PORTFOLIO OF THE COURSE OF PLANT VIROLOGI (PPT 24315)

EVEN SEMESTER OF 2022

Lecturer:
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STUDY PROGRAM OF PLANT PROTECTION
DEPARTMENT OF PLANT PRST AND DISRASE
FACULTY OF AGRICULTURE
UNIVERSITAS SRIWIJAYA
2022

I. INTRODUCTION

Course of Plant Virology is an elective course in the 2015 Curriculum but had been changed to be compulsory course in the 2021 curriculum of Plant Protection Study Program. The course is offered to second year students or semester IV, from January to December. The course has no specific requirement and every student of semester IV can attend the course. The course is delivered in the form of face-to- face lecturing and some topics are given in the form of practicum and case study. Assignments are given in the form of quiz, paper writing, project reports, and midterm and final examination. Both midterm and final examinations were in the form of answering question in short essays. For the last semester (even semester of 2022), the number of students attended the course was 82 students divided into 2 classes (A and B). All of the participants were the students of Plant Protection Study Program, Faculty of Agriculture, Universitas Sriwijaya.

This portfolio is an evaluation document of planning, implementing and evaluating the teaching and learning process of the course of Plant Virology, and also the follow up of the evaluation results with required improvement. For the stated purposes, this portfolio consists of the followings point of interests:

1. Course description
2. Course implementation
3. Course evaluation
4. Reflection
5. Course improvement
6. Appendix

II. COURSE DESCRIOTION

Thiscourse is focused on the understanding of the virus existence as plant pathogen and their strait as microrganisms. The materials given in the course include history and development of plant virology, structure and composition of plant virus particle, taxonomy and nomenclature, economical aspect of plant viruses, plant virus infection and replication, viral disease symptomatology, plant virus transmission, identification and diagnosis, ecology and epidemiology, plant virus control, and examples of plant virus diseases.

III. COURSE IMPLEMENTATION

Teaching Methods

Teaching and earning process of the course include face-to-face lecturing, either in the classroom or online via internet using Universitas Sriwijaya LMS, practical work in the laboratory, greenhouse and in the field, group discussion and project asignment. Assesment is conducted

in several ways includiung quis, practical reports, mid term axamination, presentation and final examination.

Learning outcomes asigned to the course (Course Learning / CLO) and weekly competence (Sub-CLO) to be achived by students are systematically arranged in the semester learning plan (RPS) of the course (Appendix 1). The intended learning outcomes assigned to the course are as follow:

CLO-1: Students are able to master theoretical concept of plant viruses in general, and more detail in the relationship between plant viruses and host plants in a plant-virus pathosystem.

The achievement of the CLO-1 is divided and distributed to 5 Sub-CLOs which are driven by weekly learning materials. The Sub-CLOs are as follow:

Sub-CLO 1: Students are able to explain the history and development of Plant Virology.

Sub-CLO 2: Students are able to explain the structure and composition of plant virus particles.

Sub-CLO 3: Student are able to explain the taxonomy and nomenclature of plant viruses

Sub-CLO4: Student are able explain the symptoms of plant virus infection, the damage and yield losses caused by virus infection on plants.

Sub-CLO 5: Students are able to explain the interaction between plant viruses and their hosts in a virus-plant pathosystem

CLO-2. Student are able to master theoretical concepts of the principles of plant virus control, especially environmentally friendly control measures.

The achievement of the **CLO-2** is divided and distributed to 4 Sub-CLOs which are driven by weekly learning materials. The Sub-CLOs are as follow:

Sub-CLO6: Students are able to explain how plant virus replication and its relation to the control of the viruses.

Sub-CLO 7: Student are able to explain how plant viruses transmit mechanically, through seed and pollen, and its relation to the control of the viruses.

Sub-CLO 8: Student are able to explain how plant viruses are transmitted by insect vectors non persistent, semi-persistent and persistently and its relation to the control of the viruses.

Sub-CLO 9: Student are able to explain how plant viruses are transmitted by mite, nematode and fungi and its relation to control strategies s of the viruses.

Sub-CLO 10: Students are able to explain the ways to detect plant virus existence in the host plants and diagnose the virus.

CLO3: Student are able to quickly make conclusion in the context of problem solution related to their discipline based on information and data analyses

The achievement of the **CLO-3** is divided and distributed to 2 Sub-CLOs which are driven by weekly learning materials. The Sub-CLOs are as follow:

Sub-CLO 11. Students are able to explain various plant virus infecting food crops, their economic importance, and their control measures

Sub-CLO 12. Students are able to explain various viruses infecting horticultural crops, their economic importance, and their control measures.

CLO 4. Students are able to arrange, implement and evaluate an effective and efficient crop protection procedures together with multi discipline team mates.

The achievement of the **CLO-3** is divided and distributed to 2 Sub-CLOs which are driven by weekly learning materials. The Sub-CLOs are as follow:

Sub-CLO 13. Students are able to explain how ecological factors influencing plant virus infection, survival and transmission and their relation to epidemiology of the plant viruses

Sub-CLO 14: Students are able to explain the use of information concerning factors influencing plant virus disease controls and integrate them into integrated plant virus management system.

Course Delivery

Teaching and learning process of the course of Plant Virology was conducted in accordance to Indonesian National Standard of Higher Education which every credit of lecture should be delivered in face-to-face lecture delivery for 50 minutes, structured assignment for 60 minutes, and personal learning assignment for 60 minutes. Lecture was given in two ways of lecturing, face-to-face in the classroom and online lecturing via internet. Practical works were conducted mostly in shade house and green house, while laboratory was used only for plant virus inoculum preparation. Course delivery in the classroom was made as effective as possible and students were encouraged to be active during learning process. Group discussion was also arranged to give students more opportunity to participate in the learning process. Structured assignment was frequently given in the form of paper assignment. Students were given certain topics related to the learning materials and given time to complete the assignment. Personal learning commonly given in the form of reading recommended material to broaden their knowledge and insight related to plant viruses.

Three lecturers assigned as the teaching team of the course (Suparman SHK, Nurhayati and Abu Umayah) took part in the lecturing process according to the topics determined in the Semester Lecturing Plan using the most suitable method to the materials delivered.

