Sustainability in Food Production

Educational subject description sheet

Basic information

Field of study Joint Bachelor in Sustainability	**Education cycle** 2025/26
Speciality Environmental & Life Sciences	**Subject code** UJ.WPAJBSELSS.8100.16551.25
Organizational unit Faculty of Law and Administration	**Lecture languages** english
Study level first cycle (joint degree programme)	**Subject related to scientific research** Yes
Study form full-time degree programme	**Disciplines** Food technology and nutrition, Environmental engineering, mining and energy, Biological sciences
Education profile General academic	**ISCED classification** 0721 Food processing
Mandatory obligatory	**USOS code**

Subject coordinator	Piotr Szwedo
Lecturer	Manuela Fernández Álvarez, Montaña Cámara Hurtado, Margaret Graham, Alfy Gathorne-Hardy, Priit Tammeorg, Johan Ekroos

Period Semester 5	**Examination** exam **Activities and hours** Discussion class: 45	**Number of ECTS points** 5.0

Goals

C1	To familiarize students with the food production chain, from primary production to processing and from packaging to consumption, enabling them to assess the environmental and health impacts of current and innovative practices.
C2	To introduce students to sustainable policies for the agri-food sector, enabling them to propose actions to achieve the SDGs.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	all the stages of the food chain, from animal and plant production, through processing and packaging, to consumption and their environmental and health impacts.	JBS_K1_W03, JBS_K1_W04, JBS_K1_W05, JBS_K1_W06	written exam, credit
W2	the fundamentals, concepts and policies of sustainability applied to the agri-food sector and their role in the achievement of the SDGs, including their social, economic and environmental aspects.	JBS_K1_W01, JBS_K1_W02, JBS_K1_W04, JBS_K1_W07	written exam, credit
Skills – Student can:			
U1	analyse the challenges posed by the food production chain and measure its environmental and health impacts	JBS_K1_U01, JBS_K1_U03	written exam
U2	assess sustainable strategies for food production to mitigate its direct and indirect impact.	JBS_K1_U02, JBS_K1_U04	credit
Social competences – Student is ready for:			
K1	to use environmental management tools applied to the agri-food sector.	JBS_K1_K01, JBS_K1_K03, JBS_K1_K05	written exam
K2	to propose actions that contribute to the SDGs related to the agri-food sector.	JBS_K1_K01, JBS_K1_K03, JBS_K1_K04	credit

Calculation of ECTS points

Activity form	Activity hours*	
Discussion class	45	
preparation for classes	40	
preparation for the exam	40	
Student workload	**Hours** 125	**ECTS** 5.0

* hour means 45 minutes

Study content

No.	Course content	Subject's learning outcomes
1.	Sustainability applied to the agri-food sector. Main concepts and principles. Regulation and governance. UN SDG and other policies and strategies. Food system elements and models. Sustainable food systems: framework and challenges. Environmental, social, economic and health aspects.	W2, U1

No.	Course content	Subject's learning outcomes
2.	Application of sustainable procedures. Measurements and metrics: how (not) to measure sustainability of the food systems. Indicators and measurements applied to food production. Adaptation of production to climate change. Biodiversity preservation in food production.	W2, U1, K1
3.	Environmental economics applied to food production. Social sustainability. Sustainable jobs in the agri-food sector. Fixation of the rural population. Initiatives for equality and development. Fair trade.	W2, U1, U2, K1, K2
4.	Agricultural systems. Nutrient and fertilizer recycling. Biological control in agricultural production. Organic farming. Precision agriculture. Urban agriculture. New agri-food sources. Environmental impact. Ecosystem services, local and regional population processes. Genetically modified organisms.	W1, U1, U2, K1, K2
5.	Environmental impact of animal production (meat, poultry and fish). Impact of animal feed production. Sustainable strategies. New breeding techniques. Blue transformation. Valorization of by-products for animal feeding. Additives for reduction of environmental impact. Genetically modified organisms.	W1, U1, U2, K1, K2
6.	Animal health and welfare. Disease management. Antimicrobial resistance in animal production. Safety and environmental aspects.	W1, U1, U2, K1, K2
7.	Sustainability in the food chain. Environmental and health impacts of food processing. Clean processing and clean labelling. Food sustainability certifications.	W1, W2, U1, U2, K2
8.	Strategies for sustainable adaptation of traditional food preservation methods. Non-thermal technologies. Minimal processing. Environmental aspects	W1, U1, U2, K1, K2
9.	Biopreservation. Sustainable food additives. Environmental and food safety aspects of sustainable processing.	W1, U1, U2, K1, K2
10.	New food sources. Synthetic foods. Fundamentals. Technological, safety and environmental aspects.	W1, U1, U2, K1, K2
11.	Food waste. Reduction and management. Valorization of by-products from food production and processing.	W1, W2, U1, U2, K1, K2
12.	Environmental impacts of food packaging. Sustainable materials and techniques. Primary, secondary, and tertiary packaging. Packaging and reduction of food waste. Active and intelligent packaging. Safety aspects.	W1, U1, U2, K1, K2
13.	Supply chain. Optimization and shortening of the food supply chain. Transportation, storage and distribution. Marketing and consumption. Proximity production. Ecosystem services, local and regional population processes.	W1, W2, U1, U2, K1, K2
14.	Nutritional aspects of new food sources and novel foods.	W1, U1, K2
15.	Food security and food safety implications in nutrition and health. Nutritional sustainability. Sustainable diets.	W1, W2, U1, U2, K2

