Subject Benchmark Statement

Forensic Science

March 2022

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About this Statement

This document is a QAA Subject Benchmark Statement for Forensic Science that defines what can be expected of a graduate in the subject, in terms of what they might know, do and understand at the end of their studies. Subject Benchmark Statements also describe the nature and characteristics of awards in a particular subject or area. Subject Benchmark Statements are published in QAA's capacity as a membership organisation on behalf of the higher education sector. A summary of the Statement is also available on the QAA website.

Key changes from the previous Subject Benchmark Statement include:

- a revised structure for the Statement which includes the introduction of cross-cutting themes of:
  - equality, diversity and inclusion
  - education for sustainable development
  - employability, entrepreneurship and enterprise education
- a comprehensive review updating the context and purposes of Forensic Science, including course design and content in order to inform and underpin the revised benchmark standards.

How can I use this document?

Subject Benchmark Statements are often used by higher education providers in the design and development of new courses in the relevant subject, as they provide a framework for specifying intended learning outcomes in an academic or vocational discipline. They are also used as a reference point when reviewing or revalidating degree courses. They may be used by external examiners in considering whether the design of a course and the threshold standards of achievement are comparable with other higher education providers. They also provide professional, statutory and regulatory bodies (PSRBs) with the academic standards expected of students.

Subject Benchmark Statements provide general guidance for articulating the learning outcomes associated with a course but are not intended to represent a national curriculum in a subject or to prescribe set approaches to teaching, learning or assessment. Instead, they allow for flexibility and innovation in course design within a framework agreed by the subject community.

You may want to read this document if you are:

- involved in the design, delivery and review of courses in Forensic Science
- a prospective student thinking about undertaking a course in Forensic Science
- an employer, to find out about the knowledge and skills generally expected of Forensic Science graduates.

Relationship to legislation and regulation

The responsibility for academic standards lies with the higher education provider who awards the degree. Higher education providers are responsible for meeting the requirements of legislation and any other regulatory requirements placed upon them by their relevant funding and regulatory bodies. This Statement does not interpret legislation, nor does it incorporate statutory or regulatory requirements.

The regulatory status of the Statement will differ with regard to the educational jurisdictions of the UK. In England, Subject Benchmark Statements are not sector-recognised standards as set out under the Office for Students' regulatory framework. However, they are specified

as a key reference point, as appropriate, for academic standards in Wales under Quality Assessment Framework for Wales and in Scotland as part of the Quality Enhancement Framework. Subject Benchmark Statements are part of the current quality requirements in Northern Ireland. Because the Statement describes outcomes and attributes expected at the threshold standard of achievement in a UK-wide context, many higher education providers will use them as an enhancement tool for course design and approval, and for subsequent monitoring and review, in addition to helping demonstrate the security of academic standards.

Additional sector reference points

Higher education providers are likely to consider other reference points in addition to this Statement in designing, delivering and reviewing courses. These may include requirements set out by PSRBs and industry or employer expectations. QAA has also published Advice and Guidance to support the Quality Code which will be helpful when using this Statement, for example, in course design, learning and teaching, external expertise and monitoring and evaluation.

Explanations of unfamiliar terms used in this Subject Benchmark Statement can be found in QAA's Glossary. Sources of information about other requirements and examples of guidance and good practice are signposted within the Statement where appropriate.

Foreword from the Forensic Science Regulator

Forensic science is a critical part of the investigation of crime and the administration of justice, not only to identify offenders and provide expert evidence to the courts but it is one of the strongest safeguards against false allegation and wrongful conviction. It provides the means to enforce the law against the ownership or use of illegal firearms and drugs. With the introduction of searchable forensic databases of fingerprints and DNA where the material recovered from a crime scene or victim can reveal a suspected perpetrator, forensic science has become one the main routes to rapidly solving crime and protecting society.

It is against this background that the role of the Forensic Science Regulator was established to set and ensure compliance with forensic standards set out in the Codes of Practice and Conduct, and in April 2021 the UK parliament voted to put the role of the Forensic Science Regulator on a statutory footing. Central to any role in forensic science is the demonstration of competence, building on the fundamental knowledge and understanding that comes from academic study. I can say without equivocation that it is this knowledge and understanding that will make the difference in the success or failure of a forensic practitioner to discharge their responsibilities to the investigation of crime and the administration of justice. It is equally important that forensic practitioners develop communication and other personal skills that enable them to explain complex scientific concepts to investigators and lawyers and that can deal with the challenges and pressure of the court room. For those who study but don't take up a career in forensic science, the insight and knowledge of the use of science with such a high public profile and impact, gives the basis for taking on many roles at the interface between the public and the application of science.

I am very pleased to support the QAA Subject Benchmark Statement for Forensic Science and hope that it engages with the next generation of forensic practitioners, and shapes the future provision of academic courses in this important area.

Gary Pugh OBE
Forensic Science Regulator
February 2022

1 Context and purposes of a Forensic Science degree

1.1 This Statement sets out academic standards for courses at bachelor's degree with honours and master's degree levels (including integrated master's) in Forensic Science. A range of definitions exist for the term forensic science, however, for the purposes of this Statement it is defined in paragraph 1.3.

1.2 This Statement also defines the forensic science aspects of degree courses which are primarily based in areas with established benchmarks, such as Chemistry with Forensic Science or Forensic Biology. The Statement has been drafted to be balanced and does not favour one part of the investigative process above another.

Context

1.3 Forensic science is the application of science to serve the purposes of the law. As such, there is significant diversity in the organisation of the discipline across different global jurisdictions in terms of policies, procedures and standards. The reasons for this are complex but include caseloads and resourcing, ethical and legal standards, the structure of the criminal justice system and access to training, experience and an underpinning research base. In the UK, the ambition is for all relevant forensic laboratories and police departments to achieve ISO standards for the three core areas – scene investigation, forensic examination and court reporting – by 2025, to ensure that organisations follow their policies and procedures appropriately as part of their overall quality management system, thus providing quality and consistency to their customers. Additionally, there is now a broader appreciation of the procedures and practices that contribute to the successful use of forensic science. These include working practices with other professionals, and establishing investigative strategies, including clear forensic strategies. In addition, as a distinct discipline, forensic science can refocus research and development on shared principles and purposes, such as reconstructing, monitoring and preventing crime and security issues.

1.4 Over the past 20 years there has been an increasing realisation that all forensic testimony presented to the court needs to be underpinned by sound, peer-reviewed science (National Research Council, 2009; President's Council of Advisors on Science and Technology, 2016; House of Lords Science and Technology Select Committee, 2019). Over this same period, many universities both in the UK and in other countries have developed and delivered degree courses encompassing forensic science and its associated sub-disciplines. Such courses have appealed strongly to potential students looking for a science degree within a motivating and purposeful context and have provided employers, working within the criminal justice system and beyond, with a pool of potential graduate employees. To ensure degrees are fit for purpose within the professional context, the Educational Accreditation scheme set up by the Chartered Society of Forensic Sciences continues to support most higher education providers in the UK and some overseas with ongoing accreditation and surveillance activities. This scheme ensures productive close interaction between the profession, higher education providers and their students. Furthermore, the importance of equity of opportunity through inclusive practices is established within the field and should be supported and promoted by higher education institutions through accessible programmes and positive actions.

Purposes of a Forensic Science degree

1.5 A course in Forensic Science is a broadly-based science degree with a strong vocational focus on roles where scientific knowledge and skills are used to support and underpin both investigation and the justice system.

