COURSE PORTFOLIO

INTEGRATED PLANT PEST AND DISEASE MANAGEMENT

KODE MK PG191114

BACHELOR DEGREE PROGRAM
AGROTECHNOLOGY
FACULTY OF AGRICULTURE

UNIVERSITAS PEMBANGUNAN NASIONAL
"VETERAN" JAWA TIMUR

MODULE HANDBOOK
INTEGRATED PLANT PEST AND DISEASE MANAGEMENT

Module name	Manajemen Organisme Pengganggu Tumbuhan Terpadu (MOPTT) *Integrated Plant Pest and Disease Management*
Module level	Sarjana *Bachelor Degree / Undergraduate*
Code	PG191114 *PG191114*
Course (if applicable)	Manajemen Organisme Pengganggu Tumbuhan Terpadu (MOPTT) *Integrated Plant Pest and Disease Management*
Semester	4th (Forth)
Person Responsible for the Module	Dr. Ir. Sri Wiyatiningsih, MP.
Lecturer	1. Dr. Ir. Sri Wiyatiningsih., M.P. 2. Dr. Ir. Herry Nirwanto., M.P. 3. Dr. Ir. Wiwin Windriyanti., M.P. 4. Dr. Ir. yenny Wuryandari., M.P. 5. Noni Rahmadhini., S.P., M.P. 6. Dita megasari., S.P., M.P. 7. Ramadhani Mahendra Kusuma., S.P., M.P. 8. Safira Rizka Lestari., S.P., M.P.
Language	Indonesia dan Inggris *Indonesian and English*
Relation to Curriculum	Dasar Perlindungan Tanaman *Basic of Plant Protection*
Type of Teaching, Contact Hours	Learning methods: lectures, discussions, assignments, case study, project-based learning, laboratory practices
Work load	Kuliah tatap muka : 2 x 50 = 100 menit per minggu *Lectures : 2 x 50 = 100 menutes per week* Tugas : 1 x 50 = 50 menit per minggu *Assignments : 1 x 50 = 50 minutes per week* Studi kasus : 1 x 50 = 50 menit per minggu *Case study : 1 x 50 = 50 minutes per minggu* Praktikum : 1 x 170 = 170 menit per minggu *Practice : 1 x 170 = 170 minutes per minggu*
Credit point	3 SKS
Requirements according to the examination regulations	Mahasiswa harus hadir 75% *Students must be present is 75%*
Mandatory prerequisites	Dasar Perlindungan Tanaman *Basic of Plant Protection*
Learning outcomes and their corresponding plos	CPL 4 - Mampu menerapkan pengetahuan ilmu tanaman dan konsep dasar ilmu hama dan penyakit tanaman, serta konsep perlindungan tanaman terhadap hama penyakit secara terpadu. *PLO 4 - The individual possesses the capacity to effectively utilize their comprehension of Plant Science and fundamental principles of Plant Production, Soil and Land resources, as well as the concept of Plant pests and Plant protection against pests and diseases in a cohesive and comprehensive manner.*

Content	Pendahuluan berupa pengantar materi kuliah, uraian tentang perjalanan sejarah perlindungan tanaman sampai lahirnya konsepsi MOPTT, dasar ekologi dalam MOPTT, permasalahan dan konsep MOPTT, piramida taktik dalam MOPTT, strategi dalam MOPTT, kemampuan analitik MOPT berbasis aspek ekologik, ekonomik dan sosial, mengikuti perkembangan MOPTT untuk mendukung sistem pertanian berlanjut. *The introduction is to introduce lecture material, description of the historical journey of plant protection until the birth of the MOPTT conception, Ecological basis in MOPTT, Problems and concepts of MOPTT, Pyramid of Tactics in MOPTT, Strategy in MOPTT, Analytical ability of MOPTT based on ecological, economic and social aspects, Following the development of MOPTT to support sustainable farming systems.*
Study and examination requirements and forms of examination	1. Assignment 2. Case or Project Presentation 3. Midterm Exam (UTS) 4. Final Exam (UAS)
Media employed	OS Windows, PPT, Video, Book Reference , LCD, sound system, ATK
Reading list	1. David W Onstad, Philip Crain. The Economics of Integrated Pest Management of Insects. CABI. 232 pages 2. Rosemary Collier. 2022. Improving integrated pest management in horticulture. Burleigh Dodds Science Publishing. Sawston. 464 pages. 3. Devendra Pal Singh. 2023. Integrated Pest Management in Diverse Cropping Systems. CRC Press/Apple Academic Press. Palm Bay. 579 pages 4. Cocuzza, Giuseppe E. Massimino; Rapisarda, Carmelo. 2018. Integrated pest management in tropical regions. CABI. 352 pages 5. Wiyatiningsih, S., Wibowo, A., & Triwahyu, E. 2016. Vegetative Compatibility Group in Pathogenic Isolates of *Fusarium oxysporum* f.sp. *cepae* Causing Twisting Disease in Shallot. Philippine Journal of Crop Science. 41(1):36-40. 6. Wiyatiningsih, S., Harijani, W. S., Santoso, W., Wijaya, R. S., & Maisaroh, D. 2020. Biopesticide Application to Protect Insect Biodiversity: A Study on Pomelo Orange Plantation In Magetan Regency. Agrociencia. 54(11):19-27.

A. RENCANA PEMBELAJARAN SEMESTER

<table>
<tr><td></td><td colspan="6">UNIVERSITAS PEMBANGUNAN NASIONAL “VETERAN” JAWA TIMUR
FAKULTAS PERTANIAN
JURUSAN AGROTEKNOLOGI
PRODI: S1</td></tr>
<tr><td>MATA KULIAH</td><td>KODE</td><td colspan="2">Rumpun MK</td><td colspan="2">BOBOT (sks)</td><td>SEMESTER</td><td>Tgl Penyusunan</td></tr>
<tr><td>MANAJEMEN ORGANISME PENGGANGGU TANAMAN TERPADU</td><td>PG 191114</td><td colspan="2">PERTANIAN</td><td>Teori: 2 SKS</td><td>Praktikum: 1 SKS</td><td>IV</td><td>Aug 2023</td></tr>
<tr><td rowspan="2">OTORISASI</td><td colspan="3">Pengembang RPS</td><td colspan="2">Koordinator RMK</td><td colspan="2">Ka PRODI</td></tr>
<tr><td colspan="3">Dr. Ir. Sri Wiyatiningsih., M.P.
Dr. Ir. Herry Nirwanto, M.P.
Dr. Ir. Wiwin Windriyanti, M.P.
Dr. Ir. Yenny Wuryandari, M.P.
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Ramadhani Mahendra Kusuma, S.P., M.P., M.Sc.
Safira Rizka Lestari, S.P., M.P.</td><td colspan="2">Dr. Ir. Sri Wiyatiningsih., MP</td><td colspan="2">Dr. Ir. Tri Mujoko, M.P.</td></tr>
<tr><td rowspan="5"></td><td colspan="3">CPL-PRODI</td><td colspan="4"></td></tr>
<tr><td colspan="7">CPL 4 - Mampu menerapkan pengetahuan ilmu tanaman dan konsep dasar ilmu hama dan penyakit tanaman, serta konsep perlindungan tanaman terhadap hama penyakit secara terpadu.</td></tr>
<tr><td colspan="7">LO 4 - The individual possesses the capacity to effectively utilize their comprehension of Plant Science and fundamental principles of Plant Production, Soil and Land resources, as well as the concept of Plant pests and Plant protection against pests and diseases in a cohesive and comprehensive manner.</td></tr>
<tr><td colspan="3">CP MK</td><td colspan="4"></td></tr>
<tr><td colspan="7">Mahasiswa mampu mendeteksi keberadaan organisme pengganggu tanaman (OPT) maupun musuh alaminya di lapangan, pada berbagai komponen lingkungan yang berkelindan, untuk dapat merencanakan manajemen OPT terpadu berbasis lingkungan sesuai konsep PHT Nasional secara efektif dan efisien.</td></tr>
<tr><td colspan="7">Students are able to detect the presence of Plant Pest and Disease (OPT) and their natural enemies in the field on various components of the environment that are intertwined to plan environmental-based integrated pest management according to the National IPM concept effectively and efficiently.</td></tr>
<tr><td>Deskripsi Singkat MK</td><td colspan="7">Mata kuliah ini dirancang untuk memotivasi mahasiswa memahami konsepsi strategi manajemen hama dan penyakit terpadu. Manajemen Organisme Pengganggu Tanaman Terpadu (MOPTT) suatu pendekatan berbasis luas yang mengintegrasikan berbagai praktik pengendalian hama dan penyakit secara ekonomik. Tujuan mempertahankan populasi hama dan penyakit di bawah tingkat cedera ekonomik (EIL) serta meminimalkan risiko terhadap kesehatan manusia dan lingkungan.

