



**Теорія і методика професійної освіти**

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## **Підготовка та професійний розвиток судових експертів (на досвіді США)**

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***Анотація:** Стаття присвячена проблемі підготовки та професійного розвитку судових експертів, які відіграють ключову роль у системі кримінального правосуддя, надаючи інформацію щодо доказів для розслідувань і судів. **Метою** є аналіз завдань і обов'язків судових експертів, розкриття змісту їх освіти та опис основних складових успішної кар'єри судового експерта, а також визначення важливих навичок, особистих якостей і професійних знань,*



що є вирішальними у цій галузі. **Методи.** У дослідженні використовувалися методи: порівняльного та диференційного аналізу підготовки судових експертів, систематизації та узагальнення можливостей і етапів навчання, аналізу літературних джерел та вивчення практичного досвіду організації навчання судових експертів, зокрема в США. **Результати.** Поєднання особистих, професійних та академічних критеріїв впливає на успішний розвиток кар'єри судового експерта. Судовим експертам потрібно володіти широким спектром технічних, аналітичних та комунікативних навичок, критичним мисленням, етичною свідомістю, вмінням прийняття рішень; комп'ютерними навичками тощо. Як свідчить досвід США, де існує багато можливостей стати судовим експертом, поширені етапи включають: отримання ступенів бакалавра та магістра, стажування і набуття практичного досвіду, подальше навчання і підвищення кваліфікації під час роботи, професійна сертифікація для покращення кар'єрних перспектив. У статті також аналізуються навчальні програми бакалаврату та магістратури з судової експертизи. **Висновки.** Зі зростанням впливу судової експертизи збільшується потреба у фахівцях, здатних ефективно аналізувати та інтерпретувати докази для кримінального судочинства. Підготовка до кар'єри судового експерта вимагає ґрунтовної освіти в галузі природничих наук або криміналістики, володіння комплексом особистих якостей та додатковими професійними навичками.

**Ключові слова:** *судова експертиза, кар'єра судового експерта, професійна підготовка, підвищення кваліфікації, особисті якості, академічна підготовка.*



## Training and professional development of forensic experts (on the USA experience)

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**Abstract:** *The article is devoted to the issue of training and professional development of forensic experts since they play a pivotal role in the criminal justice system, by providing information about the evidence for investigations and the courts. The **purpose** is to analyze the role and duties of forensic scientists, and to characterize the essence of their education, to describe the main steps of a successful forensic expert career, and what meaningful skills, personal qualities, professional knowledge are crucial in the field. **Methods.** The study has used methods of comparative and deferential analysis of forensic scientists' education and training, systematization and generalization of training paths and steps, analysis of literary sources and study of practical experience in organizing forensic experts training, in*



particular in the USA. **Results.** The combination of personal, professional, and academic criteria influences a successful forensic scientist career. Forensic scientists need a broad range of technical, analytical, and communication skills, critical thinking, ethical awareness, decision making; good laboratory practices; computer proficiency, etc. Although there are many paths to become a forensic expert, common steps include earning a bachelor's and master's degrees, gaining practical experience through internships or trainee positions, further on-the-job training, and professional certifications to enhance career prospects. The Bachelor's and Master's programs in forensic science are analyzed in the article. **Conclusions.** As forensic science grows in influence, the need for experts who can analyze and interpret evidence is greater, a strong educational background in the natural sciences or criminalistics, personal attributes, and additional professional skills are necessary to prepare for a career in forensic science.

**Key words:** forensic science, forensic expert career, professional training, further development, personal qualities, academic qualifications.

**Introduction.** Forensic science (FS) plays a crucial role in the criminal justice system by providing scientific and foundational information for investigations and the courts. Because the forensic scientists' work both at the crime scene and in the laboratory is often used in court, it is especially important that the training and education of forensic scientists provide a solid scientific background and a broad base in criminalistics. Criminalistics that traditionally and generally associated with the work of FS laboratories is the profession and scientific discipline directed toward the recognition, identification, individualization, and evaluation of physical evidence in legal proceedings by the application of the natural sciences. The forensic sciences encompass many disciplines: controlled substances (drugs), toxicological specimens (body tissues, body fluids, and breath), trace evidence (hairs, fibers, paint, glass, explosives and fire debris), biological



specimens, including DNA, firearms, fingerprints, impression evidence (tool-marks, tiremarks, shoeprints), questioned documents, crime scene. Thus, an institution's educational objectives and programs can vary considerably, leading to a wide variation in the content and structure. The programs are expected to prepare students for a career in FS in accordance with the best practices [1].