Assessment Method

During and after teaching and learning process, evaluations were made as parameters of the achievement made by students in relation to intended learning outcome (CLO) and sub-CLOs. Various methods of assessment were conducted in order to precisely measured the knowledge and skill gained by students after attending the source or weekly learning process. The assessment conducted included: paper assignment, quiz. practical report, midterm examination and final examination.

The relationship between assessment method and the measurement of achievement of each CLO of the course of Plant Virology are presented in the following matrix.

	Course Learning Outcomes (CLO)			
	CLO-1 (K-2)	CLO-2 (K-3)	CLO-3 (GS-4)	CLO-4 (SS-2)
CLO-1: Students are able to master theoretical concept of plant viruses in general, especially the relationship between plant viruses and host plants in a plant-virus pathosystem.	Paper assignment 1, write a short essay on the history of plant virology and plant virus particle structure (Lectures 1 and 2; weight 8%)			
	Quiz on the explanation of plant virus taxonomy and nomenclature (Lecture 3, weight 4%)			
	Paper assignment 2, write an essay on plant virus inoculation and symptomatology and (Lecture 4 and 5, weight 8%)			
		Report on the practical works on plant virus transmission, through mechanical inoculation and by insect vectors (Lectures 7 and 8, weight 10%)		

CLO3: CLO-2. Student are able to master theoretical concepts of the principles of plant virus control, especially environmentally friendly control measures.	Midterm examination on history and development of plant virology, nomenclature, infection and disease symptom development, and transmission (Lecture 1, 2, 3, 4, 5, 6, 7 and 8; weight 20%)			
CLO3: Student are able to quickly make conclusion in the context of problem solution related to their discipline based on			Paper assignment 3, on plant viruses infecting food crops and horticultural crops, and their management Lectures 11 and 12, weight 12%)	
CLO 4. Students are able to arrange, implement and evaluate an effective and efficient crop protection procedures together with multi discipline team mates.		Final exam on plant virus disease epidemiology and integrated plant virus management (Lecture 9,10, 11, 12,13 and 14; 38%)		

Figure 1. Matrix showing the relationship between assessment method and the measurement of each CLO achievement

The teaching team leader coordinated the evaluation process and determined the scoring system (Apendix 2). Grading of evaluation scores had been determined by the Rector of Universitas Sriwijaya for years and was used to converse numerical grade to letter grade as shown in Table 1.

Table 1. Universitas Sriwijaya grading system

No	Numerical grade	Letter grade	Grade point
1	86-100	A	4
2	71-85	B	3
3	56-70	C	2
4	40-55	D	1
5	<40	E	0

As presented in the above matrix, assessments were conducted 7 times to assess the CLO achievement. Each assessment was designed to assess the achievement of certain CLO or combination of two or more CLO, and the samples of students worksheet of each assessment are attached in the last appendices. The details of each assessment are as follow:

1. Assignment 1.
   Student were assigned to write essay on the history and development of plant virology, and also the plant virus particle structures. The essay should explain the close relation between development of plant virology and the invention of scientific equipment with which scientists were able to thoroughly understand the shape and size of virus particles, and students were given one week time to complete the essay. This assignment was aimed at evaluating the achievement of **CLO1**, sub-CLO 1 and 2. (Example of student work sheets are attached in Appendix

2. Quiz
   At the end of the third lecture, students were asked to answer questions on plant virus taxonomy and nomenclature. The first question asked students to explain how plant viruses are classified in the virus taxonomy, and the second question asked students to explain how plant viruses were named and gave examples. This quiz was to evaluate the achievement of **CLO 1**, sub-CLO 3.

3. Assignment 2
   Students were assigned to write assay on the inoculation method of plant viruses and the symptoms development after inoculation. In this assignment, students had to be able to explain several methods that plant viruses could be inoculated into host plants, with or without help from a virus vector. Furthermore, students also had to be able to explain how plant virus establish in the host cell and replicate until finally caused disease shown

by various symptoms. This assignment was to evaluate the achievement of **CLO1** Sub-CLO 4 and 5.

4. Report of practical works.
   After conducting some practical works, students had to write practical reports at the end of semester. The practical works consisted of plant virus transmission through several methods such as mechanical, grafting, and using insect vectors. Students worked in groups and practical reports had to be made by each group. Each practical work needed several weeks because most plant virus needed long incubation period to show infection symptoms, especially the ones used insect vector to transmit the virus. This assignment was to evaluate the achievement of **CLO1** Sub-CLO 7 and 8.

5. Midterm examination
   Midterm examination was conducted in the ninth week covering lectures 4,5,6,7,8. Since the Sub-CLO 4 and 5 had been assessed using Assignment 2, the weight of these 2 lectures in the midterm exam was only 5%, the same as the weight of lectures 7 and 8 which had been used to assess the Sub-CLO 7 ad 8 through practical works reports. Only the achievement of Sub-CLO 6 was fully assessed through midterm examination.

6. Assignment 3
   Students were assigned to write essay on plant viruses infecting food crops and horticultural crops, including their distribution, symptom development, effect to yield losses, transmission and control or management. Students were instructed to focus on virus diseases infecting tropical crops, especially those commonly cultivated in Indonesia. This assignment was to evaluate the achievement of **CLO3**, Sub-CLO 11 and 12.

7. Final examination
   Final examination was conducted at the end of the semester covering lectures 9, 10, 11, 12, 13 and 14. Since the Sub-CLO 11 and 12 had been assessed using Assignment 3, the weight of these 2 lectures in the final exam was only 4%. The weight of other lectures just as written in the RPS. In the final exam, students were order to write essay to answer several questions proportionally related to learning material given in the lectures 9 to 14. Total weight of final exam was 38%. This assignment was to evaluate the achievement of CLO 2, **CLO 3**, and **CLO 4**; Sub-CLO 9 to 14.

Lecturing Evaluation

1. **Attendance evaluation**

   Lecturers and students' attendance were evaluated and the result are presented in the following table.

Table 2. Lecturer and students' attendance in the course of Plant Virology, Even Semester 2022.