Course advanced

Teaching methods :

Situational method, conversation lecture, discussion, case study, practicals

Activities	Examination methods	Credit conditions
Discussion class	written exam, credit	Written exam: essay questions, multiple-choice questions, short answer questions, exercises; credit: active participation, pop quizzes

Entry requirements

None

Literature

Obligatory

1. European Commission. The European Green Deal. Available at: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
2. United Nations. The 17 Goals. Available at: https://sdgs.un.org/goals
3. United Nations (2015). Transforming our world: the 2030 Agenda for Sustainable Development. Available at: https://wedocs.unep.org/20.500.11822/9814

Effects

Code	Content
JBS_K1_K01	The graduate can encourage sustainability-driven practices in the workplace and appraise sustainability of own values, perceptions, roles, and actions, with a special focus on environmental wellbeing.
JBS_K1_K03	The graduate can consider different visions of the future and develop own evidence-based opinions in reference to the balance of values linked to economic development, social welfare, and environmental protection.
JBS_K1_K04	The graduate can critically assess and verbalize own competencies and skills related to different aspects of sustainability as well as their need for development.
JBS_K1_K05	The graduate can defend the importance of scientific data and methods as a basis for decision-making.
JBS_K1_U01	The graduate can critically analyse academic literature, formulate research questions and conduct research under supervision.
JBS_K1_U02	The graduate can present and report knowledge, methodologies, ideas, problems and solutions, clearly and comprehensively, in different forms destined for different audiences – including discussions and debates which require defending a substantiated opinion, as well as conversations in a foreign language at the CEFR B2 level.
JBS_K1_U03	The graduate can apply adequate methods and tools, including selected IT tools, to solve problems related to data collection, analysis, and management in the context of sustainability.
JBS_K1_U04	The graduate can plan and effectuate simple sustainability-related projects under supervision and in the context of personal lifelong learning, both individually and in a team, using appropriate transversal skills and taking shared responsibility for the outcome.
JBS_K1_W01	The graduate can describe the concept of sustainability and recognize the differences in relevant definitions, models and approaches.
JBS_K1_W02	The graduate can explain the axiological background of sustainability and summarize key stages of development of the concept.
JBS_K1_W03	The graduate can give examples of sustainability-related dilemmas and hypothesize on the optimal course of action.
JBS_K1_W04	The graduate can identify sustainability-related problems specific to selected cultural, geographical, and political contexts.
JBS_K1_W05	The graduate can identify essential international instruments and institutions related to sustainability and explain their potential role in resolution of a given problem.
JBS_K1_W06	The graduate can describe interconnections between various aspects of sustainability and identify their significance in the context of natural and social sciences, with a special focus on disciplines included in the selected specialisation track (law and politics; chemistry and physics; chemistry and biology; economics and geography; economics, management and engineering; humanities).
JBS_K1_W07	The graduate can apply the theory and methodology of disciplines included in the selected specialisation track to sustainability-related problems, taking into consideration practical limitations such as protection of intellectual property.