This course is designed to motivate students to understand the concept of integrated pest and disease management strategies. Integrated pest and disease management (MOPTT) is a broad-based approach that integrates various pest and disease control practices economically. The goal is to keep pest and disease populations below economic injury level (EIL) and minimize risks to human health and the environment.</td></tr>
<tr><td>Pokok Bahasan / Bahan Kajian</td><td colspan="7">Pendahuluan berupa pengantar materi kuliah, uraian tentang perjalanan sejarah perlindungan tanaman sampai lahirnya konsepsi MOPTT, dasar ekologi dalam MOPTT, permasalahan dan konsep MOPTT, piramida taktik dalam MOPTT, strategi dalam MOPTT, kemampuan analitik MOPT berbasis aspek ekologik, ekonomik dan sosial, mengikuti perkembangan MOPTT untuk mendukung sistem pertanian berlanjut.
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<tr><td rowspan="2">Pustaka</td><td colspan="2">Utama:</td><td colspan="5"></td></tr>
<tr><td colspan="7">1. David J. Horn. 1988. Ecological Approach to Pest Manajement. Guilford Publications.</td></tr>
</table>

		2. Frederick M. Shokes dan Hassan A. Melouk. 1995. *Plant Healt Management in Peanut Production.* APS Press. 3. Hari C. Sharma and Chandra S. Prabhakar. 2014. Impact of Climate Change on Pest Management and Food Security. In D. P. Abrol (Ed.). *Integrated Pest Management: Current Concepts and Ecological Perspective* (pp. 23-31). San Diego, USA: Academic Press 4. James R. Cook. 2000. *Advances in Plant Health Management in The Twentieth* Century. Annual Reviews Phytopathology. 38:95-116. 5. Kakde, A., Patel, K.G. & Tayade, Shailesh. 2014. Role of Life Table in Insect Pest Management--A Review. IOSR Journal of Agriculture and Veterinary Science. 7. 40-43. https://doi.ogr/10.9790/2380-07114043					
		Pendukung :					
		1. Kasumbogo Untung. 1983. *Pengantar pengelolaan hama terpadu*. Yogyakarta. Gadjah Mada University Press. 2. Mary L. Flint dan Robert van den Bosch. 1987. *Introduction to Integrated Pest Management*. Plenum Press 3. Miguel A. Altieri, Clara I. Nicholls & Luigi Ponti. 2009. Crop diversification strategies for pest regulation in IPM systems. In Edward B. R., William D. H., & Rafael E. C. (Ed.). *Integrated Pest Management: Concepts, Tactics, Strategies and Case Studies* (pp. 116-130). New York, USA: Cambridge University Press. 4. Wiyatiningsih, S., Wibowo, A., & Triwahyu, E. 2016. Vegetative Compatibility Group in Pathogenic Isolates of *Fusarium oxysporum* f.sp. *cepae* Causing Twisting Disease in Shallot. Philippine Journal of Crop Science. 41(1):36-40. 5. Wiyatiningsih, S., Harijani, W. S., Santoso, W., Wijaya, R. S., & Maisaroh, D. 2020. Biopesticide Application to Protect Insect Biodiversity: A Study on Pomelo Orange Plantation In Magetan Regency. Agrociencia. 54(11):19-27.					
Media Pembelajaran		**Perangkat lunak :**		**Perangkat keras :**			
		OS Windows, PPT, Video		Buku referensi, LCD, sound system, ATK			
Team Teaching		1. Dr. Ir. Sri Wiyatiningsih., M.P. 2. Dr. Ir. Herry Nirwanto, M.P. 3. Dr. Ir. Wiwin Windriyanti, M.P. 4. Dr. Ir. Yenny Wuryandari, M.P. 5. Noni Rahmadhini, S.P. M.Sc 6. Dita Megasari, S.P., M.P. 7. Ramadhani Mahendra Kusuma, S.P., M.P., M.Sc. 8. Safira Rizka Lestari, S.P., M.P.					
Mata Kuliah syarat		Dasar Perlindungan Tanaman					
		Basics of Plant Protection					
Mg Ke-	**Kemampuan akhir pada tiap tahap pembelajaran (Sub-CP-MK)**	**Penilaian**		**Bentuk Pembelajaran, Metode Pembelajaran dan Penugasan Mahasiswa [Estimasi Waktu]**		**Materi Pembelajaran [Pustaka]**	**Bobot Penilaan (%)**
		Indikator Penilaian	**Kriteria & Bentuk Penilaian**	**Daring (online)**	**Luring (offline)**		
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
1.	Sub CP MK : - Mahasiswa mampu menguasai gambaran seutuhnya tentang Manajemen Organisme Pengganggu Tanaman Terpadu (MOPTT) yang merupakan suatu kebutuhan dalam sistem produksi pertanian.	Mahasiswa mampu mendeskripsikan secara umum peran MOPTT pada sektor pertanian.	Non – Test: 1. Review materi kuliah: Mahasiswa menjelaskan deskripsi MOPTT secara lisan maupun tertulis (pada Kolom Chat) 2. Penyusunan tugas makalah berisi contoh pelaksanaan MOPTT di lahan petani	Penyajian PPT, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPT**	Penyajian PPT, Ceramah Diskusi Tanya-jawab	Pendahuluan: 1. Penjelasan umum tentang kontrak perkuliahan. 2. Pendahuluan. Ilustrasi materi Manajemen OPT Terpadu secara keseluruhan	5
	Students are able to master	*Students are able to describe in*	*Non – Test:*	*PPT presentation,*	*PPT*	*1. General explanation of*	

