Subject Benchmark Statement

Agriculture, Rural Environmental Sciences, Animal Studies, Consumer Science, Forestry, Food, Horticulture and Human Nutrition

April 2024

Contents

About this Statement

This document is a QAA Subject Benchmark Statement is for undergraduate degrees covering a range of separate but highly cognate areas, each of which is a subject in its own right. These include Agriculture, Rural Environmental Sciences, Animal Studies, Consumer Science, Forestry, Food, Horticulture and Human Nutrition. The Subject Benchmark Statement defines what can be expected of a graduate in each of these subject areas, in terms of what they might know, do and understand at the end of their studies. Subject Benchmark Statements are an established part of the quality assurance arrangements in UK higher education, but not a regulatory requirement. They are sector-owned reference points, developed and written by academics and practitioners on behalf of their subject. 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 an expert quality body 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:

- the addition of Animal Studies and Rural Environmental Sciences to the title and a review of the subject groupings, to ensure it is clear to readers where they can access information relevant to the course in which they are interested

- a revised structure for the Statement, which includes the introduction of cross-cutting themes of:
  - equality, diversity and inclusion
  - accessibility and the needs of disabled students
  - education for sustainable development
  - employability, entrepreneurship and enterprise education

- a comprehensive review updating the context and purposes, 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 not intended to prescribe any particular approaches to teaching, learning or assessment. Rather, they provide a framework, agreed by the subject community, that forms the basis on which those responsible for curriculum design, approval and update can reflect upon a course and its component modules. This allows for flexibility and innovation in course design while providing a broadly accepted external reference point for that discipline.

They may also be used as a reference point by external examiners in considering whether the design of a course and the threshold standards of achievement are comparable with those of other higher education providers. They also support professional, statutory and regulatory bodies (PSRBs) with the academic standards expected of students.

You may want to read this document if you are:

- involved in the design, delivery and review of courses in these subject areas

- a prospective student thinking about undertaking a course in these subject areas

- an employer, to find out about the knowledge and skills generally expected of graduates from these subject areas.

For guidance on master's degree programmes, please refer to the QAA documents The Frameworks for HE Qualifications of UK Degree Awarding Bodies (FHEQ) and the Master's Degree Characteristics Statement.

Relationship to legislation

The responsibility for academic standards lies with the higher education provider which 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 status of the Statement will differ depending on 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 the 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. PSRBs may have additional requirements in respect of content, assessment and/or delivery.

QAA has also published Advice and Guidance to support the Quality Code for Higher Education, 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.

1 Context and purposes of an Agriculture, Rural Environmental Sciences, Animal Studies, Consumer Science, Forestry, Food, Horticulture and Human Nutrition Degree

Context

1.1   This Subject Benchmark Statement encapsulates the journey 'from field to fork', with the inclusion of allied land-based areas, including rural environmental sciences, animal studies, forestry, and amenity horticulture. Encompassing a growing breadth and depth of knowledge and skills, this Statement provides an overview of the current specialisms, illustrating the importance of putting evidence-based solutions into practice.

1.2   The subject areas encompassed by this title are referred to individually and in combination, where appropriate, and are:

- Agriculture, Horticulture and Forestry
- Rural Environmental Sciences
- Animal Studies
- Food Science, Food Technology, Human Nutrition and Consumer Science.

1.3   Rather than attempt to ensure that all possible aspects are covered, all interests represented, and all nuances of the subjects detailed, the Statement seeks to provide a practical guide to the essential features of the range of degree courses.

1.4   The wider context for this Subject Benchmark Statement is the economic and societal importance of these subject areas, and their intricate relationship with each other and the global sustainability agenda. Graduates in these subjects make evidence-informed decisions, applying theory to practice effectively at every level, from global and national policy through to practical measures and professional practice at a local level. Graduates are equipped to utilise their knowledge and skills to enhance practice, utilising highly effective communication and implementation strategies.

Equality, diversity and inclusion

1.5   Courses strive to produce graduates who are culturally aware global citizens, have had equity of access and opportunity, and demonstrate a broad understanding of the social capital within the subject discipline and beyond. Therefore, equality, diversity and inclusivity (EDI) are integral to courses relating to this Subject Benchmark Statement and should be embedded in all aspects of the student journey, from when students first show interest in courses and when they transition into study, right through to graduation, employment and beyond.

1.6   Providers commit to creating safe, inclusive and supportive environments that celebrate diversity and add value to existing EDI initiatives across the institution in which the provider is based. Related initiatives, including financial support (such as bursary and scholarship opportunities), should be accessible and promoted to applicants and students to support their successful journey to and through higher education.

1.7   Providers recognise that there is a diverse range of students who may wish to study within the subjects covered in this Statement, but that not all students have equity of access. Providers have a responsibility to challenge, debate and encourage participation in the dismantling of visible and invisible barriers to engagement and participation across the disciplines. This includes strong engagement with widening access and widening participation initiatives.

1.8   To ensure inclusivity, providers seek to minimise exclusivity in recruitment to courses and work-based learning opportunities, where possible, thus ensuring equity of opportunity across the courses and subject areas. They proactively engage with and recruit underrepresented groups to address a lack of diversity, particularly in the production of marketing materials, such as prospectuses, and wider digital marketing. Specifically, providers are flexible regarding recruitment methods, entry requirements and the lack of formal qualifications in applicants.

