission spectroscopy (ICPAES).

Microscopy: Microscope and its parts, Function, Applications in Forensic Science, TEM, SEM

Electrophoresis: Theory and principles.

Chromatography: Definition and classification, distribution coefficient rate of travel, retention time, adjusted retention time, retention volume, corrected retention volume, adjusted retention volume, Specific retention volume, relative retention, column capacity, separation number, peak capacity. Shapes of chromatographic peak, column efficiency, zone broadening. Van Deemter equation, resolution, optimization of column performance. Principle, procedure and applications of Paper chromatography, Thin Layer Chromatography (TLC) and High Performance Thin Layer Chromatography (HPTLC)

Analysis of CO2, CO and other Poisonous gases, Analysis of Psychotropic Drugs: Sedatives, stimulants, opiates, drugs of abuse, Heroin, Methaqualone, Meprabomate, Mescaline, Mandrax, LSD. Amphetamines, Benzodiazepines, Haloperidols and other designer drugs. Analysis of Abusive Drugs used in sports. Food poisoning Botulism and Ptomine poisoning. Antigen Antibody reaction and Application of RIA and ELISA techniques in detection of common Snake Venoms.

Alkaloids: Definition, Classification, Isolation, General Properties and Analysis of Morphine, Codeine, Brucine, Strychinine, Nicotine, Atropine, Hyosyamine, Cocaine.

Chemical Foundation of pH & pK values. Acids, Bases, Buffers, Weak bonds & Covalent bonds. Amino acids and peptides – Classification, chemical reactions and physical properties. Sugars – Classification and reactions. Lipids – Classification, structure and functions. Proteins analysis, Hierarchy in structure, Ramachandran map. Polysaccharides – Types, Structural features, Methods for compositional analysis.

05/09/25
Deputy Secretary
Haryana Public Service Commission
Panchkula

6. Senior Scientific Officer (Documents)
(Advt. No. 13/2025)

Introduction to Forensic science:- Definition and Scope of Forensic Science. History and development of Forensic Science, Need and Principle. Police and, Forensic science laboratories/institutions in India and responsibility of Forensic scientist. Crime scene management techniques, types of crime scenes, crime scene ethics, role of the first arriving officer, crime scene documentation, searching, collection, packaging and forwarding of physical evidences, Maintaining the chain of custody, Reconstruction of scene of crime.
Expert testimony in court of law: admissibility of forensic evidence, laws and acts relevant to forensic science.
The Metric system: Unit of measurement-SI units, Measuring devices, Accuracy, sensitivity and precision of measuring instruments, Errors in measurement, Significant figures.
Mechanies: Laws of motion, Linear and rotational motion, Friction, Elasticity. Magnetism and Electricity and its Basic properties. Holography; Importance of coherence, Principle of holography and characteristics, recording and reconstruction, classification of hologram and application, non-destructive testing.
Laser:- Production, properties of laser beams such as intensity, monochromativity, coherence, directionality and brightness. Basic laser systems Gas Lasers: (1) Molecular gas lasers, CO2 laser & N2 (ii) ionic gas laser-Ar^+ laser (iii) gas dynamic laser (iv) high pressure pulsed gas laser Solid State Laser : (i) Nd : YAG laser, (ii) Nd:Glass laser, comparison of performances (iii) Tunable, solid state laser: Ti:sapphire laser; Alexandrite laser Chemical Laser : HF laser, HCl laser, COIL Excimer laser, Color centre laser, free electron laser; semiconductor diode laser, Laser Beam Propagation: Laser beam propagation properties of Gaussian beam, resonator, stability, various types of resonators, resonator for high gain and high energy lasers, Caussian beam focusing.
Basic concept of Spectroscopy: Atomic, molecular spectroscopy, imaging spectroscopy Interaction of radiation with matter and its consequences. Reflection, absorption, transmission, scattering, emission, fluorescence, phosphorescence.
Fluorescence and phosphorescence spectrophotometry: Types of sources, structural factors, instrumentation, comparison of luminescence and UV-visible absorption methods, Infrared spectrophotometry: Dispersive and Fourier transform spectrophotometry (FTIR) Sample handling and preparation, quantitative analysis and interpretation of IR spectra, forensic applications,
Raman spectroscopy: Theory, instrumentation, sample handling and preparation. Correlation of IR and Raman Spectroscopy, applications
Atomic Emission Spectrometry (AES): Instrumentation and techniques, arc/spark emission ICPMS, ICP-AES, quantitative analysis, applications.
Advanced Microscopy: The compound microscope, comparison microscope, stereomicroscope, polarizing microscope, micro-spectrophotometer, scanning electron microscope Detectors: photographic detectors, thermal detectors, photoelectric detector PMT and semiconductor detectors.