1.6 Consequently, Forensic Science degrees should aim to enable students to:

- develop an enthusiasm for forensic science
- have an intellectually stimulating and beneficial learning experience
- acquire underpinning scientific knowledge and skills of direct relevance to competence as a practitioner in forensic science, and to those organisations concerned principally with the collection or analysis of physical or digital evidence
- develop a sound knowledge of science and of laboratory and other transferable skills, which are of value not only within the forensic science profession, but also to businesses and organisations where analytical science, digital content or quality assurance underpin their activities
- acquire an understanding of the purposes of and requirements for working within an ISO quality standards framework and of the need for high standards of professional and ethical behaviour at all times, with the aim of avoiding miscarriages of justice
- acquire the communication skills required to present data, explain scientific arguments and justify outcomes to specialist and general audiences
- use independent learning at a level where they can enhance their professional development within the sector, build on knowledge and skills for their own and their potential employer's benefit, and to demonstrate initiative and flexibility with respect to changing needs and techniques; this may be achieved through a structured system of recorded personal development
- develop a clear understanding of the importance of the continuity of evidence from the (crime) scene to the court and beyond. Accepting that the value of findings at the laboratory are dependent on the knowledge and skill of those taking the appropriate samples at the scene to answer the questions relevant to the investigation. An awareness of the risks from contamination and cognitive bias at all stages in this process, together with effective mitigation strategies for avoidance and detection
- become familiar with the justice system, including those requirements of the police, expert witness roles and the legal sector (such as record keeping, admissibility and disclosure) relevant to the procedures and practice of forensic science, including a knowledge of the different legal systems and their requirements relating to forensic science within the UK and beyond
- acquire problem-solving and research skills appropriate to degree-level study, with an appreciation of current and emerging research in forensic science and related areas
- recognise the relevance of sustainability, equality, diversity and inclusion and demonstrate a commitment to those values for forensic science both as an academic subject and a profession
- develop a broad understanding of forensic opportunities and how these can support a forensic strategy, demonstrating impartial thought and investigative skills to progress an enquiry
- develop an awareness of the digital forensic opportunities and how the different sub-disciplines of forensic science can maximise opportunities for forensic evidence
- develop investigative skills, such as identifying relevant lines of enquiry, sources of evidence, artefacts, and the relationships between them
- encourage an ability to critically review information, particularity the scientific literature
- understand the scientific method, that is, the value of experimentation and gain ability to access findings
- gain an awareness of the relationship between the evidence recovered from the crime scene, the investigation process, the analysis of evidence and bringing a case to court

- gain an understanding of the duty to the court for forensic professionals, including the role of the expert witness.

1.7 In addition to these aims, a master's degree in Forensic Science should aim to enable students to develop:

- a deep knowledge and experience of examination and analytical techniques relevant to forensic science and their practical application within particular relevant specialisations
- a critical awareness of and engagement with current research methods and techniques
- the abilities and skills necessary to devise, plan, carry out and present an original, extended investigation or research project in an academic context
- a clear recognition of the constraints and opportunities of the current environment in which professional forensic science is carried out
- the ability to work within a quality standards framework
- enhanced preparedness for entry to professional employment or doctoral-level study
- the independent learning ability required for continuing professional development.

1.8 All degree courses should accord with the qualification descriptions in national qualification frameworks. QAA has published additional guidance on different kinds of master's degrees, which may also be helpful to providers.

Characteristics of a Forensic Science degree

1.9 The majority of Forensic Science courses are characterised by a broad, laboratory-based analytical science curriculum often incorporating aspects of related disciplines, such as anthropology or archaeology. Alternative courses may be strongly focused on digital forensics or investigation while retaining much of the core knowledge and skills associated with the forensic process.

1.10 Principal employers of forensic scientists include organisations within the justice system, such as the police, other law enforcement agencies and governmental agencies, in addition to the diverse range of forensic science providers who employ many laboratory-based forensic scientists. Forensic Science graduates are also well equipped to use their scientific knowledge and practical skills, in a wide variety of applications, including analytical science laboratories, non-forensic DNA and molecular biology laboratories, quality management roles, including proficiency testing organisations and roles involving the communication of science.

1.11 Forensic scientists work within an increasingly regulated environment where a knowledge and understanding of quality standards, validation of procedures, legislation and codes of conduct is essential. Moreover, awareness of issues around bias and adherence to ethical procedures and processes are now embedded in professional practice.

1.12 A forensic science practitioner requires knowledge of relevant areas of the law, the relevant jurisdictional law enforcement procedures of the legal system and the different approaches both in the UK and beyond. It is within this context (both civil and criminal) that the recognition, enhancement, preservation, recovery, scientific analysis, interpretation, evaluation and presentation of evidence takes place.

1.13 The theory and practice of forensic science, in particular the examination and analysis of physical evidence, is strongly underpinned by knowledge and skills drawn from many aspects of chemistry, biology, physics, mathematics and statistics. This

multidisciplinarity is a core feature of forensic science and, accordingly, of the benchmark standards set out in this Statement.

1.14 There are three integrated components of forensic science that make it unique as a discipline. Practitioners need a familiarity with the investigative processes covering these three key themes, although their activities and depth of expertise may lean towards a particular area. The themes are (i) scene investigation, (ii) laboratory analysis and (iii) the interpretation, evaluation and presentation of evidence.

1.15 For scene investigation, the detection, management, recovery and recording of evidence, including devices containing digital data, are fundamental to the subsequent laboratory activity and interpretation of that evidence. Equally important is the understanding and application of safety protocols for self and others. An understanding of contamination, and how to avoid it during this phase is also essential. Many of the skills required are distinct from those used in the laboratory. It should be noted that forensic scene investigation is broader than just crime scenes. For example, practitioners may investigate fire scenes for an insurance company in the civil courts or they may investigate deaths by suicide for the coroner. Practitioners may also find themselves working on a live server and/or a computer network. Such digital crime scenes effectively operate as a separate ecosystem within a physical crime scene, where the boundary is defined by the interface between the digital and physical world. Scene work may also include fieldwork, such as archaeological excavations. For the purposes of this document, the term 'scene investigation' has been used to encompass both crime scenes and other scenes where investigation and recovery of evidence has been carried out.

1.16 Laboratory work emphasises those techniques employed in the examination, comparison and analysis of chemical and biological materials, including physical marks and impressions, for identifying materials with sufficient discrimination. Equally important is the understanding and application of safety protocols for self and others to address the appropriate questions at either investigative or evaluative phases. Alternatively, examination procedures appropriate to digital devices may be the principal focus. The definition of a laboratory is broad, and may include analytical laboratories, microscopy laboratories, computer laboratories, anthropology laboratories and dedicated spaces for other forms of examination and analysis of evidence.

1.17 Interpretation and evaluation of evidence involves the reliable recording of evidential materials, experimentation, analysis and interpretation within the context of the case and data management. It also requires the clear and impartial presentation (written and oral) of the forensic examination and findings with an understanding of the significance of its outcomes within a legal context, including uncertainties. A report or witness statement must be robust, transparent, logical and unbiased and should distinguish between factual and expert reporting. It should be noted that admissible 'evidence' can only be decided by the courts and therefore, up to that point in the process, the items and findings are only 'potential evidence'. For the purpose of this document, the term evidence implies both evidence and potential evidence.