1.9   Providers recognise that not all students will have had comparable experiences or circumstances prior to and upon joining courses, and therefore enable them to succeed by providing comprehensive, connected and embedded support that is individually meaningful for each student. Students are encouraged to seek support, and barriers to accessing this support are removed, encouraging them to develop the ability to be innovative, self-driven individuals. Course teams work to create a safe and inclusive environment where students feel comfortable, stimulated, supported, respected and valued, and a learning community in which they feel a sense of belonging to each other, the course and the wider discipline.

1.10   Course teams should consider the impact of the hidden curriculum on students, which is the implicit lessons that students learn outside of what is formally taught. While the specifics of this vary from setting to setting, it shapes the values and norms about teaching, learning, assessment and the broader discipline that students acquire. Therefore, as not all students are given the same opportunity to access the hidden curriculum at the same rate as their peers, it can become a barrier to success.

Accessibility

1.11   Accessibility concerns the inclusive design of the curriculum, pedagogy and the wider student experience so as to not exclude any individual from participation, particularly on the grounds of barriers resulting from disability. Providers are guided by relevant legislation and institutional policies, and programme teams are encouraged to develop good working relationships with their internal and external support providers. This is signposted to students early and often.

1.12   The health, safety and well-being of participants is addressed through risk assessments for all planned activities, including any specific risks a student with protected characteristics may face. Course teams are prepared to be proactive, flexible and make reasonable adjustment to teaching, learning or assessment activities where required, providing multiple modes of engagement to students or making use of accessible technology.

Sustainability

1.13   Reference to sustainability and sustainable development is a priority in these subjects. The focus is generally on the management of contemporary issues with earth resources, and the promotion of the long-term well-being of the planet and all its inhabitants. For example, via the One Health approach, recognising the interconnected nature of people, animals, plants and their shared environment. It is important to note that sustainability is not solely about the environment. It is an ongoing process of addressing social, environmental, ethical, political and economic concerns to create a better world. As such, it has particular relevance within these disciplines and in relation to positive graduate outcomes.

1.14   A vital consideration when creating curriculum or module content is that sustainability and sustainable development are holistic terms, with many interconnecting factors with global impacts. As defined by UNESCO in 2019, Education for Sustainable Development (ESD) 'ESD is holistic and transformational education which addresses learning content and outcomes, pedagogy and the learning environment. It achieves its purpose by transforming society'. An

understanding of the [United Nation's Sustainable Development Goals (SDGs)](#) is central to this vision and, where appropriate, the SDGs should be integrated holistically across the curriculum.

1.15 The application of sustainable development in the higher education sector involves creating curriculum structures and subject-relevant content to support and enact sustainable development. To support the inclusion of sustainable principles within these disciplines, providers should refer to the [QAA Education for Sustainable Development Guidance](#) for key competencies, learning outcomes and assessment within the curricula.

1.16 Practical considerations may include, but are not limited to, waste reduction, sequestration and mitigation of carbon, promotion of biodiversity and alternative energy sources, social capital, reducing poverty and social inequalities, safe food for health and well-being, and engaging with certain professional recognition schemes.

Enterprise and entrepreneurship education

1.17 [Enterprise and entrepreneurship education](#) supports behaviours, attributes and competencies that are likely to have a significant impact on the individual student in terms of successful careers. It prepares students for changing environments and provides enhanced impact through placements and activities that build links between academic institutions and external organisations.

1.18 Courses are designed to provide opportunities for students to harness their creative problem-solving skills, encouraging them to develop innovative solutions to challenges in industry as well as equipping graduates with the skills to take their ideas forward independently or as part of a collaborative multidisciplinary business start-up team. 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.

1.19 Professional and accrediting bodies play a role in many of the sectors related to these subject areas, and aligning curricula with these bodies' requirements can benefit graduate employment. Encouraging students to engage with the required standards and competencies of such bodies during their studies will provide them with a strong foundation on which to develop their employability, and open opportunities for them to shape their chosen industry.

1.20 In the context of **Rural Environmental Sciences**, employers look for aptitude in environmental land use and management practices, including knowledge of current legislation and policy, experience of practical survey and data analysis techniques, and a capability to identify current and future environmental impacts on relevant industries while appreciating their economic implications and proposing suitable mitigation.

1.21 In the context of **Agriculture, Horticulture, Forestry and Animal Studies**, employers look for competence with emerging good practice and its application in a business context, knowledge of current legislation and policy, experience of practical skills, and an appreciation of technological developments and how they may shape the industry both now and in the future.

1.22 In the context of **Food Science, Technology, Nutrition and Consumer Science**, employers look for skills to be able to innovate new food products, reformulate existing products and develop interventions, including knowledge of current food and public health legislation and policy, practical lab skills and an understanding of technological developments in their areas, as well as impacts on environmental sustainability and costs.

Generative AI

1.23 [Generative AI (artificial intelligence) and other technologies](#) should be analysed in terms of their impact on the agri-food supply chain and also used with critical reflection as tools for a range of purposes. Transparency and openness in the use of these technologies will enable judgements to be made on their appropriate use. Graduates should recognise positive opportunities for use of AI but equally the need for responsible use.

2   Distinctive features of an Agriculture, Rural Environmental Sciences, Animal Studies, Consumer Science, Forestry, Food, Horticulture and Human Nutrition Degree

Design

2.1   Courses, components and individual learning experiences should be inclusive in their design and approach. Providers make use of frameworks such as Universal Design for Learning (UDL). Course leaders consider the profile of their students, both potential and actual, to ensure that programme learning outcomes are inclusive. Opportunities to develop graduate skills and attributes are embedded throughout the learning journey, with teaching approaches being firmly student-centred to enable an inclusive learning environment.