Therefore, in the past 10 years, the demand for forensic scientists has increased for many reasons, including population demographics, increased awareness of forensic science by law enforcement, database automation in physical evidence, legal requirements, and increased public awareness of forensic science through the popular media. In fact, forensic science jobs are expected to grow at a rate of 13% by 2032, a much faster rate than average [10]. As an applied science, FS requires a strong foundation in the natural sciences and the development of practical skills: a forensic scientist must be capable of integrating knowledge and skills in the examination, analysis, interpretation, reporting, and testimonial support of physical evidence. A properly designed forensic science program should address these needs and strengthen the student's knowledge, skills, and abilities in these areas.

The increased demand places a greater responsibility on educational institutions to meet this challenge. In response to this dramatically increased interest in FS, many universities have begun to offer degrees in FS at both the undergraduate and graduate level. That is why study and recommending the current best practices for educational curriculums for initial and continuing training in FS is essential to train forensic scientists with the educational and practical knowledge and skills necessary to effectively support their role in the criminal justice system.

**Literature Review.** Since forensic science is very fast growing field within contemporary judicial system, the issue of forensic experts training has attracted the attention of many domestic and foreign scientists. Thus, the American researchers C. Brown & B. Logan [4], H. Melbourn, G. Smith, J. McFarland & M. Rogers [14]. R. Jones [11] and others have investigated the certification procedure as well as



professional, academic and personal requirements to forensic experts, competence assessment for FS. The problem of improving forensic experts learning, in particular continuing education, has been raised and studied by M. Gamette [7], Y. Delgado, B. Price & P. Speaker [5], etc. K. Tregar & G. Proni [17] have conducted a review of FS higher education programs for Bachelor's and Master's degrees. The profound manual of J. Ashcroft, D. Daniels & S. Hart is devoted to the problem of education and training in FS that is aimed to FS laboratories and educational institutions [1].

Additionally, the significant contribution of the Ukrainian scientists in forming a modern system of forensic institutions and their staff education should be noted; in particular, V. Baraniak, N. Kisil, V. Hutsul, V. Yaroshovets have researched the problems of training forensic experts in higher educational institutions of Ukraine [2; 12], L. Golovchenko, A. Lozovyi and others – the issues of their professional preparation, learning programs and advanced training [8], S. Strilets, R. Kuznietsov, N. Tkachenko – the ways of improving and development of forensic expert didactics, training and qualifications [15;16]. D. Klymchuk & S. Ihnatov have studied learning technologies of forensic experts' professional training that can increase the learning productivity [13].

### **Identification of previously unresolved parts of the overall problem.**

Despite the fact that FS is a quickly developing area, and the need in qualified forensic experts has increased considerably, at the same time, we can admit that some aspects of the problem of forensic experts training have not been sufficiently studied. Analysis of works by the researches related to the issue allows stating the urgent need to summarize the existing experience inside and outside Ukraine, namely in the USA, in order to borrow the best positive practice of forensic experts training and their further professional development. This study can be essential for use by FS laboratories in hiring and training forensic scientists, educational institutions establishing the curriculum and structure of their FS academic programs, and



individual students beginning or continuing careers to assist them in evaluating training programs regarding the requirements, career paths and expectations.

**Highlighting previously unresolved parts of the overall problem.** Therefore, **the purpose of the article** is to disclose the role and duties of forensic experts for the criminal justice system, to characterize the essence of training and professional development for forensic experts, to describe the main conditions and steps of a successful FS career, to analyze FS courses and programs at different training stages, and what meaningful skills and abilities, personal qualities are crucial for the professionals in FS fields, in particular on the basis of the best USA practice.

**Presentation of the main research material.** Forensic scientists are responsible for analyzing crime scene evidence and report the findings to aid in investigations, so they are required to examine any evidence in an objective manner for legal proceedings. Forensic scientists mainly work in a lab setting closely with the evidence and samples provided by investigators working on the case. They often have to testify at trials and present their findings and their methods used in their analysis.

So, a combination of personal, professional, and academic training criteria will influence a prospective FS examiner's suitability for employment. Thus, the hiring process in the USA may include written and practical tests, phone interviews, and one-on-one personal interviews or interviews conducted by a panel. New employees may be hired provisionally or go through a probationary period. A model candidate for all FS practices should possess personal integrity, holds a Bachelor's degree (at a minimum) in the natural sciences or criminalistics, and has additional knowledge, skills and abilities.

