



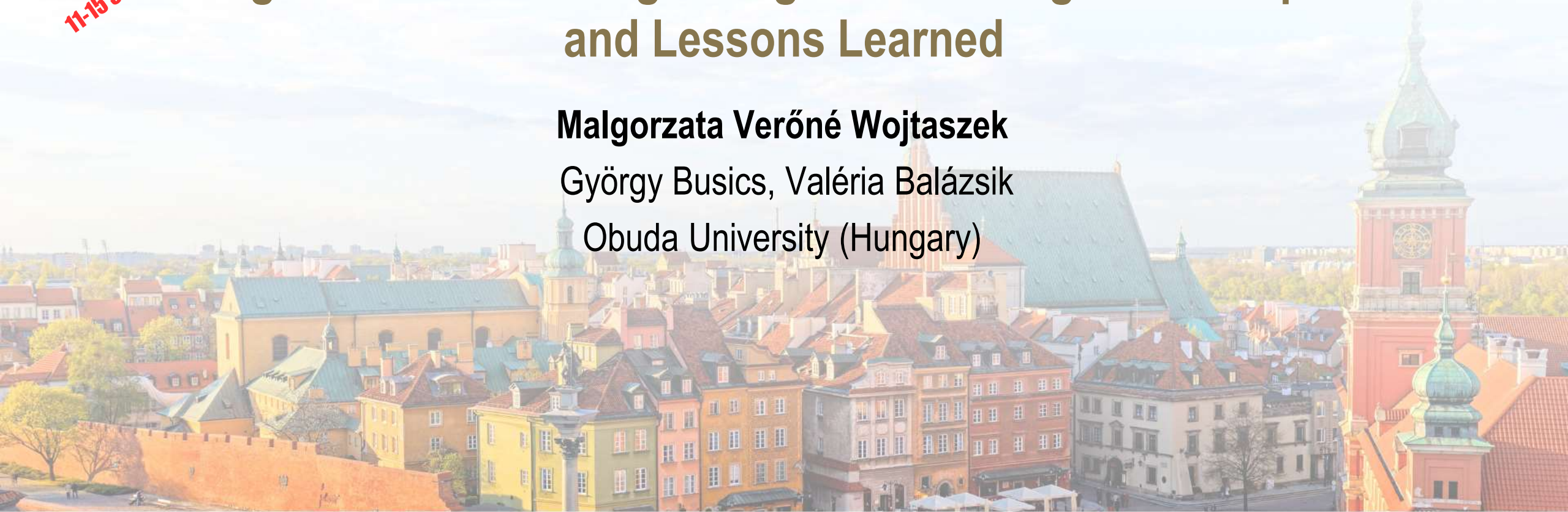
XXVII FIG CONGRESS

11-15 SEPTEMBER 2022
Warsaw, Poland

Volunteering
for the future –
Geospatial excellence
for a better living

Teaching Precision Farming for Agricultural Engineers: Experiences and Lessons Learned

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Precision Agriculture At the beginning...



Precision agriculture (PA) is a farming management concept based on observing, measuring and responding to inter and intra-field **variability** in crops.



- ✓ First conceptual work on PA go back in the late 1980s
- ✓ In the early 2000s, the practice began to pick up, but..
- ✓ Its spread has slowed down

Why?

- ✓ the lack of quality educational programs giving
 - the right level of knowledge
 - and following rapid technological development

The curriculum development

Needs analysis

- ✓ analysis was conducted on existing scientific studies considering PF
- ✓ Meetings with farmers, advisers and specialist from different fields

Content and methods

- ✓ outcomes (what learners will be able to do after participation in curriculum activities)
- ✓ the content (**what** will be taught)
- ✓ the methods (**how** it will be taught)



