ASIIN

08

Subject-Specific Criteria of the Technical Committee 08 – Agriculture, Forestry and Food Sciences

for the accreditation of Bachelor's and Master's degree programmes in agriculture, forestry and food sciences

(adopted: 28 June 2024, revised 12 December 2025)

The following specifications complement the "ASIIN General Criteria for the Accreditation of Degree Programmes".

1 Classification

1.1 Function and Context

The Subject-Specific Criteria (SSC) of the Technical Committee 08 – Agricultural, Forestry, and Food Sciences are based on the assumption that the learning outcomes formulated and aimed at by universities, in accordance with their institutional profile and responsibility, serve as the central criterion for their curricular evaluation regarding the programmes submitted for accreditation. Furthermore, the SSC of all ASIIN (Accreditation Agency for Study Programmes in Engineering, Informatics, Natural Sciences, and Mathematics) subject committees have several important functions:

The SSC are derived from a regular assessment conducted by the ASIIN Technical Committees, which summarises the accepted standards of good practice in higher education in a community equally supported by academia and professional practice. Alternatively, they serve demanded as future-oriented educational quality demands for the labour market. The expectations formulated in the SSC with respect to achievement of study goals, learning outcomes, and competency profiles are not static. Rather, they are subject to a constant review in close cooperation with organisations of the "professional community," such as faculty and departmental days, professional societies, and associations of professional practice. Applying universities are requested to critically reflect on the interplay between the learning outcomes, curricula, and related quality expectations they themselves aim for using the SSC and to position themselves with respect to their own institutional goals.

In their function in the accreditation process, the SSC further provide a professionally elaborated basis for discussion of experts, universities, and ASIIN bodies. As such, they make an important

contribution to the comparability of national and international accreditation procedures, since it should not be left to individual experts to decide which technical parameters are included in the discussion and the individual assessment. At the same time, the SSC specify those abilities, skills, and competencies that are considered "state of the art" in a field. However, they can and should always be exceeded and diversified depending on the objectives of the university.

In the case of interdisciplinary and multidisciplinary study programmes, the SSC of ASIIN can provide indicators for presentation and evaluation. However, they are fundamentally oriented towards the respective core subjects of the individual disciplines.

The SSC of ASIIN are internationally sourced and aligned, thus contributing to the realization of the European Higher Education Area. They consider the requirements of the European "Bologna 2020" strategy to formulate subject-specific, discipline-oriented learning outcomes as one of the most important instruments for promoting academic and professional mobility in Europe as a quality requirement. The SSC take into account, among other things, the diverse preparatory work within the framework of European projects (e.g., "Tuning") and professional networks.

Considering this background, the study goals and learning outcomes described in the following sections for bachelor's and master's programmes in agricultural, forestry, and food sciences are intended to support the application and evaluation of accreditation procedures.

1.2 Responsibility

The Technical Committee 08, which deals with programmes related to the development, design, production, and consumption of food and environmental goods and services, as well as the conservation and development of the landscape in terms of preserving the earth's natural resources, is the body responsible for addressing questions pertaining to the aforementioned topics.

In accordance with the width of the professional field, a variety of designed and profiled study programmes are concerned within the scope of the Technical Committee. They include Agricultural Sciences with Viticulture and Horticulture Sciences, Forestry Sciences, Food Sciences, Aquaculture Sciences, as well as specialised study offerings such as Dairy or Brewing Industry, Agribusiness, Bioeconomy, Environmental and Resource Management, or programmes in the field of Renewable Resources or Energy Production. The diversity of the subject continues to expand in line with developments in research and professional fields.

1.3 Collaboration of the Technical Committees

The Technical Committee 08 – Agricultural, Forestry, and Food Sciences works closely with other ASIIN technical committees, particularly in order to meet the requirements of interdisciplinary study programmes. Universities are requested to provide their suggestion to which technical committee their programmes should be assigned to when registering for an accreditation procedure.