2.2   It is important that course teams identify and address historical and cultural biases in the choice of and portrayal of taught content, through an inclusive (and, where appropriate, decolonised) lens. In considering the content taught to students, a co-creation approach that involves current students, graduates, industry partners, professional bodies and other stakeholders is encouraged.

2.3   The undergraduate courses covered by this Statement are described under the following indicative headings:

Courses broadly concerned with Agriculture, Horticulture and Forestry

2.4   Agriculture courses involve sustainable farming systems and production of food within terrestrial landscapes. These courses broadly include a range of subject areas, including soil management, crop and animal production, natural resource management, environmental protection, farming systems, farm business management and economics. Courses range from those that have a focus on the application of knowledge and skills within agricultural systems to those that focus on the fundamental science and economics associated with agricultural production. Graduates from these course areas can address the balance between productive agriculture and land use, and environmental and societal considerations.

2.5   Horticulture courses mainly focus on developing knowledge of plant biology, physiology, pathology and soil structure, the application of horticultural practices, the management of plant production systems, the management and maintenance of a variety of landscapes. The aim is to take that knowledge and meet social, financial, nutritional and environmental needs, and the underpinning scientific basis of plant breeding and future crops (including technologies). The courses have a theme of sustainability and responsible use of resources throughout. Many of the topics discussed explore social, cultural, ethical, equitable, financial and future themes for national and international contexts. The courses may have a greater emphasis on practical or theoretical skills. Graduates will be equipped to advise on and apply skills to industry standards in disciplines, including production horticulture, landscape management, amenity horticulture and research roles.

2.6   Forestry courses are mainly concerned with the management of woodlands and forests for market and non-market benefits. The content of courses may include a range of subject areas, including tree and plant physiology, forest measurement, forest management, forest conservation and ecosystem function, woodland pests and diseases, economics, societal benefits, and carbon management and climate change.

Courses broadly concerned with Rural Environmental Sciences

2.7   Courses in rural environmental sciences are designed to develop the knowledge and skills of those who are involved in a range of environmental land use and management activities. Some courses may have a primary concern with the economic structure of the agricultural, horticultural or forestry industries and their associated and ancillary enterprises. Others may address the physical, social and cultural aspects of the rural environment, while some may have a focus on the complex ecology of both managed and unmanaged landscapes. The courses are multidisciplinary frameworks within which there are discrete specialisms. Graduates take an integrated and holistic approach within an analytical and evaluative framework. They view the countryside as a complex environmental and cultural resource of great national and global value. Graduates can address the issues of sustainability and the competing and often conflicting demands of commercial production, leisure or cultural value, and wildlife conservation in a physically and culturally diverse landscape.

Courses broadly concerned with Animal Studies

2.8   These courses are broadly concerned with the husbandry, welfare and management requirements of non-production animals, including animals kept for their athletic abilities, conservation, recreation or sporting interests of their owners. In addition, courses recognise both the economic and societal benefits of animals to people, while being conscious of how to achieve a 'good life' for animals. The subject applies fundamental physical, biological, economic and sociological principles, with a growing awareness of sustainable approaches, considering global through to local socioeconomic and environmental impacts.

Courses broadly concerned with Food Science, Food Technology, Human Nutrition and Consumer Science

2.9   Courses in the areas of food science, food technology and human nutrition are designed to develop the knowledge and skills required by those who are involved in the food supply chain. The subject applies knowledge of science, nutrition, food policy and regulations from sourcing/ procurement of raw materials, processing, packaging, storage and retail, to develop and produce innovative, safe, nutritious, affordable and sustainable food solutions. Graduates acquire the skills to help meet the needs of the growing world population and satisfy changing consumer dietary demands and promote health.

2.10   With the importance of sustainable consumption and development, there is an increasing interest in how consumer food and drink choices are made and can be modified. This includes critical analysis of the sociocultural, economic, political, legal, technological, ethical and environmental contexts.

Progression

2.11   During undergraduate study students will progress from one level of study to the next, in line with the regulations and processes for each institution. However, it is expected that each level would see the attainment of knowledge, analytical skills, expertise and experience that builds towards the final achievement of meeting the threshold-level subject-specific and generic skills listed in this Statement. This will usually include successful completion and the award of credit for the full range of learning and assessment, including any practical and work-related components. Upon graduation, it is expected that a student who has achieved a second-class degree or higher would be equipped for undertaking postgraduate study in this or a related discipline. Entry requirements to postgraduate courses are, however, determined by individual providers and may require specified levels of achievement at undergraduate level.

2.12   Undergraduates studying these courses as part of a combined or joint degree with other subjects will achieve core elements of the specific and generic skills outlined in this Statement and will add others according to the topics covered in the other subject(s) of their degree. Additionally, they may explore the overlap between different disciplines, creating further opportunities for interdisciplinary study.

Flexibility

2.13   Higher education providers structure the courses they offer to support students' learning and attainment. Depending on the educational mission of the provider, this may include opportunities to engage in learning on campus, online, and/or through hybrid learning, arranged in terms, by semester, year-long, block or other formats. These may be offered in full and/or part-time modes of study and credit may be accumulated through the completion of micro-credentials or short accredited learning.

Partnership

2.14   Co-creation and co-delivery in teaching and learning should be considered as a mechanism of harnessing stakeholder engagement to enhance courses based on the ideas of prospective students, current students, graduates, course teams, degree accreditors and employers.