Chromatography and Electrophoresis: General Principles and types of chromatographic techniques Paper chromatography, column chromatography, Thin layer chromatography. adsorption chromatography, partition chromatography, Gas chromatography, Gas-liquid chromatography, Ion exchange chromatography. Exclusion (permeation) chromatography, affinity chromatography, HPLC, HPTLC, Capillary Chromatography and Electrophoresis.

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Statistics: Statistical evaluation of data obtained by instrumental methods. Tests of hypothesis - teats of significance of attributes, Z-test of significance and coefficient of correlation, small sample test, T-test, paired test, chi-square test, F-test for equality of variance, large sample test, normal test.

Forensic Document Examination: Legal aspects of forensic document examination, 293Crpc. Section 45 evidence act, definition of expert. Indian Penal Code Under sections viz. 29, 463, 405, and 420. Classification of documents, Care, handling, preservation of documents; Preliminary examination of case documents, Principle of handwriting examination, Importance of natural variations, Holographic documents. Comparison of handwriting, principle of fundamental divergence, natural variations in handwriting, nature and types of forgeries, characteristics of genuine and forged signatures, their detection, artificial and natural tremor, basic tools needed for forensic documents examination and their significance.

Alterations in documents: addition, deletion, obliterations, substitutions, overwriting, built up documents, determination of sequence of intersecting strokes, Ink examination, chemical composition of different types of inks, destructive and non-destructive techniques involved in differentiation of ink. Writing instruments, working of fountain pen, ball pen, gel pen, writing inks, Printing inks and printing toners. Viscosity, Surface tension, Capillary rise

Paper examination: Physical comparison, chemical composition, sizing & leading materials, tensile strength, comparison techniques: destructive & non-destructive. Examination of printed labels wrappers, rubber seal Impressions, Facsimile document, Photocopy and scammed documents: process of scanning. Indented writings, Charred documents: preservation and examination techniques involved.

Printed document examination: Printing technology, examination of type-script, classification of printers identification of printed matter, different printing technologies, Examination of computer printouts, Concept of e-documents and digital signature

Examination of security documents: Currency notes, Passport, Visa, Various identity cards, Stamp papers, travel documents. OVI ink, thermal ink, Examination of credit, debit and other plastic cards.

5/09/25

Deputy Secretary
Haryana Public Service Commission
Panchkula

7. Senior Scientific Officer (Physics)
(Advt. No. 14/2025)

UNIT 1:

Forensic science: Definition and Scope of Forensic Science. History and development of Forensic science, Need and Principles of Forensic science. Forensic science laboratories Institutions in India and their organizational structure, Functions & responsibility of Forensic scientist, Ethics in forensic science.

Introduction to physical evidences. Types of physical evidences, Classification and Role of physical evidences in Criminal Investigations & Trails. Frye case and Daubert standard, labs in Central & State, Hierarchical set up of Central Forensic Science Laboratories, State Forensic Science Laboratories, and Branches of Forensic science.

Bharatiya Sakshya Adhiniyam, 2023: Relevant sections dealing with Definition of Evidence, Relevancy of Facts, Opinion of Experts, Primary Evidence, Secondary Evidence, Electronic Digital Records, Admissibility of Electronic Records,

Bharatiya Nagrik Suraksha Sanhita, 2023: Relevant sections dealing with FIR, Zero FIR, Courts, Report of Government Scientific experts etc.

Bhartiya Nyaya Sanhita, 2023: S.3- General Explanations, Mens Rea, Actus Reus

Report writing and evidence evaluation: Components of reports and report format in respect of crime scene and laboratory findings.

Court testimony: Admissibility of expert testimony, pre court preparation and court appearance, examination in chief, cross-examination and re-examination.

UNIT 2:

Crime Scene Management: Introduction to the crime scene, Types of crime scene, Evaluation and processing of crime scene, securing the scene of crime, Documenting the crime scene (Note making. Sketching, Photography, videography of crime scene), role of the first arriving officer at the crime scene Digital Imaging of Crime Scene, 3-D scanning technique. Searching techniques of Crime scene, Processing of physical evidence-discovering, recognizing and examination of physical evidences, safety measures for evidence collection. Collection, preservation, packaging. sealing, labeling and forwarding of physical evidences, maintaining the chain of custody. probative value of physical evidences and reconstruction of scene of crime. Tele-forensic Technology, mobile kits and equipment, their utility on crime scene, Technology innovations in crime scene management. E-sakshya app. Role of Al in Crime Scene Management & Investigation

UNIT 3

Physical & Instrumental Techniques:

Theory and applications of Thermo-gravimetric analysis, differential thermal analysis and differential scanning calorimetry. Density gradient analysis, Specific Gravity analysis. Abbe's and Digital Refractometer.