1.18 Techniques used in forensic science develop rapidly, often with subsequent implications for preserving the integrity of evidence (for example, digital data). There is a need for practitioners to be aware of and respond to relevant, current and developing research trends in science and technology, and of forensic science as a research discipline (see also paragraph 1.19).

Equality, diversity and inclusion (EDI)

1.19 This Subject Benchmark Statement is to be interpreted in the context of the Equality Act 2010 and seeks to embed equality, diversity and inclusivity across all educational practices within a Forensic Science course. The Equality Duty (section 149 of the Act) supports good decision-making by ensuring public bodies consider how different people will be affected by their activities, helping them to deliver policies and services which are efficient and effective, accessible to all and which meet different people's needs. In this section we pose some reflective questions, and set out aims and objectives which might help when reviewing and reflecting on course provision, to ensure everyone is treated equally with dignity and respect. All staff and students within Forensic Science courses have a responsibility to ensure equal opportunity for all regardless of background, ability, culture, gender or identity.

1.20 The following questions are the type that might be posed in assuring that Forensic Science courses take account of EDI.

- How are different demographics represented across the organisation, staff and students? How do these compare to the national averages?
- Are there discrepancies in progression and attainment between Forensic Science students with different demographics?
- Are there changes in attainment or progression when students with different demographics progress from school to college to university and into their graduate career?
- Who has been consulted to help understand and act positively on these differences?
- How are complaints dealt with?
- What is the feedback from people who have experienced discrimination either formally or informally?
- Is recognition given to the contribution of developments in forensic science education or practice across different cultural backgrounds?

1.21 Equality, diversity, and inclusion require a strong commitment and concerted action to build an inclusive environment where opportunities are open to all, diversity is valued, and where everybody can reach their full potential without fear of harassment, prejudice or discrimination.

Aims

- To eliminate unlawful discrimination, harassment and victimisation and other conduct prohibited by the Act.
- To advance equality of opportunity between people who share a protected characteristic and those who do not.
- To foster good relations between people who share a protected characteristic and those who do not.

Objectives

1.22 In order to achieve these aims, a review of practices and procedures may include, but is not exclusive to:

- designing Forensic Science courses that consider the justice system from different legal, professional and social perspectives
- ensuring professional values, future skills and understanding

- the use of multicultural student experiences to create student-centred learning environments
- intercultural interaction within forensic science teaching activities
- forensic science teaching materials, assessment and feedback that are inclusive and accessible to all linguistic reformulation (defining discipline-specific terminology in simple language, avoiding colloquial language, and/or idioms that might be considered to exclude particular groups)
- embedding well thought-out teaching practices to ensure all students can effectively complete their studies, whatever their background, disability or personal circumstances, while maintaining academic standards
- identifying staff training that needs to be undertaken.

Sustainability

1.23 Education for Sustainable Development (ESD) is defined as 'the process of creating curriculum structures and subject-relevant content to support sustainable development' by aligning teaching practices, where possible, to the UN Sustainable Development Goals. ESD should be embedded in teaching and learning practices to ensure students are aware of social, economic and ecological well-being factors, now and in the future. ESD can be used to empower students and staff to change the way they think and work towards a sustainable future using transdisciplinary, holistic and values-driven relevant material. For Forensic Science students this includes developing practices for lifelong learning through engagement with continual professional development to ensure their future practitioner skills and knowledge base are current. Staff should be equipped with tools and inspiration to mainstream sustainable development across a student's learning environment. Critical thinking, problem-solving skills and competencies related to ESD should be embedded in a student's learning process to ensure they can manage complexities such as uncertainty and risk. This invites the use of informed student-centred and inquiry-based teaching approaches within the programme.

1.24 ESD should be interpreted in the context of the Advance HE and QAA Education for Sustainable Development Guidance.

Enterprise and entrepreneurship

1.25 Education activities in enterprise and entrepreneurship may also contribute to Forensic Science courses by supporting behaviours, attributes and competencies that are likely to have a significant impact on the individual student in terms of successful careers. Enterprise activities should be ambitious and require students to develop creative, innovative, resilient and critical approaches to provide solutions, generate ideas and communicate issues aligned with forensic practice. Through entrepreneurship activities students learn to organise and manage business risk and associated business profit. Such activities prepare students for changing environments, and provide enhanced impact through placements and activities that build links between academic institutions and external organisations.

1.26 Beyond employment, entrepreneurship education provides competencies to help students lead a rewarding, self-determined professional life, well placed to add social, cultural and economic value to society through their careers.

1.27 Enterprise thinking and entrepreneurship will drive the future of forensic science. Students should be able to identify opportunities for business development or process improvement whether this be through studies, partnerships or placements. The grounding of entrepreneurial thought is in making decisions, acting on ideas and individual creativity to support wider commercial or organisational interests.

2 Distinctive features of a Forensic Science degree

2.1 The course and thus its curriculum should be designed to enable students to demonstrate the attainment of the stated learning outcomes of the course, and the assessment strategies should align to these outcomes. The course outcomes and content (section 3) should reflect the contemporary knowledge and skills required by relevant graduate employers. Therefore, course design should be frequently updated with developments in pedagogical and scientific research and collaboration or partnership with appropriate key stakeholders - for example, with forensic science providers, police forces, other investigative agencies and the judiciary. Students should be supported to progressively acquire subject knowledge and skills, gradually advancing towards more independent learning.

Accessibility

2.2 Accessibility considerations should apply to all aspects of the course. This relates to physical access but also includes cultural awareness, language and sensitivity to victims of crime. Accessibility should consider whether all aspects of the course can be understood or used by people however it is encountered. This includes the recognition for curricula, tuition and assessment being accessible and reasonable adjustments being put in place. To ensure students who struggle with particular forms of teaching and learning scenarios are not disadvantaged, methods used within an individual course should be as varied as possible. There are many forms of delivery, too many to include all, but some examples are likely to comprise an appropriate combination of the following:

- hands-on practical exercises and science-based experiments, at scenes and in laboratory, with reasonable adjustments to support accessibility, as required
- conducting individual risk assessments across a range of learning environments
- ensuring facilities, indoor and outdoor, are accessible across physical and learning needs
- providing peer-support and group work for individuals with colour blindness
- placement or workplace experience with a forensic science or related organisation
- tutorials and supervisions for structured regular contact with tutors and supervisors
- a range of self-guided, student-centred learning practices
- team-based exercises, with consideration of neurodiverse students, and adjustments in place as required.

2.3 Digital accessibility is the inclusive practice of ensuring that all people can equally access and navigate digital information and platforms, such as websites, electronic documents and mobile phone applications, irrespective of physical, situational or socio-economical impairments (W3C, 2018). The content, which will include text, images and sound, should be accessible and comprehensible without discrimination.

Progression

2.4 Each of the UK frameworks for higher education qualifications (The Framework for Higher Education Qualifications of UK Degree-Awarding Bodies (FHEQ) and The Framework for Qualifications of Higher Education Institutions in Scotland (FQHEIS)) have a number of different framework levels. These define the outcomes of progressively more challenging learning (and typical qualifications) in ascending order. To convey the relative position of levels of achievement and/or qualifications, each framework level is assigned a number.