Monitoring and review

2.15   Degree-awarding bodies, and their collaborative partnerships, routinely collect and analyse information and undertake periodic course review according to their own needs. Considering the student voice will form part of this. They draw on a range of external reference points, including this Statement, to ensure that their provision aligns with sector norms. Monitoring and evaluation are 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.

2.16   Externality is an essential component of the quality assurance system in the UK. 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   The external examiner system 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 other UK higher education providers. External examiners are asked to 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   Courses with professional and vocational outcomes may also require evaluation and accreditation from professional and regulatory bodies. These are usually done through a combination of site visits and desk-based reviews.

3   Content, structure and delivery

Content

Agriculture, Horticulture and Forestry

3.1   The Agriculture, Horticulture and Forestry subject grouping encompasses a diverse range of subject areas where courses may focus on the following:

- Agriculture

  - crop and animal production and the underpinning scientific principles
  - sustainable agricultural management, agri-tech and environmental protection
  - farming systems, business management and economics

- Horticulture

  - plant biology and the associated underpinning scientific principles
  - management of crop production systems and use of technologies
  - management and maintenance of landscapes to meet social, financial and environmental needs

- Forestry

  - forest management to meet social, environmental and financial objectives
  - ecological and conservation aspects of woodland management
  - environmental management and forestry.

3.2   Courses in this subject grouping include the knowledge, understanding, skills and expertise described in section 4 (below). This broad subject area aligns with other areas within this Subject Benchmark Statement, particularly Rural Environmental Sciences, and other Subject Benchmark Statements such as Earth Sciences, Environmental Sciences and Environmental Studies (ES3), Geography and Biosciences.

Rural Environmental Sciences

3.3   The Rural Environmental Sciences subject grouping encompasses a wide range of specialisms where courses may focus to different extents on the:

- physical, social and cultural aspects of the rural environment
- ecology of both managed and unmanaged landscapes
- management of land for a range of activities within the rural environment and economy.

3.4   Courses in this subject will include the knowledge, understanding, skills and expertise described in section 4. This subject area aligns with other areas within this Subject Benchmark Statement, particularly Agriculture, Horticulture and Forestry, and with other Subject Benchmark Statements, such as Earth Sciences, Environmental Sciences and Environmental Studies (ES3), Geography and Biosciences.

Animal Studies

3.5   This subject grouping encompasses one or more of the following subdivisions of non-production animals:

- applied animal sciences and management (including equine, canine, zoo animals, for example)

- wildlife and animal conservation.

3.6   Courses will include the knowledge, understanding, skills and expertise described in section 4. Due to the nature of this subject area, readers may find it useful to refer to more than one Subject Benchmark Statement. For example, those with an interest in equine sports coaching may find the Subject Benchmark Statement for Events, Hospitality, Leisure, Sport and Tourism of interest. Similarly, readers with an interest in bioveterinary science may find the Subject Benchmark Statement for Biosciences useful.

Food Science, Food Technology, Human Nutrition and Consumer Science

3.7   This subject grouping encompasses a wide range of specialisms where courses may focus to different extents on:

- the characteristics and composition of food and food products

- the microbiology, nutritional quality, chemistry, physical properties and sensory qualities of food

- the impact of food storage, processing and packaging on human and environmental health, food security and sustainability

- innovative and emerging food processing and packaging technologies and their impact on food characteristics and composition

- quality management, food safety and food fraud

- diet and health

- the food chain and its impact on food choices

- the scientific principles of nutrition for the promotion of health and well-being of individuals, groups and populations, recognising benefits and risks and communicating evidence to a variety of audiences

- codes of ethics and practice relevant to their profession

- socio-cultural and individual factors in the formation of consumer knowledge, attitudes, intention and behaviour

- methodologies to explore consumer response, choice, behaviour and intervention studies.

3.8   Due to the nature of this subject area, readers may find the Biosciences and Psychology Subject Benchmark Statements useful.

Teaching and learning

3.9   Course teams are encouraged to reflect upon their teaching methods to ensure that they enable the success of all students at all levels. Approaches are encouraged which are active, individualised and differentiated, and which enable learner choice and independence in a student-led and students-as-partners context.

3.10   While blended/hybrid provision and other flexible learning approaches are encouraged because they can be more inclusive and accessible, it is important to recognise the barriers that may be created by these approaches, such as the 'digital divide', particularly for rural students, those from disadvantaged backgrounds, and those whose homes may lack appropriate study space. Creating an online community of learning that allows students to share ideas, ask questions or discuss concepts with peers in a safe, developmental space requires effective design for learning to be fully inclusive.

3.11   Programme teams and students proactively work together to identify issues, identify approaches to overcome them and ensure the overall quality of provision for all.

3.12 Work-based learning (WBL) in the form of placements, internships and apprenticeships is particularly important for the subjects covered by this Statement, given the practical nature of much of the discipline. As such, providers consider the diversity of students undertaking WBL. Providers are aware that not all students have the same opportunities to find and secure WBL, or the resources to facilitate or maintain one. Therefore, providers work closely with WBL partners to:

- ensure equitable provision of WBL opportunities

- ensure that partners understand their requirements to create a safe and inclusive working environment

- provide continued training and support to these organisations and individuals where needed, particularly around identifying and removing potential or actual barriers to a successful placement

- proactively establish ways to ensure students are fully supported while engaging in WBL.