Class	Lecturer attendance	Student attendance
A and B	Suparman SHK : 6 times	Number of students: 82
	Nurhayati : 5 times	Student with ≥85% attendance: 80
	Abu Umayah : 5 times	Student with <85% attendance: 2

2. **Teaching evaluation**

   Teaching and learning process evaluation was conducted by delivering questionnaire to students at the end of the semester. The questionnaire to evaluate learning process was attached in Appendix 3. In general, the students' opinion about the learning process can be summarized as follow:

   a. Most, but not all, learning materials delivered in the course were in accordance to the subject detailed in the RPS.
   b. Students could easily find learning resources in the library and internet
   c. The way the lecturer teaching in the classroom was very good and could lead the class comfortably.
   d. Lecturers were not always arrived in the class room on time and sometimes left the classroom before the time was over. Some times the lecturer came to the classroom about 10-minute late.
   e. The way lecturer communicated with students was excellent and very satisfying.
   f. Questions given in the quiz and exams were expectable as outlined in the RPS
   g. The difficulty of midterm and final exams was acceptable because most questions were in line with the material delivered in the course.
   h. The score of every exam was predictable and students were given opportunity to take remedial exam when necessary. However, students were less satisfied with the transparence of the marks they got, since not all exam work sheet or answer sheet were given back to students after being marked.
   i. Most, but not all, of learning materials were uploaded in the E-learning system
   j. All structured assignment were in accordance with those declared in RPS
   k. All examination were conducted according to schedule in the RPS
   l. Lectures were delivered 15 times including examination, not exactly the same as written in the RPS, 16 meetings.

Based on the summary of the lecturing process evaluation, lecturers of Plant Virology need to adjust their arrival time in the class room to avoid being late, or at least let the students know in case the lecturer should arrive late for certain reason. Other correction also required in relation to uploading learning material in e-learning system. Not all lecturers aware about this matter, so more serious effort should be taken to tidy up the mess.

3. Result Evaluation

a. Student grade achievement

Final score and grade achieved by students at the end of semester derived from proportional accumulation of various assessment method conducted to evaluate the achievement of learning outcome of the lecture and also of each learning subject. Methods of assessment and contribution weight of each method are presented in Table 3 and the score grading follow the Universitas Sriwijaya regulation as presented in Table 1.

Table 3. Method of assessment and contribution weight to the final score

No	Assessment method	Weight (%)
1	Paper assignment 1	8
2	Quiz	4
3	Paper assignment 2	8
4	Practical works reports	10
5	Midterm examination	20
6	Paper assignment 3	12
7	Final exam	38

The distribution of grades attained by students in the class of Plant Virology 2022 are presented in the following Table 4, where we can see the most students (90.24%) could achieve the highest grade (A) and 6 student (7.31%) achieved grade B and unfortunately there were 2 students could not completely attend the class and retreated from the course.

Table 4. Distribution of grades achievement of the students attending Plant Virology 2022

No	Letter grade	Numerical students
1	A	74
2	B	6
3	C	0
4	D	0
5	E	2

b. CLO achievement

In the evaluation of CLO achievement, each student was evaluated for his/her achievement on the intended learning outcome (CLO) consisted of CLO1, CLO2, CLO3, and CLO4 (Appendix 3). The CLO achievement was calculated and evaluated individually for each student and achievement of the class (Appendix 4). Similar to the fact that most of student (90.24%) gained grade A, the CLO achievement also showed the same results, that most students 90.24%) could achieve all CLO (1 to 4) and only few students fail to achieve the CLOs. The percentage of students got grade B and lower was the same as the percentage of students fail to pass all CLOs, but the names of the students were different. The achievement of **CLO** was generally very good. Only two students totally failed to achieve all **CLOs** due to their failure in attending the course seriously, failed to meet the class attendance requirements. However, there were also students failed in certain **CLOs** but succeed in achieving other CLO. Five students failed to achieve **CLO1**, 6 students failed to achieve **CLO2**, 4 students failed to achieve **CLO3** and 6 students failed to achieve **CLO4**. In the calculation of the classroom achievement, surprisingly, the average score of the class was **85.9029** at grade **B** and the achievement of **CLO** was not as expected, because the class could only achieve **CLO1, CLO2** and **CLO3** but failed to achieve **CLO4**. This was certainly caused by the presence of two students in the attendant list, but the students did not perform et al. If these two students were removed from the attendant list, the average score of the class was 87.59 (A) and all **CLOs** could be achieved**.**

IV. REFLECTION

Based on the evaluation results, the grade achieved by Students attending Plant Virology course in even semester of 2022 was quite satisfying, even though there were 2 students failed to complete the course due to inevitable reasons. The **CLO** achievement also satisfying and the failure of some students to achieve some **CLOs** was understandable because the passing grade for **CLO** achievement was set high, 85 or higher. However, based on learning process, grade, and **CLO** evaluation, it is clear that there is something did not work as expected and needs correction that all lecturers should aware of.

V. FOLLOW UP ACTION

Based on the evaluation results, some improvements are required in relation to the preparation, delivery and evaluation of the course of Plant Virology. The correction is necessary to avoid the similar situation occur again in the future, and to reduce the failure of **CLO** achievement. Lecturers should improve their course material and closely follow the RPS. The lecturers also have to pay more attention to their punctuality, since some students protested about the late coming of lecturer to the classroom. Learning materials should be uploaded in e-learning system as early as possible to give students more time to read before attending the lecture. Furthermore, students wanted the lecturers to given back exam answer sheet despite the lecture have announced the marks of the

exams. Above all, every one involved in the learning process of Plant Virology has to update and upgrade material and method of the lecturing to guarantee that good grade and high **CLO** achievement are relevant to the latest condition of the knowledge and technology around Plant Virology.

