



MODULE HANDBOOK



**Kampus
Merdeka**
INDONESIA JAYA

PLANT PROTECTION STUYDY PROHGRAMME
FACULTY OF AGRICULTURE
SRIWIJAYA UNIVERSITY

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| Module name | Introduction to Agricultural Science |
| Code | PPT 12215 |
| Semester (s) in which the module is taught | 1 st semester/1 nd year |
| Person responsible for the module | Ir. Suparman SHK, Ph.D. Ir. Yulia Pujiastuti, M.S., Ph.D. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Type of teaching | Lecture, seminar and project, |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 180 total : 4460 minutes = 74.34 hours = 2.97 ects |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain why agriculture is very important. 2. Students are able to explain the history and development of primitive to modern agriculture 3. Students are able to describe the role of agriculture on the development of civilization 4. Students are able to identify job opportunity in agricultural sector. 5. Students are able to appreciate people who have contributed their knowledge and skill to agriculture. 6. Students are aware about current issues on climate change related to agriculture 7. Students are aware about current issues on crisis of food and energy. 8. Students are able to explain the important of plant and crop in agricultural production 9. Students are able to explain the important of animal in agricultural production 10. Student are aware of pest and disease as limiting factor in agriculture |

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| | <ol style="list-style-type: none"> 11. Students are able to describe the important of soil and water in agriculture 12. Students are able to describe the important of plant materials and culture technique in agriculture 13. Students are able to describe harvest and post-harvest handling to minimize yield losses. 14. Students are able to explain how biotechnology contribute significantly to agriculture |
| <p>Content</p> | <ol style="list-style-type: none"> 1. Importance of agriculture 2. History and development of agriculture 3. Agriculture and civilization 4. Job opportunity in agricultural sector 5. Inventors in agriculture 6. Climate Change in relation to agriculture 7. Food and energy security. 8. Plant domestication 9. Animal domestication 10. Pest and disease in agriculture 11. Soil and water for agriculture 12. Crop cultivation, from seed to harvest 13. Harvest and post-harvest handlings 14. Biotechnology in agriculture |
| <p>Examination forms</p> | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Structured assignment (essay and paper) 3. Midterm exam (essay) 4. Final exam (essay) |
| <p>Reading List</p> | <ol style="list-style-type: none"> 1. Erickson Cl. 1988. Raised field agriculture in the Lake Tricaca Basin: Putting Ancient Agriculture Back to Work. Expedition 30(3):8-16. 2. Guber, DL. The Grassroots of a Green Revolution: Polling America on the Environment. The MIT Press, Cambridge, England. 3. Cowan, CW and Watson, PJ. 2006. The Origin of Agriculture; An International Perspective. The University of Alabama Press, Tuscaloosa. 4. Horne, JE and McDermot, M. 2001 The Next Green Revolution; Essential Step to a Healthy Sustainable Agriculture. Food Products Press, New York. |

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5. Ellenberg, GB. 2007. Mule South to Tractor South. The University of Alabama Press, Tuscaloosa.
6. Hamaker, JD and Weaaver, DA. 2002. The Survival of Civilization. Hamaker-Weaaver Publishers, Michigan, California.
7. Peng S., Inqram KT, Neue HU and Ziska LH. 1995. Climate Change and Rice. Springer, Singapore.

Date of last amendment

30 June 2021

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| Module Name | Inorganic Chemistry |
| Code | PER 11215 |
| Semester (s) in which the module is taught | 1 st semester/1 st year |
| Person responsible for the module | Dr. Hasanudin, M.Si and Inorganic Chemistry Team Teaching |
| Language | Indonesian |
| Type of teaching | Compulsory Course |
| Relation to curriculum | Lecture, practical, and project |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Able to understand and explain of material properties, substances and Compounds, classification and methods of measurement, the principles of the scientific method in the work of science. 2. Able to understand and explain of development of atomic theory and modern atomic theory 3. Able to understand and explain of periodic table 4. Able to understand and explain of the concept of chemical bond formation related to molecular geometry 5. Able to understand and explain of stoichiometry in chemical reactions |
| Content | <ol style="list-style-type: none"> 1. Material properties, substances and compounds classification and methods of measurement, 2. The principles of the scientific method in the work of science. 3. Development of atomic theory and modern atomic theory 4. The properties of atoms and the basis for the preparation of the periodic table, quantum mechanics 5. The basic concepts of chemical bond formation, ionic and covalent bond 6. The formation bond related to molecular geometry |

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| | <ol style="list-style-type: none"> 7. The basic concepts of stoichiometry in chemical reactions 8. To calculate the reaction product when two or more reactions occur simultaneously 9. To determine the reducing agent or oxidizing agent in the oxidation-reduction reaction, balance the oxidation-reduction reaction with the method of changing the oxidation number |
| Examination forms | <ol style="list-style-type: none"> 1. Essay exams 2. Practical works |
| Reading list | <ol style="list-style-type: none"> 1. Brady and Holum, 1993, Chemistry, The Study of Matter and Its Changes, Jhon Wileys & Sons INC, New York 2. Keenan, Charles, W., Ilmu Kimia Untuk Universitas, Terjemahan, Jilid 1, edisi VI, Penerbit Erlangga, Jakarta 3. Petrucci, R. H., 1992, Kimia Dasar Prinsip dan Terapan Modern, Terjemahan, Jilid 1, edisi IV, Penerbit Erlangga, Jakarta |
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| Module Name | Mathematics |
| Code | PER 11516 |
| Semester (s) in which the module is taught | 1 st semester/1 st year |
| Person responsible for the module | Dr Ir Herlina Hanum, MSi dan Mathematic Team Teaching |
| Language | Indonesian |
| Type of teaching | Lecture, practical, and project |
| Relation to curriculum | Compulsory Course |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Explain the concept of the real number system; Solving operations on real numbers. 2. Distinguish between rational and irrational numbers; Understand and apply field Characteristic 3. Explain the concept of inequality; Finding the solution to a simple inequality, absolute value, square root and square 4. Draw quadrilateral coordinates and the given points 5. Determine the point of intersection of the curve on the coordinate axis; Drawing equation graph 6. Able to determine function value; Drawing function; Completing operations on functions 7. Understand and solve trigonometric function problems 8. Define Understanding the concept and limit theorem ; Determining the continuity of the function 9. Understand the meaning of derivative; Understand the relationship between limits and derivatives ; Determine the derivative of sinus and cosinus 10. Understand the concept of the chain rule; Solving the derivative of the composition function ; Write down the chain rule in the Leibniz way 11. Determine the maximum/minimum critical points of a function 12. Understand the concept of integrals and understand the rules for determining integrals 13. Understand the concept of replacement method; Determine the integral function of the composition |

