



## Deliverable 1.3: Best practices of MSc programmes

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## 1. Elements of the context

Benchmarking with appropriate partners, at a national or international level, enables a University to compare and evaluate its performance and, in so doing, monitor standards, compare good practices and make quality improvements (OCDE, 2017). Benchmarking enables the structured sharing of ideas and good practices on institutional strengths and weaknesses (Burquel, 2014).

The challenges linked to sustainable food systems are not limited within national borders; they are related to regional and global issues and call for cooperative actions. In this context, the STEPS project aims at the development of a new MSc programme in “Sustainable Food Production. The MSc programme will offer advanced knowledge to graduates who work or aim to work in private companies and national bodies or start new businesses in particular, in rural, agricultural areas and in this way, can contribute to the transition to sustainable food production systems.

The main motivation of STEP project is to build the capacity of partner countries HEIs, in order to help them improve the quality of the education offered, and provide an education that is more aligned to the needs of the labour market and society. In this framework, cross-country higher education systems best practices analysis will enable the STEP consortium to identify the best examples that can be adopted in each of the countries.

This analysis will provide best practices and recommendations towards the development of an educational programme linked with environmentally friendly and socially accepted food production systems.

## 2. Methodology

The main objective of the study is to identify the best practices in sustainable food system master programs. In order to achieve this objective is undertaken the analysis of MSc programs that are based on principles as: (i) jointly implemented through several cooperation universities; (ii) consolidated programs in terms of curricula and (iii) good communication with food industry. So, the assessment following the universities web pages, the essence of each program as objectives, study plans and organizations were considered.

**Food Science and Technology Development in Europe:** The understanding and application of science to satisfy the needs of society for sustainable food quality, safety and security, has been taught as a University academic discipline for the past 60 years. Europe has been a major center for food science and technology, with one of the earliest food science degrees offered by the University of Strathclyde, in Glasgow, Scotland, led by the late Professor John Hawthorn, who was an early President of IUFoST. The discipline of Food Technology was developed in response to wartime food shortages in Britain, with the National College of Food Technology set up as a joint venture between academia, government and the food industry, initially in London, then it moved to a new site in Weybridge, Surrey, before moving to the University of Reading. The longer program in Food Technology provided the opportunity for students to include periods of time working in the food industry, to gain experience, which would also allow them to be highly 'sought after' as graduates, because of their knowledge of the kind of role they would be best able to fulfil in industry, retail, laboratory or control agency. There were industrial Advisory Boards, who could not only help guide and support the University teaching and research programs, but also help arrange the industrial placements. These Advisory Boards have become widely used in many countries with positive effect.

**Collaboration and Focus in Higher Education:** Throughout Europe, as elsewhere, Food Science and Technology courses are taught at relatively few Universities, which have usually recognised other centres of expertise, and sought co-operation and collaboration. In the UK, the Committee of University Professors of Food Science and Technology (CUPFST) came together to produce a 'Course Content for University Food Science and Technology Programs'. This recommended core subjects, such as Chemistry, Biochemistry, Microbiology, Analysis, Nutrition, and Processing, as well as other subject components, all based on learning outcomes, and which would support diversity and different research strengths.

**European Initiatives and Programs:** European food science and technology has been in the forefront of European and international collaboration, through organising a European MSc course in Food Science and Technology. This initiative, which has since been used as a model by some other disciplines, involves a cohort of graduate students from several countries studying modules in some five different European countries, and then doing a research project in a further country, while also developing different language skills. This provides great international networking opportunities, and has proved popular with the students, the food industry, and European Commission. The early days of the European Lifelong Learning Programme, which now comprises 6 sub-programs, involved the establishment, in 1987, of the ERASMUS program (European Community Action Scheme for the Mobility of University Students). In this, students spend 3 – 12 months in a different University in another European country, which is recognised as part of coursework in their own University degree

program. In the result section are analysed the 25 masters that have been considered as best practices for the previously mentioned reasons.

### 3.Results

#### 3.1. Joint degree of 5 universities in Danube region

<http://www.ica-casee.eu/index.php/casee-master>

##### **Joint degree Sustainability in agriculture, food production and food technology in the Danube region**

Five universities from Austria, Hungary, Romania, Serbia, Croatia participate in the programme: University of Natural Resources and Life Sciences, Vienna (BOKU) (AT), Szent István University (SZIU), Gödöllő (HU), University of Zagreb (UNIZG) (HR), University of Novi Sad (UNS) (SR) and Banat's University of Agricultural Sciences and Veterinary Medicine „King Michael I of Romania" Timisoara (BUASVMT) (RO). Core content of the programme consists in sustainable development, food security, technology and quality, sustainable food production, biotechnology and sustainable energy. This joint master programme gives the students the possibility to improve their knowledge and grow their skill-set regarding the intercultural and social aspects, anthropic landscape and natural resources - related to sustainability in agriculture and the food industry in the Danube region. The first semester is organized by BOKU for all student. Second semester is BOKU and SZIU and the third semester the students choose from UNIZG, UNS or BUASVMT, fourth semester is for completing the exams and preparing the thesis. Compulsory part of the programme is summer school

This joint master programme gives the students the possibility to improve their knowledge and grow their skill-set regarding the intercultural and social aspects, anthropic landscape and natural resources - related to sustainability in agriculture and the food industry in the Danube region. Sustainable development, food security, technology and quality, sustainable food production, biotechnology and sustainable energy are the core content of the master program.

Compulsory courses: 62 ECTS credits

The Master's programme comprises 9 Focus Areas of which 4 Focus Areas are compulsory:

- Focus Area “Sustainable Agriculture” (compulsory – min. 20 ECTS)
- Focus Area “Food Safety and Consumer Science” (compulsory – min. 20 ECTS)
- Focus Area “Intercultural Learning” (compulsory – min. 12 ECTS)
- Focus Area “Sustainable rural and regional development and policy”
- Focus Area “Biodiversity and sustainable use of natural resources”
- Focus Area “Soil, water and climate” (compulsory – min. 10 ECTS)
- Focus Area “Biotechnology”
- Focus Area “Regional specialities”
- Focus Area “Sustainable energy systems”
- Summer school

Title / Hyperlink to the website	Language	Credits	Semester	Orientation
Sustainability in agriculture, food production and food technology in the Danube region	English	120ECTS	4	Research

Identified best practices in this programme:

*Continuous development of teaching methodologies and equipment:* Teaching methodologies in the form of summer school involve **case studies approach**. The students are exposed to real case and have to demonstrate how they can use their knowledge to deal with the case. Annual summer school aiming at intercultural learning as an example of good practice. Summer school as compulsory element of the study programme. Every year a summer school is organized by the consortium of CASEE universities (organized by one of CASEE universities)

*Quality insurance mechanisms:* The international nature of the programme requires international board involved in quality insurance of the programme. The programme is continuous **evaluated by the international board** consisting of the members of the universities involved in this programme and partner universities (like CULS/CZU Prague, SGGW/WULS Warsaw)

### 3.2. Swedish University of Agriculture Uppsala, Sweden

#### MSc programme Sustainable Food Systems

<https://www.slu.se/en/education/programmes-courses/masters-programmes/sustainable-food-systems/>

MSc programme Sustainable Food Systems (Swedish University of Agriculture, Uppsala). Core content of the programme consists in bringing natural science and social science together for working towards sustainable development in food systems. The programme focuses on development of sustainable circular food systems. It recognises the many actors in society that have a role in the development of innovative solutions. This two-year programme is offered as a mix of programme courses and elective courses. The students gain know-how about identifying, developing and evaluating innovative products, processes and systems. They work with real cases in cooperation with companies and organisations in the food sector. A multi-disciplinary background among students and tutors serves as a condition for fruitful dialogue.