Appendix 1. RPS/Semester Learning Plan of Plant Viriology

UNIVERSITAS SRIWIJAYA
FAKULTAS PERTANIAN
JURUSAN HAMA DAN PENYAKIT TUMBUHAN
PROGRAM STUDI PROTEKSI TANAMAN

RENCANA PEMBELAJARAN SEMESTER

A. IDENTITAS MATA KULIAH

Mata kuliah	: Virologi Tumbuhan	Kode: PPT 2103	Semester : 4	sks : 2 (1-1)
Bahan kajian	: Oganisme Pengganggu Tumbuhan			
Deskripsi mata kuliah	: Mempelajari sejarah dan perkembangan virologi dan virologi tumbuhan, aspek ekonomi virus tumbuhan; taksonomi dan nomenklatur, komposisi partikel dan replikasi virus; gejala dan kerusakan akibat infeksi virus tumbuhan, cara penularan virus, identifikasi dan diagnosis virus tumbuhan, ekologi dan epidemiologi virus tumbuhan, pengendalian penyakit tanaman yang disebabkan oleh virus, dan kasus-kasus penyakit tanaman yang disebabkan oleh virus			
CPMK	CPMK-1: Menguasai konsep teoritis tentang virus tumbuhan secara umum, dan hubungannya dengan tanaman secara mendalam (P-2) CPMK-2: Menguasai konsep teoritis tentang prinsip-prinsip pengelolaan virus tumbuhan secara umum, dan pengelolaan yang ramah lingkungan secara mendalam (P-3) CPMK-3: Mampu mengambil keputusan secara tepat dalam konteks penyelesaian masalah di bidang keahliannya, berdasarkan hasil analisis informasi dan data (KU-5) CPMK-4: Mampu merancang, melaksanakan dan mengevaluasi sistem proteksi tanaman dari serangan virus yang efisien dan efektif bersama tim yang multi disiplin (KK-2)			

Dosen pengampu	: Dr. Suparman SHK (SP) Prof. Dr. Nurhayati (NH), Dr. Abu Umayah (AU)	Dosen Penanggung jawab : Dr. Ir. Suparman SHK (SP)

B. PROGRAM PEMBELAJARAN

CPMK	Kemampuan Akhir yang diharapkan di setiap tahapan pembelajaran (Sub-CPMK)	Pokok bahsan	Referenssi	Metoda pembelajaran dan waktu	Deskripsi tugas terstruktur dan mandiri	Indikator	Bobot (%)	Dosen
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. 2.	**Sub-CMK1**: Mampu menjelaskan tentang sejarah dan perkembanhgan virologi tumbuhan.	Sejarah dan perkembangan virologi tumbuhan	Hul, 2009 (hal 3 -21)	Kuliah TM (2x50")	Mengumpulkan 3 artikel terkait sejarah dan perkembangan virologi tumbuhan (2x60') dan tugas terstruktur menulis sejarah dana perkembangan virologi (2x60')	Ketepatan dalam menjelaskan tahap-tahap perkembangan virologi	5	SP
	Sub-CPMK2: Mampu menjelaskan struktur dan komposisi partikel virus tumbuhan	Struktur partikel virus tumbuhan	Hull, 2009 (hal. 88-104)	Kuliah TM (2 x 50')	Mengumpulkan 3 artikel terkait struktur virus tumbuhan (2x60') dan tugas tertsruktur	Ketepatan dalam menjelaskan struktur dan komposisi partikel virus	7	SP

					menulis struktur partikel virus (2x60')			
	Sub-CPMK3. Mampu menjelaskan sistem penamaan virus tumbuhan dan taksonominya.	Tatananama dan klasifikasi virus tumbuhan	Mayo, 2002 (hal 3-24)	Kuliah TM (2 x 50')	Mencari dan mengumpulkan 2 artikel tentang penamaan virus tumbuhan (3x60") Quiz (1 x60')	Kejelasan dalam mengartikan nama virus dan cara mengklasifikasinya, serta membedakannya dengan tatanama makhluk hidup lain.	6	SP
	Sub-CPMK4: Mampu menjelaskan dan menggambarkan gejala serangan dan kerusakan yang ditimbulkan virus tumbuhan	Gejala serangan virus tumbuhan	Hull, 2002 (hal 47-176)	Kuliah TM (1 x 50') Praktikum tentang gejala serangan virus dan membuat laporana (1x170')	Tugas terstruk-turmembuat menulis simtomatologi penyakit disebabkan virus tumbuhan (2x60')	Kejelasan dalam mendeskripsikan berbagai jenis gejala yang disebabkan oleh virus pada tanaman dan membedakan dengan gejala yang ditimbulkan oleh pathogen lain.	6	SP
	Sub-CPMK5: Mampu menjelaskan cara virus berinteraksi dengan tanaman inang dan menimbulkan penyakit	Proses infeksi virus tumbuhan.	Hull, 2009 (hal 167-188)	Kuliah TM (2 x 50')	Menelusuri artikel tentang cara virus menginfeksi tumbuhan inang (2x60') dan tugas terstruktur menulis proses infeksi virus tumbuhan (2x60')	Ketepatan dalam menjelaskan cara virus masuk ke dalam jaringan sampai berhasil menimbulkan gejala serangan	6	SP

CPMK2	**Sub-CPMK6**: Mampu menjelaskan cara virus memperbanyak diri dan hubungannya dengan pengendalian	Replikasi virus tumbuhan	Sivakumaran et al., 2002 (hal 147-174)	Kuliah TM (2 x 50’)	Tugas mandiri rmencari Pustaka tentang proses replikasi virus di dalam sel inang (4x60’)	Ketepatan dalam menjelaskan cara virus menginfeksi tanaman, dan langkah-langkah yang dapat mencegah atau meperlambat	6	NH
	Sub-CPMK7: Mampu menjelaskan cara virus menular secara mekanik, melalui benih, dan melalui serbuk sari serta hubungannya dengan pengendalian	Penularan virus secara mekanik, melalui biji dan melalui serbuksari	Hull, 2009 (hal 223-227)	Kuliah (2 x 50”) dan Praktikum penularan virus secara mekanik dan melalui biji (2 x 60’)	Tugas terstruktur Menyusun laporan praktikum (2x60’)	Ketepatan dalam menjelaskan cara virus menular melalui cairan perasan, melalui penyambungan dan melalui biji serta kaitannya dengan upaya pengendalian.	7	AU
	Sub-CPMK8: Mampu menjelaskan cara virus menular melalui vektor serangga baik yang non peristen, semi persisten maupun persisten dan kaitannya dengan pengendalian	Penularan virus tumbuhan melalui serangga	Hull, 2009 (hal 25-239) Mahy & Mortel, 2010 (hal 11-16)	Praktikum penularan virus melalui serangga (4 x 50’)	Tugas terstruktur mencari pustaka dan menyusun laporan praktikum (2x60’)	Ketepatan dalam menjelaskan cara serangga menularkan virus tumbuhan dengan berbagai variasinya dan cara memanfaatkannya untuk pengendalian.	7	AU