Spectroscopy: IR spectroscopy, Raman spectroscopy, FT-IR spectroscopy, Atomic Absorption Spectroscopy, Atomic Emission Spectroscopy.

Lasers: Characteristics of laser light. Spontaneous emission, Stimulated emission, Stimulated absorption, Einstein coefficients, Population inversion and light amplification, Essential. components of the laser, Ruby and He-Ne laser.

X-rays: Production; continuous and characteristic X-rays and their spectra, Mosley's law: diffraction of X-rays by crystals, Bragg's law: Compton Effect.

Natural Radioactivity & Radioactive Decays: Type of radioactive decays, theory of radioactive disintegration, radioactive constants, Mean life of a radio element, Activity of radioactive sources, Radioisotopes their production &uses and forensic applications, Nuclear Reactions: Types of nuclear reactions, conserved quantities of nuclear reaction, energies of nuclear reaction-Q-value & its experimental determination.

Nuclear Magnetic Resonance Spectroscopy (NMR): Theory of NMR, Environmental effect on NMR, NMR spectrophotometers, Proton NMR, C-13 NMR, and other nuclei, their Applications.

Microscopy: Introduction to principles, working and application: Optical microscope: Compound microscope, stereo microscope, comparison microscope, phase contrast microscope, fluorescence microscope. Electron microscope: Scanning electron microscope, transmission electron microscope. Probe microscope: Introduction to principles, working, sample preparation, data interpretation and application: Atomic force microscope, Scanning Tunneling Microscope.

UNIT 4:

Glass: Introduction to glass, Types of glass and their compositions, Forensic examination of glass fractures under different conditions, determination of direction of impact: hackle marks. backward fragmentation, Physical measurements of glass, color and fluorescence, physical matching, density comparison, physical measurements, refractive index by refractometer, elemental analysis, and interpretation of glass evidence.

Paints: Introduction, Composition, Manufacture of Paint, types of paint, Forensic Examination of Paints and Coatings: Collection and Preservation of paint samples, macroscopic and microscopic techniques for the characterization of Paint Fragments, Physical, Chemical & Instrumental analysis of paint, interpretation of Paint Evidence.

Soil: Soil and its composition, Classification of soil, Collection and preservation of soil as an evidence, analysis of soil samples: Physical, chemical and instrumental, interpretation of soil evidence.

Fiber analysis: Forensic significance, Classification, Textile Fibers, Yarns, Fabric construction, Fabric characteristics, Microscopy characteristic, Birefringence, Fluorescence Microscopy, Colors in textile, Color Assessment, Chemical properties, Physical, chemical and instrumental methods of examination of string/ropes, wires/cables, seals, counterfeit coins, physical matches of broken objects.

UNIT 5:

Tool mark Evidences: Introduction to tool marks, Types of tool marks, Class characteristics and individual characteristics of tool marks, Collection and Preservation of tool marks, Forensic examination of tool marks.

Restoration of erased/obliterated marks: Principle of restoration of erased marks, Techniques involved for alteration of individual markings, Restoration of erased and obliterated marks on various surfaces, Photography and Forensic assessment of methods for restoration of obliterated marks.

Bite marks: Objectives and forensic importance of bite-mark examination, the typical bite marks morphology, types of bite marks, Evidence collection from victims and suspects, Photography, lifting, preservation of bite marks, casting of bite-marks, Identification and comparison of bite marks, Case Studies

Tyre Impressions: Introduction to tire impressions, Collection and Preservation of the time impression evidence, Forensic Significance of skid marks, Forensic Examination for identification and comparison, Case Studies.

Dy. Secretary HPSC

Footprints & Shoe impression examination: Introduction to footprints & Shoe impression, locating impressions at the scene of crime, Evidence collection: Collection, Lifting Casting and Preservation of foot/footwear impressions, importance of Gait pattern, Forensic Identification and Methods of comparison, Case Studies

Lip print: Introduction to Cheiloscopy and history of lip prints, Classification of lip prints Collection, Development, Identification and Comparison of lip prints

Ear Prints: Introduction to the history of ear prints, Morphology of the ear, Procedure of taking standards from the suspects, Identification and comparison of ear prints.