2.5 Over the course of a degree with honours (FHEQ Level 6; FQHEIS Level 10), a forensics student will progress from one year of study to the next in line with the regulatory framework for each institution. However, it is expected that each year would see the attainment of certain levels of knowledge, expertise and experience which builds towards the final achievement of meeting all of the threshold-level subject-specific and generic skills listed in this Statement. Upon graduation from an undergraduate degree, it would be expected that a student who had achieved a second-class degree or higher would be capable of, and equipped for, undertaking postgraduate study in forensics or an associated discipline.

2.6 Joint honours undergraduates will achieve core elements of the specific and generic skills for the subject, and will add others according to the subjects covered in joint courses. Additionally, they may explore the overlap between their two subject areas, creating further opportunities for interdisciplinary study.

2.7 Integrated master's degrees (FHEQ Level 7; FQHEIS Level 11) in the UK comprise a four-year full-time course or a part-time course of not less than five and not more than eight academic years.

2.8 In a standard three-year undergraduate honours degree course, students may exit earlier and be eligible for a Certificate of Higher Education, a Diploma of Higher Education, or an honours degree depending upon the levels of study completed to a satisfactory standard. Scottish bachelor's degrees with honours are typically designed to include four years of study, which relates to the structure of Scottish primary and secondary education.

Flexibility

2.9 Degree providers are encouraged to consider a range of learning modes to offer flexibility within their courses with the aim of meeting diverse learner needs including assisted learning including communication skills. Where possible, full-time, part-time and distanced learning options should be offered and within each of these modes, there are a variety of options. To enable wider participation, providers might consider a combination of classroom-based, online and employer-based learning or a blended approach to all of these such as the HyFlex (hybrid-flexible) delivery approach, blending online and on-site participation. Not only does this increase inclusivity and equity, but it empowers students by providing choices, where possible and appropriate, relating to the how, what, when and where they learn.

2.10 Flexibility should also encompass a plan of action for those with protected characteristics and, where there is a change in a student's circumstances, to support them to complete their course. In addition, it is important that providers have a plan in place for the sudden need to change content delivery mode, such as the need to move entirely to online and digital delivery to ensure continuation of learning. This flexibility may include altering the practical/theory content and may even involve the practical being concentrated into blocks. Certain aspects, particularly related to practical skills, may need to be considered in a particular way to ensure the required skill development.

Partnership and employer engagement

2.11 Degree providers should be encouraged to develop partnerships and engagement with forensic science employers (law enforcement agencies and private sector forensic service providers) and other wider organisations where degree activities can be related to the work environment. This will help prepare the students for the demands and expectations of the workplace while developing their workplace skills which are likely to include self-reliance, critical thinking, interpersonal, problem-solving and teamworking skills. For

employers this helps resolve workplace skills shortages, grows a pipeline for recruitment, improves recruitment success and increases retention of staff.

2.12 Where degree courses develop research project partnerships with organisations, this allows them to contribute to the evidence base which underpins workplace practice supporting the optimisation of methods. It allows them to undertake and engage in research and development which is directly relevant to the workplace challenges faced in these organisations. It also directly provides an appreciation of the workplace while developing essential employer skills.

2.13 If students choose a work placement opportunity as part of their degree this should have a clear programme of learning. The typical activities a student may undertake as part of their placement could be quality assurance activities, data analysis, basic examination processes, administration of evidence and specific project work. In order to successfully secure a work placement, the student would likely need to display:

- high motivation and positive attitude to learning
- ability to work on their own initiative within a documented framework of instruction
- exceptional attention to detail and the ability to produce work to a high standard, on time
- ability to follow strict standard operating procedures and understand why this is important
- excellent written and verbal communication skills
- problem-solving skills and ability to deal with complexity coupled with managing a high workload
- ability to work comfortably under pressure and demonstrate resilience as a sole worker and within a team
- strong IT capability incorporating various applications such as, but not limited to, Microsoft Office, including Word and Excel, and databases
- ability to analyse data and basic reporting skills.

Monitoring and review

2.14 A major feature of academic quality assurance and enhancement at a higher education institution is having in place monitoring and regular review processes for the courses it delivers. Degree-awarding bodies routinely collect and analyse information and undertake periodic course review according to their own needs. They will draw on a range of external reference points, including this Statement, to ensure that their provision aligns with sector norms. Monitoring and evaluation is a periodic assessment of a course, conducted internally or by external independent evaluators. Evaluation uses information from both current and historic monitoring to develop an understanding of student achievement or inform future course planning.

2.15 Forensic Science degrees will work collaboratively with external examiners, student cohorts and external partners to enhance the educational experience. Close alignment with external bodies such as, but not limited to, the Chartered Society of Forensic Sciences and the Forensic Science Regulator ensure that the content as set out below remains relevant.

2.16 Externality is an essential component of the quality assurance system in the UK. Higher education providers will use external reviewers as part of periodic review to gain an external perspective on any proposed changes and ensure threshold standards are achieved and content is appropriate for the subject.

2.17 External examination currently in use across the UK higher education sector also helps to ensure consistency in the way academic standards are secured by degree-awarding

bodies. Typically, external examiners will be asked to comment on the types, principles and purposes of assessments being offered to students. They will consider the types of modules on offer to students, the outcomes of a cohort and how these compare to similar provision offered within the UK. External examiners produce a report each year and make recommendations for changes to modules and assessments (where appropriate). Subject Benchmark Statements, such as this one, can play an important role in supporting external examiners in advising on whether threshold standards are being met in a specific subject area.

2.18 Forensic science has professional and vocational outcomes that may also require evaluation and accreditation from professional and regulatory bodies as outlined above. These are usually done through a combination of site visits and desk-based reviews. Monitoring and evaluation processes should identify appropriate stakeholders and ensure dissemination of findings with regards to learning, teaching and assessment at various levels to reflect changes in cohorts, experience and pedagogic practice.

3 Content, structure and delivery

3.1 The Chartered Society of Forensic Sciences offers higher education institutions the opportunity to accredit their courses and, therefore, a comprehensive source of component standards can be accessed and used as a basis on which to design the curriculum content.

3.2 Due to the diversity of specialisms that sits under the heading of forensic science, curriculum content can provide both core and optional modules that are underpinned by the expertise, research and/or casework experience of the institutions' staff. While scene investigation, analytical chemistry, DNA, fingerprint and trace evidence analysis, and the legal system may often feature within the core curriculum, areas such as anthropology, archaeology, digital forensics, firearms and ballistics, vehicle collision, forensic engineering and criminology may be offered as optional modules to provide students with the opportunity to tailor and personalise their curriculum towards a chosen career.

Teaching and learning

3.3 Utilising a combination of teaching and learning practices (pedagogy and andragogy) should enable learners to develop their knowledge and understanding along with academic and professional skills. Teaching methods may include:

- lectures
- practical classes
- tutorials or seminars
- workshops
- simulations (such as mock crime scene, laboratory and (moot) courtroom experiences)
- case studies
- debates
- fieldwork
- problem-based learning
- team-building exercises
- training and practice in the use of technology, including hardware and software resources
- work-based learning (for example a placement opportunity)
- work-related learning (for example, using real-world scenarios).

3.4 Practical classes, for example in laboratories and/or computer rooms, should support the taught curriculum, and in particular allow the student to acquire transferable technical and practical skills. This will include familiarity with a variety of forensic experimental methods and their scientific basis, and with methods to deal with uncertainties in their outcomes, such as data handling and statistics to carry out probabilistic inference (expanded upon in paragraph 3.19). The contemporaneous preparation of records and reports is likely to be emphasised.