	UJIAN TENGAH SEMESTER (90)						
	Sub-CPMK9: Mampu menjelaskan cara virus menular melalui tungau, nematoda dan jamur, serta kaitannya dengan pengendalian	Penularan virus tumbuhan melalui vektor non serangga	Hull, 2009 (hal 239-243) Mahy & Mortel, 2010 (hal 16-18)	Kuliah TM (2 x 50")	Tugas mandiri mencari 3 sartikel tentang penularan virus oleh vector non serangga (2x60')	Ketepatan dalam menjelaskan cara penularan virus tumbuhan oleh tungau, jamur dan nematoda dan cara pemanfaatannya untuk pengendalian	8	NH
	Sub-CPMK10: Mampu menjelaskan cara mendeteksi virus tumbuhan di dalam inangnya dan manfaatnya untuk pengendalian	Deteksi dan diagnosis virus tumbuhan	Hull, 2009 (hal 245-260)	Kuliah (2 x 50') Diskusi kelompok (2x60')	Tugas mandiri mencari Pustaka tentang diagnosis dan deteksi virus tumbuhan (2x60')	Ketepatan dalam menjelaskan cara mendeteksi virus dalam jaringan tanaman dan pemanfaatannya untuk pengendalian	8	NH
CPMK3	**Sub-CPMK11**: Mampu menjelaskan berbagai kasus penyakit tanaman pangan yang disebabkan virus dan cara penanggulangannya	Penyakit virus pada tanaman pangan	Rybicki and Pietersen, 1999 (hal 4-23)	Kuliah TM (2 x 50') Praktikum (2x60')	Tugas terstruktur menulis essay tentang virus pada tanaman pangan (2x60')	Ketepatan dalam menjelaskan kasus-kasus penyakit virus pada tanaman pangan dana cara pengendaliannya	8	AU
	Sub-CPMK12: Mampu menjelaskan berbagai kasus penyakit tanaman hortikultura	Penyakit virus pada tanaman hortikultutra	Hull 2002 (hal. 302-362)	Kuliah TM (2x50')	Tugas terstruktur menulis tentang virus pada tanaman horti	Ketepatan dalam menjelaskan kasus-kasus penyakit virus pada tanaman	8	AU

	yang disebabkan virus dan cara penanggulangannya			Praktikum (2x60')	(2x60')	hortikultura dan cara pengendaliannya		
CPMK4	**Sub-CPMK13**: Mampu menjelaskan factor-faktor ekologis yang mempengaruhi epidmeiologi virus tumbuhan dan hubungannya dengan pengendalian.	Ekologi dan epidemiologi virus tumbuhan.	Hull, 2009 (hal 260-268)	Kuliah TM (2 x 50')	Tugas mandiri mencari bahan Pustaka tentang pemanfaatan factor ekologis dan epidemiologis dalam pengendalian virus tumbuhan secara terpadu (8x60')	Ketepatan dalam menjelaskan dinamika penyakit tanaman oleh virus dan faktor-faktor yang mempengaruhi	9	NH
	Sub-CPMK14: Mampu menjelaskan cara pemanfatan berbagai informasi pengendalian virus untuk memformulasikan sistem pengendaliana virus tumbuhan secara terpadu.	Pengendalian virus tumbuhan secara terpadu	Hull, 2009 (hal 269-283)	Kuliah TM (2 x 50')		Ketepatan dalam menjelaskan cara pengendalian virus tumbuhan yang efektif dan efisien	9	NH
UJIAN AKHIR SEMESTER (120 menit)								

Work load: Kuliah TM 1250 menit, praktikum 730 menit, tugas terstruktur 960 menit, tugas mandiri 1620 menit, ujian 270 menit

Total = 4830 menit = 80.50 jam = **3.22 ECTS**

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Appendix 2. Paper assignment scoring rubric

	Scor 5	Scor 4	Scor 3	SCor 2	Score 1
Format and focus Weigt 15%	Student follow the format accordingly and the focus of assignment is as intended .	Student follow the format accordingly but up to 20% ofe the assignment is out of focus	Student follow the format accordingly and up to 40% ofe the assignment is out of focus	Student do not follow the format accordingly and up to 40% ofe the assignment is out of focus	Student do not follow the format and more than a hakf of the assignment is out of fous
Dicussion Weigt 60%	Student write a complete good and comprehensive discussion supported by references.	Student write a good and comprehensive discussion supported by references.	Student follow the format accordingly and up to 40% ofe the assignment is out of focus	Student do not follow the format accordingly and up to 40% ofe the assignment is out of focus	Student do not follow the format and more than a hakf of the assignment is out of fous
Vocabulary and spelling 10	Very good choice of words, good sentences and nil spelling mistake.	Good choice of words, good sentences with few spelling mistake.	Good choice of words, fairly good sentences with few spelling mistake.	Fairly good choice of words, fairly good sentence and some spelling mistake.	Not good choice of words, not sentences and a lot of spelling mistake.
Reference Weigt 7.5% %	All references are published in the last 10 years.	More than 80% of the references are published in the last 10 years.	More than 50% of the references are published in the last 10 years.	More than 30% of the references are published	Less than 20% of the references are published

				in the last 10 years.	in the last 10 years.
Submission assignmrnt 7.5%	Paper is submitted on schedule	Paper is submitted one day late	Paper is submitted two days late	Paper is submitted three days late	Paper is submitted more than three days late

Appendix 3. Examaination essay scoring rubric

5. writes complete understanding of the questioned problem in the exam by including all requirements and presenting them in a flow sentences and paragraphs, with very good description and discussion and no typographical mistakes.

