Basic data of the subject	
University:	**University "Ukshin Hoti" Prizren**
Academic Unit:	**Faculty of Life and Environmental Sciences**
Study program:	**Agribusiness management**
Course title:	**ICT in agriculture**
Level:	**Master**
Course status:	**Elective (E)**
Study year / semester:	**1 year / 2 semester**
Number of hours per week:	**2 + 1**
Credit value – ECTS:	**5**
Time / location:	**To be announced**
Lecturer:	**Prof. Ass. Dr. Arsim Susuri**
Contact details:	**arsim.susuri@uni-prizren.com; +383 44 254 183**
Course description	The course provides knowledge on the basic principles of the ICT application in agriculture. The course will cover Global Positioning Systems (GPS), Geographic Information Systems (GIS), remote sensing, data acquisition, mapping, variable rate applications and the economics of precision agricultural technologies.
Course objectives:	The main objective of this course is to provide students with knowledge of ICT application in agriculture; identify and use appropriate hardware and software tools; gain experience in developing and interpreting descriptive maps; use data effectively in management decisions; and develop an understanding of precision farming applications in other countries.
Learning outcomes:	Upon completion of this course, students will be able to: • Develop an understanding of the use of global positioning systems and their use in precision agriculture. Students will learn how to use GPS devices and integrate results with the use of appropriate software programs. • Develop an understanding of pre-processing measured field data to create maps to display the variability of field parameters such as soil nutrients and electrical conductivity, yield, moisture content, pH and altitude. • To develop an understanding of using ArcVIEW GIS software to develop descriptive maps. ArcCatalog, ArcMap and ArcToolbox modules will be used frequently during this course and students will become proficient using these tools. • Interpret descriptive maps and be able to develop a

	variable application rate management strategy. • Develop an understanding of precision agricultural technologies and their applications in other countries.

Contribution on student load (must correspond with learning outcomes)			
Activity	**Hours**	**Days/week**	**Total**
Lectures	3	12	36
Exercise theoretical/laboratory	2	12	24
Practice work	2	3	6
Contact with lecturer/consultations	1	15	15
Field exercises	2	3	6
Mid-terms, seminars	2	1	2
Homework	1	12	12
Individual time spent studying (at the library or home)	2	12	24
Final preparation for the exam	2	10	20
Time spent in evaluation (tests, quiz, final exam)	2	1	2
Projects, presentations, etc.	3	1	3
Total			150

Teaching methods:	Lectures, exercises, discussions, consultations, course projects, homework, midterm exam (colloquium), exams.
Examination methods:	Regular and active attendance: 10%, Midterm exam (colloquium): 20%, Course project: 10%, Final exam: 60%.
Basic Literature:	Daniel R. Ess, Mark T. Morgan (2010): The Precision-Farming Guide for Agriculturists (Agricultural Primer), Moline III: Deere & Co. Heege, H.J. (2013): Precision in Crop Farming - Site-specific Concepts and Sensing Methods. Springer Dordrecht Heidelberg New York London.
Additional Literature:	Søren Marcus Pedersen, Kim Martin Lind (2017): Precision Agriculture: Technology and Economic Perspectives, Springer.

Designed study plan:	
Week	**Lectures which will be held**
First week:	Syllabus overview, introduction to ICT application in agriculture.
Second week:	GPS, NAVSTAR, receivers, Position determination-Trilateration,
Third week:	Accuracy of GPS, Precision vs Accuracy, basic statistics, RTK, NMEA Protocol and NMEA standard sentences.
Fourth week:	Coordinate systems, Map projections, Introduction to GIS, GIS components, GIS in Precision Agriculture
Fifth week:	Yield monitoring basics, system components, yield calculation. Yield monitoring systems
Sixth week:	Yield monitoring and measurement systems for alternative crops. Soil sampling and analyses, mapping
Seventh week:	Soil electrical conductivity (EM38 and Veris). Remote sensing (Electromagnetic spectrum, Spectral reluctance).
Eighth week:	Intermediate examination (test)
Ninth week:	Remote sensing (Thermal response, reflectance, NDVI). Productivity and management zones (shape, size, boundaries).
Tenth week:	GPS guidance applications. Precision Agriculture Economics.
Eleventh week:	Precision Agriculture Environmental impact. GIS Applications - Examples: Forestry and tree crops.
Twelfth week:	GIS Applications - Examples: Soil salinity. GIS Applications - Examples: On the go soil strength sensing.
Thirteenth week:	Work on semester projects
Fourteenth week:	Semester project presentations.
Fifteenth week:	Final examination (test)

Exercises

Designed study plan:	
Week	**Exercises which will be held**
First week:	Lab 1: Basic Statistics
Second week:	Lab 2: GPS receiver interface to a computer
Third week:	Lab 3: GPS NMEA code - DNR Garmin – Garmin Mapsource
Fourth week:	Lab 4: ArcMap Area calculation
Fifth week:	Lab 5: Yield files, moisture files, querry
Sixth week:	Lab 6: Yield map and estimating yield.
Seventh week:	Lab 7: Fertilizer recommendation map.
Eighth week:	Lab 8: Variable rate maps - Other mapping software (SMS).
Ninth week:	Lab 9 :Discussion of Semester Projects
Tenth week:	Lab 10: P+K recommendation lab- ArcMap-MapCalc.
Eleventh week:	Lab 11: GIS applications in Agriculture - Example
Twelfth week:	Lab 12: GIS applications in Agriculture - Example
Thirteenth week:	Work on semester projects
Fourteenth week:	Semester project presentations.
Fifteenth week:	Presentation of the course projects.

Academic policies and rules of conduct:
Students are obliged to attend lectures regularly, to take part in field study tours (excursion). Disconnection of mobile phones, timely access to the classroom and keeping quiet during the lecture hours are also mandatory.