*Personal characteristics.* Because forensic science is part of the criminal justice system, personal honesty, integrity, and scientific objectivity are paramount. Those seeking careers in this field should be aware that background checks similar to those required for law enforcement officers are likely to be a condition of



employment, namely: drug tests, history of drug use, criminal history, personal associations, and polygraph examination, driving record, past work performance, credit history, medical or physical examination [1, p. 7]. In addition, an individual's history of community service and outside activities may also be considered.

*Professional important skills and qualities for forensic scientists.* In forensic science, knowledge alone isn't enough, professionals need a broad range of technical, analytical, and communication skills to excel. Beyond mastering lab work, forensic scientists rely on critical thinking, ethical awareness, and strong soft skills. Having summarized different views to these aspects [1; 6], we may look closer at these essential skills: 1) critical thinking means the ability to approach evidence logically and make well-reasoned conclusions; 2) observation and attention to detail: Forensic science requires meticulous attention to detail in all aspects of work. When working with evidence for criminal cases, it is extremely important to do due diligence in ensuring every detail is accounted for when processing evidence. Small errors can lead to incorrect results, so precision is paramount; 3) problem-solving: Investigators rely on the support of forensic scientists to crack the cases they are working to solve; 4) scientific knowledge: A strong understanding of scientific principles and methodologies is essential; 5) analytical skills: Since forensic scientists must process vast amounts of data and find meaningful patterns, the ability to analyze evidence, interpret data, and draw logical conclusions is crucial; 6) communication skills: Clear and concise communication, both written and verbal, is necessary for reporting findings and testifying in court; 7) legal knowledge: Understanding legal procedures, court processes, and relevant regulations is important; 8) ethical conduct: Maintaining high ethical standards and integrity is paramount in FS, and ensures the integrity of evidence. Another crucial skills and qualities for forensic work include: decision making; good laboratory practices and awareness of laboratory safety; computer proficiency; interpersonal skills; public speaking; time management; prioritization of tasks, etc. [10]



*Academic qualifications.* To become a forensic expert, a strong educational foundation in science is essential, typically starting with a Bachelor's degree in forensic science/criminalistics or a related field like biology, chemistry, but a degree in FS will give the best chance of successful career [10]. Further specialization and career advancement often require a Master's or Doctoral degree, especially in specialized areas. Practical experience, often gained through internships or trainee positions, is also crucial for developing the necessary skills and knowledge. There are many paths to joining this high-growth field. According to American researcher J. Blore, six steps to becoming a forensic scientist include typical education, program accreditation, and professional certification options. They are the following [3].

*Step 1: Graduate from high school.* Additionally to graduating from high school with high marks in biology, chemistry, physiology, statistics, and mathematics., some students volunteer or intern in relevant agencies (police departments, fire departments, medical laboratories, hospitals, etc.). During a weeklong summer internship to secondary students in FS they are provided with hands-on training through forensic simulations, supervised laboratory work, and lectures from experienced professionals. The summer sessions occur at some American universities, giving interested students hands-on opportunities to solve simulated crimes and interact with legal experts.

*Step 2: Earn a forensic science associate degree (two years).* Some FS associate degree programs are available for prospective entry-level forensic scientists. An admissions requirement for these programs generally call for a high school diploma; a competitive GPA; a personal statement. In addition to general education, these programs may have classes in criminal law, fire & arson investigation, the physical sciences. The programs prepare students for employment in criminalistics with a specialty in FS or crime scene investigation as forensic identification specialists. Made up of 60 credits, the programs include courses such as human behavior in criminal justice; criminal investigation; introduction to criminal justice;



forensic science; crime scene technology; basic fingerprinting; biotechnology methods and applications; and general chemistry & qualitative analysis. Graduates of the programs can pursue entry-level positions in local, state, and federal agencies in forensic sciences, medical investigations, crime scene investigations, insurance investigations, and laboratory technologies.

