# QAA ES3 Benchmark – Overview of Key Changes

In March 2022 the QAA published the latest iteration of the subject Benchmark Statement for Earth Sciences, Environmental Science and Environmental Studies. The statement describes the content and academic standards expected in these specific subject areas and are used to inform the design of degrees and define what a graduate can expect to know, do, and understand at the end of their studies.

*"The revised Statement for Earth Science, Environmental Science and Environmental Studies firmly places sustainability, employability, and equality, diversity and inclusivity at the core of an ES3 education. In doing so, it supports the development and delivery of degrees that prepare students to take actions and make decisions that underpin the equitable solutions required to secure a sustainable future for all."*

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The purpose of this document is to highlight key changes in the latest benchmark statement, in order to support leaders of relevant programmes to identify where programme revisions are required to meet the new benchmark standards. At the end of the document is a table comparing the Benchmark Standard learning outcomes between the previous (2019) and 2022 Benchmark Statement.

In conjunction with this document, programme leaders should review the Benchmark Statement in its entirety.

The key overarching changes from the previous Subject Benchmark Statement include:

- a revised structure for the Statement which includes the introduction of cross-cutting themes of:
    1. equality, diversity, and inclusion
    2. education for sustainable development
    3. employability, entrepreneurship, and enterprise education
- a comprehensive review, updating the context and purposes of Earth Sciences, Environmental Sciences and Environmental Studies, including course design and content in order to inform and underpin the revised benchmark standards.
- the combining of the subject coverage and knowledge for environmental sciences and environmental studies where possible. The statement recognises that these courses can vary considerably in the depth and specificity, and further distinguishes between key features of each subject in terms of typical components and applications, whilst also detailing the common subject knowledge gained in both environmental sciences and studies programmes.

The following sections, drawing directly from the Benchmark Statement (for ease of reference, section numbers are in brackets), highlighting key additions to the benchmark under the aforementioned cross-cutting themes, giving an overview of each theme where the statement references them in the Content, Teaching and Learning, Assessment and Benchmark Standard (learning outcomes).

Since the publication of the new ES3 Benchmark Statement, the IES/CEDHE accreditation application and benchmark mapping documents have been reviewed and updated to reflect the changes in the new ES3 Benchmark Statement. These can be downloaded from the CEDHE website.

# 1. Equality, Diversity & Inclusion

### (1.8-1.9) Overview

Equality, diversity, and inclusivity (EDI) are integral to the ES3 disciplines, not only informing pedagogical practice but also as subject knowledge. Inclusion of diverse groups is critical to the development of subject learning communities, yet these groups may encounter multiple barriers to engagement. ES3 communities have a duty to confront and encourage the dismantling of all barriers to engagement and participation in our disciplines.

EDI can be explored in discipline contexts and by challenging discipline identities and stereotypes, including the impact of colonialism, embedding diverse representation within curriculums, broadening interdisciplinary and cross-disciplinary perspectives, and particularly valuing different cultural perspectives, ways of knowing and lived experience.

### (3.1-3.12) Content, structure and delivery (Earth Science, Environmental Science & Studies)

The importance of EDI in the practice of the discipline.

### (3.13-3.17) Teaching and learning

Activities should be designed to be inclusive to all students. If required, reasonable adjustments should be arranged in order to enable all students to take part in practical work and fieldwork activities.

### (3.18-3.22) Assessment

Assessment is inclusive for all students. It is 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 is available to avoid EDI barriers.

### (4) Benchmark Standards

*Personal and professional skills:*

Recognise the importance of equality, diversity and inclusivity and develop behaviours that support EDI.

## 2. Sustainability

**(1.10) Overview**

The application of sustainable development in the higher education sector takes place through Education for Sustainable Development (ESD), which is the process of creating curriculum structures and subject-relevant content to support and enact sustainable development. The ES3 subjects are rooted in sustainability and allow students to reflect upon their learning and the application of their knowledge for a sustainable society. Outcomes include knowledge and skills that provide graduates with a wide range of competencies, preparation for future employment, and awareness of key challenges in sustaining a habitable planet.

**(3.1-3.12) Content, structure and delivery (Earth Science, Environmental Science & Studies)**

The concepts and applications of sustainable development and systems thinking. This should be consistent with the QAA and Advance HE Education for Sustainable Development Guidance.

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

**(3.1-3.12) Content, structure and delivery (Earth Science)**

The role of Earth sciences in meeting the UN Sustainable Development Goals

The sustainable exploration, management, development, remediation, and storage of Earth resources (for example, minerals, water, aggregates, hydrocarbons, carbon dioxide and radioactive waste)

**(3.1-3.12) Content, structure and delivery (Environmental Science & studies)**

The principles of sustainability and the use of sustainable approaches to manage natural and human-induced cycles of resource use.

The role of environmental sciences and studies in meeting the UN Sustainable Development Goals.

The pursuit of sustainable cities and communities through green design and innovation.

**(3.13-3.17) Teaching and Learning**

ES3 subjects have sustainability at their core. Teaching and learning should be clearly underpinned by education for sustainable development to achieve positive graduate outcomes and teaching. Learning methods should embody sustainability principles and solutions.

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**

*Personal and professional skills:*

Appreciate the need to act and work in an ethical and sustainable manner and in compliance with relevant legislation.