	comprehensive understanding of Integrated Plant Pest and Disease Management (MOPTT) on agricultural production systems.	*general the role of MOPTT in the agricultural sector.*	*1. Review lecture materials: Students explain the MOPTT description written or verbal (in the Chat Column)* *2. Prepare paper assignments based on examples of the implementation of MOPTT on fields*	*chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*Presentation, Interactive discussion*	*the course contract.* *2. Introduction. Illustration of the material for Integrated OPT Management as a whole.*	
2.	Sub CP MK : Mahasiswa mampu menganalisis komponen lingkungan untuk menjelaskan sebab-sebab timbulnya konsep MOPTT.	Kemampuan mahasiswa menganalisis komponen lingkungan yang berkaitan dengan timbulnya konsep MOPTT	Pre-Test: 1. Mencari dan menyebutkan contoh komponen lingkungan yang berkelindan dengan kerusakan lingkungan, kerugian ekonomi, dan penurunan kesehatan masyarakat. 2. Menganalisis permasalahan ekologi, ekonomi, dan social kemasyarakatan dengan munculnya konsep MOPTT di lapangan (PBL).	Penyajian PPT, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPT**	Penyajian PPT, Ceramah Diskusi Tanya-jawab	1. Pengertian dan ruang lingkup serta mengapa harus MOPTT. 2. Dampak pemakaian pestisida pada sector pertanian terhadap lingkungan. 3. Kesadaran manusia terhadap kelestarian lingkungan. 4. Munculnya konsepsi MOPTT.	5
	Students are able to analyze environmental components to explain the causes of the emergence of the MOPTT concept.	*Students are able to understand the concept of MOPTT.*	*Pre-Test:* *1. Identify and discuss examples of environmental components linked to environmental damage, economic loss, and deterioration of public health.* *2. Analyzing ecological, economic, and social issues in terms of the MOPTT concept's development on the field (PBL).*	*PPT presentation, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT Presentation, Interactive discussion*	*1. Definition and scope of MOPTT and why MOPTT* *2. The environmental impacts of agricultural pesticide usage* *3. Human awareness of environmental sustainabilit* *4. The emergence of the MOPTT concept.*	
3.	Sub CP MK : Mahasiswa mampu menganalisis komponen lingkungan yang berkelindan menjadi sistem pertanian yang harmonis untuk menghasilkan produksi pertanian yang berkualitas dan aman bagi manusia dan lingkungannya	Kemampuan mahasiswa dalam: 1. Menyebutkan komponen dan proses pada ekosistem 2. Menyebutkan relasi antara tanaman dan herbivora 3. Menyebutkan kondisi yang	Non-Test: 1. Menyebutkan komponen dan proses pada ekosistem 2. Menyebutkan relasi antara tanaman dan herbivora 3. Menyebutkan kondisi yang terjadi pada agroekosistem yang di temukan di lapangan (PBL)	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]**	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	1. Komponen penggerak proses ekosistem. 2. Evolusi, koevolusi antara tanaman dan herbivora. 3. Ekosistem sesuai ekosistem pertanian berkelanjutan.	10

		terjadi pada agroekosistem		**[BM:3x60")]** **PPT**			
	Students are able to analyze the components of the environment that are intertwined into a harmonious agricultural system to provide high-quality, environmentally friendly agricultural products for people and the environment.	*Students are able to:* *1. Mention the components and processes in the ecosystem.* *2. State the relationship between plants and herbivores* *3. Mention the conditions that occur in the agroecosystem*	*Non-Test:* *1. Identify the ecosystem's components and processes.* *2. Explain the connection between plants and herbivores.* *3. Describe the agro - ecosystem problems that exist on the field (PBL).*	*PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Video screening, Lecture Discussion Interactive discussion*	*1. Components driving ecosystem processes* *2. Evolution, coevolution between plants and herbivores.* *3. Sustainable agricultural ecosystem.*	
4	Mahasiswa mampu mengidentifikasi kemudian mendeskripsikan keberadaan organisme pengganggu tanaman (OPT) maupun musuh alaminya di lapangan serta dinamika populasinya, sehingga dapat merencanakan suatu pengendalian terpadu berbasis lingkungan (untuk hama tanaman).	Kemampuan mahasiswa dalam: 1. Mengenali faktor-faktor yang menentukan dinamika populasi populasi hama tanaman	Non-Test 1. Mahasiswa mengenali faktor-faktor menentukan dinamika populasi hama tanaman dan musuh alaminya	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPt**	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	1. Perkembangan populasi hama. 2. Tabel kehidupan hama. 3. Mekanisme keseimbangan alam. 4. Faktor tergantung kepadatan dan bebas kepadatan hama.	10
	Students are able to identify and describe the presence of plant pest and disease (OPT)in the field, as well as their natural enemies and population dynamics, in order to create an integrated environmental-based control strategy (for pest).	*Students are able to:* *1. Identify the factors that determine the population dynamics of pest/plant.*	*Non-Test:* *1. Students recognize the factors that determine the population dynamics of plant pests and their natural enemies.*	*PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Video screening, Lecture Discussion Interactive discussion*	*1.Development of pests population* *2.Role of Life Table in Insect Pest Management* *3.Mechanism of natural balance.* *4.Density-dependent factor and Density-independent factor of pest population.*	
5	Mahasiswa mampu menguasai berbagai teknologi pengendalian terpadu baik untuk hama maupun penyakit tanaman dan permasalahannya di lapangan	Kemampuan mahasiswa dalam: 1. Menguasai pengertian Penyakit Tanaman 2. Memahami peran MOPTT	Non-Test, Tugas Kelompok : 1. Mendefinisikan pengertian Penyakit Tanaman 2. Memahami peran MOPTT untuk penyakit tanaman dan permasalahannya	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	1. Penjelasan mengenai Penyakit Tanaman dalam MOPTT 2. Penjelasan Mengenai Penerapan MOPTT untuk penyakit	10