A degree of Master of Science (120 credits) with a major in food science is awarded to students who fulfil the course requirements (courses with a Pass grade) of 120 credits, of which at least 90 credits at second-cycle level, according to the following:

- at least 30 credits of courses with specialised study in the main field food science,
- at least 30 credits from an independent project (degree project) in the main field food science.

- During the first year, three courses are offered to provide an overview of sustainable development in food systems. The content of these year 1 courses focus on:
  - developing an understanding of system perspectives on circular systems of production, processing and consumption of food,
  - identifying options and challenges related to the development of sustainable and innovative food products, processes and systems,
  - evaluating current and future food products and food systems from a sustainability perspective.

The programme includes elective courses which offer students the opportunity to specialize in an area of their choice and concludes with an independent project (degree project) corresponding to 30 credits.

Title / Hyperlink to the website	Language	Credits	Semester	Orientation
Sustainable food systems	English	120ECTS	4	Academic

#### Identified best practices

*Continuous development of teaching methodologies and equipment:* Compulsory part of the programme **bringing natural and social sciences together** is Interdisciplinary practice. Working with sustainability requires communication and co-operation between many scientific disciplines, between society's practices and between companies' production skills. Interdisciplinary methods are at the core of the toolbox needed for the next centuries for natural scientists, social scientists, practitioners and students.

*Mechanism that ensures continuous linking with the labour market:* **Work with real cases** in cooperation with companies and organisations in the food sector is crucial for this programme. The students work on real cases provided by the cooperating industry.

### 3.3. Wageningen University and Research Center, the Netherlands

#### MSc study programme in Organic Agriculture – Sustainable Food Systems

<https://www.wur.nl/en/Education-Programmes/master/MSc-programmes/MSc-Organic-Agriculture/Specialisations-of-Organic-Agriculture/Sustainable-Food-Systems.html>

After being admitted to the MSc Organic Agriculture students have to choose a specialisation. The specialisation determines the possible subjects of thesis research (i.e. at which chair groups the research can be done) and which master's courses the students are required to take. Specialisations are Agroecology or Sustainable Food Systems. The specialization Sustainable Food systems focuses on the social sciences perspective of sustainable systems of food provisioning. In addition,

globalisation and sustainability of food production and consumption are addressed. Production, processing and marketing of organic products is increasingly affected by (inter-) national policy and legislation. Insight into these aspects is crucial to expand and develop organic food production networks. The programme includes the excursion to important events (like Biofach fair in Nuremberg, Germany) and interactive learning sessions (MOA Café – scientific café format).

The students are required to take general courses if similar courses were not a part of their Bc programme (e.g. skills courses, statistic course, Agriculture and Society course). Common compulsory courses for the programme is Organic Agriculture (3 parts). Then the students have restricted option to choose from 12 courses related to their master thesis and restricted to the logics of the choice given by the internal rules of the programme:

- Economics of Agribusiness,
- The Economics and Politics of European Integration: Agricultural, Trade and Foreign Policy Analysis,
- Advanced Agricultural Business Economics,
- Researching Socio-Technical Practices,
- Innovation and Responsible Futures,
- Environmental Education and Learning for Sustainability,
- Globalization and Sustainability of Food Production and Consumption,
- Advanced Management and Marketing, Consumer Behaviour: Concepts and Research Methods,
- Creating Frameworks for Marketing and Consumer Behaviour, Governance,
- Livelihoods and Resources,
- The Sociology of Farming and Rural Life,
- Sociology of Food and Place.

Related to the theme of the thesis an internship is required depending on the Study group (a sort of WUR department) where the thesis is elaborated)

Title / Hyperlink to the website	Language	Credits	Periods	Orientation
Sustainable food systems	English	120 ECTS	6	Academic and Research

#### Identified best practices

*Scientific and technical background provided to graduates:* A network of universities called Euroleague for Life sciences annually organizes a **scientific students conference** where the students present their bachelor or master thesis in the form of posters or oral presentations. The presentations are evaluated by the jury and the best student get financial award. It is the first experience of the students with scientific conference. The conference has one section related to food (the conference is open also for other study programmes)

*Mechanism that ensure continuous linking with the labour market:* An **excursion o Biofach fair** is expected (Nurnberg, Germany) – largest organic products fair in Europe with direct links to labour market (seeing what are the trends in the industry). The students have possibility to meet directly the representatives of organic food industry and to talk to them about their carrier.

*Continuous development of teaching methodologies and equipment:* Teaching **methodology of interactive learning sessions:** The students are to design, organize & facilitate an interactive learning session a **sort of Scientific Café** - those learning meetings are organized by the students on topics like designing a research proposal, philosophy of science and research ethics. This course allows students to form a community of learners; to learn from each other's knowledge and experiences, and to share insights and skills.

### **3.4. Ghent University (UGhent) and The Katholieke Universiteit Leuven (KU Leuven), Belgium**

#### **Inter-University Master of Science in Food Technology**

The Inter University Programme in Food Technology (IUPFOOD) is jointly organised by KU Leuven and Ghent University (UGent). The programme builds on KU Leuven's and UGent's combined expertise in research and education in the field of food technology.

The programme provides multi-disciplinary and specialized professional training in food technology, with the emphasis on postharvest and food preservation engineering on one hand and food science and technology on the other hand. The programme aims at providing the students with the technical and managerial knowledge, skills and attitudes which they require to contribute successfully to solving problems related to food security through the production of safe foods of high quality.

It is the Interuniversity Programme and focuses on two technological dimensions of prime and crucial importance in food processing and preservation: (1) the transformation (processing) of raw materials into products suited for human consumption, (2) the role of postharvest and food preservation unit operations in delivering safe and nutritious foods to the end consumer.

In the first year of the MSc programme, in-depth knowledge in food science, engineering and food engineering is obtained. The first semester is organised at UGent while the second semester is organised at KU Leuven. The second year provides a broad knowledge in food technology and in-depth understanding in either 'Postharvest or Food Preservation Engineering' (PFPE – KU Lueven) or 'Food Science and Technology' (FST – UGHnet), depending on the major chosen. The second year of the programme therefore consists of specific courses on each major (PFPE and FST), optional courses and dissertatio-n research. The major, the optional courses and the dissertation topic are chosen after completing the first year.

For the optional courses the student may choose among the courses of the other specialisation and the additional optional courses offered. This enables the participants to compile a tailor-made study curriculum according to their individual needs and interests.

The Master of Science in Food Technology (120 ECTS) consists of four major segments:

- In-depth education segment (60 ECTS)
- Specialisation segment (18 ECTS)
- Elective courses segment (12 ECTS)
- Master's thesis segment (30 ECTS)

Title / Hyperlink to the website	Language	Credits	Semesters	Orientation
Food technology	English	120 ECTS	4	Academic and Research

#### Identified best practices

*Scientific and technical background provided to graduates:* The programme utilises the synergies of the best elements of two participating universities. It combines the education in two leading universities in Belgium (University Ghent and Catholic University of Leuven). Both harmonize their schedules and provide the best classes in the specializations selected by the students. It saves time and capacities – the best example how to share the capacities in education and to deliver to the students the best education (courses). If the courses the students are interested are not in one university, they might opt for them at another university.

### 3.5. Cranfield University, UK

#### **MSc in Future Food Sustainability and MSc in Food Systems and Management**

<https://www.cranfield.ac.uk/courses/taught/future-food-sustainability>

<https://www.cranfield.ac.uk/courses/taught/food-systems-and-management>

This first course has been designed with the multidisciplinary nature of these grand societal challenges in mind. Therefore, it is the first of its kind in the UK in that it will provide you with a balanced mix of technology, science, logistics, economics and management skills (teaching shared with our internationally recognised School of Management and industry experts). With this mixture of subjects, we aim to develop your forward and lateral thinking. Hence, complementary skills such as horizon scanning and strategic foresight techniques are included so that you can build and analyse future possible scenarios that could inform policy and decision-making globally.