3.13 Teaching is about engaging all students to facilitate their acquisition of knowledge and their ability to understand and subsequently apply relevant concepts and processes. It is inclusive of all students. It includes curriculum design, the selection and delivery of content, the method and type of assessment, moderation and reflection. Learning is the process of gaining knowledge and skills through the processes of being taught, studying, experiencing and practising. The goal of student learning is the considered application of knowledge and skills together with an appreciation of the integrative nature of the subject areas in an appropriate context.

3.14 This Subject Benchmark Statement does not specify which methods of teaching or learning should be employed in relevant courses; however, learning outcomes should be achievable through the methods utilised, taking into account any requirements of professional bodies, if required.

3.15 Teaching and learning are interlinked as part of the curriculum design process, and methods chosen are inclusive and appropriate to the development of the relevant knowledge and skills. Research-led and enquiry-based courses may develop specific subject-based knowledge and skills.

3.16 Graduates in these subjects have wide employment prospects. They are adaptable and have subject-specific knowledge and abilities, and generic skills. Many different formats for teaching and learning aid the development of these attributes. Courses may incorporate a project or other self-motivated individual study leading to a thesis, dissertation or report. Courses also contain most, but not necessarily all, of:

- lectures, complemented by student-led seminars

- practical sessions delivered in real-world environments

- tutorials and seminars

- active collaborative learning (including group work)

- specialist external guest lectures

- literature-based research

- e-learning and digital technologies, including the use of virtual learning environments

- case studies / employer-engaged assessment

- problem-based learning

- other exercises which require students to integrate information and techniques

- directed self-study

- visits to commercial and industrial businesses, consumer organisations, public services, policy-making bodies and research organisations

- opportunities for work-like experience, for example a managed placement or work-based learning.

3.17   Advances in knowledge and understanding in these subject areas are founded on accurate observation and recording in the field, and the collection of empirical data for analysis. Developing practical and research skills is therefore important for students wishing to pursue careers in related sectors. Practical studies allow students to develop and enhance many graduate attributes and transferable skills. These include leadership, team working, problem-solving, self-management and interpersonal relationships, which are of value to their employability, entrepreneurship and active citizenship. Activities are designed to be inclusive to all students and, where required, reasonable adjustments should be made to enable all students to take part in practical work and fieldwork activities.

Assessment

3.18   Course teams reflect upon their assessment strategy to ensure that each student has the same opportunity to demonstrate progress and achievement. Given the uniqueness of all students, a flexible and creative mindset enables the design of appropriate opportunities for initial, diagnostic and formative and summative assessment. A range of assessment formats across different years and within modules produces well-rounded graduates with wide skill sets and allows students with different abilities and interests to perform. This can be extended to a varying degree of assessment choice, in which students may select what or how they address learning outcomes and assessment criteria. Regular peer and self-assessment are also encouraged.

3.19   Providers must take every opportunity to promote the voice of students, including the co-design of assessment. To improve employability, assessment should be authentic to post-study life.

3.20   Assessment strategy is an integral part of course design and may be formative as well as summative and is likely to take several forms, including continuous assessment and controlled conditions assessment (written, electronic, verbal and/or non-verbal or practical; closed or open book). This Subject Benchmark Statement is not prescriptive about which assessment methods are used on courses. Authentic assessment approaches, based on tasks likely to be encountered in the workplace, can benefit employability outcomes for graduates and ease the transition from university to the workplace. The style of assessment varies between subjects and higher education providers but is linked to clearly defined goals and anticipated learning outcomes.

3.21   Assessment should be inclusive for all students. It should be designed in a way that facilitates learning and supports students to succeed, and it is clearly linked to the specified learning outcomes or desired competencies. Where appropriate, modified and alternative provision with reasonable adjustments should be available to avoid barriers to learning.

3.22   Feedback is an important part of the assessment cycle and can be provided in a variety of formats. Formative feedback can benefit student performance and, when used appropriately, boost student confidence and outcomes. The opportunity for personal reflection, and peer and self-assessment is also a valuable component of assessment. Such feedback and reflection can enable transformative learning and is closer to workplace reality.

3.23 Examples of authentic assessment types include, but are not limited to:

- practical (especially field and laboratory-based) investigations including new technologies.

- research-led and enquiry-based, and reflective evaluations of real-life case studies

- case reports based on skills in observation and analysis to support decision-making in the light of uncertainty

- presentations, using for example posters, graphical resources, videos and websites, including an appreciation of societal contribution and context

- integrative assessments, which could capstone projects and dissertations

- collaborative working, such as peer assessment, enquiry-based learning and group work

- a range of styles of communication aimed at different audiences, such as debates, verbal and/or non-verbal presentations and vivas

- time constrained assignments

- critical evaluation and communication of prevailing theories, hypotheses and paradigms based on review of published works and suited for a range of audiences, for example academic publications, websites, schoolchildren social media.

3.24 Where appropriate, assessments take multidisciplinary and interdisciplinary approaches and are clearly underpinned by education for sustainable development to achieve positive graduate outcomes.

4 Benchmark standards

Introduction

4.1   This Subject Benchmark Statement sets out the threshold, typical and excellent levels of achievement that a student will have demonstrated when they are awarded an honours degree in subjects covered by this Statement. Demonstrating these standards over time will show that a student has achieved the range of knowledge, understanding and skills expected of graduates in these subjects.

4.2   The vast majority of students will perform significantly better than the minimum threshold standards. Each higher education provider has its own method of determining what appropriate evidence of this achievement will be and should refer to Annex D in The Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies. 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.