Content and methods

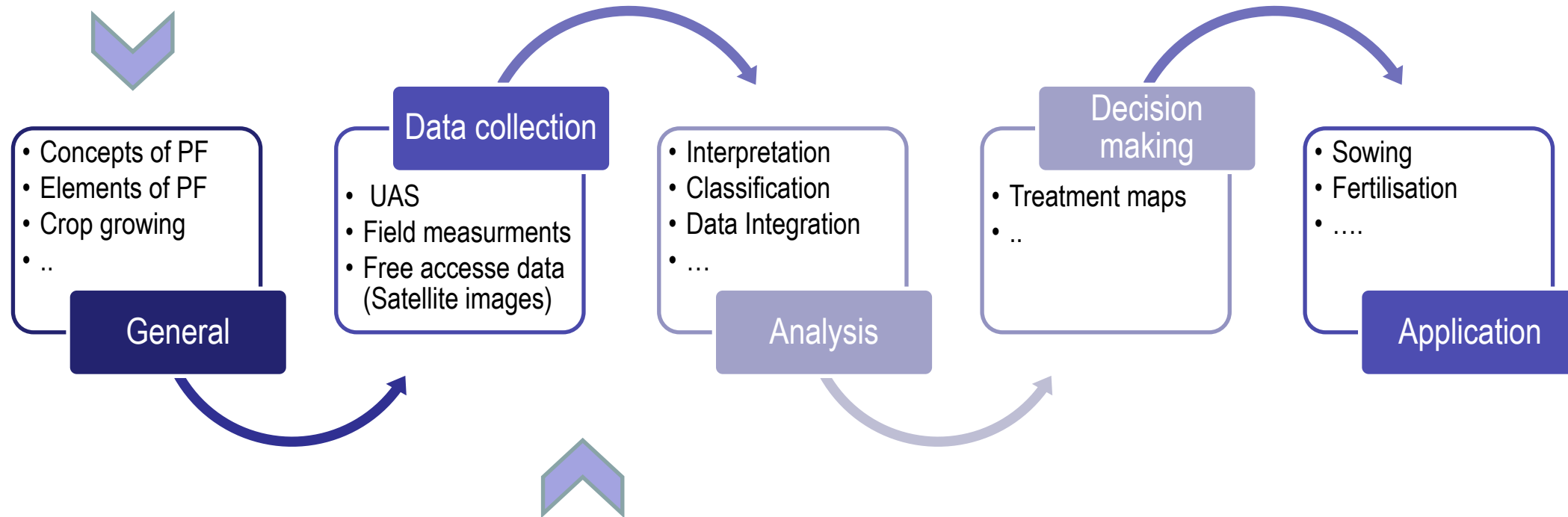
The aim of the curriculum

- ✓ Is to present the achievements of modern technologies and their integration into precision farming
- ✓ Is to provide the necessary theoretical knowledge, but the program emphasis on practical application
- ✓ It develops uses and problem-solving skills by using demonstrations, interactive exercise and case studies
- ✓ The practical part of the training includes field demonstrations of precision machines, sensors and UAV flights.

The students learn about the tools for data collection, data sources and methods of data evaluation needed to get various information and support decision making.