		untuk penyakit tanaman 3. Menemukan solusi dari permasalahan yang ditemukan	3. Mengidentifikasi permasalahan dan mencari solusi dari permasalahan yang ditemukan (PBL)	Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPT**		tumbuhan di tingkat petani 3. Solusi Berdasarkan Permasalahan (PBL)	
	Students are able to master various integrated control technologies for plant pests and diseases and their problems in the field.	*Students are able to:* *1. Explain the meaning of Plant Diseases* *2. Discuss the role of MOPTT for plant diseases* *3. Mention the solutions to the challenges found*	*Non-Test:* *1. Defining the meaning of Plant Disease* *2. Understand the role of MOPTT for plant diseases and their problems* *3. Find solutions to the problems found*	*PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Video screening, Lecture Discussion Interactive discussion*	*1. Explanation of Plant Diseases in MOPTT* *2. Explanation regarding the application of MOPTT for plant diseases at the farmer level* *3. Problem Based Solution (PBL)*	
6	Mahasiswa mampu menguasai berbagai teknologi pengendalian terpadu baik untuk hama maupun penyakit tanaman dan permasalahannya di lapangan.	Kemampuan mahasiswa dalam: 1. Memahami Konsep Manajemen Kesehatan Tanaman	Pre-Test : Mahasiswa Mempresentasikan Konsep Manajemen Kesehatan Tanaman Tugas : Mahasiswa menyusun tugas berisi contoh pelaksanaan Konsep Manajemen Kesehatan Tanaman di lapangan (PBL)	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPT**	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	1. Penjelasan mengapa harus MKT untuk Penyakit Tanaman 2. Pengertian Konsep Pengelolaan Kesehatan tanaman. 3. Langkah-langkah Sistematis MKT	5
	Students are able to master various integrated control technologies for both pests and plant diseases and their problems in the field.	Students are able to: 1. Understand the Concept of Plant Health Management	Pre-Test: Students explain the Concept of Plant Health Management Task: Students prepare assignments containing examples of implementing the Plant Health Management Concept in the field. (PBL)	PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning	PPT presentation, Video screening, Lecture Discussion Interactive discussion	1. Explanation of why Plant Health Management should be used for Plant Diseases 2. Understanding the Concept of Plant Health Management 3. Plant Health Management Systematic Steps	
7	Mahasiswa mampu mengidentifikasi berbagai teknologi pengendalian terpadu baik untuk hama maupun penyakit	Kemampuan mahasiswa dalam: 1. Memahami Konsep keanekaragam	Non-Test, Diskusi Kelompok: 1. Memahami Konsep keanekaragaman hayati sebagai strategi	Penyajian PPT, Pemutaran video, Chatting, diskusi,	Penyajian PPT, Pemutaran video, Ceramah Diskusi	1. Penjelasan mengenai kelemahan dalam system pertanaman monokultur.	

	tanaman dan permasalahannya di lapangan.	an hayati sebagai strategi pengendalian hama dan penyakit dalam MOPTT. 2. Memahami jenis dan peran keanekaragaman hayati dalam pengendalian hama dan penyakit 3. Menganalisis dampak perubahan iklim terhadap efektivitas pengelolaan hama dan penyakit	pengendalian hama dan penyakit dalam MOPTT. 2. Memahami jenis dan peran keanekaragaman hayati dalam pengendalian hama dan penyakit 3. Menganalisis dampak perubahan iklim terhadap efektivitas pengelolaan hama dan penyakit	tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPT**	Tanya-jawab	2. Tipe dan peran keanekaragaman hayati dalam agroekosistem 3. Diversifikasi agroekosistem dan pengendalian hama 4. Hubungan Perubahan iklim dengan : a) aktivitas dan kelimpahan musuh alami b) Efektivitas biopestisida dan pestisida sintesis	
	Students are able to identify various integrated control technologies for both pests and plant diseases and their problems in the field.	*Students are able to:* *1. Understand the Concept of Crop diversification strategies for pest and disease regulation in MOPTT* *2. Understand the types and roles of biodiversity in pest and disease management* *3. Analyzing the impact of climate change on the effectiveness of pest management*	*Non-Test, Group Discussion:* *1. Understand the Concept of Crop diversification strategies for pest and disease regulation in MOPTT* *2. Understand the types and roles of biodiversity in pest and disease management* *3. Analyzing the impact of climate change on the effectiveness of pest management*	*PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Video screening, Lecture Discussion Interactive discussion*	*1. Understanding pest vulnerability in monocultures* *2. Type and role of biodiversity in agroecosystems* *3. Diversified agroecosystems and pest management* *4. Relationship of climate change with:* *a. Activity and abundance of natural enemies* *b. The effectiveness of biopesticides and synthetic insecticides*	
8.	**Ujian Tengah Semester (UTS)**						
9.	Sub CP MK: Mahasiswa mampu mengidentifikasi kemudian mendeskripsikan keberadaan organisme pengganggu tanaman (OPT) maupun musuh alaminya di lapangan serta dinamika	Kemampuan mahasiswa dalam: 1. Mengenali faktor-faktor penyebab timbulnya penyakit. 2. Mengenali Pengendalian Penyakit Tanaman	Non-Test, Presentasi kelompok: 1.Menganalisis faktor-faktor penyebab timbulnya penyakit. 2. Merancang Pengendalian Penyakit Tanaman Berdasarkan Konsep Epidemiologi	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	1. Pengertian perkembangan penyakit dalam ruang dan waktu 2. Pengendalian penyakit berdasarkan konsep epidemiologi 3. Memanipulasi unsur-unsur	10

	populasinya, sehingga dapat merencanakan suatu pengendalian terpadu berbasis lingkungan (untuk penyakit tanaman).	Berdasarkan Pada Konsep Epidemiologi		Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPT**		yang mempengaruhi perkembangan penyakit	
	Students are able to identify and describe the presence of plant pest and disease (OPT) in the field, as well as their natural enemies and population dynamics, in order to create an integrated environmental-based control strategy. (for plant diseases).	*Students are able to:* *1. Recognize the factors that cause disease.* *2. Determine Plant Disease Control Based on Epidemiological Concepts.*	*Non-Test, Group presentation::* *1.Analyzing the factors that cause disease.* *2. Designing Plant Disease Control Based on Epidemiological Concepts*	*PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Video screening, Lecture Discussion Interactive discussion*	*1. Understanding the space-time development of disease* *2. Disease control based on the concept of epidemiology* *3. Manipulating elements that influence disease development*	
10	Mahasiswa dapat mengetahui dan menjelaskan konflik kepentingan dalam aspek social dan lingkungan dalam Pelaksanaan MOPTT	Kemampuan mahasiswa dalam: 1. Memahami konflik kepentingan dalam aspek social dan lingkungan dalam Pelaksanaan MOPTT	Menyusun tugas di kelas: Mencari contoh konflik kepentingan dalam aspek social dan lingkungan dalam Pelaksanaan MOPTT (PBL)	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPT**	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	1. Konflik kepentingan dalam pengolahan ekosistem 2. Dampak sosial dalam kegiatan MOPTT 3. Kualitas lingkungan	
	Students are able to identify and explain conflicts of interest in social and environmental aspects in the Implementation of MOPTT.	*Students are able to:* *1. Understand conflicts of interest in social and environmental aspects in the Implementation of MOPTT*	*class assignments:* *Look for examples of conflicts of interest in social and environmental aspects of MOPTT implementation. (PBL)*	*PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Video screening, Lecture Discussion Interactive discussion*	*1. Conflicts of interest in ecosystem management* *2. The Social consequences of MOPTT activities.* *3. Environmental quality*	
11	Mahasiswa mampu menilai dan menentukan mengenai keputusan ekonomi pengendalian hama dan penyakit.	Kemampuan mahasiswa dalam: 1. Mengetahui cara menentukan keputusan berdasar análisis ekonomi dalam MOPTT	Post-Test: Menilai cara menentukan keputusan berdasar análisis ekonomi dalam MOPTT	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	1. Konsep aras ekonomi 2. Kerusakan ekonomik dan ambang pendapatan 3. Ambang pendapatan dan aras luka ekonomik	10

				Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPT**			
	Students are able to understand and explain the economic decisions of pest/disease control.	*Students are able to:* *1. Knowing how to make decisions based on economic analysis in MOPTT*	*Post-Test:* *Assessing how to make decisions based on economic analysis in MOPTT*	*PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Video screening, Lecture Discussion Interactive discussion*	*1. The concept of economic level* *2. Economic damage and income threshold* *3. Income threshold and economic injury level*	
12	Mahasiswa mampu menentukan dan menggabungkan cara pengendalian hama tanaman yang sesuai dan saling mendukung (compatibel).	Kemampuan mahasiswa dalam: 1. Mengetahui berbagai cara atau teknik pengendalian hama tanaman	Diskusi kelompok: Strategi memadukan berbagai teknik pengendalian hama tanaman	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")]** **[BT: 3x60")]** **[BM:3x60")]** **PPT**	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	Pengendalian Hama: Pengendalian Hayati a. Tanaman tahan b. Pengendalian kultur teknik c. *Autocidal control* (pengendalian sendiri) d. Pengendalian fisik dan mekanik e. Pengendalian kimia f. Karantina/UU	5
	Students are able to determine and combine appropriate and compatible pest management methods.	*Students are able to:* *Understanding of various pest control strategies or approaches*	*Group discussion:* *Strategies for integrating various plant pest management approaches*	*PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Video screening, Lecture Discussion Interactive discussion*	*Pest Control:* *Biological Control* *a. Host plant resistant* *b. Cultural practices* *c. Autocidal control (self-control)* *d. Physical and mechanical controls* *e. Chemical control* *f. Quarantine/Law*	
13	Mahasiswa mampu menentukan dan memadukan cara pengendalian penyakit tanaman yang sesuai dan saling mendukung (compatibel).	Kemampuan mahasiswa dalam: 1. Memadukan berbagai cara atau teknik pengendalian	Diskusi Kelompok Strategi Memadukan berbagai cara atau teknik pengendalian penyakit tanaman	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	Pengendalian Penyakit: Pengendalian Hayati a. Tanaman tahan b. Pengendalian kultur teknik	5

		penyakit tanaman		Google Meet/ Google Classroom/ E-learning **[TM: 3x50")] [BT: 3x60")] [BM:3x60")] PPT**		c. Autocidal control (pengendalian sendiri) d. Pengendalian fisik dan mekanik e. Pengendalian kimia f. Karantina/UU	
	Students are able to determine and combine appropriate and compatible disease management methods.	*Students are able to:* *1. Understanding of various disease control strategies or approaches*	*Group discussion:* *Strategies for integrating various plant disease management approaches*	*PPT presentation, video screening, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Video screening, Lecture Discussion Interactive discussion*	*Disease Control: Biological Control* *a. Host plant resistant* *b. Cultural practices* *c. Autocidal control (self-control)* *d. Physical and mechanical controls* *e. Chemical control* *f. Quarantine/Law*	
14	Mahasiswa dapat merencanakan bagaimana program MOPTT khususnya hama di masa depan	Kemampuan mahasiswa dalam: 1. Memahami konsep MOPTT dalam mengantisipasi perkembangan pertanian secara global. 2. Menganalisa prospek MOPTT hama kedepan	Tugas Presentasi: 1. Merancang konsep MOPTT dalam mengantisipasi perkembangan pertanian secara global. 2. Menganalisa prospek MOPTT hama kedepan	Penyajian PPT, Pemutaran video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")] [BT: 3x60")] [BM:3x60")] PPT**	Penyajian PPT, Pemutaran video, Ceramah Diskusi Tanya-jawab	Presentasi Problem *Based Learning* Hama	5
	Students are able to plan how the MOPTT program in the future (pests management)	*Students are able to:* *1. Understand the MOPTT concept in anticipating global agricultural developments.* *2. Analyzing future MOPTT prospects (for pest management)*	*Presentation tasks:* *1. Designing the MOPTT concept in anticipating global agricultural developments.* *2. Analyzing pest-regulation MOPTT potential in the future*	*PPT presentation, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Lecture Discussion Interactive discussion*	*Presentation of Problem Based Learning (Pests)*	
15	Mahasiswa dapat merencanakan bagaimana program	Kemampuan mahasiswa dalam:	Tugas Presentasi:	Penyajian PPT, Pemutaran	Penyajian PPT, Pemutaran	Presentasi Problem *Based Learning* Penyakit	5

	MOPTT khususnya penyakit di masa depan.	1. Memahami konsep MOPTT dalam mengantisipasi perkembangan pertanian secara global. 2. Menganalisa prospek MOPTT penyakit kedepan	1. Merancang konsep MOPTT dalam mengantisipasi perkembangan pertanian secara global. 2. Menganalisa prospek MOPTT penyakit kedepan	video, Chatting, diskusi, tanya-jawab, dalam Forum Google Meet/ Google Classroom/ E-learning **[TM: 3x50")] [BT: 3x60")] [BM:3x60")] PPT**	video, Ceramah Diskusi Tanya-jawab		
	Students are able to plan how the MOPTT program in the future (disease management)	*Students are able to:* *1. Understand the MOPTT concept in anticipating global agricultural developments.* *2. Analyzing future MOPTT prospects (for disease management)*	*Presentation tasks:* *1. Designing the MOPTT concept in anticipating global agricultural developments.* *2. Analyzing disease-management MOPTT potential in the future*	*PPT presentation, chat, discussion, interactive discussion, in Google Meet/ Google Classroom/ E-learning*	*PPT presentation, Interactive discussion*	*Presentation of Problem Based Learning (Disease)*	
16.	**Ujian Akhir Semester (UAS)** **Evaluasi ketercapaian CPL yang dibebankan pada MK**						10
Total							100%

RENCANA ASSESSMENT & EVALUASI **MK : MANAJEMEN OPT TERPADU** **Kelas: A / B / C / D**			**RA&E**
Kode: **PG 191114**	Bobot sks (T/P): 2/1	Rumpun MK: Ilmu Hama dan Penyakit Tanaman	Semester: 4
OTORISASI	Penyusun RA & E Ir. Sri Wiyatiningsih, MP.	Koordinator RMK Dr. Ir. Sri wiyatiningsih, MP.	Ka Prodi Dr. Ir. Tri Mujoko, MP.

Mg ke (1)	Sub CP-MK (2)	Bentuk Asesmen (Penilaian) (3)	Bobot (%) (4)
1	Mahasiswa mampu menguasai gambaran seutuhnya tentang Manajemen Organisme Pengganggu Tanaman Terpadu (MOPTT) yang merupakan suatu kebutuhan dalam sistem produksi pertanian.	Non-Test: 1. Review materi kuliah: Mahasiswa menjelaskan deskripsi MOPTT secara lisan maupun tertulis (pada Kolom Chat) 2. Penyusunan tugas makalah berisi contoh pelaksanaan MOPTT di lahan petani	5
	Students are able to master comprehensive understanding of Integrated Plant Pest and Disease Management (MOPTT) in agricultural production systems.	Non-Test: 1. Review lecture materials: Students explain the MOPTT description written or verbal (in the Chat Column) 2. Prepare paper assignments based on examples of the implementation of MOPTT on fields	
2	Mahasiswa mampu menganalisis komponen lingkungan yang berkaitan dengan sebab-sebab timbulnya konsep MOPTT.	Pre-Test: 1. Mencari dan menyebutkan contoh komponen lingkungan yang berkelindan dengan kerusakan lingkungan, kerugian ekonomi, dan penurunan kesehatan masyarakat. 2. Menganalisis permasalahan ekologi, ekonomi, dan social kemasyarakatan dengan munculnya konsep MOPTT.	5
	Students are able to analyze environmental components that have contributed to the MOPTT concept's development.	Pre-Test: 1. Identify and discuss examples of environmental components linked to environmental damage, economic loss, and deterioration of public health. 2. Analyzing ecological, economic, and social issues in terms of the	