## 3. Employability, entrepreneurship and enterprise

**(1.13 - 1.15) Overview**

Employability is the set of competencies demonstrated by a combination of knowledge, skills and behaviours, that make individuals more likely to gain employment and be successful in their chosen occupations, benefiting themselves, society, and the economy. Employability and entrepreneurship focus on competencies (knowledge, skills and behaviours) and cross-cutting, transferable themes such as business awareness, professional ethics, health and safety codes and personal motivation.

In the context of the Earth sciences, employers will be looking for competence with the selection, application and interpretation of appropriate numerical, digital, qualitative and quantitative techniques and the ability to understand the Earth system in four dimensions.

In the context of environmental sciences and studies, employers will be looking for competence with emerging good practice, survey and data analysis techniques, knowledge of current legislation and policy, and the ability to identify the impacts on the environment from activities.

**(3.13-3.17) Teaching and learning**

The ES3 subjects are characterised by the integration of practical work, especially field-based activities, with theoretical studies. Courses therefore offer all students opportunities for significant field-based learning and teaching, to foster skills such as the ability to visualise and extrapolate data in three dimensions or understand the application of practical methodologies. Much advancement in knowledge and understanding in these subject areas is founded on accurate observation and recording in the field and the collection of empirical data for analysis. Developing field-related practical and research skills is therefore important for students wishing to pursue careers in ES3-related sectors. Field based studies allow students to develop and enhance many graduate attributes and transferable skills. For example: leadership, team working, problem-solving, self-management and interpersonal relationships. All of these are of value to their employability, entrepreneurship, and active citizenship.

**(3.18-3.22) Assessment**

Assessment strategy is an integral part of course design. 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.

**(4) Benchmark Standards**

There are numerous learning outcomes related to employability, entrepreneurship and enterprise. See table below.

## 4. Comparison of Benchmark Standards Learning Outcomes

| Previous ES3 Benchmark | 2022 ES3 Benchmark (4) |
|---|---|
| **Knowledge and Understanding** | **Intellectual skills (knowledge and understanding)** |
| Knowledge and understanding of subject-specific theories, paradigms, concepts and principles | Have a knowledge and understanding of subject-specific theories, paradigms, concepts and principles |
| An ability to integrate evidence from a range of sources to test findings and hypotheses | Integrate evidence from a range of sources to test findings and hypotheses consider and appraise issues from a range of multidisciplinary and interdisciplinary perspectives |
| An ability to consider issues from a range of interdisciplinary and multidisciplinary perspectives | |
| An ability to analyse, synthesise, summarise and critically evaluate information | Analyse, synthesise, summarise, appraise and critically evaluate information |
| An ability to define complex problems and to develop and evaluate possible solutions | Define complex problems and develop and evaluate possible solutions |
| A critical approach to academic literature, data and other sources of information | Take a critical approach to academic literature, data and other sources of information |
| | Develop and test hypotheses to inform and design investigations (and experiments) |
| | Plan, conduct and present an independent project with appropriate guidance |
| | Have confidence and competence in dealing with uncertainty in data and systems response. |
| | |
| **Practical skills** | **Practical skills** |
| Conduct fieldwork and laboratory investigations competently (as appropriate) | Conduct fieldwork and laboratory investigations competently (as appropriate) |
| Describe and record observations in the field and laboratory | Describe and record observations effectively in the field and laboratory |
| Interpret and evaluate practical results in a logical manner | Interpret and evaluate practical results in a logical manner |
| Undertake laboratory and fieldwork ethically and safely | Undertake laboratory and fieldwork ethically and safely with an appreciation of appropriate codes of conduct and legal requirements |
| Plan, conduct and present an independent project with appropriate guidance | |
| Prepare, manipulate and interpret data using appropriate techniques | Gather, prepare, process and interpret data using appropriate techniques |
| Use appropriate numerical and statistical techniques | Use appropriate numerical, statistical and qualitative techniques |
| Use appropriate technologies in addressing problems effectively. | Use appropriate technologies in addressing problems effectively |
| | |
| **Communication skills** | **Communication skills** |
| An ability to communicate effectively to a variety of audiences using a range of formats | Communicate effectively with a variety of audiences using a range of formats and media |

| | |
|---|---|
| Good interpersonal communication skills to enable effective team working | Have good interpersonal communication skills to enable effective team working |
| An ability to argue a case in an effective manner. | Effectively articulate and synthesise an argument |
| | Acknowledge and understand different perspectives |
| | Present a case in an influential and persuasive manner. |
| | |
| **Personal and Professional skills** | **Personal and professional skills** |
| Work effectively as a team member | Work effectively as a team member |
| Recognise and respect the views of others | Recognise and respect the views of others |
| Demonstrate an awareness of the importance of risk assessment and relevant legislation | Demonstrate an understanding of the importance of risk assessment and associated legislation for health, safety and well-being |
| Develop the skills for autonomous learning | Develop the skills for autonomous learning |
| Identify and work towards targets for personal, career and academic development | Recognise the importance of planning for personal, career and professional development, including identifying and working towards targets |
| Reflect on the process of learning and to evaluate personal strengths and weaknesses | Reflect on the process of learning and evaluate personal strengths and weaknesses |
| Display an appreciation of developing their graduate skills relevant to career pathways. | Display an appreciation of developing graduate skills relevant to career pathways |
| | Work online and remotely as well as in person |
| | Demonstrate professional behaviours |
| | Plan and organise workloads, including project management |
| | Develop leadership qualities |
| | Recognise the importance of equality, diversity and inclusivity and develop behaviours that support EDI |
| | Appreciate the need to act and work in an ethical and sustainable manner and in compliance with relevant legislation. |
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