3.5 At master's level, experience of research methods and of reading and interpreting research publications is expected, as is extended project work, including the preparation of an independent original report, for example, in the style of a journal article or thesis.

3.6 As previously outlined in section 2, the programme of teaching and learning should be designed to enable students to demonstrate the attainment of the stated learning outcomes of the course using assessment strategies that align to these outcomes and the skills required by relevant graduate employers. As a result, the teaching and learning strategies suggested above should be reviewed and updated with advances in pedagogy,

andragogy and educational and professional information technology, although the balance between different methods may vary between institutions and courses. Teaching staff will need to maintain their knowledge of forensic science to remain current by suitable and regular continuous professional development engagement. Subject-specific content should also be underpinned and updated based on the latest research, innovation, practice and regulation within the sector. Overarching considerations will be the demonstrable acquisition by the student of a clear appreciation of the scientific approach, and of the knowledge and skills needed for the practice of forensic science.

3.7 Depending on the course type, learning outcomes or learner demographics, the taught curriculum may be delivered using synchronous (live) and/or asynchronous approaches, on campus and/or from a distance (remote). Wherever possible, sessions should be designed to be student-centred and utilise active learning strategies to promote inclusivity, application and engagement. Design and delivery should also consider the use of technology, hardware and/or software, to enhance the learning experience and provide further opportunities to apply knowledge in problem-solving.

Knowledge and understanding

3.8 Throughout the forensic and investigative process, from the (crime) scene to the court, students should be expected to use safe working practices and demonstrate:

- an understanding of current ISO standards, legislation and Forensic Science Regulator Codes of Conduct and associated guidance, including impartiality and disclosure requirements
- familiarity with professional ethics, including respect for codes of practice and conduct, standards, rules and responsibilities (outlined above)
- knowledge and understanding of relevant types of cognitive bias, their consequences (including cumulative effects) and appropriate mitigation measures
- an understanding of and ability to implement approaches such as Case Assessment and Interpretation in formulating and delivering a forensic strategy.

3.9 Students should also be expected to develop a knowledge of the criminal justice and legal systems within the UK and an appreciation of systems that operate globally in different jurisdictions. This should include an understanding of both the adversarial and inquisitorial approaches from the global perspective and, in particular, how forensic science and the role of the expert witness, including defence scientists operate within these systems. They should have an understanding of prevailing legal standards and legislation applicable to the recovery, storage, retention, analysis and disposal of evidence.

3.10 Within the three main themes of forensic science outlined in paragraph 1.14, different degree schemes may have different emphases, however, a basic knowledge of all three themes, appropriate to that degree, is a minimum expectation for all students. The content of these themes is expanded on as follows.

3.11 **Scene investigation** encompasses knowledge of the principles and effective safe working practical application of the relevant techniques needed for the formulation of scene examination strategies which involve understanding the potential significance of various materials in a given context. This includes understanding the importance of the recognition, priority processing, recording, preservation, recovery, storage, scientific analysis and interpretation of evidence at the scene, including strategies for dealing with contamination issues throughout the process. Students will acquire, as appropriate, an understanding of the forensic principles and practices when using a range of imaging techniques, in particular (crime) scene photography together with a clear understanding of the responsibilities, roles

and liabilities of the individuals and agencies involved in a (crime) scene, and of information exchange between them.

3.12 **Laboratory examination and analysis** requires competence in the selection and application of a range of methods used in the location, identification, recovery, examination, comparison (including mark comparison), extraction and scientific analysis of commonly encountered physical, chemical, biological and digital evidential materials, including appropriate storage practices, as appropriate. This is underpinned by safe working practices and knowledge of the theory, application and limitations of the principal laboratory methods used routinely in forensic science together with an understanding of the importance of validation, calibration and the use of accepted examination or analytical methods for all laboratory work, where appropriate. Students will also have a knowledge of the principles and application of control and reference samples, and the use of databases for the identification of materials.

3.13 **Interpretation, evaluation and presentation of evidence** encompasses the management and interpretation of the results from the examination of physical or digital evidence, in the context of casework. Fundamental to this is the understanding and application of accepted methods of interpretation and evaluation, in particular that of logical evaluation using likelihood ratio, and other appropriate statistical analysis, including the use of appropriate interpretive databases, together with an understanding of factors affecting the interpretation process that may contribute to uncertainty in the outcome and consequent expert opinion. Students will be able to interpret and assign conclusions to forensic findings and to distinguish between factual and expert reporting. They will be able to formulate expert opinion and have the knowledge and skills to write impartial, comprehensive and appropriate reports in a variety of formats and for a variety of audiences, including for both investigators and for the court. They will acquire the skills and expertise to convey and defend, both orally and in writing, a written report in the context of the court.

3.14 The three core components of forensic science above are underpinned by scientific knowledge and understanding drawn principally from chemistry, biology, physics, mathematics, computer science and law topics, but the list is not intended to be exhaustive and may include aspects of digital forensics. Again, different degree schemes may have different emphases, but a basic knowledge of these underpinning sciences appropriate to that degree course is expected. For courses in digital forensics, appropriate scientific and mathematical underpinning is expected.

3.15 In chemistry, students should be able to select, utilise and interpret data from appropriate analytical and microscopic techniques, to determine analytes in a sample, identify and compare materials and determine their composition within a forensic science context. The student should appreciate the underlying theoretical and operating principles of analytical and microscopic techniques and the limitations of the techniques, as well as chemical interactions that may be taking place.

3.16 In biology, the course should include practical microscopy, and molecular biology and biochemistry (with particular emphasis on body fluid identification and detection, nucleic acids, proteins, enzymes and biochemical processes, molecular genetics, genomics and principles of inheritance), forensic genetic techniques such as Short Tandem Repeat (STR) and may include anatomy, organ systems, some forensic medicine and other areas such as entomology, microbiology, palynology, botany and anthropology.

3.17 In physics, the course should include elementary optics (including principles of microscopy), the mechanics principles that underpin projectiles, ballistics, explosions and blood dynamics, aspects of the physical properties of materials, and an understanding of electromagnetism, atomic structure and radiation needed for an appreciation of the

theoretical aspects of chemical instrumental analysis, forensic photography and other imaging techniques.

3.18 In mathematics, there should be sufficient knowledge and facility in functions, algebra and trigonometry to cover the mathematical aspects of the physics, chemistry and biology in the course. Appropriate statistics would be a working knowledge of the basis and application of statistical methods and probability for analysis of experimental data and their uncertainties, including sampling methods and determining method uncertainty. This should also include an understanding of the principles and application of the likelihood ratio approach to the evaluation of evidence for the court, including the retrieval and use of frequency of occurrence information and the use of databases.

3.19 Digital forensics builds upon principles based in computer science. Such principles are likely to include knowledge in data representation schemes (such as binary and hexadecimal), coding in a least one language (for example, Python), the different types of networks and the basic protocols in use, the principles of computer security, and an understanding of relational databases. From these principles, the course should develop to include reverse engineering techniques to understand the structure of unfamiliar data, linking artefacts from disparate data sources to develop a timeline of user activity and distinguishing between circumstantial and probative evidence.

3.20 In law, the course would be expected to include an awareness of criminal law, appropriate range of legislation, jurisdiction and procedures for working within a justice system. This includes the role of the expert witness as well as a working knowledge of the legislation that governs professional practice, such as the Police and Criminal Evidence Act 1984, the Data Protection Act 2018, and the Criminal Procedural Rules and Practice Directions 2020.