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| | <p>14. Form a matrix with a certain ordo; Performing operations on matrices</p> <p>15. Form a system of linear equations from the given case</p> |
| Content | <ol style="list-style-type: none"> 1. Real numeral system; Rational and irrational numbers; Operations on real numbers, ;Characteristif of Field 2. Inequality ; Absolute value; square root; square 3. Quadrilateral coordinate system, point distance, straight line, slope of line 4. The point of intersection of the curve; Draw an equation graph 5. Definition of function; Drawing function; Sum operation and multiplication, Composition of functions and trigonometric functions 6. Definition of limit; limit theorem; Continuity of function 7. Definition of derivative through limit; derivate search rules; derivate sinus dan cosinus 8. Leibniz Writing chain rule; High-level derivative 9. Maximum-minimum function; monotony; Concavity 10. Integral concept; Integral determination rule 11. Integral of composition function (Replacement method 12. Area of flat area 13. Ordo matrix ; Transpose, sumation, multiplication; Determinant ; ajoin, dan kofactor Invers matrix 14. System linear Of equations ; Form matrix from System linear of equations ; Solution System linear Of equations ; Notation sigma Σ |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (MCQ) 5. Final Exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. |
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| Module Designation | Botany |
| Code | PER12116 |
| Semester (s) in which the module is taught | 1 st semester/1 year |
| Person responsible for the module | 1. Dr. Susilawati, S.P., M.Sc. 2. Dr. Ir. Maria Fitriana, M.Sc. 3. Dr. Ir. Marlina, M. Si. 4. Ir. Teguh Achadi, M.P. 5. Dr. Fikri Adriansyah, S.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | 1. Lectures (explanation, discussion) 2. Structured assignment (i.e.: article reading and review) 3. The class size 30-75 students per class 4. Contact hours for lecture are 23.33 hours per semester 5. Total hours practical is 34.00 hours per semester |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits (equivalent with 4.36 ECTS) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | Attitude 1. LO-AV-8: Capable of internalizing academic values, norms and ethics. Knowledge 1. LO-KC-1: Mastering the theoretical concepts and being able to develop science and technology for the cultivation of food crops, plantations and horticulture based on local wisdom and resources. General Skill 1. LO-GS-1: Capable of applying logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology that pays attention to and applies humanities values in accordance with their field of expertise. |
| Content | 1. Introduction, Definition, history and theory of cells. 2. Structure, cell organelle and function of plant cells. 3. Cell reproduction. 4. Relationships between cells and tissues. 5. Tissue according to the number of constituent cells, level of development and function. 6. Anatomy, morphology and function of leaves, stems. 7. Anatomy, morphology and function of roots. |

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| | <p>8. Flower organ.</p> <p>9. Fruit organ.</p> <p>10. Taxonomy and plant systematics.</p> <p>11. Plant nomenclature.</p> <p>12. Plant identification.</p> <p>13. Plant description.</p> |
| Examination forms | <p>1. Quiz (essay)</p> <p>2. Doing practical works (report)</p> <p>3. Structured assignment (essay and paper)</p> <p>4. Midterm (MCQ)</p> <p>5. Final Exam (essay)</p> |
| Media employed | LCD, whiteboard, websites |
| | <p>1. Elpel, T.J. 2013. Botany in a Day: The Patterns Method of Plant Identification. HOPS Press.</p> <p>2. Mauseth, J.D. 1991. Botany: An Introduction to Plant Biology. Jones & Bartlett Learning.</p> <p>3. Pollan, M. 2001. The Botany of Desire: A Plant's-Eye View of the World. Random House Trade Paperbacks.</p> <p>4. Hodge, G. 2013. Practical Botany for Gardeners: Over 3,000 Botanical Terms Explained and Explored. University of Chicago Press.</p> <p>5. Pollan, M. 2001. The Botany of Desire: A Plant's-Eye View of the World. Random House Publishing Group.</p> <p>6. Wohlleben, P. 2015. The Hidden Life of Trees: What They Feel, How They Communicate – Discoveries from a Secret World. Greystone Books.</p> <p>7. Erskine, W., Muehlbauer, F.J., Sarker, A., Sharma, B. 2009. The Lentil Botany, Production and Uses. Icarda.</p> <p>8. Heywood, V.H., Brummitt, R.K., Culham, A., Seberg, O. 1978. Flowering Plan Families of the World. Firefly Books.</p> |
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| Module designation | Entomology |
| Semester (s) in which the module is taught | 1 st semester/1 st year |
| Person responsible for the module | Prof. Dr. Ir. Siti Herlinda, M.Si. Dr. Ir. Chandra Irsan, M.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload | Lectures = 1400 minutes Practicum = 1360 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 5860 minutes = 97,666 hours = 3,91 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to accurately explain about the history and importance of insects for humans 2. Students are able to describe insect morphology 3. Students are able to describe the structure and function of insect organs 4. Students are able to explain about biology, growth and reproduction of insects 5. Students are able to classify insects and explain their evolution and nomenclature 6. Students are able to carry out collecting and preserving insects 7. Students are able to explain how to identify insects molecularly |
| Content | <ol style="list-style-type: none"> 1. History and importance of insects for humans 2. Insect morphology 3. The structure and function of insect organs 4. Biology, growth and reproduction of insects 5. Insect classification and their evolution and nomenclature 6. Collecting and preserving insects 7. Identifying insects molecularly |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (MCQ) 5. Final Exam (MCQ) |
| Reading List | 1. Jumar. 2000. <i>Entomologi Pertanian</i> . PT Rineka Cipta |

