

Precision Livestock Farming for Sustainable Production

Schedule 15 January to 19 March 2024.

The course is a distance course using the Canvas platform to direct the students in their study flow.

The distance course format is based on asynchronous teaching, where the student's learning comprises several activities, including literature, videos, lectures, reports and reflections, all of which the student can explore, assimilate and respond to. All the material will be on the Canvas platform.

A Q&As with teachers on Zoom follows each of the subjects. This is an excellent opportunity to identify and sort out difficulties and misunderstandings. However, to make the best out of it, students are urged to have done their part, watching the lectures, reading the papers, and at least have begun to solve the hand-ins – assignments/discussion contributions.

The release of the content will be primarily done on the Monday of each study week. This format creates considerable flexibility for the student, but it is combined with deadlines for hand-ins, which have to be held by students who have the ambition to obtain better grades than pass (3). The higher grades are 4 and 5.

Synchronous meetings on Zoom with Q&A and student presentations will be held in relation to each theme or lecture, which is marked in **yellow**.

Zoom links will be provided on the canvas platform.

Week 2024	Date	Theme and lectures	Main resources and student activity	Deadlines S=Student T=Teacher feedback
3	2024-01-15	Introduction (Oleksiy Guzhva)	Presentation of yourself on Canvas – get to know each other!	First week
		1 Introduction to Precision livestock farming (Oleksiy Guzhva)	1.1, 1.2 Short reflection on lecture and videos	1.2 Deliverable S: 2024-01-22 T: 2024-01-23
		The Hitchhiker's Guide to Integration of Social and Ethical Awareness in Precision Livestock Farming Research by Guzhva et al (2021) and Berckmans (2017) General introduction to precision livestock farming. Animal Frontiers 7: 6–11.	1.3 Papers to be read followed by Quiz 1.3	1.3 Quiz S: 2024-01-29 T: 2024-02-02
	2024-01-17 16-17	Meet the course leader + Q&A, Zoom (Oleksiy Guzhva)		
4-5	2024-01-22	2-3 Fundamentals of PLF: Biology, sensors, signal interpretation, data processing, validation.		
		2.1 Sensing animals' physiology and behaviour (Oleksiy Guzhva)		

		Molina et al. (2019) Welfare Quality® for dairy cows: towards a sensor-based assessment. Journal of Dairy Research 87: 28-33	Lecture Read paper and do Quiz 2.12	2.12 Quiz: S: 2024-02-05 T: 2024-02-12
	2024-01-25 16-17	Q&A, Zoom (Oleksiy Guzhva)		
		2.2 Signals and annotation (Oleksiy Guzhva)	Lecture Exercise	2.21 Exercise S: 2024-02-05 T: 2024-02-09
	2024-01-29 16-17	Q&A, Zoom (Oleksiy Guzhva)		
	2024-01-29	2.3 Development of algorithms (TBC)	Lectures Material to read (links) Quiz	2.31 Quiz S: 2024-02-12 T: 2024-02-16
	2024-02-02 16-17	Q&A, Zoom (TBC)		
		2.4/3.0 Assessment and validation (Oleksiy Guzhva)	Lecture Papers Quiz	3.1 Quiz S: 2024-02-12 T: 2024-02-16
		Tullo et al. 2016 Technical note: Validation of a commercial system for the continuous and automated monitoring of dairy cow activity. J Dairy Sci 9: 7489–7494 Elischer et al. 2013 Validating the accuracy of activity and rumination monitor data from dairy cows housed in a pasture-based automatic milking system. J Dairy Sci 96: 6412–6422 Burfeind et al. 2011 Technical note: Evaluation of a system for monitoring rumination in heifers and calves J Dairy Sci 94: 426–430		
	2024-02-06 16-17	Q&A, Zoom (Oleksiy Guzhva)		
6-7	2024-02-05	4 Application of PLF – integration of perspectives and management		
		4.1 Standard operation procedure SOP, decision support, effects on herd performance (Annica Hansson, Växa Sverige)	Lectures Videos Exercise	4.11 Exercise in discussion S: 2024-02-19 T: 2024-02-23
	2024-02-12 16-17	Q&A, Zoom (Annica Hansson)		
		4.2 User-Centered dairy production (Elinor Eineren, Agricam)	Lectures Literature Reflections	4.22 Reflections in discussion S: 2024-02-21 T: 2024-02-26

		Macmanus et al. 2016. Infrared thermography in animal production: An overview. Comp. Electro. Agric. 123: 10-16		
	2024-02-19 16-17	Q&A, Zoom (Elinor Eineren)		
		4.3 Production control: Automatic weighing – what’s and how’s (Oleksiy Guzhva)	Lectures, videos, papers Reflections	4.31 Reflection in discussions S: 2024-02-26 T: 2024-03-04
		Arvidsson Segerkvist et al. 2020 Automatic weighing as an animal health monitoring tool on pasture. Livest. Sci. 240: 104157 Chedad et al. 2003 Do heavy broiler chickens visit automatic weighing systems less than lighter birds? Brit. Poultry Sci. 44: 663–668 Kashiha et al. 2014 Automatic weight estimation of individual pigs using image analysis Comp. Electro. Agric. 107: 38-44		
	2024-02-26 16-17	Q&A, Zoom (Oleksiy Guzhva)		
8-9	2024-02-19	5 PLF applications and the end-user perspective	Lectures, several papers (see canvas) Video interviews Written report	5.1 Report S: 2024-03-04 T: 2024-03-15
		Evaluating PLF for the end-user (Oleksiy Guzhva)		
		Involving end-users (Oleksiy Guzhva)		
	2024-03-04	Q&A, Zoom (Oleksiy Guzhva)		
	2024-03-08	Joint seminar on project 13-16 (CET), Zoom (Oleksiy Guzhva + Evgenij Telezhenko)	Attend seminar, discussion on presentations	
10-11	2024-03-08	Development of a PLF application from beginning to end (R&D cycle including product deployment and infrastructure maintenance) and its role in the digital transformation of smart farming.	Literature to be used in project work (instructions)	6.1 Report S: 2024-03-15 T: 2024-03-25
		Lecture on definitions, examples, multi-actors (Oleksiy Guzhva)		
	2024-03-11 16-17	Q&A, Zoom (Oleksiy Guzhva)		
	2024-03-15 16-17	Q&A, Zoom (Oleksiy Guzhva)		

	2024-03-18		Deadline (report and presentation)	
	2024-03-19	Joint seminar on project 13-16 (CET), Zoom (Oleksiy Guzhva + Evgenij Telezhenko)	Attend seminar, discussion on presentations	
		Feedback about course management 16-16.30 (CET), Zoom	Course evaluation	