		MOPTT concept's development.	
3	Mahasiswa mampu menganalisis komponen lingkungan yang berkelindan menjadi sistem pertanian yang harmonis untuk menghasilkan produksi pertanian yang berkualitas dan aman bagi manusia dan lingkungannya.	Non-Test: 1. Menyebutkan komponen dan proses pada ekosistem 2. Menyebutkan relasi antara tanaman dan herbivora 3. Menyebutkan kondisi yang terjadi pada agroekosistem	5
	Students are able to analyze the components of the environment that are intertwined into a harmonious agricultural system to provide high-quality, environmentally friendly agricultural products for people and the environment.	Non-Test: 1. Identify the ecosystem's components and processes. 2. Explain the connection between plants and herbivores. 3. Describe the agro - ecosystem problems that exist.	
4	Mahasiswa mampu mengidentifikasi kemudian mendeskripsikan keberadaan organisme pengganggu tanaman (OPT) maupun musuh alaminya di lapangan serta dinamika populasinya, sehingga dapat merencanakan suatu pengendalian terpadu berbasis lingkungan (untuk hama tanaman).	Non-Test Mahasiswa mengenali faktor-faktor menentukan dinamika populasi populasi hama tanaman dan musuh alaminya	10
	Students are able to identify and describe the presence of plant pest and disease (OPT)in the field, as well as their natural enemies and population dynamics, in order to create an integrated environmental-based control strategy (for pest).	Non-Test: Students recognize the factors that determine the population dynamics of plant pests and their natural enemies.	
5	Mahasiswa mampu menguasai berbagai teknologi pengendalian terpadu baik untuk hama maupun penyakit tanaman dan permasalahannya di lapangan.	Non-Test, Diskusi Kelompok : 1.Mendefinisikan pengertian Penyakit Tanaman 2. Memahami peran MOPTT untuk penyakit tanaman dan permasalahannya 3. Menemukan solusi dari permasalahan yang ditemukan	10
	Students are able to master various integrated control technologies for plant pests and diseases and their problems in the field.	Non-Test: 1. Defining the meaning of Plant Disease 2. Understand the role of MOPTT for plant diseases and their problems 3. Find solutions to the problems found	
6		Pre-Test : Mahasiswa menjelaskan Konsep Manajemen Kesehatan Tanaman Tugas :	10

	Mahasiswa mampu menguasai berbagai teknologi pengendalian terpadu baik untuk hama maupun penyakit tanaman dan permasalahannya di lapangan.	Mahasiswa menyusun tugas berisi contoh pelaksanaan Konsep Manajemen Kesehatan Tanaman di lapangan	
	Students are able to master various integrated control technologies for plant pests and diseases and their problems in the field.	Pre-Test: Students explain the Concept of Plant Health Management Task: Students prepare assignments containing examples of implementing the Plant Health Management Concept in the field.	
7	Mahasiswa mampu menguasai berbagai teknologi pengendalian terpadu baik untuk hama maupun penyakit tanaman dan permasalahannya di lapangan.	Diskusi Kelompok: 1. Memahami Konsep keanekaragaman hayati sebagai strategi pengendalian hama dan penyakit dalam MOPTT. 2. Memahami jenis dan peran keanekaragaman hayati dalam pengendalian hama dan penyakit 3. Menganalisis dampak perubahan iklim terhadap efektivitas pengelolaan hama dan penyakit	
	Students are able to master various integrated control technologies for plant pests and diseases and their problems in the field.	Group Discussion: 1. Understand the Concept of Crop diversification strategies for pest and disease regulation in MOPTT 2. Understand the types and roles of biodiversity in pest and disease management 3. Analyzing the impact of climate change on the effectiveness of pest management	
8	UTS (midterm examination)	UTS / essay	5
9	Mahasiswa mampu mengidentifikasi kemudian mendeskripsikan keberadaan organisme pengganggu tanaman (OPT) maupun musuh alaminya di lapangan serta dinamika populasinya, sehingga dapat merencanakan suatu pengendalian terpadu berbasis lingkungan (untuk penyakit tanaman)	Non-Test, Presentasi kelompok: 1.Menganalisis faktor-faktor penyebab timbulnya penyakit. 2. Merancang Pengendalian Penyakit Tanaman Berdasarkan Konsep Epidemiologi	10
	Students are able to identify and describe the presence of plant pest and disease (OPT) in the field, as well as	Non-Test, Group presentation:: 1. Analyzing the factors that cause disease.	

	their natural enemies and population dynamics, in order to create an integrated environmental-based control strategy. (for plant diseases).	2. Designing Plant Disease Control Based on Epidemiological Concepts	
10	Mahasiswa dapat memahami dan menguraikan konflik kepentingan dalam aspek social dan lingkungan dalam Pelaksanaan MOPTT.	Menyusun tugas di kelas: Mencari contoh konflik kepentingan dalam aspek social dan lingkungan dalam Pelaksanaan MOPTT	
	Students are able to identify and explain conflicts of interest in social and environmental aspects in the Implementation of MOPTT.	class assignments: Look for examples of conflicts of interest in social and environmental aspects of MOPTT implementation.	
11	Mahasiswa mampu menilai dan menentukan mengenai keputusan ekonomi pengendalian hama dan penyakit.	Post-Test: Menilai cara menentukan keputusan berdasar análisis ekonomi dalam MOPTT	10
	Students are able to understand and explain the economic decisions of pest/disease control.	Post-Test: Assessing how to make decisions based on economic analysis in MOPTT	
12	Mahasiswa mampu menentukan dan memadukan cara pengendalian hama tanaman yang sesuai dan saling mendukung (compatibel).	Diskusi kelompok: Strategi memadukan berbagai teknik pengendalian hama tanaman	10
	Students are able to determine and combine appropriate and compatible pest management methods.	Group discussion: Strategies for integrating various plant pest management approaches	
13	Mahasiswa mampu menentukan dan memadukan cara pengendalian penyakit tanaman yang sesuai dan saling mendukung (compatibel).	Diskusi Kelompok Strategi Memadukan berbagai cara atau teknik pengendalian penyakit tanaman	
	Students are able to determine and combine appropriate and compatible disease management methods.	Group discussion: Strategies for integrating various plant disease management approaches	
14	Mahasiswa dapat merencanakan bagaimana program MOPTT khususnya hama di masa depan.	Tugas Presentasi: 1. Merancang konsep MOPTT dalam mengantisipasi perkembangan pertanian secara global. 2. Menganalisa prospek MOPTT hama kedepan	5
	Students are able to plan how the MOPTT program in the future (pests management)	Presentation tasks: 1. Designing the MOPTT concept in anticipating global agricultural developments. 2. Analyzing pest-regulation MOPTT potential in the future	