In the case of programmes in agriculture, forestry, or food science that have a common content of more than 50 percent, the Technical Committee 08 – Agricultural, Forestry, and Food Sciences is typically responsible for leading the accreditation procedure. This may involve the inclusion of experts from other areas if necessary. In the case of interdisciplinary programmes with a significant share of agricultural, forestry, or food science content (up to and including 50%), the

Subject Committee 08 Agricultural, Forestry, and Food Sciences assumes joint responsibility with the relevant disciplinary fields, or alternatively, provides expert reviewers.

2 Educational Objectives and Learning Outcomes

The following summary of the study goals and competencies is provided to clarify the knowledge, skills, and abilities that graduates should have achieved to successfully enter professional life or to be sufficiently qualified for further studies. The specific objectives of bachelor's and master's programmes influence the width and depth of the study goals.

In the context of career choice freedom, it is a particular challenge to design undergraduate degree programmes in such a way that students acquire sufficient general subject knowledge but also gaining adequate vocational knowledge and skills. This combination ensures good prospects for successful career advancement even in a changing professional environment. It is evident that undergraduate programmes must provide students with an adequate foundation in natural sciences and technology. This is to ensure that they are prepared for either a specialised master's curriculum or a career path without the need for an additional master's degree. Master's programmes tend to focus more on specialised programmes to either leading students into research-oriented roles in the workforce or preparing them for specific fields requiring management positions.

The following section provides a general overview of the qualification profiles of bachelor's and master's graduates. It should be noted that these qualifications and competencies may vary in intensity depending on the specific study profile and subject-specific orientation.

In the context of the EQAS-Food Award, the learning objectives developed by the ISEKI-Food Association are also taken into account when assessing degree programmes in food science. The relevant criteria can be accessed via the following link (https://www.iseki-food.net/sites/iseki-food.net/files/download/96/framework_doc_edit_rc_16.01.18.pdf, last accessed: 17/04/2024).

2.1 Requirements for Bachelor’s degree programmes

A successfully completed bachelor's degree programme enables early entry into the workforce (professional qualification) or equips graduates for further study with a scientific focus or broader scope.

The competency areas are derived from the requirements of professional life and therefore should be understood, interpreted, and transferred in the context of the specific study profiles and desired career fields (see section 3).

1. Knowledge and Understanding

Graduates:

- understand the natural and social science as well as mathematical, health, economic, and engineering principles underlying their discipline,
- possess comprehensive knowledge of their discipline including knowledge of new developments in their field,
- are familiar with concepts of identification and assurance of quality in their respective fields of work,
- know the fundamental and relevant legal regulations in their field of expertise,

- have an awareness of the multidisciplinary context of agricultural, forestry, and food sciences and related areas.

2. Analysis and Methodology

Graduates:

- have the necessary knowledge and understanding to identify and formulate problems in agricultural, forestry, and food sciences (which may include aspects outside their specialisation area),
- are capable of applying various fundamental methods, such as mathematical, statistical, and experimental (laboratory) analyses,
- possess the ability to plan and conduct appropriate experiments, interpret data, and draw conclusions

3. Research and Evaluation

Graduates:

- are able to conduct targeted literature research and utilize databases and other information sources,
- have the ability to conduct evaluations through comparison with literature references and plausibility considerations.

4. Development and Problem Solving

Graduates:

- are capable of creating scientific designs, such as engineering designs, according to the current state of knowledge and understanding and to collaborate with stakeholders in their field of work,
- can adapt solutions and independently develop approaches to problem-solving,
- are able to use their creativity to develop new and original ideas and methods.

5. Transfer and Application

Graduates:

- are able to identify and solve practical problems,
- can combine theory and practice to solve scientific and practice-related problems,
- are able to select and apply appropriate equipment and resources as well as procedures and methods,
- have developed an understanding of applicable techniques and methods as well as their limitations,
- are aware of the technical, health-related, social, economic, safety-related, ecological, and legal implications of practical scientific and engineering activities,
- master the application of field-relevant procedures,
- are aware of the applicability and limitations of concepts and solution strategies,
- have experiences with scientific problems, topics, and processes,

- are able to use appropriate literature and information sources and coordinate expert teams,
- have the knowledge to consider national and global challenges, such as food security, globalization, sustainability, climate change, in their professional activities.