Skills and employability

3.21 Students studying for Forensic Science degrees are expected to develop a wide range of skills and abilities. These may be broadly grouped into four areas: (i) basic scientific skills, including laboratory skills, (ii) skills specific to forensic science, (iii) generic graduate skills and (iv) ethical behaviour.

Scientific, laboratory and research skills

3.22 A course in a forensic discipline should be designed to enable students to develop the necessary skills so that they can:

- work safely and effectively in a laboratory; this includes competent risk assessment, following documented procedures, ensuring calibration (where applicable), and reliable recording of methods and results
- be confident in using advanced laboratory equipment (where applicable), and in learning how to use new facilities, including understanding the principles on which the instrumentation is based
- understand the need to carry out tasks in a consistent, reproducible and traceable manner
- evaluate and critically interpret the results obtained via problem-solving; this will require the student to identify the appropriate scientific principles, plan strategies for solution and present conclusions in suitable textual, tabular or graphical form
- plan, execute and report the results of a scientific investigation using appropriate methods to critically analyse the data and evaluate the level of its uncertainty
- apply scientific methods to tackle problems in science, including how to construct a suitable hypothesis and how to design experiments to test this hypothesis

- use ICT skills to analyse and organise data, including software appropriate to experimental equipment and use of databases.

3.23 In addition to the abilities above, a master's degree course should be designed to enable students to:

- work safely and effectively with minimal direct supervision in a laboratory
- apply and adapt problem-solving skills to unfamiliar, complex, poorly defined and open-ended situations
- independently plan, design and execute new experimental procedures
- independently plan, design, conduct and report an independent research project.

Forensic science skills

3.24 A course should be designed to enable students to develop the ability to:

- appreciate why standards and codes of conduct are necessary and the importance of adhering to these
- work effectively within a team and within a formalised system, following relevant quality assurance procedures
- undertake the recording, recovery, scientific analysis, evaluation, interpretation, preservation and presentation of potential evidence
- construct efficient case-examination strategies
- be competent in procedures for maintaining the integrity and continuity of evidence
- use impartial written and oral presentation skills appropriate for the legal, court and law enforcement environments
- comply with safe working practices, both for self and others
- have an appreciation of the special issues, legal framework and practices involved with the recovery, storage, handling, retention, investigation, analysis and disposal of digital evidence and various contact trace materials, including human or other biological tissues and DNA with reference to the Human Tissue Act 2004.
- possess an awareness of the implications of modern technological advances, including databases and digital forensics, such as collection of data from mobile devices and PCs/laptops
- appreciate the ethical, legal and commercial responsibilities of a forensic science practitioner, and of the quality assurance and validation requirements relevant to professional competency.

3.25 In addition to the abilities above, a master's degree course should be designed to enable students to develop:

- a deep experience of and a critical approach to an appropriate range of the methods used in forensic science
- an open and innovative attitude to the development of new and emerging procedures and techniques relevant to forensic science
- an understanding of the moral and ethical issues involved in the practice of forensic science.

Generic graduate skills

3.26 A course should be designed to enable students to develop:

- personal and academic resilience by developing an awareness of their own well-being and that of others

- investigative skills, including the ability to carry out an independent investigation using multiple information sources and applying critical judgement
- communication skills, including the ability to present complex concepts and information in a concise and effective manner, both orally and in writing, and the ability to interact and communicate effectively within a wide range of professional environments
- analytical skills, including the ability to pay attention to detail, to construct logical arguments based on incomplete data, and to use technical language correctly
- ICT skills, including the use of databases, software packages and modern communications methods
- personal skills, including the ability to work both independently and as part of a team, and the ability to plan, organise and perform work efficiently and conscientiously in a timely way, meeting deadlines where necessary
- personal development skills, including the ability to identify and reflect on where further training or skills acquisition is necessary for self-improvement.
- an understanding of how to apply best practices with respect to equality, diversity and inclusivity

3.27 In addition to the abilities above, a master's degree course should be designed to enable students to develop:

- self-direction and originality in problem-solving
- an effective self-critical attitude in planning, carrying out and reporting investigation
- competence in their ability to interpret complex technical information and to communicate it in a wide variety of professional situations
- the independent learning ability required for continuing professional development.

Ethical behaviour

3.28 Students should fully appreciate that to fabricate, falsify, misrepresent or wilfully misinterpret evidence, data or the results of experiments is unethical and unacceptable. This should be referred to within the course material.

They should also:

- appreciate the serious consequences of careless or substandard practices
- be objective, unbiased and truthful in all aspects of their work
- recognise and acknowledge the limits of their knowledge
- recognise that plagiarism constitutes unethical behaviour
- be aware of equality and diversity legislation
- be aware of ethical issues, legal requirements and procedures involved in the conduct of research, particularly when working with animals and humans, and/or using an individual's data.

Assessment

3.29 Within the multidisciplinary curriculum of forensic science, a diverse selection of assessment formats is expected to provide opportunities for students to develop a broad and contemporary skillset for the range of careers they may wish to pursue post-graduation. Assessments may be a combination of formative and summative to enhance students' skills and gain confidence, and may be delivered through in-person and/or online mechanisms. Reasonable adjustments for disabled students should be made to all assessment practices according to the student requirements. Assessment types could include some or all of the following elements at various levels of the curriculum:

- Problem-solving (within or across disciplines)
- oral, audiovisual, poster and conference presentations
- practical tasks (including scene processing, laboratory experimentation and research)
- laboratory reports
- case reports on simulated scenes
- critical analysis of literature (literature review) and/or case studies
- oral defence (viva voce), interviewing and debate
- investigative skills
- placement reports
- project reports, theses or dissertations
- draft journal articles
- curriculum vitae
- self-reflection
- peer-assessment
- group work
- examination (open or closed book).

3.30 Assessment will test the successful achievement of subject knowledge, and the acquisition of generic and subject-specific skills embedded in the learning outcomes for the course. It is appropriate that some assessment elements will test a student's ability to organise and complete work, and to communicate effectively, under constraints of time and pressure. Elements of the assessment should also allow students the opportunity to demonstrate reflection, originality, creativity and integration of their knowledge into practice.

3.31 Assessments should be shared with students via an assessment brief with associated marking criteria mapped against the specific learning outcomes of the module or course. However, there may also be opportunities for students to design or co-create assessments with their tutors and/or peers as part of the learning process and these may or may not form part of the marking criteria. Assessments should be designed to be inclusive of all students, for example by using digital accessibility best practices, and meet learning support requirements, such as hearing impairments and colour blindness. While it still may be necessary on occasion to provide an alternative assessment to meet a specific learning support requirement, good assessment design should aim to anticipate such needs as much as possible. It is also important that alternative assessments enable students to demonstrate that they meet the expected learning outcome(s).

3.32 A variety of formal and informal feedback mechanisms may also be adopted within the learning design to support student progression and professional development. Feedback could be delivered on an individual or group basis through synchronous or recorded asynchronous mechanisms and may include the following:

- knowledge checks
- verbal or audio
- audiovisual
- written comments or summaries
- peer-review
- qualitative or quantitative matrices (rubrics)
- worked examples.

3.33 To encourage students to engage with feedback, it should be provided in a timely manner. It is also suggested that the curriculum contains embedded, visible opportunities for students to create and implement their action plans to further promote personal development.

