SULAWE

SULAWE module outline: Module 3 „Digital Livestock Farming"

Name of topics	Types of work (hours)					Teaching/Learning forms	Forms of assessment	Persons responsible
	Contact work				Self work			
	Lectures	Lab works	Practical works	Other (e.g. consultation)	Self work			
Subtopic 1: Introduction to Digital Livestock Farming								
1.1 Basic concepts of digital livestock farming – Effects of digital livestock farming technologies on production efficiency, labor, animal health and welfare, sustainability of production	2					Lecture presentation	Written test	1 . Schuele H. 2 . Vashchenko P. (PSAU) 3 . Matvieiev M. (NUBiP)
1.2 Practical examples of digital livestock farming systems in cattle/milk, pig and poultry production			2			Guest lectures, excursions		1. Schuele H. 2. Vashchenko P. (PSAU) 3. Matvieiev M. (NUBiP)
1.3 Evolution of digital farming systems (Precision – Smart – Digital Farming) 1.4 Overview about the components of digital livestock farming systems (sensors, databases, automation, software, artificial intelligence)					8	Self-study of materials		1. Schuele H. 2. Vashchenko P. (PSAU) 3. Matvieiev M. (NUBiP).

Sustainable Livestock Production and Animal Welfare
Project 101083023-SULAWE-ERASMUS-EDU-2022-CBHE

SULAWE

Co-funded by the
Erasmus+ Programme
of the European Union

Name of topics	Types of work (hours)					Teaching/Learning forms	Forms of assessment	Persons responsible
	Contact work				Self work			
	Lectures	Lab works	Practical works	Other (e.g. consultation)				
Subtopic 2: Technological Basics for Digital Agriculture and Smart Livestock Farming								
2.1. Technical components of digital farming systems – their functionality, operation and application: Sensors, cameras, robots, process control systems, animal identification, data recording and evaluation, Artificial Intelligence	2					Lecture presentation	Viva voce apposition	1 Vashchenko P. (PSAU) 2. Mazur N. (LNAU)
2.2 Practical examples for the application of digital technologies in cattle/milk, pig and poultry production - Health control - Pasture management - Automated milking systems - Herd management systems - Climate control			4			The solution of experimental tasks	Testing No. 1	1. Vashchenko P. (PSAU) 2. Mazur N. (LNAU)
2.3 Application of digital technologies in other areas of livestock farming - Smart beekeeping; - Digital technologies in fish farming and aquaculture					12	Self-study of materials		

Sustainable Livestock Production and Animal Welfare
Project 101083023-SULAWE-ERASMUS-EDU-2022-CBHE

Co-funded by the
Erasmus+ Programme
of the European Union

SULAWE

Name of topics	Types of work (hours)					Teaching/Learning forms	Forms of assessment	Persons responsible
	Contact work				Self work			
	Lectures	Lab works	Practical works	Other (e.g. consultation)	Self work			
Subtopic 3: Application of Digital Technologies in Livestock Production for increasing sustainability and animal welfare								
3.1 Practical application of digital technologies in dairy farming - Monitoring of the physiological condition of cows and detection of oestrus - Remote identification of animals using chips - Automated accounting of cow productivity	2					Lecture presentation	Viva voce apposition	1 Vashchenko P. (PSAU) 2. Kuzmenko L. (PSAU)
3.2 Elements and examples of practical application for precision poultry production - Thermal imaging to assess distress in chickens - Digital image analysis to estimate the live weight of broilers - Image analysis for evaluating young chick's behaviour - Infrared thermography for evaluation of heat loss in chickens	2					Lecture presentation	Viva voce apposition	1 Vashchenko P. (PSAU) 2 Kuzmenko L. (PSAU)
3.3 Practical application of digital technologies in livestock production - Monitoring the health of calves using sensors (Calf monitoring) - Monitoring swine welfare with digital technologies (Lameness, Body condition scoring, prolapse syndrome, welfare at the group level) - Identification of pigs with radio frequency identification (RFID chip), optical behavior recognition, and facial recognition			8			The solution of experimental tasks Testing No. 1		1 Vashchenko P. (PSAU) 2 Kuzmenko L. (PSAU)

Name of topics	Types of work (hours)					Teaching/Learning forms	Forms of assessment	Persons responsible
	Contact work				Self work			
	Lectures	Lab works	Practical works	Other (e.g. consultation)				
- Monitoring temperature, humidity, CO_2 and light using wireless sensor networks in pig farms								
3.4 Case study in digitalization of animal husbandry				18		Self-study with actual farm materials	Report	

Sustainable Livestock Production and Animal Welfare
Project 101083023-SULAWE-ERASMUS-EDU-2022-CBHE

SULAWE

Co-funded by the
Erasmus+ Programme
of the European Union

Name of topics	Types of work (hours)					Teaching/Learning forms	Forms of assessment	Persons responsible
	Contact work				Self work			
	Lectures	Lab works	Practical works	Other (e.g. consultation)				
Subtopic 4: Automation and Robotics in Livestock Production								
4.1 Capacities of automated systems application, the concept and scope of artificial intelligence and the Internet of things. Possibilities and limiting factors for the use of automation and robotics in agriculture. Evaluation of economic efficiency and sustainability when using automation and robotics	2					Lecture presentation	Oral interview	1 Vashchenko P. (PSAU) 2 Parchomenko L. (Dal University)
4.2 Functioning of automated systems in cattle/dairy production – Automated milking systems – Automated feeding systems for cows, cattle and calves – Automated manure removal systems for cattle – Automated climate control systems for cattle	2					Lecture presentation	Oral interview	1 Vashchenko P. (PSAU) 2 Parchomenko L. (Dal University)
4.3 Automation and robotization of pig farming livestock production, pig farming and poultry – Automated feeding systems for pigs – Automated manure removal systems for pigs – Automated climate control systems for pig farms			8			The solution of experimental tasks	Testing No. 1	1 Vashchenko P. (PSAU) 2 Parchomenko L. (Dal University)
4.4 Automation and robotization of poultry production – Robotization of poultry egg and meat production systems – Automated manure removal systems for poultry – Automated feeding systems for poultry – Automated climate control systems for poultry					18	Self study of materials Presentation		

Sustainable Livestock Production and Animal Welfare
Project 101083023-SULAWE-ERASMUS-EDU-2022-CBHE

SULAWE

Co-funded by the
Erasmus+ Programme
of the European Union

Name of topics	Types of work (hours)					Teaching/Learning forms	Forms of assessment	Persons responsible
	Contact work				Self work			
	Lectures	Lab works	Practical works	Other (e.g. consultation)	Self work			
Subtopic 5: Management Information Systems in Livestock Farming								
5.1. Principles and functions of Farm Management Information Systems (FMIS) in livestock production. Use of artificial intelligence for decision support systems and their application in practice	2					Lecture presentation	Oral interview	1 Vashchenko P. (PSAU) 2 Matvieiev M. (NUBiP)
5.2 Practical application of Farm Management Information Systems (FMIS) in animal production	2					Lecture presentation	Testing No. 1	1 Vashchenko P. (PSAU) 2 Matvieiev M. (NUBiP)
5.3 Examples for software for digital cattle/dairy, pig and poultry production			8			The solution of experimental tasks		1 Vashchenko P. (PSAU) 2 Matvieiev M. (NUBiP)
5.4 Application and Evaluation of selected FMIS software					18	Self study of materials	Oral presentation	