BRAWIJAYA UNIVERSITY

FACULTY OF AGRICULTURE

DEPARTMENT OF PLANT PESTS AND DISEASES / MASTER OF AGRICULTURAL ENTOMOLOGY STUDY PROGRAM

SEMESTER COURSE PLAN

COURSES	CODE	CLUSTERS OF COURSES	CREDIT	SEMESTER	Date of Preparation
Insect Behaviour	PTH81209	Agricultural Entomology	2 SKS 2.98 ECTS	Odd	June 8, 2021

AUTHORIZATION	Course Developer Lecturer	Course Coordinator	Head of Study Program
Department of Plant Pests and Diseases	Dr. Ir. Sri Karindah, MS. Dr.Ir. Retno Dyah Puspitarini, MS.	Name Signature	Dr. Akhmad Rizali, SP., M.Si. Signature

Learning Outcomes	ILO STUDY PROGRAM	
	A1	Able to work together and have social sensitivity and high concern for society and the environment.
	K1	Mastering concepts, theories and methods in the field of agricultural entomology

	Course Learning Outcome	
	1	Students develop knowledge about insect behavior
	2	Students are able to manage research on insect behavior which is basic knowledge to solve plant pest problems.
Brief Description of Course		
Learning Material / Subject	1) Introduction 2) Mechanism of insect behavior 3) Adaptation of insects to the environment 4) The mechanism of feeding behavior of insects 5) Mechanisms of chemical communication of insects 6) Visual communication 7) Mechanical communication 8) Activity insect behavior 9) Self-defense mechanisms of insects 10) Reproductive behavior in insects 11) Insect behavior in caring for offspring and nest making 12) Social insect behavior (I) 13) Social insect behavior (II) 14) Adaptation behavior to climate change	

Relationship of CLO and ILO

	A1	K1	K2	K3	S1	S2	S3
CLO 1	0.5	0.5	0	0	0	0	0
CLO 2	0.5	0.5	0	0	0	0	0
CLO 3	0.5	0.5	0	0	0	0	0
CLO 4	0.5	0.5	0	0	0	0	0
CLO 5	0.5	0.5	0	0	0	0	0
CLO 6	0.5	0.5	0	0	0	0	0

Reference

Main

1. Matthews RW, Matthews JR. 2010. Insect Behavior. Springer
2. Price PW, Denno RD, Eubanks MD, Finke DL, Kaplan I. 201. Insect Ecology: Behavior, Populations and Communities. Cambridge University Press
3. Cordoba-Aguilar A, Gonzalez-Tokman D, Gonzalez-Santoyo I. 2018. Insect Behavior: From Mechanisms to Ecological and Evolutionary Consequences. Oxford University Press

Supporting Reference

	1) Puspitarini RD, Fernando I, Widjayanti T, Purwanti RA, Munthe SS, Wildaniyah U. 2021. Development and reproduction of Rhizoglyphus robini Claparéde (Astigmata: Acaridae), an emerging pest in Indonesia, on six host plants. International Journal of Acarology 47(8): 695-700. 2) Prabowo H, Rahardjo BT, Mudjiono G, Rizali A. 2021. Impact of habitat manipulation on the diversity and abundance of beneficial and pest arthropods in sugarcane ratoon. Biodiversity Journal of Biological Diversity, 22(9). 3) Rahayu SE, Leksono AS, Gama ZP, Tarno, H. 2023. The Effect of Papaya Leaf Extract (Carica papaya L.) on the Mortality Rate of Spodoptera litura Fabricius Larvae and the Level of Damage to Soybean Leaves in Malang, Indonesia: A Greenhouse Simulation. AGRIVITA, Journal of Agricultural Science 45(1): 20-30.	
Learning Media	**Software:**	**Hardware:**
	Powerpoint	Computer, LCD
Team Teaching	Dr. Ir. Sri Karindah, MS. Dr.Ir. Retno Dyah Puspitarini, MS.	
Required Courses	-	