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| | <ol style="list-style-type: none"> 2. Karlshoven, LGF . 1981. <i>The Pest of Crops In Indonesia</i>. Jakarta: PT Ichtiar baru Van Hove 3. Metcalf, C.L. & W.P. Flint. 1979. <i>Destructive and Useful Insect</i>. New Delhi: McGraw-Hill Book Company 4. Snodgrass, R.E. 1975. <i>Principles of Insect Morphology</i>. Washington DC: McGraw-Hill Book Company 5. Daly, Hewel V. Et. al.. 1978. <i>Introduction to Insect Biology and Diversity</i>. Kogakusha: McGraw-Hill, Inc. 6. Ross, Robert H, Charles A. Ross, June R.P., Ross. 1982. <i>A Textbook of Entomology</i>. Singapore: John Wiley & Sons., Inc. |
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| Module Name | Pancasila |
| Code | UNI 10509 |
| Semester (s) in which the module is taught | 1 st semester/1 st year |
| Person responsible for the module | Dr. Hudaidah, M.Pd dan Pancasila Team Teaching |
| Language | Indonesian |
| Type of teaching | Lecture, practical, and project |
| Relation to curriculum | Compulsory Course |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3.00 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Able to explain the concept and urgency of Pancasila education 2. Able to explain the dynamics and challenges of Pancasila education 3. Able to explain the concept and urgency of Pancasila in the current history of the Indonesian nation 4. Explaining the dynamics and challenges of Pancasila in the Study of the History of the Indonesian Nation 5. Able to explain the concept and urgency of Pancasila as the basis of the state 6. Able to Explaining the dynamics and challenges of Pancasila as the basis of the state 7. Able to explain the dynamics and challenges of Pancasila as the basis of the state 8. Able to explain the concept and urgency of Pancasila as a state ideology 9. Able to explain the dynamics and challenges of Pancasila as a state ideology 10. Explain the concept and urgency of Pancasila as a philosophical system 11. Explaining the dynamics and challenges of Pancasila as a philosophical system 12. Explain the concept and urgency of Pancasila as an ethical system 13. Explain the dynamics and challenges of Pancasila as an ethical system 14. Explain the concept and urgency of Pancasila as |

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| | <p>the basis for the value of developing science</p> <p>15. Explaining the dynamics and challenges of Pancasila as the basis for the value of science development</p> |
| Content | <ol style="list-style-type: none"> 1. Introduction to Pancasila Education : the concept and urgency of Pancasila education, the reason for the need for Pancasila education, historical sources, sociological, Pancasila education politics 2. The dynamics and challenges of Pancasila education and the essence and urgency of Pancasila education for the future 3. Pancasila in the Current History of the Indonesian Nation 4. Pancasila as the State Foundation 5. Pancasila as the State Ideology 6. Pancasila as a Philosophical System 7. Pancasila as a System of Ethics 8. Pancasila as the Basic Value of Science Development 9. The dynamics and challenges of Pancasila as the basis for the value of science development |
| Examination forms | <ol style="list-style-type: none"> 1. Essays questions 2. Practical works 3. Oral presentation |
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| Module Name | Indonesian |
| Code | UNI 1004 |
| Semester (s) in which the module is taught | 1 st semester/1 st year |
| Person responsible for the module | Dr. Zahra A., M.Pd. dan Indonesia Language Team Teaching |
| Language | Indonesian |
| Type of teaching | Lecture, practical, and project |
| Relation to curriculum | Compulsory Course |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3.00 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Able to explain the birth of Indonesia 2. Be able to explain the position, function, and legal force of the Indonesian language 3. Explain various academic texts; explain the characteristics of academic texts 4. Explain the structure of academic texts 5. Able to Use proper spelling and punctuation in academic texts 6. Able to Using effective sentences in academic texts 7. Understanding the essence of paragraphs; understand and use paragraph elements; understand and use paragraph types 8. Able to use quotes in writing 9. Able to use bibliography in writing 10. Understand the characteristics of an essay 11. Explain the structure of essay writing 12. Able to write essays 13. Able to present the resulting essay writing |
| Content | <ol style="list-style-type: none"> 1. History of Indonesian Language Development 2. The position, function, and legal force of the Indonesian language 3. Characteristics of academic texts 4. Academic text structure 5. Spelling and punctuation in academic texts 6. The Nature of Effective Sentences; Characteristics of Effective Sentences; Sentence Structure; Types of Sentences |