*Step 3: Enroll in a bachelor's degree program (two to four years).* While there are many ways to become a forensic scientist, most forensic scientists have a bachelor's degree. Graduates from two-year associate's degree programs can finish their degree in two years, while those enrolling in a Bachelor's program from high school can complete this degree in four years. Regardless of the area of forensic science pursued, an undergraduate degree in FS should be interdisciplinary, combining a strong foundation in the natural sciences with extensive laboratory experience. Unlike other criminal justice professionals, a forensic scientist requires a foundation in chemistry, biology, physics, and mathematics. So, the minimum general core requirements for undergraduate FS programs include general chemistry, organic chemistry, biology, physics, calculus, and statistics. In addition to general education, students in FS Bachelor's programs receive training in crime scene investigation, criminalistics, forensic biology, forensic chemistry, forensic toxicology, fire debris analysis, and forensic firearms examinations. Many FS programs in forensics provide a rigorous mix of laboratory experience and classes such as molecular biology; genetics; organic chemistry; introduction to criminal justice; biochemistry; and introduction to forensic research, principles of FS; fundamentals of forensic analysis; testimony and ethics in FS; and analytical chemistry for life sciences.

The curriculum of the programs can comprises from 90 till 120 credits, and also includes internship opportunities with forensic laboratories. A model undergraduate FS degree program should provide a strong and credible science foundation that emphasizes the scientific method and the application of problem-



solving skills in both classroom and laboratory settings. Graduates of an undergraduate FS program include scientific writing, public speaking, laboratory skills and safety practices, and computer software application skills [1].

*Step 4: Hands-on experience/internship (one to three years).* Gaining practical experience through internships, trainee positions, or working under experienced professionals is crucial for developing the necessary skills. An internship as a vital part of the training process will give students hands-on experience, provide technical skills, and help build connections in the field. At this stage, many graduates of FS programs choose to garner some professional experience in medical or crime laboratories, police departments, local governments, hospitals or other settings.

*On-the-job training.* Many forensic scientists after hire undergo further on-the-job training by the hiring agency, which can last from six months to three years, depending on the trainee, agency, and FS specialty. Some specialties have established peer-based objective standards adopted throughout the field, while others vary from agency to agency. Also specialized training in specific areas like DNA analysis, fingerprint identification, or crime scene investigation is often required.

*Step 5: Gain professional certification (timeline varies).* In addition to earning a degree and completing field work, it is important to gain a professional certification through one of the FS certification Boards (of Forensic Document Examiners, Forensic Odontology, Forensic Toxicology, Forensic Anthropology, Forensic Engineering Sciences, Death Investigators, etc.). While not always mandatory, professional certifications can demonstrate expertise and enhance career prospects. A certification proves that a forensic scientist is an expert in the chosen subject area and can be trusted to carry out the responsibilities, and also can support job prospects. The requirements for certifications vary, but typically involve possessing at least a Bachelor's degree in a field relevant to forensics; proof of job experience; letter(s) of recommendation; submitting an application fee; and successfully passing a test.



*Step 6: Enroll in a graduate program in forensic science (optional but encouraged, two to four years).* While a Master's degree may be optional for many positions, pursuing a Master's or Doctoral program in FS is an enticing option for mid-career forensic scientists seeking to upgrade their knowledge and credentials. A graduate-level FS programs educate students in theoretical concepts, and provide with critical thinking ability, problem-solving skills, and advanced, discipline-specific knowledge. The core FS curriculum consists of a minimum of 30 semester credit hours, and contains the topics: crime scenes, physical evidence concepts, law/science interface, ethics and professional responsibility, quality assurance [3]. Specific courses cover the following areas: analytical chemistry and instrumental methods of analysis, drug chemistry/toxicology, microscopy and materials analysis, forensic biology, pattern evidence, etc. FS programs may offer specializations, or concentrations in analytical chemistry or molecular genetics. All FS programs offer rigorous graduate-level academic coursework in appropriate subjects, and the courses are advanced, comprehensive, and current. A number of specialized courses are required to suit the students' interests and enhance the research experience [1].

**Conclusions.** As forensic science grows in influence, the need for experts who can analyze and interpret complex evidence is greater than ever. From FS technicians and forensic biologists to DNA analysts and digital forensic experts, each role plays a critical part in solving cases and advancing research. A strong educational background in the natural sciences, personal attributes such as honesty and integrity, and additional professional skills (critical thinking, problem-solving, analytical skills etc.) are necessary to prepare for a career in forensic science. In addition to formal academic education, hands-on experience and on-the-job training, a level of self-motivated professional development, including certification and involvement in the field, provides tremendous growth opportunities for both experienced professionals and those entering the field.



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