Subject knowledge, understanding and skills

Agriculture		
Threshold	**Typical**	**Excellent**
Graduates have some familiarity with and awareness of:	Graduates have a well-grounded understanding of:	Graduates have a deep and comprehensive understanding of:

- the principles and theories of agricultural, animal and environmental science that underpin sustainable production systems

- processes of sustainable crop production and high welfare animal husbandry

- the impact of agricultural practices on the agri-environment, including landscape, soil, water, air, biodiversity and climate change

- development and management of sustainable and ethical production systems to address farming objectives, including economic sustainability, food security, social inclusion, animal health and welfare and environmental benefits

- application and integration of technology (agri-tech) within agriculture and the effective use of digital data to inform management decisions

- environmental, nutrient and waste management processes within sustainable agricultural systems

- policy and legislation with specific reference to agriculture and land use and the wider rural economy, including regulation of the farmed environment, animal welfare and health and safety

- agri-environment schemes and their function, application and integration within sustainable agricultural systems

- economic and business management theory and techniques applicable to sustainable farm enterprises

- the contribution of agriculture to global environmental change and the practical management of carbon on farms towards net zero

- effectively researching issues and concepts associated with agriculture and communicate viewpoints to a wide range of audiences using traditional and digital formats
- undertaking relevant practical tasks within a farmed environment in a safe, legal and proficient manner

Horticulture

Threshold	Typical	Excellent
Graduates have some familiarity with and awareness of:	Graduates have a well-grounded understanding of:	Graduates have a deep and comprehensive understanding of:

- variance of morphology, composition, physiology and adaptation across a range of plants
- knowledge of a variety of plant biomes and understanding the role(s) plants play in ecosystems
- the scientific basis of propagation principles and plant manipulation (including plant breeding courses, genomic/phenomic breeding practices, and plant growth regulator application)
- management of plant production systems for conservation and commercial use across a range of plants
- the underpinning technological and scientific basis of plant production for edible and ornamental crops
- the importance of social, economic and environmental factors to achieve sustainable crop production practices, supply chains and circular economies
- the management and maintenance of a variety of landscapes for environmental horticulture
- evaluating current business and industry horticultural practices and, where appropriate, make recommendations for a more sustainable future
- relevant policy, regulation, legislation, ethical, and health and safety guidance associated with plant production, manipulation, horticultural practices, and management/maintenance of landscapes
- national and international horticultural practices, including gender equity, socio-economic factors and public concern regarding sustainable land use and production practices

Forestry		

Threshold	Typical	Excellent
Graduates have some familiarity with and awareness of:	Graduates have a well-grounded understanding of:	Graduates have a deep and comprehensive understanding of:

- the scientific and commercial basis for managing trees and forests

- global and local differences in composition, structure, productivity and function of forests

- physical and ecological processes that influence the distribution and composition of natural, semi-natural and managed forest systems

- the role that forests have in providing provisioning, supporting and regulating ecosystem services

- the importance of balancing social, economic and environmental objectives to achieve sustainable forest management

- how management of forests can maximise benefits for the economy, health, well-being and landscape

- long-term horizons of forestry and the importance of planning

- approaches to increasing forests' resistance and resilience to climate change and pests and diseases

- the sociological, legal and policy framework relating to forestry at a national and international level

- how to manage risk and encourage a culture of health and safety

Rural Environmental Sciences		

Threshold	Typical	Excellent
Graduates have some familiarity with and awareness of:	Graduates have a well-grounded understanding of:	Graduates have a deep and comprehensive understanding of:

- physical and ecological characteristics of the rural environment and the factors limiting its development

- the principles of ecology as applied to human, plant, animal and microbial communities, and the complex ecology of managed near-natural and natural landscapes

- economic and biological principles underpinning the various rural industries and environments

- the principles of wildlife and landscape conservation within historical, contemporary, and future contexts

- the principles of climate change, how it will impact the rural environment and the necessary steps for mitigation and adaptation

- important social, cultural and ethical factors for managing the rural environment

- legal, planning and policy framework applicable to the rural environment, and the roles and responsibilities of statutory, advisory and non-governmental bodies

- conflicting elements' interests and trade-offs within the rural economy and environment

- ways that rural business, communities and other stakeholders can be supported to develop and manage the rural environment sustainably

- the use of technologies such as geographic information systems (GIS), remote sensing and other appropriate environmental science techniques for managing, evaluating and monitoring the rural environment

Animal Studies

Threshold	Typical	Excellent
Graduates have some familiarity with and awareness of:	Graduates have a well-grounded understanding of:	Graduates have a deep and comprehensive understanding of:

- how quality of life within animal populations can be optimised, utilising evidence-informed management and practice to ensure positive welfare

- the physical and biochemical processes of life relating to animal anatomy and physiology

- evolutionary process, its genetic basis and relationship to modern breeding practice principles of animal health, behaviour and nutrition

- the global, national and local sustainability (financial, environmental and social) of animal management and practice

- social and ethical issues associated with animal management and practice

- the socio-economic, legal and policy framework for the animal sector

- health and safety issues in animal management and practice

- the importance of being industry led and industry leading, including consideration of the latest evidence-based developments and the use of data and technology, to enhance animal management and practice

- the importance of education and communication in achieving best animal management and practice, through human behaviour change

- the importance of human animal interactions to society, and the need to consider animal welfare during all interactions (including, for example, sport, therapy and education)

Please note, as highlighted in section 3 (above), this refers to non-production animals.