4. writes complete understanding of the questioned problem in the exam by including all requirements and presenting them in a flow sentences and paragraphs, with considerable good description and discussion and minimum typographical mistakes.

3. writes almost complete understanding of the questioned problem in the exam by including all requirements and presenting them in a flow sentences and paragraphs, with considerable good description and discussion and minimum typographical mistakes.

2. write incomplete understanding of the questioned problem in the exam by including some of requirements and presenting them in a flow sentences and paragraphs, with fairly good description and discussion and minimum typographical mistakes.

1. write some things different from questioned problem in the exam

Appendix 4

QUESTIONNAIRE FOR THE FEEDBACK OF TEACHING PROCESS PLANT PROTECTION STUDY PROGRAMME FACULTY OF AGRICULTURE, UNIVERSITAS SRIWIJAYA

All students of Plant Protection Study Programme are expected to fill out this questionnaire honestly. This questionnaire is designated to appreciate and or to criticize the performance of all lecturers in Teaching Process conducted in Plant Protection Study Program, Faculty of Agriculture, Universitas Sriwijaya. No student's personal information, e.g. Name, ID Number, Mobile Number, et cetera, are requested. Students need to tick (√) the option beside the number in box of every question which is chosen.

Evaluated lecturer's name :…….

Subject taught :…….

1	Suitability of course content to those published in Semester Learning Plan	Unsuitable	Less suitable	Suitable	Very suitable
		1	2	3	4
2	Easiness of getting learning resources	Not easy	Less easy	Easy	Very easy
		1	2	3	4
3	Teaching approach	Not interesting	Less interesting	Interesting	Very interesting
		1	2	3	4
4	Classroom management	Fairly good	Good	Very good	excellent
		1	2	3	4
5	Timekeeping ability	Unpunctual	Less punctual	Punctual	Very punctual
		1	2	3	4
6	Communication skill	Ineffective	Less effective	Effective	Very effective
		1	2	3	4
7	Suitability of questions in examinations to the course content	Unsuitable	Less suitable	Suitable	Very suitable
		1	2	3	4
8	Difficulty of question in the examinations	Very easy	Easy	Less difficult	Difficult
		1	2	3	4
9	Closeness of gained mark with student's expectation	Far	Close	Very close	Precise
		1	2	3	4
10	Availability of learning materials in the e-learning system	Not uploaded	Uploaded in the same day of lecture	Uploaded within three days before lecture's day	Uploaded a week before lecture's day
		1	2	3	4
11	Suitability of assignments to course content published in Semester Learning Plan	Unsuitable	Less suitable	Suitable	Very suitable
		1	2	3	4
12	Execution of midterm and final examinations	Not done at all.	Done, but not as scheduled	Done as scheduled,	Done as scheduled in

				but different from schedule in Semester Learning Plan	Semester Learning Plan
		1	2	3	4
13	Number of lectures delivered for the entire semester.	Less than 12 times	12-13 times	14-15 times	16 times
		1	2	3	4

This part will be filled in by Study Program Administrator or Quality Assurance Task Staff

Final score = $\frac{\Sigma x_i}{Nz} \times 100$

X_i = score of each answered question

N = number of question

Z = highest score

Predicate

< 55: not good

55-70: fairly good

>70-85: good

>85: very good

Conclusion : …….

Appendix 5. Score sheet of the course of Plant Virology

PROGRAM STUDI : PROTEKSI TANAMAN
TAHUN AKADEMIK : 2021/2022 (SEMESTER GENAP)
NAMA MATA KULIAH : VIROLOGI TUMBUHAN (3 SKS)
RUANG : R. BAKRI HAMID
DOSEN : DR. IR. SUPARMAN SHK / PROF. DR. IR. NURHAYATI, M.SI. / DR. IR. ABU UUMAYAH, M.S.
JADWAL : SENIN (11:10 - 12:50 WIB)

NO.	NIM	NAMA	Assignment 1	Quiz	Assignment 2	Assignment 3	Practical works	Mid term	Final term	Final score	Grade	CLO achievement			
												CLO1	CLO2	CLO3	CLO4
			8%	4%	8%	12%	10%	20%	38%	100%					
1	05081182025001	JENIA CAROLIN	88	87	90	92	91	95	86	89.54	A	Yes	Yes	Yes	Yes
2	05081182025003	BELLA ANNISA FEBRIANTI	87	88	88	90	89	100	86	89.9	A	Yes	Yes	Yes	Yes
3	05081182025004	NOVITASARI J	89	90	86	91	94	95	87	89.98	A	Yes	Yes	Yes	Yes
4	05081182025005	REGINA APRIANI	87	90	88	89	93	90	86	88.26	A	Yes	Yes	Yes	Yes
5	05081182025006	JULIA CASSANDRA PRASETYO	88	89	87	88	87	88	86	87.1	A	Yes	Yes	Yes	Yes
6	05081182025007	NURLIZA AZZAHRA SYAFRI	88	90	90	88	91	100	87	90.56	A	Yes	Yes	Yes	Yes
7	05081182025008	FAUZIAH NABILA	90	88	89	89	89	90	88	88.86	A	Yes	Yes	Yes	Yes
8	05081182025009	MEYLIA ARISKA	85	86	88	86	86	60	85.5	80.69	B	No	No	Yes	Yes
9	05081182025010	NABILA FEBRIYANTI	90	90	89	89	92	95	86	89.48	A	Yes	Yes	Yes	Yes
10	05081182025011	TIA ELLISA RIYANTI	93	87	89	90	89	90	86	88.42	A	Yes	Yes	Yes	Yes
11	05081182025012	FUAN AMBAR RAHMA	87	86	88	87	85	88	88	87.42	A	Yes	Yes	Yes	Yes
12	05081182025014	MITA AMEILIA	89	89	90	90	90	95	87	89.74	A	Yes	Yes	Yes	Yes
13	05081182025015	CESEY GRESYA GINTING	86	90	89	90	87	95	89	89.92	A	Yes	Yes	Yes	Yes
14	05081182025016	EVI ROMANSAH	84	90	90	89	87	88	86	87.18	A	Yes	Yes	Yes	Yes

