Course Unit Descriptor

Study Programme: Precision agriculture

Course Unit Title: Sensor detection

Course Unit Code: 19.PRP024

Name of Lecturer(s): Marko Kostić

Type and Level of Studies: Master academic studies

Course Status (compulsory/elective): elective

Semester (winter/summer): winter

Language of instruction: serbian/english

Mode of course unit delivery (face-to-face/distance learning): face-to-face

Number of ECTS Allocated: 5

Prerequisites: no

Course Aims:

To enable students to apply sensor systems that precision agriculture entails.

Learning Outcomes:

Students will be trained to work with sensor systems used in precision agricultural production on conventional machines. They will be trained to work with sensor devices for proximal detection of soil parameters, detection of plant parameters, to work in software packages for geospatial data processing and visualization and interpretation of results.

Syllabus:

Theory

Students will become familiar with the basic elements applied in precision agricultural production such as global positioning system (GPS, GNSS), yield recording devices, soil sampling strategy, remote sensing, proximal sensing systems, use of geographic information system (GIS). in spatial parameter modeling and variable application systems. In addition to the aforementioned, they will be introduced to systems for monitoring and remote control of the operation of machines in the field using telematics. Students will be trained to work in appropriate software packages for analysis and generation of yield maps, soil properties, giving recommendations for solving the causes of variations on the plot, for developing a strategy for improving the general condition of the plot, as well as evaluating the economic justification of applying a certain technology.

Practice

Application of available sensor devices in the field. Data collection according to the principles of precision agriculture. Mastering data acquisition and processing techniques. Raw signal processing using interpolation and filtering techniques. Variogram modeling, selection of data interpolation methods, cross-correlation of models, creation of thematic maps.

Required Reading:

1. Kostić M. Precision agriculture, University of Novi Sad, 2021.
2. Kostić M., Rakić D., Savin L., Dedović N., Simikić M. 2016. Application of an original soil tillage resistance sensor in spatial prediction of selected soil properties. Computers and Electronics in Agriculture, 127(2016): 615-624.
3. Kostić, M., Rajković, M., Ljubičić, N. et al. Georeferenced tractor wheel slip data for prediction of spatial variability in soil physical properties. Precision Agric (2021).

Weekly Contact Hours:	**Lectures:2**	**Practical work:2**

Teaching Methods:

Oral lectures with the use of modern equipment for visual display and simulation. Practical exercises on machines with demonstrations in laboratory and field conditions.

Knowledge Assessment (maximum of 100 points):

Pre-exam obligations	points	**Final exam**	points
Active class participation	5	written exam	
Practical work	5	oral exam	60
Preliminary exam(s)	15	…….	
Seminar(s)	15		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			