6. Social Competencies

- are able to act efficiently as individuals and as members of a team,
- can apply various methods to effectively communicate with the scientific community and society as a whole,
- are committed to acting in accordance with professional ethics and the responsibilities and norms of scientific practice,
- are aware of project management methods and business practices such as risk and change management and understand their limitations,
- recognise the need for independent, lifelong learning and are capable of it,
- have competencies in management and marketing, depending on the field
- have adequate communication skills, such for presentation or moderation.

2.2 Requirements for Master's Degree Programmes

Building upon an initial undergraduate degree, the master's programme leads to the acquisition of advanced analytical and methodological competencies. At the same time, the disciplinary competencies from the undergraduate programme are deepened or expanded.

The competency fields are derived from the requirements in professional life and therefore need to be understood, interpreted, and transferred within the context of specific study profiles and desired professional fields.

1. Knowledge and Understanding

Graduates:

- possess profound knowledge and understanding in their disciplinary specialisation including engineering as well as in the broader disciplinary context,
- have developed a differentiated knowledge and critical awareness of the latest developments in their discipline,
- possess in-depth knowledge of relevant legal regulations in their professional field,
- possess in-depth knowledge of quality standards and quality processes as well as their management.

2. Analysis and Methodology

Graduates:

- are capable of formulating and solving problems from a new and evolving area of their specialisation,

- can use their knowledge and understanding to design engineering models, systems, strategies, and processes,
- are able to design and apply various methods - such as mathematical analysis, computer-aided modelling, practical (laboratory) experiments, or plans,
- are able to recognise the significance of social, health and safety-related, ecological, and economic conditions,
- are capable of planning, conducting, and evaluating field and laboratory experiments.

3. Research and Evaluation

Graduates:

- are able to apply appropriate methods to conduct research or detailed investigations into disciplinary issues according to their knowledge and understanding,
- are capable of identifying, locating, and acquiring necessary information,
- can define and conduct research utilising the means of analysis, modelling, and experiments,
- can critically evaluate data and draw conclusions,
- are capable of evaluating the application of emerging technologies in their disciplinary field.

4. Development and Problem Solving

Graduates:

- possess the ability to solve problems that are incompletely defined or unusual and exhibit conflicting objectives or competing specifications,
- are capable of analysing and evaluating system behaviour,
- are able to use their knowledge and understanding to develop solutions to unusual problems, also involving other disciplines,
- can apply their disciplinary judgment to work with complex, technically unsound, and incomplete information,
- are capable of applying innovative methods to problem-solving.

5. Transfer and Application

Graduates:

- can combine theory and practice to achieve quality in structure, process, and outcome,
- can handle complex situations and combine knowledge from different areas,
- can develop and implement deductive and inductive approaches,
- have developed a comprehensive understanding of applicable theories, models, techniques, and methods as well as their limitations,
- understand the social, economic, and environmental impacts of engineering, activities and can assess them,

- possess the general and overarching knowledge to recognise and analyse the challenges arising from globalisation, resource scarcity and food security, sustainability, climate change, etc., on national and global levels; they are able to draw the necessary conclusions and derive and implement required actions.

6. Social Competences

Graduates:

- meet all requirements for graduates of undergraduate programmes regarding interdisciplinary qualifications at the higher level of master's programmes,
- can effectively work as leaders of teams composed of individuals from different disciplines and levels,
- can work and communicate in national and international contexts.

3 Curriculum

The design of a specific curriculum is derived from the programme goals or intended learning outcomes. Accordingly, the diversity of questions encompasses topics in natural sciences, economics, technology, as well as social sciences and health-related areas. Furthermore, a characteristic of contemporary research and teaching is to relate subject matter and processes to different contexts.

A typical framework for academic teaching in agricultural, forestry, and food sciences is a holistic approach, particularly evident in environmental and ecological, as well as socio-economic research approaches. This perspective considers not only nature and natural resources but also structures, processes, humans, and their respective interrelationships. From the perspective of "action-oriented sciences," meaning problem-solving research in a holistic approach, activities aim to create a knowledge base focused on the transfer of knowledge, in line with the concept of "applied science." The insights gained here aim for sustainable positive benefits in terms of welfare that are accepted by the people.