15	05081182025017	MEGA ZAKRIA FERISYA	88	90	90	90	90	95	87	89.7	A	Yes	Yes	Yes	Yes
16	05081182025018	M. AKBAR SATRIAWAN	90	89	88	87	86	88	86	87.12	A	Yes	Yes	Yes	Yes
17	05081282025021	GINANJAR WAHYU HIDAYAT	90	88	88	88	87	88	84	86.54	A	Yes	Yes	Yes	No
18	05081282025024	NUR JANNAH	90	91	90	89	88	86	86	87.4	A	Yes	Yes	Yes	Yes
19	05081282025035	NIKEN AYU SULHA	88	90	90	90	92	90	86	88.52	A	Yes	Yes	Yes	Yes
20	05081282025043	ADE GILANG RHOMADON	88	90	87	86	92	95	87	89.18	A	Yes	Yes	Yes	Yes
21	05081282025045	KMS.KAHESA ERFIARI PALAMI	87	89	88	87	95	95	87	89.56	A	Yes	Yes	Yes	Yes
22	05081282025046	HANNY LIA ANGGRAINI	90	90	87	90	89	88	87	88.12	A	Yes	Yes	Yes	Yes
23	05081282025047	PARI YANTI	92	90	88	90	92	100	90	92.2	A	Yes	Yes	Yes	Yes
24	05081282025048	LAJA ANDRIYANI	88	89	89	87	84	88	90	88.36	A	Yes	Yes	Yes	Yes
25	05081282025049	AHMAD MAULANA	89	88	90	90	95	80	86	86.82	A	Yes	Yes	Yes	Yes
26	05081282025050	DESI FITRIYANI	90	90	90	90	88	90	86	88.28	A	Yes	Yes	Yes	Yes
27	05081282025051	TESSIA MASNITA SINAGA	88	87	87	86	87	95	88	88.94	A	Yes	Yes	Yes	Yes
28	05081282025053	AISYAH FAKHRIYAH PUTRI	87	88	88	89	82	95	89	89.22	A	Yes	Yes	Yes	Yes
29	05081282025058	RAMA DONA	84	87	85	85	86	50	84.5	77.91	B	Yes	No	No	No
30	05081282025061	MELIA ZAHRA	88	89	89	89	89	88	86	87.58	A	Yes	Yes	Yes	Yes
31	05081381722046	AGUNG PRAYOGO	80	81	78	88	80	60	86	79.12	B	No	No	No	Yes
32	05081381823051	CHICHI KLARAMITA	89	89	89	88	87	86	86	86.94	A	Yes	Yes	Yes	Yes
33	05081382025064	NURIL AZMI PURWITASARI	90	90	90	91	97	100	87	91.68	A	Yes	Yes	Yes	Yes
34	05081382025065	TIARAAPRILYA	90	89	88	88	86	88	86	87.24	A	Yes	Yes	Yes	Yes
35	05081382025066	MUHAMMAD LUTHFI KUSUMA	88	90	89	88	85	100	87	89.88	A	Yes	Yes	Yes	Yes
36	05081382025069	THOSIN	87	88	92	88	83	100	90	90.9	A	Yes	Yes	Yes	Yes
37	05081382025070	MUHAMMAD ARYADINATA	1	1	1	1	1	1	1	1	E	No	No	No	No
38	05081382025071	ANISA PUTI IMANI	88	88	87	87	90	86	84	86.08	A	Yes	Yes	Yes	No

39	05081382025073	UUS AMELIA ANGGRENI	87	90	87	89	87	86	86	86.78	A	Yes	Yes	Yes	Yes
40	05081382025074	FIGO ARDATHA SUTARMA	90	87	90	90	93	95	86	89.66	A	Yes	Yes	Yes	Yes
41	05081382025076	IFFATUN NISA	87	88	87	87	87	90	86	87.26	A	Yes	Yes	Yes	Yes
42	05081382025077	MUHAMMAD AZIZ	90	90	88	87	91	95	88	89.82	A	Yes	Yes	Yes	Yes
43	05081382025079	MAGHFIRA WIDYA KUSUMA	87	87	89	87	84	90	87	87.46	A	Yes	Yes	Yes	Yes
44	05081181823065	APRIYANI	1	1	1	1	1	1	1	1	E	No	No	No	No
45	05081182025002	ELFIN MEIDI	88	89	88	89	90	95	87	89.38	A	Yes	Yes	Yes	Yes
46	05081182025013	RAMA AKBARIO	87	88	89	87	89	95	86	88.62	A	Yes	Yes	Yes	Yes
47	05081282025019	NILAM NASLATUL AUDA	88	90	87	87	87	90	87	87.8	A	Yes	Yes	Yes	Yes
48	05081282025020	MUHAMAD AGUS HARIYANTO	90	89	92	90	93	100	86	90.9	A	Yes	Yes	Yes	Yes
49	05081282025022	LATIFA KARUNIA	88	86	88	89	86	90	87	87.86	A	Yes	Yes	Yes	Yes
50	05081282025023	YUANA	87	86	88	85	87	88	86	86.62	A	Yes	Yes	Yes	Yes
51	05081282025025	ERLIZA RIZKI SEPHIANI	88	88	90	89	84	90	86	87.52	A	Yes	Yes	Yes	Yes
52	05081282025026	FAISAL ARISANDI	90	91	90	85	91	95	84	88.26	A	Yes	Yes	Yes	No
53	05081282025027	SARIPUDIN	90	87	89	87	93	95	86	89.22	A	Yes	Yes	Yes	Yes
54	05081282025029	NILAM AYU SETYANINGSIH	88	90	90	88	89	95	86	88.98	A	Yes	Yes	Yes	Yes
55	05081282025030	RAFAEL IKA RAHAYU	87	87	87	88	86	88	86	86.84	A	Yes	Yes	Yes	Yes
56	05081282025031	DESRIZA RAHMA DANI	90	92	90	90	90	95	86	89.56	A	Yes	Yes	Yes	Yes
57	05081282025032	NADIA	88	86	88	88	87	90	86	87.46	A	Yes	Yes	Yes	Yes
58	05081282025033	YANSE MASLIANA PAKPAHAN	88	87	88	89	89	86	87	87.4	A	Yes	Yes	Yes	Yes
59	05081282025034	TRIA ANGGRAINI	89	90	89	87	88	90	88	88.52	A	Yes	Yes	Yes	Yes
60	05081282025036	APRILLIYAH MAWARNI	88	90	87	87	89	95	87	89	A	Yes	Yes	Yes	Yes
61	05081282025037	IRENIUS TEGAR SETIAWAN	89	88	84	88	88	50	87	79.78	B	Yes	Yes	Yes	Yes
62	05081282025038	WENTI OKTAPIANI	91	87	88	90	90	100	86	90.28	A	Yes	Yes	Yes	Yes

