WORKING CHARACTERISTICS, OPERATION AND MAINTENANCE OF PLANT PROTECTION MACHINES

1	Course Title:	WORKING CHARACTERISTICS, OPERATION AND MAINTENANCE OF PLANT PROTECTION MACHINES	
2	Course Code:	BSM5061	
3	Type of Course:	Optional	
4	Level of Course:	Third 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:	Prof. Dr. Halil Ünal	
15	Course Lecturers:	Yok	
16	Contact information of the Course Coordinator:	Prof. Dr. Halil ÜNAL e-posta : hunal@uludag.edu.tr Telefon: 0 224 2941607 Adres: Bursa Uludağ Üniversitesi, Ziraat Fakültesi, Biyosistem Mühendisliği Bölümü, Görükle Kampüsü, 16059, Nilüfer/BURSA	
17	Website:		
18	Objective of the Course:	To give information about the techniques of evaluating the performance of the sprayer in plant protection machines, for example, in pesticide applications with sprayers. There are many machines available today for the application of herbicides. However, the selection made by considering only the cost of spraying and the work capacity of the equipment to be used in the selection of equipment is often not sufficient. Within the scope of this course, other effective selection criteria (biological effectiveness, machine safety, etc.) will be given, apart from the cost of spraying and work capacity in the selection of plant protection machines.	
19	Contribution of the Course to Professional Development:	Students learn to evaluate the performance of spraying machines and equipment, the cost of spraying and the work capacity of the equipment to be used, new techniques and machines, theoretically and practically.	
20	Learning Outcomes:		
		1	Learns the mechanisms of disintegration of liquid drugs into drops and effective factors.
		2	It measures and interprets the amount of deposition of the sprayed material on different target surfaces.
		3	Learns sampling techniques and trace materials that can be used for sampling purposes on target surfaces and can make analyzes.
		4	Have all the necessary information to evaluate the performance of any drug delivery machine.
		5	Knows the calculation of plant protection machines work success.
		6	Knows the effective parameters in the selection of plant protection machines.
		7	Knows the maintenance of plant protection machines.
		8	

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21	Course Content:

	Course Content:

Week	Theoretical	Practice
1	Some important physical properties of liquids and their effects on disintegration, liquid drug degradation mechanisms: by pressure, centrifugal force, airflow, electro-hydrodynamic force.	
2	Measurement of spray pattern characteristic drop diameters, Determination of spray pattern in the use of a single nozzle and multiple nozzles.	
3	Drug drift and its causes, Drug drift reduction technologies, Drug accumulation and drift potential measurement methods on target surfaces in working with Field Sprayers.	
4	Drug accumulation and drift potential measurement methods on target surfaces in working with garden sprayers with auxiliary air flow, Case studies in field and garden.	
5	Fluorometric analysis of samples taken in the field and orchard, presentation and interpretation of the data in graphics and tables.	
6	material separation techniques from sampling surfaces.	
7	back, Plant protection machines carried on the hand.	
8	machines Self-propelled Plant Protection machines	
9	Safety/safety factors in machine selection.	
10	machine selection. Area and workforce requirement in machine selection.	
11	area to be sprayed, ease of use, Evaluation of fixed, operating and service costs in	

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	4.00	56.00
Homeworks	5	10.00	50.00
Projects	1	28.00	28.00
Field Studies	0	0.00	0.00
Midterm Exam/s	0	0.00	0.00
Others	0	0.00	0.00
Final Exams	1	2.00	2.00
Total Work Load			178.00
Total work load/ 30 hr			5.93
ECTS Credit of the Course			6.00

12	Evaluation of machine robustness, spraying speed and carrier-water availability in machine selection, maintenance of sprayers.
13	Homework I
14	Homework II

22	Textbooks, References and/or Other Materials:	1. Matthews, G. A., Hislop, E. C., Application Techology for Crop Protection. ISBN:0 85198 834 2. Matthews, G.A.,2000. Pesticide Application Methods. 3rd Edition. Blackwell Science 3. ISO 5682-2: Equipment for crop protection-Spraying equipment Part 2: Test methods for hydraulic Sprayers 4. ASABE S 561.1. ARP2004. Procedure for Measuring Drift Deposits from Ground, Orchard and aerial sprayers. 5. Koch, H., Knewitz, H., 2008. Methodology and sampling technique of spray deposit and distribution measurement in vineyards. Nachrichtenbl. Deut. Pflanzenschutzd., 60 (2). S. 25–30, 2008, ISSN 0027-7479.
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	0	0.00
Quiz	0	0.00
Home work-project	14	40.00
Final Exam	1	60.00
Total	15	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		Measurement and evaluation are carried out according to the principles of Bursa Uludağ University Graduate Education Regulations.

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	5	4	4	4	5	2	4	5	4	5	4	5	0	0	0	0
ÖK2	5	4	4	3	4	2	3	5	5	5	4	4	0	0	0	0
ÖK3	4	4	5	4	4	2	4	5	4	4	4	4	0	0	0	0
ÖK4	4	5	5	5	5	2	4	4	5	5	4	4	0	0	0	0
ÖK5	4	5	5	5	5	2	4	3	4	5	4	5	0	0	0	0
ÖK6	5	4	4	4	5	2	4	4	4	4	4	3	0	0	0	0
ÖK7	5	4	4	5	4	3	5	4	5	4	4	2	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

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