The Master's programme comprises 8 courses:

- Principles of Sustainability
- Economic Valuation and Appraisal
- Leading Corporate Sustainability
- Soil Systems
- Agricultural Informatics
- Plant-Based Technologies
- Water and Sustainable Agrifood Systems
- Strategic Foresight

In addition, students have to elaborate 1 individual project and 1 group project.

The second course is suitable for new graduates from a science or technology background who are interested in a career within the food industry. The course is also ideal for professionals already working in the industry who would like to train to further their careers. Available on a full and part-time basis the course offers flexibility and support for those who wish to train whilst remaining in employment. Food Systems and Management MSc is part of the Agriculture and Food Programme. It provides a critical appreciation of the issues concerned with the production and supply of safe food in the modern world. Through the integration of scientific, technological and managerial factors students will learn how to use food resources more efficiently to achieve higher quality and safer food production as well as successfully understand and manage food supply chains.

The Master's programme comprises 7 courses:

- Quality of Food and Beverages
- Food Diagnostics
- Leading Corporate Sustainability
- Postharvest Technology
- Food Chain Resilience
- Food Safety and Quality Management and Certification
- Agrifood Business Innovation

In addition, students have to elaborate 1 individual project and 1 group project.

Title / Hyperlink to the website	Language	Credits	Semesters	Orientation
MSc in Future Food Sustainability MSc in Food Systems and Management	English	N/A	2	Academic

Identified best practice in these programmes:

The university outlines a procedure towards keeping courses up-to-date and current. They suggest that it requires constant innovation and change. The modules offered reflect the needs of business

and industry and the research interests of staff and, as a result, may change or be withdrawn due to research developments, legislation changes or for a variety of other reasons. Changes may also be designed to improve the student learning experience or to respond to feedback from students, external examiners, accreditation bodies and industrial advisory panels. Therefore, it is important to prescribe a mechanism for the continuous improvement of courses.

### 3.6. University of Leeds, UK

#### MSc programme Sustainable Food Systems

<https://environment.leeds.ac.uk/see-masters/doc/sustainable-food-systems-msc/page/1>

This course comes at a time when food and its implications on our health and planet is making headlines. Current challenges include malnutrition and obesity, the food waste-hunger paradox, and food's devastating environmental impact. Global food consumption and production accounts for a quarter of all greenhouse gas emissions, making our food choice the most effective way to address climate change. Food is the single strongest lever to optimise human health and environmental sustainability; however, transforming our food system is not an easy task. Our food system is highly complex; it works across different scales, from the local to the global, it involves a wide range of interconnected actors, it has environmental, social, economic and political drivers and implications. The MSc in Sustainable Food Systems, therefore, uses a holistic system thinking approach to understand, evaluate, and deconstruct the complexity of the food system, in order to formulate sustainable solutions addressing the grand challenges we are facing, such as food security and global environmental change.

The Master's programme comprises 5 courses:

- Introduction to Sustainable Food Systems
- Skills for Researching and Transforming Food Systems
- Sustainable Food Production
- Sustainable Food Consumption
- Sustainable Food Supply Chains and Trade

In addition, students have to elaborate 1 research project and participate in a food systems fieldtrip.

Title / Hyperlink to the website	Language	Credits	Semesters	Orientation
Sustainable Food Systems	English	N/A	2	Academic and Research

#### Identified best practices

On this course, students have the opportunity to participate in a number of fieldtrips to food production and consumption sites, including a week-long fieldtrip to a food producing region outside the UK. Through these fieldtrips they are exposed to the global nature of our food system, and the challenge of reconciling competing local and global, environmental, economic and social priorities.

### 3.7. Royal Agricultural University, UK

#### MBA Innovation in Sustainable Food and Agriculture

<https://www.rau.ac.uk/pg-isfa>

Multi-national companies across business, food production, agribusiness, and the food retailing sectors are seeking employees who are equipped to solve challenges such as their supply chain. To create an effective, resilient, and forward-looking global food system, firms must strengthen their business management skills to enable them to deliver competitive offerings in a complex global market. Emerging technologies, business models and changing demands add to the complexity faced by this industry, as do a range of challenges - from managing natural resources to navigating political change. This business management programme has been designed with these challenges firmly in mind. Strategy, use of data, people skills and marketing are embedded in a business and agricultural context making them accessible and directly relevant to what is happening in the world today. Students can learn the core skills they need to lead a business in an unpredictable and challenging environment, whether they are launching or running their own venture, looking for career progression or just entering one of these industries.

The Master's programme comprises 6 required courses:

- Developing your leadership and people skills
- Making sense of a changing world
- Improving your decision-making with data and technology
- Developing sustainable business strategies
- Improving your financial decision-making skills
- Marketing for sustainable food systems and agribusiness
- Managing your food and agribusiness supply chains
- Delivering growth through entrepreneurship and innovation
- Research skills

In addition, students have to elaborate a dissertation or applied project.

Title / Hyperlink to the website	Language	Credits	Semesters	Orientation
MBA Innovation in Sustainable Food and Agriculture	English	N/A	2	Academic and Research

#### Identified best practices

Coaching will be available to all MBA students. This provides a unique opportunity for participants' personal and professional development in drawing on methods such as the Myers Briggs Type Indicator (MBTI) and the Analytic-Network Coaching System. To support development, enable reflection, and to evaluate application of coaching insights to organisational life, each participant will have a 'coaching credit' system comprising coaching hours to be used by the participant according to context and need. Coaching sessions will be face-to-face, by email, telephone or via Skype or a similar messaging platform.

### 3.8. Inter-University, Belgium, Germany, Portugal

#### European Master of Food Science, Technology and Business

<https://iiw.kuleuven.be/english/biftec>

The inter-university programme adopts a transversal and multidisciplinary approach to a broad range of topics related to the 4S pillars Science (Food Science & Engineering Technology), Sustainability (Sustainable Food Product & Food Process Design), Safety (Food Safety & Quality), and Simulation (Computational Food Science & Technology).

The Master's programme comprises 6 required courses:

- Food Biotechnology
- Food Safety and Quality Management
- Process Management and Product Development
- Environmental Practices and Sustainability
- Business and Economics in Food Industry
- Innovations in Food Engineering and Technology

In addition, 9 elective courses are offered:

- Malt and Beer Production
- Distilled Spirits Technology
- Wine Production
- Fats and Oils
- Fruits and Vegetables
- Food Packaging. Materials, Systems and Technology
- Meat and Meat Products
- Cereals and Cereal Products
- Dairy Science and Technology

Finally, there is a professional competence semester and students have also to elaborate on a Master's thesis.

Title / Hyperlink to the website	Language	Credits	Semesters	Orientation
Food Science, Technology and Business	English	120 ECTS	4	Academic and Research

#### Identified best practices

Semester three consists of a Professional Competence Module, organised by partner institution(s) in cooperation with companies and/or research laboratories, as well as in associated partners, in a selected field (Fermentation Technology, Meat Technology, Wine Making, New Trends in Food Processing, Food Business). The objective of the professional competence semester is to allow students to focus on a specialist area in which they wish to develop their knowledge base, competence and skillset relevant to the food sector and thereby enhance their employment prospects. This semester should reassure students regarding choice of topic for the Master's thesis.

Additionally, to the three European consortium partners, the study programme also benefits from the involvement of associated partners, who contribute through knowledge and skills transfer, the provisions and backing possibilities for professional competence module and/or Master's thesis.