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| | <p>7. The Nature of Paragraphs; Paragraph Forming Elements; Types of Paragraphs; Requirements for a Good Paragraph; Techniques and Patterns of Paragraph Development</p> <p>8. Systematics of writing quotes</p> <p>9. Systematics of writing a bibliography</p> <p>10. Characteristics of an essay</p> <p>11. Essay writing structure</p> <p>12. Essay writing</p> <p>13. Presentation of the resulting essay writing</p> |
| Examination forms | <p>1. Essays questions</p> <p>2. Practical works</p> <p>3. Oral presentation</p> |
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| Module Name | English |
| Code | UNI 10415 |
| Semester (s) in which the module is taught | 2 nd semester/1 st year |
| Person responsible for the module | English Team Teaching |
| Language | Indonesian |
| Type of teaching | Compulsory Course |
| Relation to curriculum | Lecture, and project |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3.00 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | After completing the course, students will be able to: 1. Understanding and developing grammar structure to make an effective English sentence 2. Understanding and developing good paragraph 3. Understanding and developing Reading: strategies and application 4. Understanding and developing listening to talks and note taking 5. Understanding and developing academic presentation and discussion |
| Content | 1. Introduction and study agreement 2. Pronoun Referents 3. Adjective clause 4. use of words in sentences 5. Modifier Problems in sentences 6. Subject and predicate in sentences 7. Implied main idea 8. Making inference and drawing conclusion 9. Reading practices 10. Strategy for reading and Scientific learning 11. Specific information from spoken paragraph 12. Listening Practices |
| Examination forms | 1. Essay exams 2. Multiple choice exams |
| Reading list | Loeneto, B.A., Wijaya.A., Kurniawan, D., Zuraida, Suganda, Lingga, A., 2019. English Proficiency Training for |

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| | use only by students of Sriwijaya University, Language Institute Sriwijaya University, Palembang |
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| Module Name | Principles of Management |
| Code | ABI 11115 |
| Semester (s) in which the module is taught | 1 th semester/1 nd year |
| Person responsible for the module | Ir. Fauzia Asyiek, M.A.,Ph.D Dr. Ir. Idham Alamsyah, M.Si Dr.Ir. Amruzi Minha, M.Si Ir. Yulius, MM Dwi Wulan Sari, S.P.,M.Si.,Ph.D Henny Malini,S.P.,M.Si Erni Purbiyanti, S.P.,M.Si Muhammad Arby, M.Si Thirtawati, S.P.,M.Si Elly Rosana, S.P.,M.Si |
| Language | Indonesian |
| Type of teaching | Compulsory Course |
| Relation to curriculum | Contextual Learning, Cooperative Learning, Case Based Learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 Structured assignment =1440 Self-study = 1440 Exam = 220 Total : 4500 minutes = 75 hours = 3 ects |
| Credit points | 2 (2-0) credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | 1. Atitude CP-STN 2 : Students have good morals, ethics and personality in completing their duties CP-STN 4: Studets able to work together and have high social sensitivity and concern for society and the environment. CP-STN 8: Students able to internalize the entrepreneurial spirit 2. Ability of the Field of Science CP-KIP 3: Students able to understand the fields of economics, management, business, entrepreneurship, institutional, sociology, counseling and communication, as well as agricultural sciences for the development of sustainable agribusiness operating systems. |

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| | <p>3.Skill</p> <p>CP-KBP 6 : Students able to use methods and formulate strategies for the use of resources to increase the capacity of themselves and the community in facing the challenges of agribusiness development in the future.</p> <p>CP-KBP 7 : Able to communicate business policy and agribusiness management for the benefit of empowering farmers.</p> <p>CP-KBP 11 : Able to manage and develop agribusiness businesses by implementing a management system that ensures quality output</p> |
| Content | <ol style="list-style-type: none"> 1. Introduction, and Development of Figures of Management 2. Planning Function 3. Organization Function 4. Departmentation 5. Staff and Committee 6. Delegation 7. Acquiring Employees 8. Advancing Employees 9. Utilizing Employees 10. Dismissing Employees 11. Giving Ordes Function 12. Supervision Function 13. Human Resource Management 14. Presentation Of The Company's Case Review |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. Hasibuan, Malayu. 2001. Management: Basics, Understanding and Problems. Earth Characters. Jakarta Manulang. 1998. 2. Management Basic. Ghalia Indonesia. Jakarta. 3. Rae, Leslie. 1993. 50 Activities to Develop Management Skills. Volume 1. Scripting. Jakarta. 4. Stoner, James. 2001. Management Volumes 1 and 2. Erlangga. Jakarta. Williams, Teresa. 1993. 50 Activities to Develop Management Skills. Volume 2. Scripting. Jakarta. Zandstra, 5. Jack. 1993. 50 Activities to Develop Management Skills. Volume 3. Scripting. Jakarta |
| Date of last amendment | 28 April 2021 |

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| Module Name | Rural Sociology |
| Code | ABI 11315 |
| Semester (s) in which the module is taught | 2 nd semester/1 nd year |
| Person responsible for the module | Ir. Fauzia Asyiek, M.A.,Ph.D Ir. Yulian Junaidi, M.Si Dr. Riswani, S.P., M,Si Dr. Yunita, S.P.,M.Si Dr. Agustina Bidarti, S.P.,M.Si Henny Malini,S.P.,M.Si Elly Rosana, S.P.,M.Si Eka Mulayana, S.P.,M.Si Indri Januarti, S.P., M.Si |
| Language | Indonesian |
| Type of teaching | Contextual Learning, Cooperative learning,Case based Learning |
| Relation to curriculum | Compulsory Course |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 Practicum = 2040 Structured assignment =1440 Self-study = 1440 Exam = 220 Total : 6540 minutes = 109 hours = 4.36 ects |
| Credit points | 3 (2-1) credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | 1. Atitude CP-STN 4: Able to work together and have high social sensitivity and concern for society and the environment. CP-STN 5: Able to manage and develop agribusiness businesses by implementing a management system that values cultural diversity, views, beliefs, and religions and the original opinions / findings of others 2. Ability of the Field of Science CP-KIP 3: Able to understand the fields of economics, management, business, entrepreneurship, institutional, sociology, counseling and communication, as well as agricultural sciences for the development of sustainable agribusiness operating systems. 3.Skill |