UNIT 6:

Forensic Ballistics: Firearms characteristics & classification of firearms, History and background of firearms, Functional assembly & Operating principle of firearms, Characteristics & Working mechanism of Standard & Non-standard firearms, Improvised, Country made. Imitative firearms, identification of origin.

Concepts of Ammunition: Types of ammunition classification and constructional features of different types of cartridges, types of primers and priming composition, propellants and their compositions, velocity and pressure characteristics under different conditions, various types of bullet and compositional aspects

Internal ballistics: Heat problems, Pressure, Recoil, Vibration & Jump, Barrel Fouling, Ignition of propellants, shape and size of propellants, manner of burning, various factors affecting the internal ballistics: lock time, ignition time, barrel time, erosion, corrosion and gas cutting equation of motion of projectile. Density of loading. Measurement of strength of firearm projectile velocity determination, theory of recoil, and methods for measurement of recoil External ballisties: vacuum trajectory, trajectory formation & its computation, effect of air resistance on trajectory, Angle of Fall, Influence of Earth on Trajectory, base drag, yaw, shape of projectile and stability, ballistics coefficient and limiting velocity, Ballistics tables, measurements of trajectory parameters.

Terminal/Wound Ballisties: striking velocity, striking angle and nature of target, tumbling of bullets, effect of instability of bullet, effect of intermediate targets, temporary and permanent cavities, Ricochet and its effects, stopping power, threshold velocity for penetration of skin flash/bones, Nature of wound of entry & exit wound, Characterization & evaluation of injuries, determination of range of fire, time of firing, analysis of GSR

Test firing: Procedure for test fire. Purpose for test firing. Recovery methodology. Specifications of Firing gallery, working of automatic firing rest, Safety & Preventive measures. Weapons and their linkage with fired ammunition.

Instrumental techniques used for ballistic evidence analysis: Borescope, Comparison Microscope, Stereo microscope, travelling microscope, SEM, EDXRF. Introduction to automated system of trajectory computation, (Ballistic Data Acquisition system): Operating system & its concepts, Universal Receiver, ICM, Target Frame. Automated management of ballistics data, Integrated Ballisties Identification system)

UNIT 7

Multimedia Forensics:

Audio Recognition: Introduction to forensic speaker recognition, history, and its types Physiology of voice production, Interspeaker and Intraspeaker variations, text-dependent and text-independent speaker recognition, collection of audio standards, marking of speakers Techniques of speaker profiling, Tape authentication and tampering detection in audio files Speech enhancement and normalization techniques Introduction to forensic video and image analysis: frame hy frame extraction and analysis, shot by shot analysis, technical aspects of video files, Video authentication and enhancement techniques SOP's for handling, collection, preservation and analysis of multimedia evidences, Tools and techniques used for audio and video examination.

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UNIT 8:

Introduction to Photography: History of photography & Cameras, Types of Camera and lenses, photographic instruments: light sources, optical filters, fundamentals of light and vision, Spectral sensitivity of photographic materials, Camera exposure determination. Basic principles and techniques of Black & White and colour photography, Concepts of coloured photography. Linkage of cameras and film negatives

Modern developments in photography: Digital photography, Image sensors, software for digital photography, Image File formats, photo shop-development- digital images processing and manipulation- forensic application. Crime scene photography, photomicrography, macro photography. Reprovit unit, photography of fingerprints and documents, IR and UV photography, Introduction to photogrammetry and its applications in Forensic Science, crime scene videography/high speed videography. Court representation and admissibility of photographs in the judicial system

UNIT 9:

Forensic Engineering: Introduction to forensic engineering, ISI/Code of Building Construction, Structural failures, structural material composition analysis leading to failures, manufacturing defects, etc., static loads, dynamic loads, causes of structural collapse, Investigation and observation of collapsed structures and causes of failure Examination of structural parameters (beam, column, slab, foundation, ties, reinforcements and reinforcement cover etc.). Forensic examination of the basic materials like cement, sand, brick, grit, steel, quality of water, bitumen, determination of adulterants, electrical appliances installations etc, Sampling of the materials with relevant information required for the investigation

UNIT 10:

Laboratory management System: Laboratory information system, Laboratory information management system, sample management, Chain of custody, workflow automation, data management, quality control, Security system, standards and compliances, validation and safety equipment.

Forensic statistics: Types of data, Basic concept of frequency distribution, measure of central values Mean, median and mode, measure of dispersion, range, mean deviation and standard deviation, Probability: Theory and classical definition of probability, Bayes theorem of probability, conditional probability and coincidence probability, Chi-square test, t-test, z-test, ANOVA.