### 3.9. University of Hohenheim, Germany

#### Food Systems M.Sc.

<https://www.uni-hohenheim.de/food-systems-master-studium>

This Master's program allows for a unique integration of different aspects of the food system. During the study at three separate European academic institutions, the students will acquire in-depth knowledge of the whole food system, supported by individual skills in its main subsections. By means of a strong integration of entrepreneurial elements and mentored project work with industry partners from the EIT Food consortium and beyond, the students will also build up practical skills that optimally match the employability criteria of businesses spanning from start-ups to large multinationals.

The Master's programme comprises 4 required courses:

- SPOC: Introduction to Food Systems
- Summer School: Introduction to Entrepreneurship
- AgFoodTech
- Emerging Technologies Business Case Study

In addition, 14 elective courses are offered:

- Advanced Meat Science and Technology
- Encapsulation of Functional Food Components
- Free Project Work
- Scientific Writing and Reporting
- Advanced Flavor Chemistry
- Advanced Process Engineering Techniques for Cereal Processing
- Dairy Science and Technology
- Drying, Granulation and Instantisation
- Food Process Design II - Process Integration and Scale up
- Information Technologies and Expert Systems in Plant Protection
- Irrigation and Drainage Technology
- Post-Harvest Technology of Food and Bio-Based Products
- Precision Farming
- Soft Matter Science II - Food Physics

Finally, students have also to elaborate on a Master's thesis and the opportunity to select an internship.

Title / Hyperlink to the website	Language	Credits	Semesters	Orientation
Food Systems	English	120 ECTS	4	Academic and Research

### Identified best practices

Owing to the strong integration of entrepreneurial elements and mentored project work with industry partners from the EIT Food consortium and beyond, the students have the opportunity to prepare the practical part of the Master's Thesis in a cooperation with an industry partner.

## **3.10. Inter-University, Austria, Hungary, Serbia, Croatia, Romania**

### **Master Programme Sustainability in Agriculture, Food Production and Food Technology in the Danube Region**

<https://boku.ac.at/en/international/themen/boku-students-going-international/englische-internationale-masterprogramme/andere-internationale-master-programme/danube-agrifood-master>

The main focus of the programme is on self-development in a multicultural European region. At the end of this course, students will be able to identify some of their own culturally-biased assumptions and behaviour, and begin to objectively address the benefits of EU multiculturalism for regional agriculture and food industry. Sustainable development, food security, technology and quality, sustainable food production, biotechnology and sustainable energy make up the core content of the Master's programme. With the international Joint Master Programme a unique and competent response to issues such as climate change and protection and promotion of livelihoods is offered in and for the Danube region.

The Master's programme comprises 5 required courses:

- 754325 VO Food microbiology for SIFC
  - 754325 VO Food microbiology for SIFC
  - 953324 VU Ecological plant protection
  - 911327 SE Soils and global change
  - 112303 SE Presenting at a scientific conference
- In addition, 135 elective courses are offered:
- 754317 VO Food chemistry (for SIFC)
  - 52327 VO Cereal technology
  - 754314 VS Food safety and risk management
  - 754316 UE Practical training in food microbiology for SIFC
  - 752313 UE Practical course in food processing
  - 754319 UE Applied quality management practical course for SIFC
  - 976300 VO Human nutrition
  - 754318 UE Food chemistry practical course for SIFC
  - 941304 VU Molecular biology for food analysis
  - 754310 UE Food authenticity practical course
  - 754323 VO Validation of cleaning processes and hygienic design
  - 970301 VU Analysis of bio-hazards in foods

- 754335 VU Automatic identification technology in food industry
- 976321 VS Food safety in livestock feeding
- 754326 SE National and international food safety authorities
- 752324 VO Food biotechnology
- 169401 VS Development innovation
- 169302 VS Applied development research I
- 953336 VO Global change and pest management
- 958317 VX Organic fruit production and organic viticulture
- 952333 VX Organic horticulture (vegetables and ornamentals)
- 958348 VS Biology and physiology of the grapevine
- 951316 VO Medicinal and aromatic plants
- 932302 VO Animal production in organic agriculture
- 933103 VS Standards, certification and accreditation in organic farming
- 911312 VO Rhizosphere processes and application to agriculture and soil protection
- 933310 SE System analysis and scenario technique - methods and practises
- 831312 VO Plant and environment
- 933308 VU Soil fertility and soil ecology in organic agriculture
- 931362 VO Production systems and atmospheric pollution
- 933303 VO European regulatory framework for organic production
- 933333 VS Local knowledge and ethnobiology in organic farming - introduction
- 933334 SE Local knowledge and ethnobiology in organic farming - methods seminar
- 69305 VS Facilitating change for sustainable development
- 814301 VS Meteorological conditions and precipitation
- 815340 VO Lecture series in soil, water and atmosphere
- 816338 VO Water resources planning and management
- 911300 VO Soil physics and chemistry
- 911342 VU Soils and food security
- 814304 VO Agrometeorology
- 814307 UE Selected projects in meteorology
- 112303 SE Presenting at a scientific conference
- 735336 VU Intercultural communication
- 731383 VS Principles of empirical research methods in the social sciences
- 169306 VS Negotiating change: Simulating an international conference for sustainable development
- 732337 VS Innovations for sustainable forest management
- 733303 VS Forest resource economics
- 855327 VS Sustainable spatial development
- 731324 VO Resource and environmental economics
- 731333 VO Globalisation and rural development
- 731347 VO Rural development
- 853313 VO Rural tourism
- 169304 VS Livelihood system dynamics in rural development
- 752327 VO Cereal technology

- 754314 VS Food safety and risk management
- 754325 VO Food microbiology for SIFC
- 754316 UE Practical training in food microbiology for SIFC
- 752313 UE Practical course in food processing
- 754319 UE Applied quality management practical course for SIFC
- 754317 VO Food chemistry (for SIFC)
- 976300 VO Human nutrition
- 754318 UE Food chemistry practical course for SIFC
- 941304 VU Molecular biology for food analysis
- 754310 UE Food authenticity practical course
- 754323 VO Validation of cleaning processes and hygienic design
- 970301 VU Analysis of bio-hazards in foods
- 754335 VU Automatic identification technology in food industry
- 976321 VS Food safety in livestock feeding
- 754326 SE National and international food safety authorities
- 752324 VO Food biotechnology
- 913311 VS Multiple criteria decision making in natural resource management
- 911322 VU Role of soils in nature conservation and wildlife management
- 815321 VU Soil conservation and soil protection
- 815322 VU Soil erosion models and their application
- 834321 VS Biocultural diversity in rural landscapes
- 912337 VS Biodiversity and conservation of mountain forests
- 871314 VX Protection and mitigation measures against natural hazards
- 933308 VU Soil fertility and soil ecology in organic agriculture
- 731328 VO Valuation methods for natural resources
- 816342 VO Possible impacts of climate change on water resources
- 169305 VS Facilitating change for sustainable development
- 169401 VS Development innovation
- 169302 VS Applied development research I
- 953324 VU Ecological plant protection
- 53336 VO Global change and pest management
- 958317 VX Organic fruit production and organic viticulture
- 952333 VX Organic horticulture (vegetables and ornamentals)
- 958348 VS Biology and physiology of the grapevine
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- 933103 VS Standards, certification and accreditation in organic farming
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- 931362 VO Production systems and atmospheric pollution
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- 933333 VS Local knowledge and ethnobiology in organic farming - introduction
- 933334 SE Local knowledge and ethnobiology in organic farming - methods seminar
- 169305 VS Facilitating change for sustainable development
- 814301 VS Meteorological conditions and precipitation
- 815340 VO Lecture series in soil, water and atmosphere
- 911327 SE Soils and global change
- 816338 VO Water resources planning and management
- 911300 VO Soil physics and chemistry
- 911342 VU Soils and food security
- 814304 VO Agrometeorology
- 814307 UE Selected projects in meteorology
- 790350 VU Bioprocess engineering I
- 790111 VO Plant biotechnology
- 790318 VO Animal cell culture
- 772327 VU Biochemical and biotechnological methods (analytics design)
- 790353 VU Quality management in biotechnology
- 941311 VO Cell biology
- 941339 VU Methods in cell biology
- 941331 UE Cell factory - plants
- 51300 VO Crop production
- 790312 VO Safety aspects of plant biotechnology
- 941328 VU Molecular phytopathology
- 941332 SE Genetically modified organisms in the environment
- 958348 VS Biology and physiology of the grapevine
- 951316 VO Medicinal and aromatic plants
- 952328 US Methods in horticultural physiology
- 958347 VS Genetic control of secondary metabolites in perennial crop plants
- 958334 VS Viticulture and pomology journal club
- 915344 VS Technology assessment
- 731369 VS Computer simulation in energy and resource economics
- 731351 VS Applied mathematical programming in natural resource management
- 813300 VO Global waste management I
- 813301 VO Global waste management II
- 931305 VO Post-harvest technology
- 931362 VO Production systems and atmospheric pollution
- 731370 VU Operations research and system analysis
- 735336 VU Intercultural communication
- 731383 VS Principles of empirical research methods in the social sciences
- 169306 VS Negotiating change: Simulating an international conference for sustainable development