4 Benchmark standards

Introduction

4.1 The benchmark standards have been divided into two groups. The first set identifies the transferable and core skills that would be expected of all honours degree graduates in Forensic Science. The second group of standards relates to three more specific themes within forensic science (scene investigation, laboratory analysis and digital forensics). The relative emphasis placed on these themes will vary between different providers and degree courses.

4.2 In each case, the standards are divided into 'threshold', 'typical' and 'excellent'. These standards are intended to reflect the performance of the individual student. The threshold level is the core of the Subject Benchmark Statement and is achieved by anyone obtaining an honours degree. Many students will perform significantly better than the threshold standard, and it is expected that most should achieve the typical standard. Each higher education provider has its own method of determining what appropriate evidence of this achievement will be and should refer to Annex D: Outcome classification descriptions for FHEQ Level 6 and FQHEIS Level 10 degrees. This Annex sets out common descriptions of the four main degree outcome classifications for bachelor's degrees with honours: 1st, 2:1, 2:2 and 3rd.

4.3 The benchmark standard for master's degrees, including integrated master's, is identified at the end.

Threshold level (3rd class)

Generic standards, not specific to any particular theme

4.4 Students graduating with an honours degree in Forensic Science at threshold level of attainment are expected to be able to demonstrate:

- knowledge and understanding of those sciences, including mathematics and statistics (including the Bayesian approach and likelihood ratios), involved in forensic investigations
- knowledge of forensic techniques
- laboratory skills to carry out a range of tasks and technical processes with a degree of autonomy
- an ability to select and carry out practical laboratory experiments in forensic investigations, including the ability to use appropriate laboratory equipment
- knowledge of the types of cognitive bias and how they may affect forensic processes
- a range and knowledge of the general issues and techniques involved in scene investigation
- the ability to interpret the results of laboratory and other investigations, with an appreciation of their limitations, including the hierarchy of propositions and activity level hypotheses
- knowledge of the various legal and law enforcement environments within which forensic science is practiced, including working across jurisdictions
- an understanding of the differences between the intelligence and evidential value of forensic findings in an investigation
- the ability to record results accurately, organise data, make deductions and present clearly the results of investigations both in written and oral form, in a manner which can be readily assimilated within a legal, law enforcement or court environment

- an appreciation of how progress is made within the discipline
- knowledge of, and commitment to, the ethical and legal obligations of science and particularly forensic science
- knowledge and understanding of and respect for issues and practices involved with the handling, storage and investigation of human tissues, DNA, digital data and other trace evidential material
- competence in safe working practices at scenes and in the laboratory, both for self and others
- an appreciation of quality assurance procedures within a forensic science context
- communication skills to an understandable level, verbally and in writing.

Interpretation, evaluation and presentation of evidence

- the ability to interpret and communicate forensic evidence and experimental results in the context of casework, including expert opinion
- ability to formulate and justify expert opinion using transparent arguments, including statistical likelihood ratio where appropriate
- the ability to appraise, quantify and clearly communicate levels of uncertainty in expert opinion or associated experimental data
- the ability to prepare and deliver impartial, comprehensible and comprehensive oral and written reports of a quality suitable for a wide variety of legal and law enforcement situations, including those involving the public
- a working knowledge of prevailing industry best practice and legal standards applicable to evidence, including digital data
- the ability to construct, manage and deliver case-appropriate forensic strategies, including the Case Assessment and Interpretation framework (Jackson, Aitken & Roberts, 2015)
- the ability to adhere to contamination avoidance procedures including the handling of digital data.

Area-specific standards

4.5 Students graduating with a third-class honours degree in Forensic Science with a particular emphasis on one of the three areas below, at the threshold level of attainment, are expected to be able to demonstrate:

Scene investigation

- knowledge and appreciation of the techniques and skills required for the recording (including photography), preserving, collection, processing and interpretation of evidence at a scene
- an understanding of the responsibilities, roles and liabilities of those involved in a scene investigation, including when to call upon specialist personnel and an ability to work safely, effectively and contribute positively within such a team.

Laboratory analysis

- knowledge and appreciation of the theory and application of the laboratory methods used in forensic science
- an ability in the selection and use of a wide range of methods used in the location, identification, recovery, extraction and scientific analysis of commonly encountered physical, digital, chemical and biological materials and marks, including trace materials such as DNA.

Digital forensics

- knowledge and understanding of the principal techniques and skills required for the searching, identification, preservation, transport, handling, and continuity of

commonly encountered physical devices likely or known to contain digital data from a range of scenes
- the ability to select and thoroughly justify the use of a range of methods used in the acquisition and analysis of digital data
- the ability to carry out an investigation through the examination of facts from a variety of sources (including those which require additional reading or experimentation to understand their operation) relating to an incident or allegation to establish the truth of a matter
- the ability to review, validate and verify methods and tools used for the processing of digital data
- the ability to construct and manage a forensic strategy, with regards to the search of multiple sites and the subsequent analysis of digital data.

Typical level (2:2 or 2:1)

Generic standards, not specific to any particular theme

4.6 Students graduating with an honours degree in Forensic Science at a typical level of attainment are expected to be able to demonstrate:

- a strong knowledge and understanding of those sciences, including mathematics and statistics (including the Bayesian approach), involved in forensic investigations
- a thorough knowledge of forensic techniques
- the laboratory skills to carry out a full range of tasks and technical processes, mainly independently
- the ability to effectively select and carry out practical laboratory experiments in forensic investigations, including the confident use of the appropriate laboratory equipment
- a strong knowledge of the types of cognitive bias, how they may affect forensic processes and the ability to identify and apply mitigating measures across a range of scenarios
- a thorough knowledge of the general issues and techniques involved in scene investigation
- the ability to interpret the results of laboratory and other investigations, with a thorough appreciation of their limitations
- a strong knowledge of the various legal and law enforcement environments within which forensic science is practiced, including working across jurisdictions.
- a thorough understanding of the differences between the intelligence and evidential value of forensic findings in an investigation
- the ability to record results accurately, organise data, make rational deductions and present clearly the results of complex investigations both in written and oral form, in a manner which can be readily assimilated within a legal, law enforcement or court environment
- a strong appreciation of how progress is made within the discipline
- a thorough knowledge of, and consistent commitment to, the ethical and legal obligations of science and particularly forensic science
- a strong knowledge and understanding of and respect for issues and practices involved with the handling, storage and investigation of human tissues, DNA, digital data and other trace evidential material
- consistent and well-developed competence in safe working practices at scenes and in the laboratory, both for self and others
- a thorough appreciation of quality assurance procedures within a forensic science context
- communication skills to a highly proficient level, verbally and in writing.

Interpretation, evaluation and presentation of evidence

- the ability to manage, critically interpret and clearly communicate forensic evidence and experimental results in the context of casework, including expert opinion
- the consistent ability to formulate and justify expert opinion using transparent arguments, including statistical likelihood ratio where appropriate
- the consistent ability to appraise, quantify and clearly communicate levels of uncertainty in expert opinion or associated experimental data
- the ability to prepare and deliver impartial, comprehensible and comprehensive oral and written reports of high quality in a wide variety of legal and law enforcement situations, including those involving the public
- a strong working knowledge of prevailing industry best practice and legal standards applicable to evidence, including digital data
- a consistent ability to adhere to contamination avoidance procedures, including the handling of digital data
- the ability to effectively construct, manage and deliver case-appropriate forensic strategies, including the Case Assessment and Interpretation framework.