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| | <p>CP-KBP 5 : Able to communicate and negotiate effectively with rural community stakeholders and in the development of agribinic operating systems by utilizing information technology in the field of agribusiness, to realize sustainable and efficient agribusiness</p> <p>CP-KBP 8 : Able to communicate and negotiate effectively with rural community stakeholders and in the development of agribisnist operating systems by utilizing information technology in the field of agribusiness, to realize agribusiness Able to motivate and empower the community in the field of agribusiness business development to improve the welfare of rural communities</p> |
| Content | <ol style="list-style-type: none"> 1. Understanding Rural Sociology 2. Social Interaction 3. Social Groups 4. Rural Social Institutions 5. Social System 6. Social Structure 7. Culture 8. Social Problems 9. Social Stratification 10. Social Change 11. Social Change in the Countryside 12. Village Development 13. Social Mobility 14. Modernization |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. Cohen, Bruce J.; Simamora, Sahat, translator (Bina Aksara, 1983) Sociology an Introduction, Publisher Rineka Cipta. 2. Rahardjo.1999. Introduction to Rural Sociology and Agriculture. Yogyakarta: Gajah Mada University Press. 3. Soerjono Soekanto, 1985, Sociology of an Introduction, Jakarta: Rajawali Press. 4. Soekanto, Soejono. 2010. Sociology an Introduction. Jakarta: Raja Grafindo Persada. 5. Sugihen. 1996. Rural Sociology An Introduction. Jakarta: PT Raja Grafindo Persada. |
| Date of last amendment | 21 December 2021 |

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| Module Designation | Agroclimatology |
| Code | PAG 20116 |
| Semester (s) in which the module is taught | 1 st semester/1 st year |
| Person responsible for the module | Dr. Ir. Firdaus Sulaiman, M. Si. Dr. Ir. Yakup, M. S. Dr. Ir. Zaidan Panji Negara, M. Sc. Fitra Gustiar, S. P., M. Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Capable of understanding, describing and explaining the basic definition of agroclimatology. 2. Capable of understanding, describing and explaining the role of climate for agriculture. 3. Capable of understanding, describing and explaining the description of climate and weather elements (atmosphere, radiation, temperature, humidity, air pressure, wind, clouds, rain, evapotranspiration) and the relationship between agricultural classification, rainfall, and climate in Indonesia. 4. Capable of understanding, describing and explaining solar radiation, air temperature, temperature and plant growth, air pressure and wind, humidity, hydrological cycle, clouds, and rain. 5. Capable of understanding, describing and explaining climate classification, tropical climate and climate in Indonesia 6. Capable of understanding, describing and explaining global warming and climate change. 7. Capable of understanding, describing and explaining the effect of climate on pests and plant diseases. 8. Capable of understanding, describing and explaining adaptation to climate change. 9. Capable of understanding, describing and explaining agroclimate suitability for agriculture, climate modification. |

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| | <p>10. Capable of understanding, describing and explaining measurement of weather and climate elements.</p> <p>11. Capable of understanding, describing and explaining La-nina and El-nino and their impact on agricultural production, Indonesian climate.</p> |
| Content | <ol style="list-style-type: none"> 1. Scope of agroclimatology 2. The role of climate for agriculture 3. Earth's atmosphere 4. Solar radiation 5. Air temperature 6. Temperature and plant growth 7. Air Pressure and Wind 8. Humidity 9. Hydrological cycle, clouds, and rain. 10. Climate classification 11. Tropical climate 12. Climate in Indonesia 13. Global warming 14. Climate change 15. The effect of climate on pests and plant diseases 16. Adaptation to climate change |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (essay) 5. Final Exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. Hatfield, J.L., Sivakumar, M.V.K., Prueger, J.H. Agroclimatology (Agronomy Monographs) 1st Edition. ACSESS; 1st edition. 2. Balasubramanian, T.N. 2021. Agro-Climatology Advances and Challenges. New India Pub Agency Nipa. 3. Veeranjanyulu., Mahapatra, R. 2011. Agro Climatology: Principles and Predictions. 4. Stigter, K. 2010. Applied Agrometeorology. Springer Berlin Heidelberg. 5. Sahu, D.D., Patel, H.R., Chopada, M.C. 2013. Fundamentals of Agricultural Climatology. Agrobios. 6. Mavi, H.S., Tupper, G.J. 2004. Agrometeorology Principles and Applications of Climate Studies in Agriculture. CRC Press. 7. Pritchard, S.G., Amthor, J.S. 1984. Crops and Environmental Change. Food Products Press. |
| Date of last amendment | 30 June 2021 |

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| Module Designation | Fundamentals of Agronomy |
| Code | PAG 202116 |
| Semester (s) in which the module is taught | 2 nd semester/1 st year |
| Person responsible for the module | Dr. Ir. Yakup, M. S. Dr. Ir. Firdaus Sulaiman, M. Si. Dr. Ir. Zaidan Panji Negara, M. Sc. Fitra Gustiar, S. P., M. Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Capable of understanding, describing and explaining basic definition and scopes of agronomy. 2. Capable of understanding, describing and explaining the development of agricultural and the role of agronomy. 3. Capable of understanding, describing and explaining areas of origin and centers of crop production especially in Indonesia. 4. Capable of grouping the potential agronomic crops for certain agroecosystems. 5. Capable of understanding, describing and explaining the plant growth and development. 6. Capable of understanding, describing and explaining the effect of abiotic factors on plant growth and development and capable of providing solutions for each abiotic problems. 7. Capable of understanding, describing and explaining the effect of biotic factors on plant growth and development and capable of providing solutions for each biotic problems. 8. Capable of understanding, describing and explaining grouping and roles of growth regulator substances (GRS), enzymes, and vitamins. 9. Capable of understanding, describing and explaining the roles and procedure of plant breeding. |