Finally, students have also to do an internship.

Title / Hyperlink to the website	Language	Credits	Semesters	Orientation
Sustainability in Agriculture, Food Production and Food Technology in the Danube Region	English	120 ECTS	4	Academic and Research

#### Identified best practices

The compulsory course "Presenting at a scientific conference" (along with the participation at a scientific conference) gives students the opportunity to present their results in the academic community. This is particularly important to illustrate the research potential of the programme.

### 3.11. Tufts University, USA

#### MA in Food Studies

<https://nutrition.tufts.edu/academics/degree-programs/agriculture-food-environment>

The Agriculture, Food and Environment (AFE) program fuses the disciplines of nutrition, sustainability, agricultural science, environmental studies, and public policy. Students in the AFE degree program learn to evaluate the ecological, political, economic and social aspects of food production and distribution. This program aims to educate future leaders at the nexus of agriculture, food, and environmental science and policy, and empower them by providing rigorous training, an ethic of social change, and an intellectual community generating visions and models of alternative systems.

The Master's programme comprises 4 required courses:

- Fundamentals of U.S. Agriculture
- Agricultural Science and Policy I
- Agricultural Science and Policy II
- Economics of Agriculture and the Environment
- In addition, 18 elective courses are offered:
- Principles of Nutrition Science
- Fundamentals of Nutrition Policy and Programming: How Science and Practice Interact
- Statistical Methods for Nutrition Science and Policy
- Seminar in Humanitarian Issues
- Fundamentals of GIS
- Basics of U.S. Public Policy
- Economics for Food and Nutrition Policy

- Food for All: Ecology, Biotechnology and Sustainability
- Nutrition and Entrepreneurship
- Food Law and Regulation
- Determinants of U.S. Food Policy
- Regression Analysis for Nutrition Policy
- Qualitative Research Methods for Nutrition
- Food and Agriculture International Trade
- Food Systems and Sustainable Diets
- Anthropology of Food and Nutrition
- Environmental Life Cycle Assessment
- Food Systems Modeling and Analysis

Finally, students have the opportunity to select a summer internship.

Title / Hyperlink to the website	Language	Credits	Semesters	Orientation
Food Systems	English	(16) points	4	Academic and Research

#### Identified best practices

The program offers a structured path to PhD studies. This is critical for individuals who want to continue their studies in a given discipline.

### 3.12. International Hellenic University, Greece

#### MSc in Sustainable Agriculture and Business

<https://econ.ihu.edu.gr/index.php/en/courses/mastersmscs/programmes/msc-in-sustainable-agriculture-and-business.php>

The MSc in Sustainable Agriculture and Business approaches agriculture from an interdisciplinary perspective that focuses on:

- Increasing agricultural production whilst minimizing the impact on the environment
- Developing and managing agricultural enterprises of various sizes
- Agricultural products marketing and trading

The Master's programme comprises 9 required courses:

- The Biological Environment
- Soil Processes
- Integrated Disease Management
- Integrated Management of Arthropods
- Agri-product Trade and Markets

- Use of Modern Technologies in Different Crops
- Management of Soil Resources
- Agricultural Finance
- Applied Quantitative Methods for Decision Making
- In addition, 9 elective courses are offered:
- Agricultural Policy
- Greenhouse Management
- Climate Change
- Water Management
- Plant Breeding
- Analytical Tools for Business Forecasting
- Entrepreneurship and Innovation
- E-commerce and Digital Marketing
- Agribusiness Brand Management and Export Marketing
- Consulting Project

Finally, students have also to elaborate on a Master's thesis on 1 or 2 semesters (30 or 60 ECTS accordingly) and the opportunity to select to work on a consulting project.

Title / Hyperlink to the website	Language	Credits	Semesters	Orientation
Food Systems	English	90 or 120 ECTS	3-4	Academic and Research

#### Identified best practices

Students have the opportunity to participate in a group consulting project. They study a real project of a particular agricultural company or organization and following problem-solving strategies, they prepare and present concrete and practical solutions. The project supplants 1 elective course.

### **3.13. Green Economy and Sustainability (MSc) 120 Credits- University of Brescia**

This curriculum aims to prepare MSc (Master of Science) students to face the challenges and opportunities of a time of deep economic change, which requires high-value added, environmentally and socially friendly goods and services.

At corporate level, the postgraduates in “Green Economy and Sustainability” will have a suitable profile for the new positions in the area of Corporate Social Responsibility (CSR) / Sustainability. Moreover, they will be fitting candidates for the following industries / activities where sustainability has become a crucial feature: business consulting; food supply chains; public utilities; services, mainly focused on the promotion of local flagships capable of attracting qualified tourist flows; research, and so on.

**First Year**

BUSINESS CONTRACT LAW - 6 credits

BUSINESS HISTORY - 9 credits

CORPORATE SOCIAL RESPONSIBILITY AND SUSTAINABILITY - 9 credits

ENVIRONMENTAL ECONOMICS - 9 credits

FINANCIAL STATEMENT ANALYSIS - 9 credits

ORGANIZATIONAL BEHAVIOR - 6 credits

Free choice (optional) courses- 12 credits

**Second Year**

FINANCIAL MANAGEMENT - 6 credits

LOGISTICS MANAGEMENT - 12 credits

MARKETING-ADVANCED - 6 credits

METHODS AND MODELS FOR ENVIRONMENTAL SUSTAINABILITY - 9 credits

RESOURCE AND ENERGY ECONOMICS - 9 credits

Laboratory - 2 credits

**Master Thesis - 16 credits**

### 3.15. Food Sciences for Innovation and Authenticity (University of Parma)

This two-year master provides students with sound knowledge of current and future challenges in food sciences, combining innovation and authenticity, and offering you the opportunity to interact closely with the food industry. The programme is a joint initiative with the Universities of Parma and Udine, known worldwide for their excellence in higher education in the field of food sciences. The course aims at training professionals who are able to work confidently in areas of food sciences, such as technology, engineering, microbiology, chemistry and sustainability.

After the first year, students can choose among five different profiles:

- Applied Engineering and Genetics;
- Food Quality and Management;
- Nutrition Sciences;
- Food Chemistry;
- Food Packaging.

The latter two learning tracks are offered in partnership, respectively, with the University College Cork, Ireland, and the Technical University of Munich, Germany. Students will have the opportunity to spend up to two semesters in one of these European partner institutions.