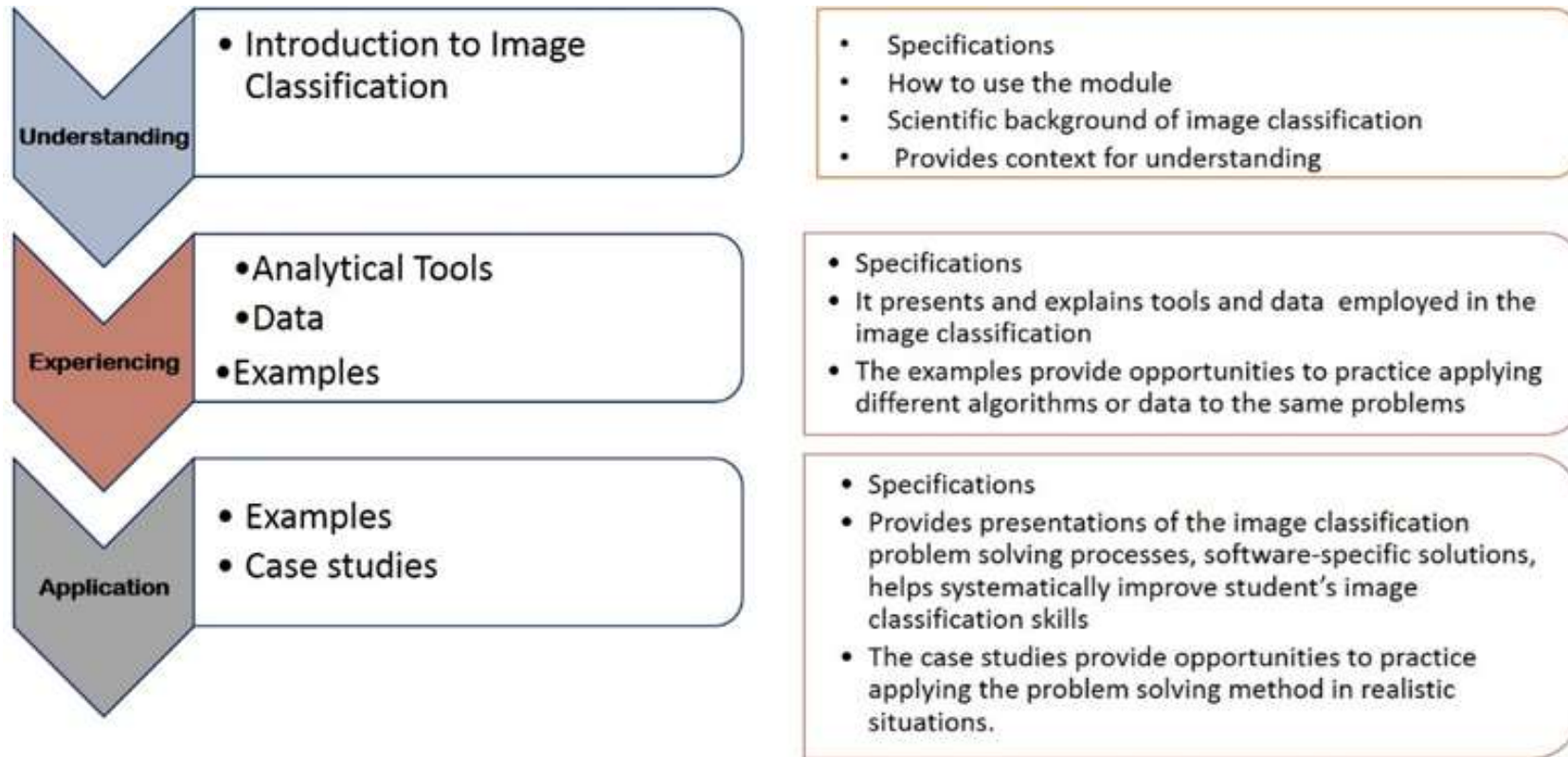


The concepts, technologies and implementations strategies of precision farming (PF), the elements of PF

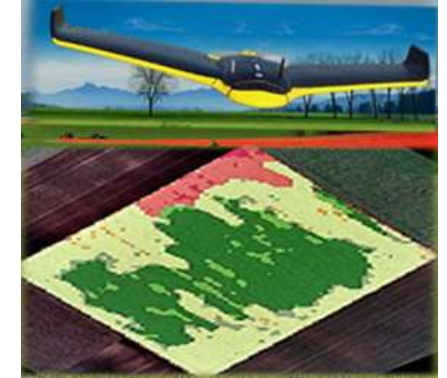


Crop growing monitoring, the concept of spatial variability within a field and other applications

Developing Learning Materials (Example)



Case study: Mapping of spatial variability within a field



Data gathering

- Flight planning
- Field measurements
- Free access data (data download)



Image Processing

- Rectification
- Mosaic
- Data Integration

Classification

- Unsupervised (Cluster)
- OBIA (eCognition)
- Statistics

GIS

- Generalize Results
- Combine Results
- Create Maps
- Analyze

Summary

This curriculum provides practical-oriented knowledge of precision agriculture technologies, covering both the applications and the different technologies (e.g. RS and UAV, GIS, GNSS, variable rate application etc. that make precision farming (PF) possible.

Duration

- ✓ 1,5-year / 3 semesters
- ✓ 5 moduls / semester
- ✓ 240 contact hours

The training was launched in 2017. A new course starts every year.