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| | <ol style="list-style-type: none"> 10. Capable of understanding, describing and explaining the process of plant propagation (sexual and asexual), and tissue culture. 11. Capable of understanding, describing and explaining the preparation of dry land, swamp land, and micro land especially in Indonesia. 12. Capable of understanding, describing and explaining the process of nurseries, seeding, and planting. 13. Capable of understanding, describing and explaining the cropping patterns and crop diversification especially in Indonesia. 14. Capable of understanding, describing and explaining the agricultural intensification, and agricultural extensification. 15. Capable of describing, explaining and providing sustainability of land resources/conservation, and utilization of agricultural waste. 16. Capable of understanding, describing and explaining the agricultural production facilities. |
| Content | <ol style="list-style-type: none"> 1. Basic definitions and scopes of agronomy. 2. Agricultural development and the role of agronomy. 3. Areas of origin and centers of crop production. 4. Agronomic plant grouping and examples 5. Plant growth and development 6. Effect of abiotic factors on plant growth and development 7. Effect of biotic factors on plant growth and development 8. Grouping and roles of growth regulator substances (GRS), enzymes, and vitamins 9. Plant breeding 10. Plant propagation (sexual and asexual), and tissue culture 11. Preparation of dry land, swamp land, and micro land 12. Nurseries, seeding, and planting 13. Cropping patterns and crop diversification 14. Agricultural intensification, and agricultural extensification 15. Sustainability of land resources/conservation, and utilization of agricultural waste 16. Agricultural production facilities |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (essay) 5. Final Exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. Webster, C.C., Wilson, P.N. 1998. Agriculture in the Tropics. Blackwell Science. |

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| | <ol style="list-style-type: none"> 2. Arya, R.L. 2020. Fundamentals of Agronomy. Scientific Publishers. 3. de Gopal, C. 2019. Fundamentals of Agronomy. Oxford and Ibh Publishers. 4. Donald, L., Sparks. 2021. Advances in Agronomy, Volume 167. Academic Press; 1st edition. 5. Chandrasekaran, B., Annadurai, K., Somasundaram. 2010. A Textbook of Agronomy. New Age International Publishers New Delhi. 6. Jhariya, M. J., Meena, R W., Banerjee, A. 2021. Ecological Intensification of Natural Resources for Sustainable Agriculture. Springer; 1st ed. 2021 edition. 7. Sadras, V., Calderini, D. 2020. Crop Physiology Case Histories for Major Crops. Academic Press; 1st edition. |
| Date of last amendment | 30 June 2021 |

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| Module Name | Academic Agricultural English |
| Code | PPT 11215 |
| Semester (s) in which the module is taught | 2 rd semester/1 nd year |
| Person responsible for the module | Ir. Suparman SHK, Ph.D. Dr-phil. Ir. Arinafril |
| Language | English |
| Type of teaching | Elective Course |
| Relation to curriculum | Lecture, seminar, and project, |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3.00 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students understand and ready to participate in the building of academic atmosphere in the campus 2. Students are able to express their feeling and idea verbally in English 3. Students are able to tell story about their experience related to agriculture 4. Students are able to catch information and knowledge from reading materials related to agriculture 5. Students are able to catch knowledge from reading materials related to plant pest and disease 6. Students are able to understand the content of video on agriculture and make written summary. 7. Students are able to understand the content of video on plant pest and disease and make written summary 8. Students are able to search literatures or articles which are related to agriculture from Internet 9. Students are able to write academic material with emphasis on grammatical aspect. 10. Students are able to write academic material with emphasis on vocabulary aspect. 11. Students are able to listen to audio material and write summary I. 12. Students are able to listen to audio material and write summary II. |

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| | 13. Students are able to present academic material summarized from scientific articles I 14. Students are able to present academic material summarized from scientific articles II. |
| Content | 1. Building conducive atmosphere academic 2. Speaking on agricultural aspects, free topic based on experience 3. Speaking on agricultural aspects, talk about personal experience related to agriculture 4. Reading and summarizing agricultural article related to agriculture 5. Reading and summarizing agricultural article related to plant disease 6. Watching and summarizing the content of video on agriculture. 7. Watching and summarizing the content of video on plant pests and diseases 8. Searching literatures or articles which are related to agriculture from internet. 9. Academic writing tutorial with emphasis on grammatical aspect. 10. Academic writing tutorial with emphasis on vocabulary aspect. 11. Academic listening tutorial: Listening and summarizing audio material I 12. Academic listening tutorial: Listening and summarizing audio material II 13. Academic speaking tutorial: presentation academic material summarized from scientific articles I 14. Academic speaking tutorial: presentation academic material summarized from scientific articles II |
| Examination forms | 1. Write essays 2. Presentation |
| Reading list | 1. Eastwood J..2002. Oxford guide to English grammar. Oxford University Press, Oxford. 2. Murphy, R. 2019. English Grammar in Use. Fifth Edition.Cambridge University Press, Cambridge. 3. Spears, RA.2005. Dictionary of American Idioms and Phrasal Verbs. McGraw-Hills, New York. 4. Zemach, DE and Rumisek LA. 2005. Academic writing: from paragraph to essay.Macmillan, Spain. |
| Date of last amendment | 30 June 2021 |