The programme is supported by industries belonging to AssolImprenditori Alto Adige - sezione Alimentari - and Südtiroler Bauernbund - Unione Agricoltori e Coltivatori Diretti Sudtirolesi.

**Structure of the course**

The first year mainly includes modules on **Food Technology** and **Food Microbiology**, which are common to all learning tracks. From the second year onwards, modules become specific to the profile chosen. You will be able to choose from **five profiles** and a range of modules in order to **customize your course**.

**Study plan for the 1<sup>st</sup> year**

Innovation and Authenticity in Food Processing  
Fermentations as Tools for Making Traditional and Innovative Foods and Beverages  
Environmental Chemistry towards Food Processing  
Food Value Chain Management  
Reaction Kinetics in Food Processing  
Food Chemistry  
Starter and Functional Microbes for Innovation, Authenticity and Healthy Status  
The Natural Microbial Starters for Innovation and Authenticity  
The Food – Human Axis for Driving the Gut Micro-biome

**2nd Year - Path “Applied Engineering and Genetics” (unibz)**

Food Processing Equipment  
Genetics Applied to Foods  
Sensors and Biosensors for Food Processing  
Free Choices  
Thesis

**2<sup>ns</sup> Year - Path “Food Quality Control and Management” (at University of Udine)**

Food Structure Control and Management  
Quality System Development and Management and Shelf Life Assessment of Food  
Sample Preparation Techniques and Analysis of Contaminants  
Free Choices  
Thesis

**2nd Year - Path “Nutrition Sciences” (at University of Parma)**

Human Nutrition  
Applied Nutrition  
Industrial Microbiology for Food Quality Improvement  
Free Choices  
Thesis

**2nd Year - Path “Food Chemistry” (at University College Cork)**

Chemistry of Food Proteins  
Cheese and Fermented Dairy Foods  
Meat Science and Technology  
Free Choices

Thesis

### **2nd Year - Path “Food Packaging” (at Technical University of Munich)**

Introduction to Packaging Technology

Packaging Technology – Mechanical Processes

Yeast and Beer

Free Choices

Thesis

### **3.16. MSc: Sustainable Agriculture (University of Padova, Italy)**

#### **Course description**

The M.S. degree in Sustainable Agriculture at the University of Padova aims to provide advanced knowledge in the field of agricultural systems as well as skills to develop and manage sustainable production systems. The context is international, having as its main area of investigation warm-temperate environments at a global level.

The normal duration of the course is two years and requires 120 university credits (or CFUs). The Master degree in Sustainable Agriculture will be awarded upon completion of the course. With the aim of strengthening this global approach to sustainability, the degree program has been included in an internationalization project in collaboration with the University of Georgia, USA, which enables students to achieve a dual degree in “Sustainable Agriculture” (Italy) and “Crop and Soil Science” (USA). This course is also part of the Erasmus Mundus Joint Master Degrees in Plant Health In Sustainable Cropping Systems, Erasmus+ Programme Key Action 1 (<http://planthealth.upv.es>) that is organised by a consortium of six Universities from four European countries (Italy, Spain, France and Germany).

The training course in Sustainable Agriculture includes two main areas of study:

1. Production: training in the areas of agronomy, crop and animal productions, soil science, plant breeding, and integrated management of pests and diseases, all aimed at the sustainability of the production process and its social implications;
2. Technology: training in the areas of management and protection of air-soil-water, use of biomass of agricultural plants and animals, land management, and management of the production process (at different geographic scales) considering both innovative technologies and socio-economic aspects.

#### **Course structure**

- Advanced Statistics
- Agrifood Economics And Policy
- Gis For Agro-Environmental Studies
- Integrated Management Of Arthropod Pests
- Research Planning
- Sustainable Agriculture
- Agricultural Management Of Biogeochemical Cycles
- Plant Breeding

- Precision Farming
- Soil Microbiology
- Sustainable Disease Management
- Biotechnology In Plant Protection
- Crop Physiology
- Ipm Of Pathogens Of Fruit Crops In Temperate Climate
- Ipm Of Pests Of Fruit Crops In Temperate Climate
- Management Of Native And Non-Native Pests In The Landscape
- Sustainable Livestock Systems
- Sustainable Use Of Pesticides
- Sustainable Viticulture And Woody Crop Production
- Water Resources Management

### **3.17. MSc: Innovation in Sustainable Food and Agriculture (Royal Agricultural University, Cirencester, United Kingdom)**

#### Course Overview

Industry partners from across the agricultural and food supply chain, including Waitrose and the National Farmers' Union, have been closely involved in the development of the programme. It has been carefully tailored to meet skills gaps and respond to changes in industry trends. Multi-national companies across business, food production, agribusiness, and the food retailing sectors are seeking employees who are equipped to solve challenges such as their supply chain. To create an effective, resilient, and forward-looking global food system, firms must strengthen their business management skills to enable them to deliver competitive offerings in a complex global market. Emerging technologies, business models and changing demands add to the complexity faced by this industry, as do a range of challenges - from managing natural resources to navigating political change.

This business management programme has been designed with these challenges firmly in mind. Strategy, use of data, people skills and marketing are embedded in a business and agricultural context making them accessible and directly relevant to what is happening in the world today. You can learn the core skills you need to lead a business in an unpredictable and challenging environment, whether you are launching or running your own venture, looking for career progression or just entering one of these industries.

#### **Course structure**

With two entry points per year the course can be studied full-time over one year or part-time over two years.

Eight modules as well as a final project will be completed during the course; giving you the opportunity to choose an applied project related to a business opportunity or assignment dissertation based on a topic of specific interest.

There will be plenty of academic support during residentials and during distance learning, where you'll discuss, challenge and create through group discussion and forums.

Coaching will be available to all MBA students. This provides a unique opportunity for participants' personal and professional development in drawing on methods such as the Myers

Briggs Type Indicator (MBTI) and the Analytic-Network Coaching System. To support development, enable reflection, and to evaluate application of coaching insights to organisational life, each participant will have a 'coaching credit' system comprising coaching hours to be used by the participant according to context and need. Coaching sessions will be face-to-face, by email, telephone or via Skype or a similar messaging platform.

You will also be invited to participate in at least one additional enhancement week. This optional programme, not linked to a specific module, will include farm and site visits as well as invited speakers to help students consolidate and apply their learning. This will be particularly valuable for full time residential and international students.

#### Modules

- 4401 Developing your leadership and people skills
- 4402 Making sense of a changing world
- 4403 Improving your decision-making with data and technology
- 4404 Developing sustainable business strategies
- 4405 Improving your financial decision-making skills
- 4406 Marketing for sustainable food systems and agribusiness
- 4407 Managing your food and agribusiness supply chains
- 4408 Delivering growth through entrepreneurship and innovation
- 4413 Research skills
- 4414 Dissertation or
- 4415 Applied Project

### **3.18. MSc Food Innovation (University of Greenwich)**

This programme has been designed to provide students with knowledge and understanding of key steps in the development and launch of new ingredients and products to contribute to healthy living and lifestyles. It is based on the strengths and expertise of staff working in the Faculty of Engineering and Science, e.g. human nutrition and public health; food chemistry and biochemistry, functional foods, marketing and economics; new product and process development; food packaging; food safety and quality management; food legislation; applied food microbiology, creative thinking, sustainability and entrepreneurship.

This programme is aimed at: graduates who want to develop a career path in the food industry in the area of product development, for students who have not followed an undergraduate programme in food science or technology, and for professionals working in the food industry who want to participate in the programme, either in a part-time mode or by following a continuing professional development (CPD) model. Students with backgrounds in Biology, Chemistry, Nutrition, Biotechnology and Hospitality are encouraged to join the programme.

This new programme is intended to prepare graduates from a life science or catering background for careers as professional Product Development Scientists, based upon a clear understanding and competency of science-based subjects.

