DIGITAL IMAGE PROCESSING IN AGRICULTURAL TECHNOLOGIES

1	Course Title:	DIGITAL IMAGE PROCESSING IN AGRICULTURAL TECHNOLOGIES	
2	Course Code:	BSM5049	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. FERHAT KURTULMUŞ	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	ferhatk@uludag.edu.tr Ziraat Fakültesi, Biyosistem Mühendisliği Bölümü, C Blok 2. Kat	
17	Website:		
18	Objective of the Course:	Matlab program, which is a software package for industrial and research purposes for data analysis, visualization and technical calculations, helps students to understand the advantages of using digital image processing technologies in agricultural production, to use data types, algorithms, transformations and basic methods used in digital image processing, to be able to utilize image processing tools as a solution to the problems encountered in agricultural production.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	be able to use Matlab and image processing tools at the basic level.
		2	Recognizing the tools and methods currently used in the field of digital image processing.
		3	be able to understand basic image processing algorithms and how to apply them.
		4	be able to design digital image processing methods as a sensor system that can be used in agricultural production.
		5	be able to understand the current and future technology requirements of digital image processing in the field of agriculture.
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21	Course Content:		
	Course Content:		

Week	Theoretical	Practice
1	Introduction to digital image processing, definitions, concepts, visible and invisible wave length, human vision system	
2	Matlab working environment and basic image IO functions	
3	Basic data types in digital image processing	
4	Gray level transformations, histogram equalization and some image enhancement methods	
5	Image transformations and filtering	
6	orphological image processing methods, edge detection algorithms, connected components, region labeling	
7	Midterm	
8	Feature extraction methods for image objects, color, shape, and textures	
9	Frequency components and Fourier transform of digital images	
10	Image segmentation and object recognition	
11	Object recognition-counting and Matlab sample work	
12	Image processing in precision agriculture and Matlab sample work	
13	Detection of agricultural material by digital	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	3.00	42.00
Homeworks	6	10.00	60.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	20.00	20.00
Others	0	0.00	0.00
Final Exams	1	16.00	16.00
Total Work Load			180.00
Total work load/ 30 hr			6.00
ECTS Credit of the Course			6.00

22	Textbooks, References and/or Other Gonzalez, R.C., Woods, R.E., Eddins, S.L., Digital Image Palm, W.J., Introduction to Matlab 7 for Engineers, McGraw Hill, 2005.
23	Assesment

Midterm Exam	1	40.00
Home work-project	0	0.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		

24 ECTS / WORK LOAD TABLE

25 CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS

	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ÖK2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	**1 very low**	**2 low**	**3 Medium**	**4 High**	**5 Very High**