Food Science, Food Technology, Human Nutrition and Consumer Science		
Threshold	**Typical**	**Excellent**
Graduates have some familiarity with and awareness of:	Graduates have a well-grounded understanding of:	Graduates have a deep and comprehensive understanding of:

- food science, food composition and chemistry (including nutrients and non-nutrients), physiology, biochemistry, genetics and nutrition to understand the impact of food on human health

- the food supply chain and the impact of primary production and raw material quality on end product, including factors which can affect raw material quality.

- food analysis - physical, chemical, microbiological and allergen.

- the importance of sensory in terms of properties of food, human nutrition and health to enhance consumer choice and the application of sensory evaluation methods to measure product attributes and consumer response

- the importance of food quality control, assurance, food safety, waste and environmental management systems to the food industry

- the principles and practice of food preservation and processing operations on the safety and nutritional quality of foods

- key aspects of engineering and innovation in hygienic design of food equipment and premises

- how to improve food productivity, nutritional quality and efficiency through innovative digital technologies

- standard methods for the detection and enumeration of microorganisms important for food safety

- the risks associated with food fraud, food intolerances and allergies and appreciation of the need for food risk management and innovative mechanisms of traceability to ensure consumer acceptability and safety

- how to apply and communicate knowledge to a range of audiences in a suitable format and across different communication media to meet the needs of consumer, industry and society for a sustainable, ethical, safe, secure, affordable, quality assured and resilient food supply

- how to apply theories of nutrition health education and promotion to public health messages

- the global challenges associated with ethical, sustainable production, processing and manufacture of food commodities, supply of consumer services and relevant approaches to promote supply chain resilience and mitigate impact

- how to design/reformulate a diet and/or food product to meet the specific needs of an individual or group, considering factors such as age, gender, religion, culture, socio-economic background, geographical and environmental factors, physical activity and sustainability

- the interaction between diet, health and disease, showing awareness of how to address the consequences of any nutritional imbalance across the life course

- the principles and methods of nutritional assessment, including anthropometric, biochemical and dietary assessment, understanding the strengths and limitations of the methods

- local, national and international food, nutrition, health and consumer science related policy

- the legal, moral and ethical issues and frameworks relevant to the food, nutrition and consumer science sectors, including professional codes of conduct

- the main aspects of the business environment in which agri-food businesses operate, recognising the importance of innovation and entrepreneurship in the development of affordable, sustainable, nutritious and safe food

- digital interconnected manufacturing systems for communication and analysis and the use of big data to reveal trends to make better decisions and drive change to reduce waste, meet food security challenges and address changing consumer needs

- socio-cultural and individual factors in the formation of consumer knowledge, attitudes, intention and behaviour, applying this to a range of routine real-life situations

- social and economic factors in differential access to goods and services, and the inequity that different consumer groups face in this access

- the roles and responsibilities of consumer organisations, food and health charities, nutrition organisations, public health bodies and nutrition and health professionals

- a range of theories and methodologies to understand consumer response, choice, behaviour and aid design and implementation of consumer and intervention studies

Generic skills

4.3   On graduating with an honours degree in subjects covered by this Statement, students should be able to:

People skills

- demonstrate an ability to listen and comprehend when presented with new ideas or information

- recognise strengths and weaknesses in the arguments of others

- appreciate and engage constructively in contemporary debates

- reflect effectively on their own progress and make use of feedback provided

- identify and work towards targets for personal, academic and career development

- appreciate how different stakeholders may have varying opinions on topics and respond sensitively to these in communication and decision making and when dealing with conflict

Communication skills

- express themselves clearly via a range of communication methods to a range of audiences

- present knowledge or an argument in a way that is comprehensible and accessible to others

Analytical skills

- identify problems and questions and apply critical thinking to generate creative solutions

- undertake critical analysis of factual information

- produce a synthesis of the state of knowledge on a particular subject or topic

- undertake tasks independently and with guidance

- demonstrate skills in recognising, describing, categorising and collating data

Business skills

- develop leadership and commercial skills

- develop project planning skills

- perform assigned tasks individually or as part of a team, participating in verbal and non-verbal communication

Wider skills

- consider the responsible use of big data and technology, including AI and beyond

- use relevant numeracy and IT skills to collate, analyse, select and present information (digital literacy)

- understand the importance of health and safety and of equity, diversity and inclusiveness in the work environment.

5   List of references and further resources

HEA (2016) Framework for embedding employability in higher education
www.advance-he.ac.uk/knowledge-hub/framework-embedding-employability-higher-education

Office for Students, The Regulatory Framework for Higher Education in England
www.officeforstudents.org.uk/advice-and-guidance/regulation/the-regulatory-framework-for-higher-education-in-england/

QAA The UK Quality Code for Higher Education
www.qaa.ac.uk/the-quality-code

QAA (2024) Annex D in The Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies
www.qaa.ac.uk/the-quality-code/qualifications-frameworks

QAA and Advance HE (2021) Education for Sustainable Development Guidance
www.qaa.ac.uk/the-quality-code/education-for-sustainable-development

QAA (2018) Enterprise and Entrepreneurship Education: Guidance for UK Higher Education Providers
www.qaa.ac.uk/the-quality-code/enterprise-and-entrepreneurship-education

QAA (2022) Glossary
www.qaa.ac.uk/glossary

QAA, Quality Enhancement Framework (Scotland)
www.qaa.ac.uk/scotland/quality-enhancement-framework

QAA (2021) Quality Enhancement Review (Wales)
www.qaa.ac.uk/reviewing-higher-education/types-of-review/quality-enhancement-review