#### Contents.

Marketing, Innovation and Management (30 credits) New Product and Process Development 1 (30 credits) Research Methods (15 credits) Planning for Professional and Personal Development (15 credits) Research Project (60 credits) One 30-credit option from: Innovations in Food Packaging; Human Nutrition and Public Health; Applied Food Microbiology; Applied Food Chemistry and Biochemistry (30 credits).

### **3.19. MSc Advanced Food Safety (Queen's University Belfast)**

The MSc in Advanced Food Safety is tailored towards students who aim to, or currently work within the agri-food industry and related sectors, offering a unique qualification in the fields of food safety and security. The world's food supply is reducing. Its production is under increasing pressure, and so safety issues are more likely to arise. The programme focus will be on new and emerging issues within the field, concentrating on developments in analytical approaches to monitor and regulate food safety, authenticity and security.

Core topics in the field:

- Food safety, health, and disease;
- Food authenticity and traceability;
- Chemical/biological hazards in animal feed and human food;
- Current and emerging analytical technologies to prevent food safety incidents.

#### MODULE TOPICS

You'll be assessed by continuous assessment and examination in the following areas:

- Advanced Food Bioanalysis
- Agri-food Traceability and Fraud
- Bio-entrepreneurship and Advanced Skills
- Food Safety, Health, and Disease
- Foundations for Research in the Biosciences
- Literature Review

Research Project (triple module)

You'll complete a laboratory-based, food safety-related research project.

### **3.20. MSc Applied Food Safety and Quality Management (University of Greenwich)**

#### **MSc Applied Food Safety and Quality Management**

This programme provides graduates with an insight into measures that are required to provide a supply of safe and wholesome food to consumers globally. A wide spectrum of food safety and quality management issues are addressed following the farm to fork approach. Topics covered include good governance and national control systems; food inspection and testing services; legislation and private standards; and management of food safety and quality within the supply chain as well as in hotels and restaurants.

Students also acquire a knowledge of the design and management of safety and quality management systems based upon risk analysis, e.g. Hazard Analysis and Critical Control Point (HACCP), ISO 9001:2008 designed to meet the requirements of national and international legislation and private standards. Students sit the Royal Society for Public Health Level 3 Award in HACCP for Food Manufacturing and are also given the membership of the Institute of Food Science and Technology. Individual courses are offered on a stand-alone basis. These are attended by professionals working in the food industry. Lectures are also delivered by experts currently working in the food sector. This gives our postgraduate students the opportunity to interact with and learn from a range of practitioners. Students have the opportunity to apply for short placements in the food sector, which provides them with the all-important experience that they need to demonstrate when applying for jobs.

Content:

Food Safety (30 credits) Food Safety and Quality Management (30 credits) Research Methods (15 credits) Research Project (MSc only) (60 credits) Two or three optional courses chosen from a range of themes running across the programme (45 credits)

### **3.21. MSc Sustainable Food and Natural Resources (Liverpool John Moores University)**

Taught at the Centre for Alternative Technology (CAT), which pioneered sustainability practice and theory in the UK, this is the first MSc course to properly integrate the social, political, economic and practical aspects of sustainable food and natural resources production. This Masters degree tackles these themes through a combination of academic study, discussion and hands-on practical work. Our MSc programme is taught either by distance learning or through residential blocks in one of the most innovative environmental buildings in the UK, or via a mixture of the two.

A flexible Masters degree designed to develop a rigorous understanding of transformational responses to the pervasive effects that economic structures and environmental change are having on a diet, health, sustainability and community empowerment. The course will cover globalisation, corporate and economic control, increasing global population and the effects of industry-scale agriculture and materials production on ecosystems and our environment.

The programme uses the concepts of sustainability and transformational adaptation to frame an understanding of sustainable food and resources management across scales, including cities, communities, farms, industry and the individual. Students will study aspects of food and natural resource management in a broad sustainability context through focused, intensive module weeks that will help them understand:

- ecosystems and biodiversity;
- land and resources in cities;
- sustainable materials, supply chains and energy provision;
- the science of food and growing;
- political and economic aspects;
- sustainable food management, diet and health.

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### 3.22. Sustainable Food Systems (MSc Prescott college)

This program offers optional concentrations across three distinct areas of focus:

**Sustainable Diets and Biodiversity:** This concentration is designed for students who work in nutrition, culinary nutrition, public health, and other sustainable food system fields where knowledge about diverse diets with low environmental impacts can play an important role in ensuring food and nutrition security. Students concentrating in Sustainable Diets and Biodiversity will take nine credits of context courses. Assignments in all courses and the capstone are tailored by students to ensure that food and nutrition security, health and wellbeing will be at the forefront when considering one's food system. The concentration challenges students to understand dietary diversity as an ecosystem service, nutrition-sensitive agricultural value chains and how to build resilience into fragile and fleeting diet and knowledge systems.

**Food Justice:** This concentration is designed for students who seek to shift global, industrial food systems towards more equitable, just, and sustainable foodways. Food justice can be measured through a community's ability to acquire healthy food (food access), and its right to define its own food systems (food sovereignty). Students concentrating in Food Justice will take nine credits of context courses. Students should also tailor their assignments in all courses to ensure that they deepen their understanding of how institutional racism and classism prevent certain communities from accessing healthy and culturally appropriate food so that sustainable food systems solutions can be developed.

**Food Entrepreneurship:** This concentration is designed for students who have a vision for impacting food system change through self-employment or another entrepreneurial endeavor who are seeking knowledge about how businesses can play an important role in ensuring food and nutrition security. Students concentrating in Food Entrepreneurship will take nine credits of context courses. Students should also tailor their assignments in all courses to ensure that they deepen their understanding of how to improve organizational success through social and environmental performance as change agents as well as improving their ability to build organizational strategies for sustainability.

#### Signature Courses

Food System Biodiversity:

Sustainable Diets Theory and Practice in Agroecological Systems

Social Values and Value Chains:

Farm to Plate Sustainability Place,

Sustainability and Diets: Eco-nutrition

Food Justice and Sustainable Food Systems Organization

Transformation and Sustainable Leadership Food System Biodiversity: Conservation in the Marketplace Food and Agriculture: Advance Policy

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**Learning outcomes**

- Develop a complex systems approach to understanding sustainable food systems, their historical development, ecological foundations, socio-economic dynamics, policy aspects and the cultural values that create contemporary food systems
- Develop an understanding of agroecological production systems and ecosystem services in order to apply best practices to vegetable, fruit, medicinal plant and livestock sectors, at different scales in different bioregions
- Demonstrate the ability to analyze different components of a food system -- origins, production, processing, distribution, preparation, consumption and waste -- in order to assess economic, ecological, and social justice and sustainability
- Apply professional and analytical skills to build and encourage sustainable practices to leverage food system change within communities, businesses, the non-profit sector, and/or policymaking organizations
- Apply quantitative and qualitative methods and tools for food system analyses and sustainability impact measurement in order to address local and global food system challenges
- Recognize and analyze problems and opportunities and develop solutions for local and global food system issues that integrate (1) skills and knowledge of the functional areas of food systems and (2) the interdisciplinary analysis of food system dynamics

The career path that the future can employee can follow are: Registered Dietitian, Faculty at Culinary Institutes, Entrepreneurs, Farm Managers, Campus Farm Managers, Market Gardeners, Teachers, Nutrition Educators, Agricultural Extension Agents, Food Service Director/Food Hub Manager, Local Food Procurement Specialist, Farm-to-Table Program Coordinators and Directors, Policy Directors for Organic Advocacy Organizations, Non-Profit Program Director.