15	Mahasiswa dapat merencanakan bagaimana program MOPTT khususnya penyakit di masa depan.	Tugas Presentasi: 1. Merancang konsep MOPTT dalam mengantisipasi perkembangan pertanian secara global. 2. Menganalisa prospek MOPTT penyakit kedepan	5
	Students are able to plan how the MOPTT program in the future (disease management)	Presentation tasks: 1. Designing the MOPTT concept in anticipating global agricultural developments. 2. Analyzing disease-management MOPTT potential in the future	
16	Evaluasi Akhir Semester (final examinations)	UAS / validasi hasil asesmen (assessment validation)	5
Total bobot penilaian			100%

	UPN VETERAN JAWA TIMUR **FAKULTAS PERTANIAN** **AGROTEKNOLOGI** **LEMBAR TUGAS MAHASISWA**				
MATA KULIAH (Subject)	**MANAJEMEN OPT TERPADU** **(Integrated Pest and Disease Management)**				
KODE (Code)	PG 191114	SKS (Credit)	3	SEMESTER	4
DOSEN PENGAMPU (Lecturer)	1. Dr. Ir. Sri Wiyatiningsih., M.P. 2. Dr. Ir. Herry Nirwanto, M.P. 3. Dr. Ir. Wiwin Windriyanti, M.P. 4. Dr. Ir. Yenny Wuryandari, M.P. 5. Noni Rahmadhini, S.P. M.Sc 6. Dita Megasari, S.P., M.P. 7. Ramadhani Mahendra Kusuma, S.P., M.P., M.Sc. 8. Safira Rizka Lestari, S.P., M.P.				

CPL yang dibebankan pada MK

Mampu menerapkan pengetahuan ilmu tanaman dan konsep dasar ilmu hama dan penyakit tanaman, serta konsep perlindungan tanaman terhadap hama penyakit secara terpadu.

BENTUK TUGAS (Assigment Form)

(Case Study) Sudi Kasus
mahasiswa melakukan analisis perbandingan kondisi dan metode pengendalian hama pada lahan pertanian konvensional dan lahan pertanian dengan sistem Pengelolaan Hama Terpadu (PHT).
The task at hand entails the composition of a case study, wherein students will undertake an evaluation that compares the conditions and approaches of pest management in conventional farms and farmland implementing the Integrated Pest Management (IPM) approach.

JUDUL TUGAS (Assigment title)

Studi Kasus: Analisis Perbandingan Kondisi dan Metode Pengendalian Hama pada Lahan Pertanian Konvensional dan Lahan Pertanian dengan Sistem PHT.
Case Study: A comparative analysis of the pest management practiced on conventional agricultural land and integrated pest management (IPM) agricultural land-system.

SUB CAPAIAN PEMBELAJARAN MATA KULIAH

Sub CP MK 4
Mahasiswa mampu mengidentifikasi kemudian mendeskripsikan keberadaan organisme pengganggu tanaman (OPT) maupun mush alaminya di lapangan serta dinamika populasinya, sehingga dapat merencanakan suatu pengendalian terpadu berbasis lingkungan.
Students are able to identify and then describe the presence of plant pests and diseases (OPT) and their natural enemies in the field and their population dynamics so that they can plan an integrated environmental-based control.

DISKRIPSI TUGAS (Assigment Description)

Tugas ini bertujuan untuk membandingkan kondisi dan metode pengendalian hama yang digunakan pada lahan pertanian konvensional dan lahan pertanian yang menerapkan sistem PHT. Mahasiswa akan melakukan pengamatan langsung di kedua jenis lahan tersebut, mengumpulkan data terkait hama yang ada, tingkat serangan, dan metode pengendalian yang digunakan. Kemudian, data yang dikumpulkan akan dianalisis untuk memahami perbedaan efektivitas, keberlanjutan, dan dampak lingkungan antara kedua sistem pengendalian hama tersebut.

This assignment aims to compare the conditions and methods of pest control used in conventional agricultural land and agricultural land implementing the IPM system. Students will conduct direct observations in both types of land, collect data on existing pests, the level of infestation, and the pest control methods used. The collected data will then be analyzed to understand the differences in effectiveness, sustainability, and environmental impacts between the two pest control systems.

METODE PELAKSANAAN TUGAS (Implementation Method)

Kelompok

- Tugas dilaksanakan secara berkelompok.
- Setiap kelompok mengunjungi dan mengamati dua lokasi pertanian yang berbeda, yaitu lahan pertanian konvensional dan lahan pertanian dengan sistem PHT.
- Data pengamatan akan dikumpulkan melalui observasi langsung, wawancara dengan petani, dan studi literatur terkait.
- Data kemudian dianalisis secara berkelompok, kemudian menyusun laporan hasil pengamatan.
- Selanjutnya, setiap kelompok kerja membuat presentasi untuk memaparkan temuan dan kesimpulan mereka.

- The assignment will be carried out in groups.
- Each group will visit and observe two different agricultural locations, namely conventional agricultural land and agricultural land with the IPM system.
- Data collection will be done through direct observations, interviews with farmers, and relevant literature studies.
- The group will analyze the collected data and prepare a report on their observations.
- Subsequently, the group will create a presentation to present their findings and conclusions.

BENTUK DAN FORMAT LUARAN (sebagai Luaran Tugas) – bila bukan menyelesaikan soal

Laporan hasil pengamatan kelompok dan presentasi.

- Laporan harus mencakup deskripsi lokasi pertanian, data pengamatan, analisis perbandingan kondisi dan metode pengendalian hama, serta kesimpulan mengenai keefektifan dan keberlanjutan masing-masing sistem.
- Presentasi akan menyajikan temuan utama, analisis perbandingan, dan rekomendasi berdasarkan hasil pengamatan kelompok
-
- The assignment will be carried out in groups.
- Each group will visit and observe two different agricultural locations, namely conventional agricultural land and agricultural land with the IPM system.
- Data collection will be done through direct observations, interviews with farmers, and relevant literature studies.
- The group will analyze the collected data and prepare a report on their observations.
- Subsequently, the group will create a presentation to present their findings and conclusions.

INDIKATOR, KRITERIA DAN BOBOT PENILAIAN (Indicators and Criteria of Assessment)

kriteria :

- Kualitas laporan dan presentasi (40%)
- Analisis perbandingan kondisi dan metode pengendalian hama (30%)
- Kesimpulan dan rekomendasi yang didukung oleh data pengamatan (20%)
- Kerja kelompok dan kolaborasi (10%)
- Quality of the report and presentation (40%)
- Analysis of the comparison of conditions and pest control methods (30%)
- Conclusions and recommendations supported by observation data (20%)
- Group work and collaboration (10%)

JADWAL PELAKSANAAN (Schedule)

- Minggu 9: Penugasan kelompok dan pemilihan lokasi lahan observasi.
- Minggu 10-13 : Melakukan pengamatan dan pengambilan data pada lahan pertanian konvensional dan lahan pertanian dengan sistem PHT.
- Minggu 14-15 : Mempresentasikan hasil pengamatan kelompok di depan kelas dan Evaluasi serta penilaian tugas oleh dosen dan teman sebaya.
- Week 9: Group assignment and selection of agricultural locations.
- Week 10-13: Conducting direct observations at the conventional agricultural land and agricultural land with the IPM system.
- Week 14-15: Presenting the group's observations in front of the class and Evaluation and assessment of the assignment by the instructor and peers.