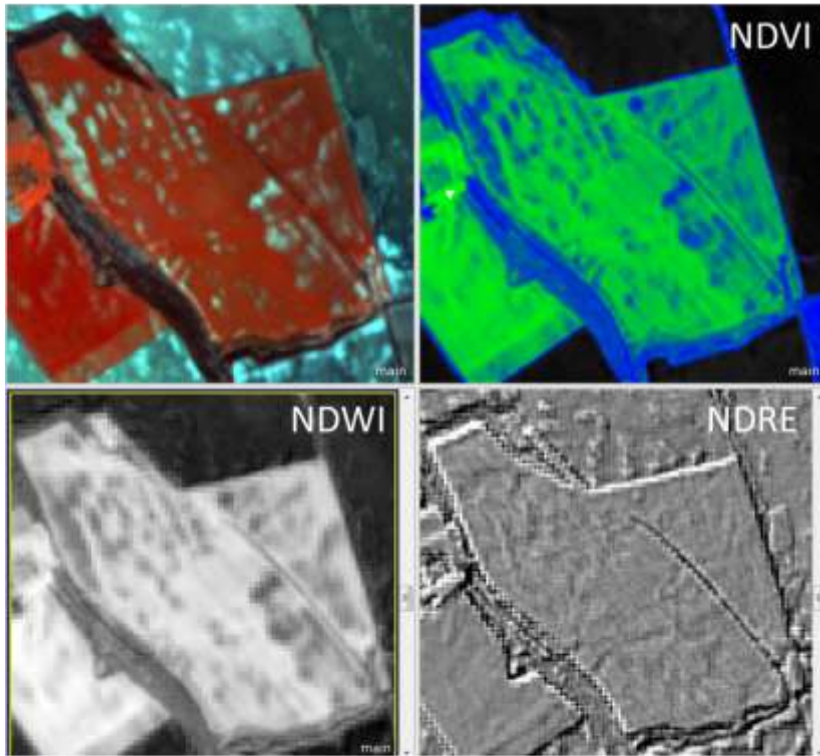
<i>The first semester/ Subjects</i>	<i>Duration/ hours</i>
Precision farming	21
Remote Sensing	18
Soil Science in Agriculture	15
Geoinformatics (GIS)	21
Topography and Digital Elevation Models	15
<i>The second semester/ Subjects</i>	
Project module	18
Data and software in precision farming	12
UAS data acquisition and applications	15
GNSS technology and precision farming	15
Seminar, thesis 1.	15
<i>The third semester/ Subjects</i>	
Thesis 2.	30
Applications of Drone Technologies	15
Data integration in precision farming	9
Accounting	9
EU agricultural and environmental policy, environmental management	9



Cooperation between universities and farmers, and companies

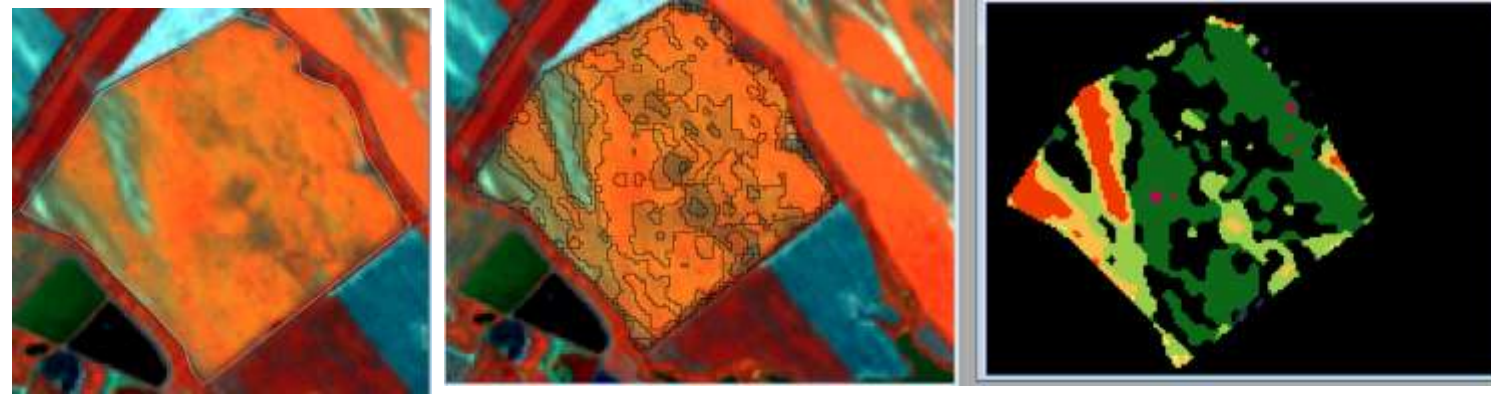
A partnership and cooperation agreements were signed between university and AXIÁL LTD, one of the market leaders in Hungary and farmers to support education.





Sentinel 2, B3, B4, B8, NDVI, NDWI, NDRE

Calculation and analysis of spectral indices



Satellite image, classification



Yield map

Thank you for your attention



If you require any further information, feel free to contact me.

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