Week	Sub-CLO (as expected final capability)	Indicators	Criteria & Forms of Assessment	Learning Methods (Lectures / Assignments /	Time (Duration)	Learning Materials / [References]	Proportion (%)

				other forms of learning)			
1	Students are able to develop thoughts about the Introduction to Insect Behavior course material	Accuracy explains about Insect Behavior	Criterion: The accuracy of students in explaining the understanding of the regulation of insect behavior Form of Assessment: discussion	Method: Lectures and discussions	100 minutes Self-study (2x60 minutes)	Insect behavior is regulated by the nervous system, endocrine system and is genetically acquired	5 %
2	Students are able to explain the mechanism of insect behavior	Accuracy explains the mechanism of insect behavior	Criterion: accuracy of students explaining the coordination mechanism with the nervous system	Lectures and discussions Self-study	100 minutes Self-study (2x60 minutes)	Coordination mechanism with the nervous system and endocrine system	5 %

			and endocrine system Form of assessment: discussion				
3	Students are able to master material about insect adaptation to the environment	Accuracy explains about the adaptation of insects to the environment	Criterion: Precision explains Locomosi, orientation, dispersal and thermoregulation Form of assessment: assignment	Lectures and discussions Self-study	100 minutes Self-study (2x60 minutes):	Locomosi, orientation, dispersal and thermoregulation	5 %

4	Students are able to master material about the mechanism of insect feeding behavior	accuracy describes the mechanism of insect feeding behavior and skills and carrying out tasks	Criterion: Accurately explain the strategy of systematic coevolution of herbivores and plants Form of assessment: Presentation	Lectures and discussions Self-study	100 minutes Self-study (2x60 minutes):	Coevolution strategy of herbivores and plants	5 %
5	Students are able to master material about the mechanism of chemical communication of insects	Accuracy explains the mechanism of insect chemical communication and skills	Accuracy describes criteria about the type and function of chemical communication and control of insect populations	Lectures and discussions Self-study	100 minutes Self-study (2x60 minutes):	1) Types and functions of chemical communication 2) Chemical communication and insect population control	5 %

			Form of assessment: Quiz				
6	Students are able to master material about visual communication	Accuracy explains visual communication	accuracy explains the light stimuli on insect behavior (*phototaxis*), as well as the function of visual communication systematically Form of assessment: Assignment	Lectures, and discussion	100 minutes	1) Light stimulation of insect behavior (*phototaxis*) 2) Visual communication functions	5 %
7	Students are able to master material about mechanical communication (tactile)	Accuracy describes learning activities about mechanical communication and skills	accuracy explains about sound production and Functions of insect sounds	Lectures, and discussion	100 minutes	1) Sound production 2) Functions of insect sounds	5 %

			Assessment form: Task				
8	Mid-term Exam						20%
9	Students are able to master material about insect behavior on the move	accuracy in responding to learning materials, participating in learning activities about insect behavior, activities and skills, and carrying out tasks	accuracy explains about the *Circadian rhythm*, . nocturnal, diurnal, crepuscular Form of assessment: Quizzes and assignments	Lectures, discussion and practicum	100 minutes + 120 minutes	*Circadian rhythm*: nocturnal, diurnal, crepuscular	5 %
10	Students are able to master material about insect self-defense mechanisms	Precision about the mechanism of self-defense of insects	accuracy explains about Crypsis, mimesis, mimicry and insect defense against the process of predation	Lectures, and discussion	100 minutes	1) Crypsis, mimesis, mimicry 2) Insect defense against the process of predation	5 %

			Form of assessment: Assignment				
11	Students are able to master material about reproductive behavior in insects	accuracy in responding to learning material, following learning activities about reproductive behavior in insects	Accuracy explains the copulation behavior of arthropods, and oviposition behavior Form of assessment: Quiz	Lectures, discussion and practicum	100 minutes +120 minutes	1) Arthropod copulation behavior 2) Oviposition behavior	5 %
12	Students are able to master material about insect behavior in caring for offspring and making nests	accuracy explains about the behavior of insects in caring for offspring and making nests	accuracy explains about insects, caring for offspring, and nest making	Lectures, and discussion	100 minutes	1) Nest making 2) Insects care for offspring	5 %

			Form of assessment: Assignment				
13	Students are able to master material about social insect behavior (I)	Respond appropriately to learning materials, and explain the behavior of social insects	Accuracy explains about the organizational structure of social insects Form of assessment: Assignment	Lectures, and discussion	100 minutes	The organizational structure of social insects (honeybees)	5 %
14	Students are able to develop thoughts about social insect behavior (II)	Respond appropriately to learning materials, and explain the behavior of social insects	Accuracy explains about the organizational structure of social insects. Form of assessment:	Lectures, and discussion	100 minutes	The organizational structure of social insects (ants and termites)	5 %

			Assignment				
15	Students are able to develop thoughts about adaptation behavior to climate change	Accuracy in explaining adaptation behavior to climate change	Accuracy explains the effect of climate change on insect behavior Form of assessment: The task of summarizing the lecture material from scratch.	Lectures, and discussion	100 minutes	The influence of climate change on insect behavior	5 %
16	Final Exam						15 %