3.1 Agriculture

The interdisciplinary qualifications required in the respective desired professional fields and roles or activities are considered in the curriculum.

The curriculum includes general foundations that include scientific, technical, ecological, social science, and economic fundamentals, the extent of which vary according to the specific study programme.

Subject-specific foundations include the basics of production, processing, distribution, and the use of food and bioresources. This encompasses knowledge of ecosystems such as soil and water, plant cultivation and breeding, animal breeding and husbandry, nutrition, and health of animals providing food and biological raw materials. Additionally, societal, socioeconomic, technical, and legal aspects throughout the entire value chain from production to retail are considered.

The profile development includes subject-specific focal topics that qualify for specific professional activities, may represent specialised study directions, correspond to the profile of the location, and offer individual profiling opportunities for students.

In addition to subject-specific learning outcomes, interdisciplinary learning outcomes lead to professional qualification or competency. These outcomes can be derived from the requirements of the desired professional fields, roles, and activities and are reflected in the curriculum of a study programme in various teaching and methodological ways. Application-oriented and professionally qualifying offers are essential components of the educational programme.

3.2 Food Sciences

The field of food science, as an interdisciplinary domain, comprises food technology, nutrition science, and dietetics.

The general foundations of this field include scientific, technical, technological, medical, ecological, social science, and economic fundamentals. The extent of these fundamentals is specific to the study programme.

The specific contents of food technology encompass the physical, chemical, microbiological, and sensory basics of processing plant and animal raw materials into food products including their storage and transportation, along with quality assessment. Process engineering and technological aspects are also involved together with considerations of sustainability and resource conservation.

In nutrition science and dietetics programmes, emphasis is placed on physiological and anatomical basics as well as the knowledge about biochemistry and about the components of food and their mechanisms of action. Additionally, social science and cultural knowledge about nutrition and the determinants of dietary behaviour as well as a basic understanding of food production are included.

Profile development encompasses specialised areas that qualify for specific professional activities, represents specialised study directions, corresponds to the profile of the location, and offers individual profiling opportunities for students.

In addition to subject-specific knowledge, interdisciplinary knowledge contributes to professional qualification or competency. Interdisciplinary knowledge can be derived from the requirements arising in the desired professional fields, roles, and activities, and is reflected in the curriculum of a study programme in various ways.

3.3 Forestry

The field of forestry encompasses the study of the forest ecosystem and its evolution in response to both intended and unintended human influences. Its foundation is based on the integration of scientific, technological, ecological, social science, and economic principles.

The specific content of this field includes:

- Natural conditions such as soil, water, and site characteristics, as well as their changes in the context of climate change
- Habitat conditions of trees and forest communities, genetics, biodiversity, and nature conservation
- Biotic and abiotic threats to the forest including their prevention and mitigation
- Establishment, maintenance, and development of forests while adhering to the principle of sustainability

- Ecosystem services of the forest for nature, environment, and society as well as harvesting and use of products within conventional applications and bioeconomy
- Management of forestry enterprises (including risk management) considering economic, ecological, and social goals
- Analysis of policy approaches to forests and forestry in local, national, and international political processes.

Depending on the location and conditions, it may be necessary to emphasise specific topics to a greater or lesser extent, up to the development of specialised study profiles focusing on particular aspects. These should be clearly identified in the curriculum, specifying relevant career fields.

4 Practical Experience

Bachelor's Degree Programmes

Relevant practical experiences gained in the respective programme during an appropriate duration enhance the achievement of professional qualification in the study programme.

"Transfer phases" such as laboratory work, field trips, and projects have a similar effect.

Programme-related practical phases are part of the student workload and are credited with ECTS points. The university must transparently outline the specific learning contents taught in practice phases and their relevance to the curriculum. The internship contents must be agreed upon with the internship provider, for example through a Learning Agreement.