QAA (2018) Quality Code Advice and Guidance
www.qaa.ac.uk/the-quality-code/advice-and-guidance

UNESCO (2019)
www.unesco.org/en/education-sustainable-development

United Nations, Sustainable Development Goals
https://sdgs.un.org/goals

About Universal Design for Learning
www.cast.org/impact/universal-design-for-learning-udl

6 Membership of the Advisory Group

Membership of the Advisory Group for the Subject Benchmark Statement for Agriculture, Rural Environmental Sciences, Animal Studies, Consumer Science, Forestry, Food, Horticulture and Human Nutrition 2024

Rosie Scott-Ward (Chair)	Hartpury University
Dr Susan Doherty (Deputy Chair)	Queen's University Belfast
Dr Sarah Broadberry	Nottingham Trent University
Dr Louise Bulmer	Scotland's Rural College
Dr Miriam Clegg	University of Reading
David Dowd	College of Agriculture, Food and Rural Enterprise
Professor Basma Ellahi	University of Chester
Dr Carol Hall	National Equine Welfare Council
Dr Kieran Higgins	Queen's University Belfast
Dr Alex Hilton	Scotland's Rural College
Kevin Kendall	QAA Officer
Liz Lawrenson	Landex
Dr Adilia Lemos	Abertay University
Dr Andrew Leslie	University of Cumbria / National School of Forestry
Dr Wanda McCormick	Hartpury University
Natasha Medhurst	Institute of Food Science and Technology (IFST)
Dr Rana Parween	Askham Bryan College
Jenny Paxman	Association for Nutrition / Sheffield Hallam University
Opal Rowe	Scotland's Rural College
Dr Christina Siettou	University of Nottingham
Laura Sperry	QAA Coordinator
Alysha Thompson	Queen's University Belfast
Paul Ward	Duchy College
Dr Andrew Wilcox	Harper Adams University
Dr Hefin Williams	Aberystwyth University
Professor Bethan Wood	University of Glasgow
Dr Qian Yang	University of Nottingham

Membership of the Advisory Group for the Subject Benchmark Statement for Agriculture, Horticulture, Forestry, Food, Nutrition and Consumer Sciences (2019)

The fourth edition, published in 2019, was revised by QAA to align the content with the revised UK Quality Code for Higher Education, published in 2018. Proposed revisions were checked and verified by the Chair of the Subject Benchmark Statement for Agriculture, Horticulture, Forestry, Food, Nutrition and Consumer Sciences from 2016.

Professor Julian Park	University of Reading
Dr Alison Felce	QAA

Membership of the Advisory Group for the Subject Benchmark Statement for Agriculture, Horticulture, Forestry, Food, Nutrition and Consumer Sciences (2016)

Details provided below are as published in the third edition of the Subject Benchmark Statement.

Dr Sue Bailey	London Metropolitan University
Dr Christine Cahalan	Bangor University

Professor Ian Connerton	University of Nottingham
Professor Basma Ellahi	University of Chester
Dr Peter Glaves	Chartered Institute of Ecology and Environmental Management (CIEEM)
Professor Mike Gooding	Aberystwyth University
Dr Phil Lyon	Queen Margaret University Edinburgh
Leonie Milliner	Association for Nutrition
Alison Murray	SRUC (Scotland's Rural College)
Professor Julian Park (Chair)	University of Reading
Dr Anya Perera	Writtle College
Professor Carol Phillips	Institute of Food Science and Technology
Mr Nigel Warner	Royal Agricultural University
Dr Andy Wilcox	Harper Adams University
Professor Paul Wilson	University of Nottingham

Student reader

Anne Carpenter	University of Reading
Helen Kealy	QAA

Membership of the Advisory Group for the Subject Benchmark Statement for Agriculture, Horticulture, Forestry, Food, Nutrition and Consumer Sciences (2009)

Details provided below are as published in the second edition of the Subject Benchmark Statement.

Mrs Carol Brennan	Queen Margaret University
Dr Christina Cahalan	University of Wales, Bangor
Professor Ian Connerton	University of Nottingham
Professor Richard Ellis	University of Reading
Professor Phil Garnsworthy	University of Nottingham
Mr Mike Kitson	Independent, formerly London Metropolitan University
Mrs Chris Leggate	Scottish Agricultural College
Dr Phil Lyon	University of Umeå, Sweden
Mr Nigel Warner	Royal Agricultural College
Dr Andy Wilcox	Harper Adams University College
Dr Alan Younger	University of Newcastle

Membership of the original Advisory Group for the Subject Benchmark Statement for Agriculture, Horticulture, Forestry, Food, Nutrition and Consumer Sciences (2002)

Details below are as published in the original Subject Benchmark Statement.

Dr Christine Cahalan	University of Wales, Bangor
Mr Alan Costley	Harper Adams University College
Dr David Gray	University of Nottingham
Dr William Hutcheon	Scottish Agricultural College, Aberdeen
Ms Margaret Jepson	Liverpool John Moores University
Professor Philip John	University of Reading
Dr David Jukes	University of Reading

Dr Ara Kanekanian	University of Wales Institute, Cardiff
Dr Karen King	The Queen's University of Belfast
Dr Martin Luck	University of Nottingham
Dr Phil Lyon	University of Dundee
Professor Richard Moore-Colyer	University of Wales, Aberystwyth
Professor Robert Naylor	University of Aberdeen
Dr Iwan Owen	University of Wales, Aberystwyth
Dr Chris Strugnell	University of Ulster
Mr Nigel Warner	Royal Agricultural College