LAIN-LAIN

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2. Arshad, M. I., Ali, A., Khan, M. B., Ahmed, S., & Ali, Q. (2018). Effect of integrated pest management (IPM) techniques on the control of insect pests and yield of tomato. Journal of Entomology and Zoology Studies, 6(2), 311-316.
3. Brunetti, A., & Mazzon, L. (2018). Integrated pest management in agricultural ecosystems: A brief overview. Integrated Pest Management: Principles and Practice, 1-15.
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INDIKATOR PENCAPAIAN CPL PADA MK (*INDICATOR OF PLO ACHIEVEMENT CHARGED TO THE COURSE)*

CPL yang dibebankan pada MK / PLO charge to the course	CPMK / Course Learning Outcome (CLO)	Minggu ke- / Week	Bentuk Assessment / Form of Assessment	Bobot / Load (%)
PLO-4	CLO-1	1	Practicum	5
	CLO-2	2	Practicum	5
	CLO-3	3	Practicum	5
	CLO-4	4	Practicum	5
	CLO-5	5	Practicum	5
	CLO-6	6	Practicum	5
	CLO-7	7	Practicum	5
	CLO-8	8	Mid Test	10
	CLO-9	9	Project	5
	CLO-10	10	Project	5
	CLO-11	11	Project	5
	CLO-12	12	Project	5
	CLO-13	13	Project	5
	CLO-14	14	Project	5
	CLO-15	15	Project	5
	CLO-16	16	Final Exam	20
				Total = 100%

No	Form of assessment	CPL-4	Total
1	Practicum	35	35
2	Mid Test	10	10
3	Project	35	35
4	Final Exam	20	20
			100

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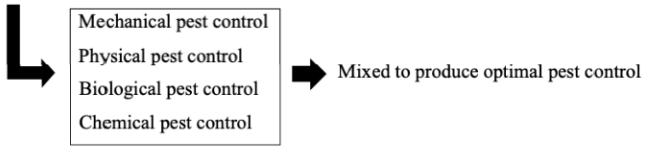
INTRODUCTION OF INTEGRATED PEST MANAGEMENT

Integrated Pest Management



IPM : Method of thinking about controlling plant pest organisms by considering ecology, economy and efficiency. We must be able to understand the ecological aspects, biology of pests and the emergence of pests through agroecosystem analysis. After understanding these factors, we can determine control strategies by selecting and implementing effective pest control and prioritizing environmental health and has a high level of efficiency.

Targets :

a. Ecology : Reducing the risk of environmental pollution due to use pesticide, 'pesticides are the last option'.
b. Economy : Increase in agricultural productivity and farmer welfare.
c. Efficiency ; Control strategy by selecting and implementing pest control that has high success and accuracy.

Principles of IPM :

- Grow a healthy crop
  We must understand about how to support grow a healthy crop, land preparation, correct spacing, soil improvement, fertilizer management, water management, and crop rotation. IPM requires detailed understanding of pest biology and ecology so that the cropping system can be selectively manipulated to the pest's disadvantage (Listiana, 2017). The idea is to make the crop less favourable for pest survival and reproduction with as little disturbance to the rest of the ecosystem as possible.
- Understanding and preserving defenders (natural enemy)
  The term “defender” is sometimes used instead of “natural enemy”, because a natural enemy of a pest is a defender of the crop. Naturally occurring predators, parasites, pathogens, antagonists and competitors (collectively known as biological control agents) help keep many pest populations in check. IPM strives to enhance the impact of “beneficials” and other natural controls by conserving or augmenting those agents already present (Baehaki, et. al., 2013). If you kill the natural enemies, you inherit their jobs.
- Observe the field regularly
  Farmers manage crops based on information about the actual field situation therefore farmers must: Monitor field situation at least once a week (soil, water, plants, pests, natural enemies, etc.); Making decisions based on field situations; Take direct action (mechanical pest control) when necessary for example removing pest eggs, removing infested plants, etc.
- Farmers become experts in crop management
  Because field conditions continue to change, IPM farmers learn to make these decisions based on observations and analysis of the field situation. Farmers need to continuously improve their skills and knowledge by improve farming practices by experimenting and farmers can share knowledge with other farmers.

IPM considers all possible control actions, including taking no action at all, and fits tactics together into complementary strategies. The idea is to combine different control tactics into an overall strategy that balances the strengths of each against individual weaknesses. Most crops can tolerate low pest infestation levels without any loss in harvestable produce or quality, so it is not necessary to totally eliminate pests. IPM seeks to reduce pest populations to levels that are below economically damaging rather than to totally eliminate infestations (Prihatiningrum, et. al., 2021). IPM takes maximum advantage of farming practises that promote plant health and allow crops to escape or tolerate pest injury. IPM begins from the premise that killing pests is not the objective; protecting the commodity is. Pest status can be reduced by repelling the pest; avoiding the pest or reducing its rate of colonization or invasion; and directly killing the pest.

Date . .

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Review Materi 3

Organogenesis merupakan pembentukan organ tanaman yang diawali dari berkembangnya sel somatik yang menghasilkan morfologi mirip embrio zigotik. Proses yang dilakukan supaya tunas jaringan meristem dapat terbentuk dan berkembang disebut proses organogenesis.

Three fundamental abilities of Plants

- Totipotency
  The potential or inherent capacity of a plant cell to develop into an entire plan if suitably stimulated. It implies that all the information necessary for growth and reproduction of the organism is containede in the cell.
- Dedifferentiation
  Capacity of mature cells to return to meristematic condition and development of a new growing point, follow by redifferentiation which is the ability to reorganize into new organ.
- Competency
  The endogenous potential of a given cells or tissue to develop in a particular way.

Plant Regeneration Pathways

- Existing Meristems (Microcutting)
  Uses meristematic cells to regenerate whole plant.
- Organogenesis
  Relies on the production of organs either directly from an explant or callus structure
- Somatic Embryogenesis
  Embryo like structure which can develop into whole plants in away that is similar to zygotic embryos are formed from somatic cells.

Plant morphogenesis

- Organogenesis

Date . .

The formation of organs (such as leaves, shoots, roots) on a plant organ, usually of a different kind.

1. Enhancement of axillary bud proliferation / develop
2. Adventitious shoot formation
3. Adventitious root formation

- somatic Embryogenesis.
  Embryo initiation and development from somatic cells.

Berkembangbiaknya eksplan tanaman untuk membentuk organ-organ biasanya didapatkan melalui dua metode seperti metode organogenesis langsung dan tak langsung. Organogenesis langsung adalah perkembangan sel meristematik yang sudah terdeferensiasi membentuk organ tanaman seperti tunas dann serta akar, sedangkan organogenesis tak langsung adalah peristiwa yang dimulai dari terbentuknya kalus dari awal terbentuknya organ tunas sampai perbanyakan tunas dan akhir dari subkultur atau aklimatisasi.

PGRs - Organogenesis

PGRs are prob. the most important factor affecting organogenesis.

- cytokinins tend to stimulate formation of shoots
- auxins tend to stimulate formation of roots.

The central dogma of organogenesis.

1.) a high cytokinin :
rasioauksin mempromosikan tunas dan menghambat akar.

2.) a high auxin :
rasio sitokinin mempromosikan akar dan/atau pembentukan kalus saat menghambat pembentukan tunas.