

Precision Agriculture (I002151)

Course size (nominal values; actual values may depend on programme)
 Credits 5.0 Study time 135 h Contact hrs 60.0 h

Course offerings and teaching methods in academic year 2018-2019

Offering	Language	Teaching Method	Hours
A (semester 2)	English	group work	10.0 h
		guided self-study	0.0 h
		excursion	10.0 h
		seminar	5.0 h
		lecture	30.0 h
		demonstration	5.0 h

Lecturers in academic year 2018-2019

Mouazen, Abdul LA20 lecturer-in-charge

Offered in the following programmes in 2018-2019	crdts	offering
Master of Science in Bioscience Engineering: Agricultural Sciences	5	A
Master of Science in Bioscience Engineering: Land and Water Management	5	A

Teaching languages

English

Keywords

Site specific management, GPS, smart farming

Position of the course

Precision agriculture aims at improving the management of spatial and temporal variability within agricultural fields, by applying the right amount of farm input (fertilisers, water for irrigation, pesticides, seeds, tillage etc.) into the right place in the right time by using of the right technologies and practices. In crop production the scale of management of variability is down to within field or subfield scale.

The final target of precision agriculture is successful management of within field variability to maximise yield at reduced input cost, and reduced environmental impacts and waste. The final farm output is increased profit and farming production efficiency, whereas a reduced risk for pollution can be achieved by applying less agrochemicals into the environment (e.g., into soil, water and air).

The implementation of precision agriculture requires the combination of several technologies into an integrated agricultural management system. These technologies often include global positioning systems, geographical information systems, remote sensing of crop, proximal soil and crop sensing, yield monitoring, geostatistical modelling and mapping, decision support tool (PA software), and variable rate technologies.

This course aims at an interdisciplinary approach with activating work forms. The lecturer in charge takes up a coordinating role, whereby the different topics covered will be presented by specialists in the respective disciplines. The concrete contents will be adapted as a function of the foreknowledge of the students who select this optional course.

Contents

The different parts of this course are presented by topic-specific specialists.

1. General philosophy of precision agriculture (A. Mouazen).
2. PA information technologies - GIS and GPS techniques (F. Van Coillie).
3. Remote sensing for crop monitoring - satellite, airborne and drones - image processing - Part 1 (F. Van Coillie).

4. Remote sensing for crop monitoring – satellite, airborne and drones – image processing – Part 2 (F. Van Coillie).
5. Proximal soil sensing – electrical resistivity, electromagnetic induction, ground penetrating radar (M. Van Meirvenne).
6. Proximal soil sensing – reflectance – strength – electrochemical – multi-sensor & data fusion (A. Mouazen).
7. Proximal crop sensing including yield sensors (A. Mouazen).
8. Basic geostatistics and mapping (M. Van Meirvenne).
9. Variable rate technologies – VR spraying, seeding, fertilisation (A. Mouazen).
10. Technical and environmental aspects of site specific management – VR fungi and insect control (P. Spanoghe).
11. Technical and environmental aspects of site specific management – VR weed control (B. De Cauwer).
12. PA and farm management / business models for PA innovations (X. Gellynck).

Initial competences

No specific prior knowledge is required for this course other than that obtained during the joint section Bachelor in Bio-engineering.

Final competences

- 1 Understand what precision agriculture is.
- 2 *Insight in the multidisciplinary nature of precision agriculture.*

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Guided self-study, demonstration, excursion, group work, lecture, seminar

Extra information on the teaching methods

The theoretical lessons are lectures supported with illustrations. The practical exercises are composed out of demonstrations and excursions with a visit to one or more farms applying precision agriculture. Interaction with the facilities offered by the Bayer chair in Forward Farming is foreseen.

Learning materials and price

Since this course is conceived as a combination of multiple expertises, its contents will be adapted to the foreknowledge of the students subscribing for it. So it is not intended to have a prior fixed course content and worked out course material.

References

Course content-related study coaching

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Written examination with open questions

Examination methods in case of periodic evaluation during the second examination period

Written examination with open questions

Examination methods in case of permanent evaluation

Participation, assignment

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

The exam will consist of a combination of questions from the diverse disciplines which are covered in this course, with a focus on the interdisciplinary nature of Precision Agriculture and the practical experiences gathered during the field trips and farm visits

Calculation of the examination mark

- End-of-term assessment: continuous assessment 75 % and 25 % continuous assessment.
- Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.

- There are no additional conditions to pass or in the calculation of the end-of-term assessment