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| Module designation | Agricultural Microbiology |
| Semester (s) in which the module is taught | 1 st semester/1 st year |
| Person responsible for the module | Ir. Suwandi, M.Agr., Ph.D. Dr. Ir. Harman Hamidson, M.P. Dr. Ir. Abu Umayah, M.S. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 practicum = 2040 structured assignment =1440 self-study = 1440 exam = 220 total : 6540 minutes = 109 hours = 4.36 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 8. Students will be able to describe the history, development, and application used of microbiology in agriculture. 9. Students will be able to describe the standard rules of classification systems to categorize microorganisms. 10. Students will be able to describe and identify morphology, reproduction, and taxonomy of bacteria. 11. Students will be able to describe and identify morphology, reproduction, and taxonomy of fungi. 12. Students will be able to describe and identify morphology, replication, and taxonomy of viruses. 13. Students will be able to describe and identify morphology, replication, and taxonomy of protozoa and algae. 14. Students will be able to describe and differentiate microbial nutrition and the mechanism of nutrient uptake. 8. Students will be able to describe and differentiate microbial growth and the growth factors. 9. Students will be able to describe and differentiate microbial metabolism. 10. Students will be able to describe and differentiate microbial genetic. |

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| | <ol style="list-style-type: none"> 11. Students will be able to describe and differentiate the soil microbiology and nutrient cycles 12. Students will be able to describe and differentiate the plant-microbe interaction. 13. Students will be able to describe and differentiate the water microbiology. 14. Students will be able to describe and differentiate the microbiology of food and food preservation. 15. Students will be able to describe and differentiate the industrial microbiology. 16. Students will be able to describe and differentiate the beneficial microbiology in agriculture. 17. Students will be able to performed basic cultivation and microscopic technique of bacteria. |
| <p>Content</p> | <ol style="list-style-type: none"> 1. History and development of microbiology, and its application in agriculture. 2. Classification of microorganism. 3. Bacteria. 4. Fungi. 5. Viruses. 6. Protozoa and algae. 7. Microbial nutrition. 8. Microbial growth. 9. Microbial metabolism. 10. Microbial genetic. 11. Soil microbiology and nutrient cycle. 12. Plant-microbe interaction. 13. Water microbiology. 14. Food microbiology and food preservation. 15. Biodegradation and organic matter recycling. 16. Beneficial microorganism in agriculture. 17. Microbiology laboratory practices |
| <p>Examination forms</p> | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| <p>Reading List</p> | <ol style="list-style-type: none"> 1. Tortora, Gerard J., Funke, Berdell R., and Case, Christine L. 2012. Microbiology: An |

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| | <p>Introduction (11th Edition). Benjamin Cummings. 960p.</p> <ol style="list-style-type: none"> 2. Pommerville, J.C. 2011. Alcamo's fundamentals of microbiology (9th edition). Jones and Bartlett Publishers, LLC. 805p. 3. Moat, A.G., Foster, J.W., Spector, M.P. 2002. Microbial physiology (4th Edition).Wiley-Liss, Inc. 4. Ahmad, I., Ahmad, F., Pichtel, J. 2011. Microbes and Microbial Technology- Agricultural and Environmental Applications. Springer. 5. Hakeem, K.R., Akhtar, M.S., Abdullah, S.N.A. 2016. Plant, Soil and Microbes - Implications in Crop Science. Springer. 6. Gillings, M., Holmes, A. 2004. Plant Microbiology. Garland Science/BIOS Scientific Publishers. 7. Pollack, R. A., Findlay, L.F., Mondschein, W., Modesto, R.R. 2009. Laboratory Exercises in Microbiology (3rd Edition). John Wiley & Sons, Inc. 273p. 8. Leboffe, M. J., Pierce, B. E. 2011. A Photographic Atlas for the Microbiology Laboratory (4th Edition). Morton Publishing. 256p. |
| Date of last amendment | 4 November 2021 |

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| Module designation | Acarology |
| Semester (s) in which the module is taught | 2 th semester/1 rd year |
| Person responsible for the module | Dr.Ir. Chandra Irsan, M.Si. Arsi, SP., M.Si. |
| Language | Indonesian |
| Relation to curriculum | compulsory course |
| Teaching methods | lectures and discussions |
| Workload (incl. Contact hours, self-study hours) | 6 hours and 20 minutes of total workload: 100 minutes for Contact Study; 120 minutes for structured academic assignment and 120 minutes for self-study per week |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students understand the importance of plant acarology to support plant production. Students understand the importance of acarina on crops and animal domestication 2. Students are able to understand the kind of acarina symptom on crops and animal 3. Students are able to explain the importance part morfologi of acarina egg, nymph and adult 4. Students are able to identify some family, genus and species of acarina based on morfology 5. Students are able to explain the abiotic factor are influence the dynamic of acarina population 6. Students are able to explain the importance acarina on green haouse 7. Students are understand the technic and the way how to collecting acarina from crops, and soil 8. Midterm exam 9. Students are able to explain the some of acarina on importance food crops 10. Students are able to explain the some of acarina on importance horticultural crops 11. Students are able to explain the some of acarina on importace ornamental crops 12. Students are able to explain the some of acarina on importace plantation crops 13. Student are able to explain the natural enemies of acarina 14. Student are able to explain some technic of acarina control |