Deputy Secretary
Haryana Public Service Commission
Panchkula

8. Senior Scientific Officer (NDPS)
(Advt. No. 16/2025)

Introduction to Forensic science Definition and Scope of Forensic Science, History and development of Forensic science, Need and Principle. Police and, Forensic science laboratories/ institutions in India, Organizational Structure of a Forensic Science Laboratory Institution, Services provided by other institutions, Functions and responsibility of Forensic scientist.

Introduction to the crime scene: its types and processing order, role of the first arriving officer at the crime scene, Searching techniques of Crime scene, crime scene ethics, types of physical evidences, Classification and Role of physical evidences in Criminal Investigations & Trails, Collection of evidences, Safety measures for evidence collection, Preservation, Packaging. scaling, labeling and forwarding of physical evidences. Maintaining the chain of custody. Probative value of physical evidences, Reconstruction of scene of crime. Introduction to physical evidence

Expert testimony in court of law, admissibility of forensic evidences, laws and acts relevant to forensic science

History of Drug Abuse and related common terminologies, Routes of administration, action and symptoms of Narcotic Drugs and Psychotropic Substances, Different methods of extraction of drugs, clean up procedures, analysis and field tests

Analytical Chemistry: Classification of analytical methods Classical and Instrumental, volumetric, titrimetric and gravimetric techniques, selection of proper analytical techniques. types and range of determination, accuracy, sensitivity, precision and errors, sample preparation, handling of reagents with safety, density and viscosity measurements

Statistical Analysis: Mean, Mode, Median, Correlation and Regression analysis, Null Hypothesis, Variance, t-test, Chi-Square test. Type of Data, Measure of central tendency, Dispersion of Data, Correlation, Probability and Proof, ANOVA test

Chemical periodicity, main group of elements and their compounds, concept of acids and bases, hard soft acid base concept, non aqueous solvents, organometallic compounds- synthesis, bonding & structure and reactivity, characterization of inorganic compounds. Chemistry of natural products carbohydrates, proteins and peptides, fatty acids, nucleic acids, steroids and alkaloids

Qualitative analysis: Sample preparation, dissolution, digestion and fusion, Nature of trace analysis, spot tests and spectroscopic methods. Screening tests commonly engaged in chemical analysis of drugs samples.

Solvent extraction: Advantage and application, Derivation of the relation between the percentage extraction and number of extraction, relation between distribution ratio and distribution coefficient, quantitative treatment of neutral chelate in extraction systems, pH extraction curve, masking agent, salting out technique, single extraction verses multiple extractions, solid phase extraction, accelerated solvent extraction, ultrasonic extraction, heat reflux extraction.

Chromatography and Electrophoresis General Principles and types of chromatographic techniques: Paper chromatography, column chromatography, Thin layer chromatography, adsorption chromatography, partition chromatography, Gas chromatography, Gas-liquid chromatography, Ion exchange chromatography, Exclusion (permeation) chromatography. affinity chromatography, HPLC, HPTLC, Capillary Chromatography and Electrophoresis

Spectrophotometry- Basic principles, Beer-Lambert's Law, Principle and biochemical applications of UV-Vis spectrophotometry, atomic absorption spectroscopy Theory and applications of IR, Fourier Transform Infrared spectroscopy (FTIR), Nuclear Magnetic Resonance spectroscopy (NMR) in the study of macromolecular structures, Raman spectroscopy, Mass spectroscopy.

Extraction, isolation & identification of Alkalends viz- Marphine, Codeine, Bracine, Strychnine, Nicotine, Atropine, Hyoscyamine, Cocaine, Heruin and Dhatura alkaloids. Extraction, isolation & identification of sedative, depressants, stimulants, opiates and drugs of abuse.

Medicinal Chemistry: General drugs, Designer Drugs, Drugs of abuse, Drug dependence and Drug Tolerance, mode of administration and pharmacological action of drugs of forensic Importance, Mandatory provisions of NDPS Act, 1985

Drugs Act and Excise Act

Narcotics drugs and psychotropic substances: Definition, types, appearance, production and chemical characteristics, common terminologies, Drug action on central nervous system Sampling and analytical techniques for qualitative & quantitative analysis

Plants of Narcotic importance and their morphology: Papaver somniferum, Cannabis sativa, Coca plant and analysis of their active constituents. Psychotropic substances: Amphetamines. Besnsdazapines and their derivatives. Barbiturates, Lysergides, Mascalines and Psilocybin etc.

Introduction to Controlled Substances, Classification of controlled substances, Precursor chemicals, Narcotic raids and clandestine drug laboratories evidences and forensic examination.

05/09/25

Dated: 05/09/2025

Deputy Secretary
Haryana Public Service Commission
Panchkula