UNIVERSITI TEKNOLOGI MARA

AGR514: CROP DISEASE MANAGEMENT

Course Name (English)	CROP DISEASE MANAGEMENT APPROVED
Course Code	AGR514
MQF Credit	3
Course Description	This course will provide students with plant pathology principles and procedures to understand about diseases in plantation crops, characteristics of organisms that cause diseases, how diseases interact with hosts and the environment and also available methods for controlling or managing diseases in plantation crop such as oil palm, rubber and paddy. Students also will have opportunity to conduct experiments in the laboratory to improve practical skills and understanding about the Koch's postulate procedures, disease diagnosis on fresh infected plant samples, antagonistic activity of pathogens and antagonists and other relevant practices that related to the disease management in plantation crops.
Transferable Skills	knowledge of crop disease management in plantation
Teaching Methodologies	Lectures, Blended Learning, Practical Classes, Discussion
CLO	CLO1 Relate plant pathology concepts including fundamental ideas of what is disease, the causes of disease, how disease relates to environment and crops and how to manage diseases to the our current disease management in plantation CLO2 Discuss common diseases of oil palm, rubber and rice and describe well about the available methods for managing and controlling the diseases CLO3 Communicate to peers and the facilitator verbally on the common diseases in plantation crops in Malaysia and the available control methods to manage the diseases. CLO4 Interact cooperatively with group members about how to diagnose disease symptoms and signs in the fields and present their ideas on the available methods for managing the disease
Pre-Requisite Courses	No course recommendations

Topics
1. INTRODUCTION TO PLANT DISEASES 1.1) What is a plant disease 1.2) Causes of plant disease 1.3) Abiotic factors - (Unfavorable extreme environment / temperature / humidity) , Imbalance nutrients / Soil pH (acidic and alkaline), Flood / drought, others). 1.4) Biotic factors - (Plant Pathogenic Fungi, Plant Pathogenic Prokaryotes, Plant pathogenic Viruses and Viroids, Plant Parasitic Nematodes)
2. PLANT- PATHOGEN- ENVIRONMENT INTERACTIONS 2.1) Disease triangle 2.2) Relation of environment to disease development 2.3) Host- pathogen interactions (Host defenses) 2.4) Pathogen attack strategies (Chemical and physical attacks) 2.5) Disruption of plant function (disease symptoms)
3. PLANT DISEASE DIAGNOSIS 3.1) Visual disease symptoms and signs 3.2) Culture and microscopic examination

4. COMMON DISEASES IN PLANTATION CROPS
4.1) Major diseases of oil palm
4.2) Causal pathogens (Ganoderma boninense, Fusarium sp. , etc)
4.3) Disease Symptoms and Signs
4.4) Economic Importance
4.5)
4.6) Major diseases of rubber
4.7) Causal pathogens of (Powdery Mildew, White root rot, etc)
4.8) Disease Symptoms and Signs
4.9) Economic Importance (On yield quantity and quality reduction)
4.10)
4.11) Major diseases of rice
4.12) Causal pathogen of (Blast disease, Viral disease, etc)

5. CROP DISEASE MANAGEMENT
5.1) Control methods of disease in oil palm plantation
5.2) Cultural Practices - (sanitation, irrigation , soil mounding, fertilizer input, etc)
5.3) Chemical control - (pesticides, active ingredient, calibration, sprayer types, etc)
5.4) Biological control - (Trichoderma sp., arbuscular mycorrhiza, endophytes, etc)
5.5) Resistant Planting material - (Zaire x Cameroon) (DxP), Cameroon x Cameroon (TxT), Cameroon x AVROS (TxP), Nigeria x Nigeria (TxT)
5.6) Remote sensing - (BSR mappping)
5.7) Integrated Pest Management
5.8)
5.9) Control methods of disease in rubber plantation
5.10) Cultural Practices - (artificial defoliation, increase nitrogen manuring, etc)
5.11) Chemical control - (types of pesticides, active ingredient, delivery techniques - dusting, ground and aerial spraying , fogging , etc)
5.12) Biological control - (Trichoderma sp., etc)
5.13) Resistant Planting material - (Tolerance to drought, disease and environment stress)
5.14) Disease modelling and forecasting - (modelling in white root disease)
5.15) Integrated Pest Management
5.16)
5.17) Control methods of disease in rice plantation
5.18) Cultural Practices - (systems of cultivation, spacing , sowing, etc)
5.19) Chemical control - (types of pesticides, active ingredient, delivery techniques)
5.20) Biological control - (Trichoderma sp., Pseudomonas sp. , etc)
5.21) Resistant Planting Materials
5.22) Integrated Pest Management

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Lab Exercise	Learn fundamental concept of plant pathology and diagnosis of crop disease by conducting exercise in the lab	20%	CLO4
Presentation	Students will produce a video to discuss the importance of selected disease of major crop such as oil palm, rubber, rice, cocoa, pineapple, banana and others and presenting the video via online medium.	20%	CLO3
Test	Online test	20%	CLO1

Reading List

Recommended Text

- **Trigiano, R.N, Windham, M.T and Windham, A.S. 2004, *Plant pathology: concepts and laboratory exercises*, CRC Press Washington D.C.**
- **Agrios, G.N. 2004, *Plant Pathology*, 5 Ed., Academic Press New York**

Reference Book Resources

- **Cook, B.M, Jones, D, G and Kaye, B. 2006, *The Epidemiology of Plant Diseases*„ Springer Netherland**

Article/Paper List

Reference Article/Paper Resources

- **Cook, B.M, Jones, D, G and Kaye, B. 2006, The Epidemiology of Plant Diseases, *Netherlands,Springer***
- **Ciancio, A and Mukerji, K.G 2007, General Concepts in Integrated Pest and Disease management, *Netherlands, Springer***
- **Flood, J, Bridge PD, Holderness, M 2000, Ganoderma Diseases of Perennial Crops, *Wallingford. Uk, CABI Publishing***

Other References

- **book Cook, B.M, Jones, D, G and Kaye, B. 2006, *The Epidemiology of Plant Diseases*, Springer, Netherlands**
- **book Ciancio, A and Mukerji, K.G. 2007, *General Concepts in Integrated Pest and Disease management* , Springer, Netherlands**
- **book Flood, J, Bridge PD, Holderness, M, (eds) 2000, *Ganoderma Diseases of Perennial Crops*, CABI Publishing, Wallingford. Uk**
- **book Zadoks, J.C. and Schein, R.D. 1979, *Epidemiology and Plant Disease Management.* , Oxford University Press, UK**
- **Journal Wastie, R. L. 1975, *Diseases of Rubber and their Control, Tropical Pest Management***