**3.23. MSc in Food Innovation and Product Design**

<https://www.masterstudies.com/MSc-in-Food-Innovation-and-Product-Design/Sweden/Lund-Uni/>

The Erasmus Mundus Joint Master Degree in Food Innovation and Product Design (FIPDes) is a two-year academic programme in the field of food science and product development, operated by Université Paris Saclay and AgroParisTech (France), together with DIT (Ireland), UNINA (Italy), and Lund University. The FIPDes Master's aims to provide a European dimension in the knowledge-intensive area of food research and development and is highly relevant for both EU and third-country students who wish to be employed in the agri-food and drink sector

**Programme modules/courses**

Semester 1: Food Science and Technology, Sustainability, R&D Project Management. Semester 2: Culinary Innovation, Business Creation, Marketing,

Specialisations: Semesters 3 & 4: Food Design and Engineering, Healthy Food Design, Food Packaging Design and Logistics, Master's degree project.

### 3.24. Master of Science in Food Identity

#### Master of Science in Food Identity (Erasmus Mundus)

By offering opportunities to carry out study periods and work experience abroad, thus contributing to a comprehensive approach to the marketing process 'from production to marketing. Beyond the typical food products, similar groups of food products exist in European countries, each distinct to its country of origin, and called by different names: - Local food products, regional food products, traditional food products or terroir\* food products. The term typical food products will be used to describe all such European food products.

In this Msc the students will analyse:

***A comprehensive curriculum of the Typical Food: «from soil and human community to terroir\*»***

How factors like soil, climate, cultural or technologic know-how and the whole socio-ecological context participate in the construction of the specificity of the typical food products?

***The characterisation of the specificity of the typical food products***

How demonstrate the authenticity of the quality of the typical food products by reliable analysis and how to control and authentify its quality (by physical and chemical analysis, sensory and nutritional tools)?

***The development, appreciation and marketing of typical food products in the global market***

How to value such products and how to construct a product differentiation besides the consumers?(different strategies from a country to another one: quality label, marketing, communication), how to market these products? (international laws for trading, international regulations and policies, distribution networks, the market participants and their organisation).

**This master is organised as it follows:**

- A 4-semester course
- The course is taught in 5 European countries
- Taught in 2 languages (Français and English) but you keep the possibility to answer the tests in English during the semesters in France.
- 1 Study trip of 3 weeks + visits of regional food companies
- 6/8-months of professional project (work placement) in a company
- 120 ECTS (European Credit transfer system) required.
- Qualification: 60 ECTS credits per year are required.

### Identified best practices

Owing to the strong integration of entrepreneurial elements and mentored project work with industry partners from the Food consortium and beyond, the students have the opportunity to prepare the practical part of the Master's Thesis in a cooperation with an industry partner.

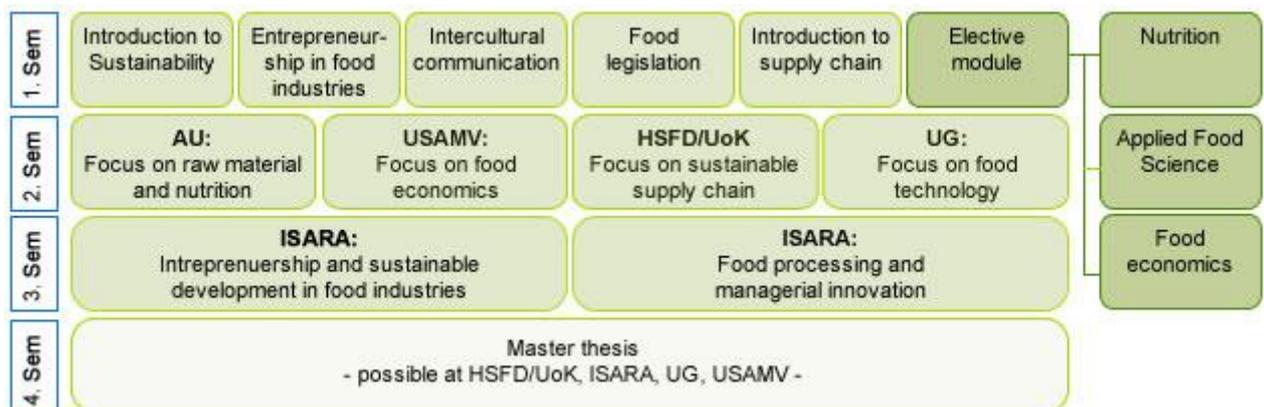
### 3.25.MSc Sustainable Food Systems – European Joint Degree program

<https://www.masterstudies.com/MSc-Sustainable-Food-Systems-%E2%80%93-European-Joint-Degree-program/France/ISARA-Lyon/>

The European MSc Sustainable Food Systems is jointly offered:

- by a European consortium gathering around ISARA-Lyon (France), renown universities in Belgium (Ghent University), Denmark (Aarhus University), Germany (University of Kassel and Hochschule Fulda) and Romania (University of Agriculture and Veterinary Medicine of Cluj-Napoca).
- in close collaboration with a network of food companies and organizations of the participating countries in order to guarantee the coherence of students' skills and attitudes with employers' expectations, to secure the employability of the future graduates.
- with the support of the European Union.

#### Program structure



## Conclusions

Identified best practices in the MSc programmes are mainly linked to teaching methodologies and to the mechanisms that link the programme with the business sector. Teaching methodologies applied in the form of summer schools, fieldtrips, practical internships related to master thesis in cooperation with the industry sectors are present at a large scale in the considered universities.

**Continuous development of teaching methodologies and equipment:** Teaching methodologies in the form of summer school that involve **case studies approach**. The students are exposed to real case and have to demonstrate the use of their knowledge dealing with the case. In addition students work on real cases provided by the cooperating industry. Students have also the opportunity to participate in a number of **fieldtrips to food production** and consumption sites. Through these fieldtrips they are exposed to the global nature the food system, and the challenge of reconciling competing local and global, environmental, economic and social priorities. In addition, the strong integration of entrepreneurial elements and mentored project work with industry partners gives to the students the opportunity to prepare the **practical part of the Master's Thesis** in a cooperation with an industry partner.

Students have also the opportunity to participate in a **group consulting project**. They study a real project of a particular agricultural company or organization and following problem-solving strategies, they prepare and present concrete and practical solutions. The project supplants 1 elective course.

Working with sustainability requires communication and co-operation between many scientific disciplines, between society's practices and between companies' production skills. In this context interdisciplinary methods are at the core of the toolbox needed for the next centuries for natural scientists, social scientists, practitioners and students.

**Teaching methodology of interactive learning sessions:** The students have to design, organize & facilitate an interactive learning session (a **sort of Scientific Café**) - those learning meetings are organized by the students on topics like designing a research proposal, philosophy of science and research ethics. This course allows students to form a community of learners; to learn from each other's knowledge and experiences, and to share insights and skills.

**Coaching** is another best practice identified in the programmes that are analysed in this report. Through coaching methodologies such as the Myers Briggs Type Indicator (MBTI) and the Analytic-Network Coaching System, the participants will be supported in their personal and professional development.

Another important dimension identified as best practices is the compulsory course "Presenting at a scientific conference". This is particularly important to illustrate the research potential of the programme. In the **Scientific students conference** the students present their bachelor or master thesis in the form of posters or oral presentations.

**Mechanism that ensures continuous linking with the labour market:** Working with real cases in cooperation with companies and organisations in the food sector are crucial for the programme MSc programme. The universities have outlined the procedure towards keeping courses up-to-date and current. They suggest that it requires constant innovation and change. The modules offered reflect the needs of business and industry and the research interests of staff and, as a result, may change or

be withdrawn due to research developments, legislation changes or for a variety of other reasons. Changes may also be designed to improve the student learning experience or to respond to feedback from students, external examiners, accreditation bodies and industrial advisory panels. Therefore, it is important to prescribe a mechanism for the continuous improvement of courses.

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