Area-specific standards

4.7 Students graduating with a second-class honours degree in Forensic Science with a particular emphasis on one or more of the three areas below, at a typical level of attainment, are expected to be able to demonstrate:

Scene investigation

- a thorough knowledge and appreciation of the techniques and skills required for the collection, processing, recording (including appropriate photography), preservation and interpretation of evidence at a scene
- a thorough understanding of the responsibilities, roles and liabilities of those involved in a (crime) scene investigation, and an ability to work effectively and contribute positively within such a team.

Laboratory analysis

- a thorough knowledge and appreciation of the theory and application of the laboratory methods used in forensic science
- consistent ability in the selection and use of a wide range of methods used in the location, identification, recovery, extraction and scientific analysis of commonly encountered physical, digital, chemical and biological materials and marks, including trace materials such as DNA.

Digital forensics

- a thorough knowledge and understanding of the principal techniques and skills required for the searching, identification, preservation, transport, handling and continuity of commonly encountered physical devices likely or known to contain digital data from a range of scenes
- the consistent ability to select and thoroughly justify the use of a range of methods used in the acquisition and analysis of digital data
- the ability to carry out an effective investigation through the examination of facts from a variety of sources (including those which require additional reading or experimentation to understand their operation) relating to an incident or allegation to establish the truth of a matter
- the consistent ability to review, validate and verify methods and tools used for the processing of digital data
- the ability to construct and manage an effective forensic strategy, with regards to the search of multiple sites and the subsequent analysis of digital data.

Excellent level (1st class)

Generic standards, not specific to any particular theme

4.8 Students graduating with an honours degree in Forensic Science at an excellent level of attainment are expected to be able to demonstrate:

- a consistent, detailed knowledge and understanding of those sciences, including mathematics and statistics (including the Bayesian approach), involved in forensic investigations
- a detailed and thorough knowledge of forensic techniques
- the confidence and laboratory skills to carry out a full range of tasks and technical processes with a high level of autonomy
- the ability to critically select, develop and carry out practical laboratory experiments in forensic investigations, including the confident use of the appropriate laboratory equipment
- a detailed knowledge of the types of cognitive bias, how they may affect forensic processes and the ability to critically identify and apply mitigating measures across a wide range of scenarios
- a wide-ranging and critical knowledge of the general issues and techniques involved in scene investigation
- the ability to consistently interpret the results of laboratory and other investigations, with a thorough critical appreciation of their limitations
- an extensive knowledge of the various legal and law enforcement environments within which forensic science is practiced, including working across jurisdictions
- an exceptional understanding of the differences between the intelligence and evidential value of forensic findings in an investigation
- the ability to consistently record results accurately, critically organise data, make rational deductions and present clearly the results of complex investigations both in written and oral form, in a manner which can be readily assimilated within a legal, law enforcement or court environment
- an exceptional and critical appreciation of how progress is made within the discipline
- an extensive knowledge of, and consistent commitment to, the ethical and legal obligations of science and particularly forensic science
- an advanced knowledge and critical understanding of and respect for issues and practices involved with the handling, storage and investigation of human tissues, DNA, digital data and other trace evidential material
- consistent and exemplary competence in safe working practices at scenes and in the laboratory, both for self and others
- a critical appreciation of quality assurance procedures within a forensic science context
- communication skills to an accomplished level, verbally and in writing.

Interpretation, evaluation and presentation of evidence

- the ability to consistently and effectively manage, critically interpret and clearly communicate forensic evidence and experimental results in the context of casework, including expert opinion
- exceptional ability to formulate and justify expert opinion using transparent arguments, including statistical likelihood ratio where appropriate
- the ability to critically appraise, quantify and clearly communicate in a consistent fashion level of uncertainty in expert opinion or associated experimental data

- the ability to consistently prepare and deliver impartial, comprehensible and comprehensive oral and written reports of exceptional quality in a wide variety of legal and law enforcement situations, including those involving the public
- a comprehensive working knowledge of prevailing industry best practice and legal standards applicable to evidence, including digital data
- a consistent and exceptional ability to adhere to and develop contamination avoidance procedures, including the handling of digital data
- the ability to consistently and effectively construct, manage and deliver case-appropriate forensic strategies, including the Case Assessment and Interpretation framework.

Area-specific standards

4.9 Students graduating with a first-class honours degree in Forensic Science with a particular emphasis on one of the three areas below, at an excellent level of attainment, are expected to be able to demonstrate:

Scene investigation

- an extensive knowledge and critical appreciation of the techniques and skills required for the collection, processing, recording (including appropriate photography), preservation and interpretation of evidence at a scene
- a comprehensive and critical understanding of the responsibilities, roles and liabilities of those involved in a (crime) scene investigation, and a consistent ability to work effectively and contribute positively within such a team.

Laboratory analysis

- an extensive knowledge and critical appreciation of the theory and application of the laboratory methods used in forensic science
- consistent ability in the critical selection, use and development of a wide range of methods used in the location, identification, recovery, extraction and scientific analysis of commonly encountered physical, digital, chemical and biological materials and marks, including trace materials such as DNA.

Digital forensics

- an advanced knowledge and critical understanding of the principal techniques and skills required for the searching, identification, preservation, transport, handling and continuity of commonly encountered physical devices likely or known to contain digital data from a range of scenes
- the consistent ability to critically select and thoroughly justify the use of a range of methods used in the acquisition and analysis of digital data
- the exceptional ability to carry out an investigation through the examination of facts from a variety of sources (including those which require additional reading or experimentation to understand their operation) relating to an incident or allegation to establish the truth of a matter
- the consistent ability to critically review, validate and verify methods and tools used for the processing of digital data
- the exceptional ability to construct and manage a forensic strategy, with regards to the search of multiple sites and the subsequent analysis of digital data.

Master's degrees (including integrated master's)

Integrated master's

4.10 An integrated master's degree is a combination of both bachelor's degree studies and master's level; students are therefore expected to have developed the graduate outcomes for Forensic Science associated with a degree to at least a typical level (paragraph 4.6) but will have extended their knowledge, skills and understanding into outcomes associated with aspects of a master's degree.

Master's degree

4.11 Students graduating with a master's degree are expected to be able to demonstrate:

- either a deep specialist knowledge and experience of techniques within a particular area of forensic science, or a wide knowledge and critical awareness of the whole discipline
- engagement and familiarity with recent and current research methods, results and publications
- an effective self-critical attitude in planning, carrying out and reporting investigations
- the abilities and skills necessary to devise, plan, carry out and report an original investigation or research project
- a clear recognition of the constraints and opportunities of the environment in which professional forensic science is carried out
- self-direction and originality in applying and adapting problem-solving skills to unfamiliar, complex and open-ended situations
- an open and innovative attitude in the ability to plan and execute new experimental procedures
- a familiarity with the moral and ethical issues involved in the practice of forensic science
- confidence in their ability to interpret complex technical information and to communicate it in a wide variety of professional situations
- the independent learning ability required for continuing professional development.

5 List of references and further resources

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6 Membership of the Advisory Groups for the Subject Benchmark Statement for Forensic Science

Membership of the Advisory Group for the Subject Benchmark Statement for Forensic Science (2022)

Brian Rankin (Chair)	The Chartered Society of Forensic Sciences
Dr Craig Adam	Keele University
Dr Stefano Biagini	University of Kent
Dr Rachel Bolton-King	Staffordshire University
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