63	05081282025039	N. PRAY CHRISTIAN GINTING	88	90	89	89	90	95	86	89.12	A	Yes	Yes	Yes	Yes
64	05081282025040	ALVIYA SARI HIDAYATI	89	89	89	88	88	86	86	87.04	A	Yes	Yes	Yes	Yes
65	05081282025041	YUDIANTI	91	90	90	90	90	100	90	92.08	A	Yes	Yes	Yes	Yes
66	05081282025042	SAKHA PRAWIRA MADYA	89	88	87	88	87	100	86	89.54	A	Yes	Yes	Yes	Yes
67	05081282025044	AKMAL NUGROHO	90	86	87	88	88	100	86	89.64	A	Yes	Yes	Yes	Yes
68	05081282025052	RIKO FIRMANTO	91	89	90	90	91	95	90	91.14	A	Yes	Yes	Yes	Yes
69	05081282025054	RIKI SURANTA SEMBIRING	88	92	90	87	87	86	90	88.46	A	Yes	Yes	Yes	Yes
70	05081282025055	MIFTAH AFIFAH	89	87	86	88	88	100	87	89.9	A	Yes	Yes	Yes	Yes
71	05081282025056	AKSEL SANTOSO	87	89	89	89	86	90	86	87.6	A	Yes	Yes	Yes	Yes
72	05081282025057	MUKRI PURNAMA NASUTION	89	90	93	90	88	88	86	88.04	A	Yes	Yes	Yes	Yes
73	05081282025059	ROY WESLEY	88	89	89	89	89	90	86	87.98	A	Yes	Yes	Yes	Yes
74	05081282025060	IVANA SEPTA MARIANA	90	89	90	90	87	90	86	88.14	A	Yes	Yes	Yes	Yes
75	05081282025082	RHANI ARRWAIS	91	90	92	89	92	100	87	91.18	A	Yes	Yes	Yes	Yes
76	05081381621049	ENDI DARMAWAN	85	85	83	86	85	50	86	78.34	B	No	No	Yes	Yes
77	05081382025067	ALFIAN BUSTOMMI	90	92	90	90	91	95	86	89.66	A	Yes	Yes	Yes	Yes
78	05081382025068	MUHAMAD RYAN ASRUL	89	88	87	88	86	88	86	87.04	A	Yes	Yes	Yes	Yes
79	05081382025075	NANDA RIANA	91	89	89	90	93	100	86	90.74	A	Yes	Yes	Yes	Yes
80	05081382025078	REZA DEMAILA MIRAND	87	88	90	90	89	95	87	89.44	A	Yes	Yes	Yes	Yes
81	05081382025080	RAMA DONI	85	85	88	89	87	50	86	79.3	B	Yes	Yes	Yes	Yes
82	05081382025081	YUNITA NURFADILA	90	89	89	90	89	90	86	88.26	A	Yes	Yes	Yes	Yes

CLO Calculation for the class of Plant Virology

Assessment	Course material	Weight	Score	W.S	Score of each CLO			
					CLO-1	CLO 2	CLO 3	CLO4
Assignment 1	Lecture 1 &2	0.08	86.268	6.90146	86.27			
Quiz	Lecture 3	0.04	86.451	3.45804	86.45			
Assignment 2	Lecture 4 & 5	0.08	86.342	6.90732	86.34			
Practical reports	Lecture 7 & 8	0.12	86.366	10.3639		86.366		
Assigment 3	Lecture 11 & 12	0.1	86.476	8.64756			86.476	
Midterm exaM	Lecture 1-8	0.2	87.48	17.496	43.74	43.74		
Final exam	Lecture 11-14	0.38	84.549	32.1286		25.365	25.365	33.82
Final score				85.9029	302.8	155.47	111.84	33.82
Maximum score				100	350	180	130	40
CLO achievement				85.9029	86.51	86.37	86.03	84.55
Grade, Yes for CLO achievement >85 and No for CLO achievement <85)				B	Yes	Yes	Yes	No

CLO Calculation for individual student in the class Plant Virology (JENIA CAROLIN)

Assessment	Course material	Weight	Score	W.S	Score of each CLO			
					CLO-1	CLO 2	CLO 3	CLO4
Assignment 1	Lecture 1 &2	0.08	88	7.04	88			
Quiz	Lecture 3	0.04	87	3.48	87			
Assignment 2	Lecture 4 & 5	0.08	90	7.2	90			
Practical reports	Lecture 7 & 8	0.12	92	11.04		92		
Assigment 3	Lecture 11 & 12	0.1	91	9.1			91	
Midterm exaM	Lecture 1-8	0.2	95	19	47.5	47.5		
Final exam	Lecture 11-14	0.38	86	32.68		25.8	25.8	34.4
Final score				89.54	312.5	165.3	116.8	34.4
Maximum score				100	350	180	130	40
CLO achievement				89.54	89.29	91.83	89.85	86.00
Grade, Yes for CLO achievement >85 and No for CLO achievement <85)				A	Yes	Yes	Yes	Yes

Appendix 5. exam question

Final Examination of Plant Virology (PPT 24315)

1. Please write a brief outline of the history and development of Plant Virology.
2. Please describe how plant viruses infect their host plants!
3. Please describe how insect vector transmit plant viruses.
4. Please explain how to differentiate plant disease symptom caused by virus from disease symptom caused by fungi!
5. Please describe how to control plant viruses effectively!