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| | <p>15. Students are able to describe the technic to control population of acarina</p> <p>16. Final exam.</p> |
| Content | <ol style="list-style-type: none"> 1. The scope of plant acarology, its history and development 2. Symptom of acaraina on crops 3. Morphology of acarina 4. Taxonomy and classification acarina. 5. Factor abiotic influence acarina 6. Acarina on green house 7. Collecting acarina 8. Midterm exam 9. Acarina on food crops 10. Acarina on horticulture cropps 11. Acarina on ornamental Crops 12. Acarina of Plantation crops 13. Natural enemies of acarina 14. Technic contol of acarina 15. Cotrolling acarina populatin 16. Final exam |
| Examination forms | <ol style="list-style-type: none"> 1. Write essays 2. Doing practical works |
| Study and examination requirements | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. Zhi-Qiang Zhang. 2003 Mites of Green Houses, Identification, Biology and Control. CABI Publishing. London 2. Woolley TA. 1988. Acarology Mites and human welfare. Jhon Wiley and Sons. Toronto 3. Puspita Rini 2006. Tungau di Tanaman dan Pengandaliannya. Universitas Brawijaya, Malang 4. Khalshoven LGE. 1981. Pest of Crops in Indonesia, Revised and translated by Van Del Laan PA. Univ. Of Amsterdam. PT Ichtiar Baru-Van Hoeve, Jakarta |

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| Module designation | Basic Soil Science |
| Code | PTN 10115 |
| Semester (s) in which the module is taught | 2&3 ^d semester/1&2 nd year |
| Person responsible for the module | <ol style="list-style-type: none"> 1. Prof. Dr. Ir. Dedik Budianta, MS 2. Dr. Ir. Warsito, MS 3. Dra. Dwi Probawati Sulistyani, MS 4. Ir, Marsi, MSc, PhD |

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| | 5. Dr. Ir. Satria Jaya Priatna, MS 6. Dr. Ir. A. Napoleon, MP 7. Dr. Ir. Dwi Setyawan, MSc 8. Dr. Ir. Bambang Prayitno, MSc 9. Dr. Ir. Agus Hermawan, MT 10. Dr. Ir. Bakri, MS 11. Prof. Dr. Ir. Edi Armanto, MS 12. Prof. Dr. Ir. Nuni Gofar, MS 13. Dr. Ir. Madjid Rohim, MS 14. Dr. Ir. Momon Imanuddin, MS 14. Ir. Sabarudin, MSc. PhD 15. Ir. Siti Nurul Aidil Fitri, MS |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 Praktikum = 2040 Structured assignment = 1440 Self study = 1440 exam = 220 total : 6540 minutes = 109 hours = 4,36 ects |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | 1. Students are able to explain why soil is very important for agriculture. 2. Students are able to explain the definition and the soil genesis 3. Students are able to describe the factors soil forming and soil phases 4. Students are able to explain the soil components related to agriculture 5. Students are knowing the soil distribution and soil classification in Indonesia. |
| Content (14 meetings) and two examinations | 1. Introduction of soil for agriculture (definition, function, etc) 2. Soil genesis: factors affecting soil formation and soil phases 3. Soil components for agriculture 4. Soil chemistry (soil acidity, soil alkalinity, CEC, SOM, soil liming) 5. Soil physics (soil texture, soil structure, soil pores, soil bulk density, soil specific density, soil moisture). 6. Soil biology (soil fauna and soil flora) |

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| | <p>7. Soil development in Indonesia (Soil distribution and soil classification)</p> <p>8. Examination</p> |
| Examination forms | <p>Quiz (essay)</p> <p>Doing practical works (report)</p> <p>Structured assignment (essay and paper)</p> <p>Midterm exam (essay)</p> <p>Final exam (essay)</p> |
| Reading List | <ol style="list-style-type: none"> 1. Buckman, H.O. and N.C. Brady. 1982. Ilmu Tanah. Terjemahan Prof. Soegiman. Bhratara Karya Aksara Jakarta. 2. Huang, P.M., Li, Y. and Sumner, M.E. 2012. Handbook of Soil Sciences. Resource Management and Environmental Impacts. CRC Press. Taylor & Francis Group. New York. |
| Date of last amendment | 30 June 2020 |

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| Module Name | Religion |
| Code | UNI 10116 |
| Semester (s) in which the module is taught | 2 nd semester/1 st year |
| Person responsible for the module | Dr. Nurhasan, M. Ag dan Religion Team Teaching |
| Language | Indonesian |
| Type of teaching | Lecture, practical, and project |
| Relation to curriculum | Compulsory Course |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3.00 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Describe, explain about the introduction of Islamic Religious Education 2. Explain the meaning, the philosophy of divinity in Islam, the history of human thought about God, God according to religion 3. Explain the meaning, the philosophy of divinity in Islam, the history of human thought about God, God according to religion 4. Describe and explain the implementation of Faith and Taqwa, Explaining Problems, challenges and risks in modern life the role of Faith and Taqwa in Answering the Challenges of Modern Life 5. Describe, explain about humans according to Islam 6. Describe, explain the concept of Law, HAM, and Democracy in Islam 7. Describe, explain the concept of Islamic law, the Contribution of Muslims in Indonesia 8. Describe, explain how to apply al-Karimah's morals in everyday life 9. Describe, explain the concept of science and technology and art in Islam 10. Describe, explain the concept of religious harmony 11. Describe, explain the concept of Civil Society 12. Describe, explain the concept of Islamic Economics 13. Describe, explain the concept of Islamic politics |
| Content | <ol style="list-style-type: none"> 1. Introduction to Religious education 2. The Concept of God in Islam 3. The concept of faith and piety 4. Implementation of Faith and Taqwa in modern life 5. Human nature according to Islam |

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| | <ol style="list-style-type: none"> 6. Law, HAM, and Democracy in Islam 7. Islamic Law, Contribution of Muslims in Indonesia 8. Moral and Moral Ethics 9. Science and technology and art in Islam 10. Inter-religious harmony 11. Civil Society 12. Islamic Economics 13. The concept of Islamic culture 14. Islamic political concept |
| Examination forms | <ol style="list-style-type: none"> 1. Essays questions 2. Pratical works |
| Date of last amendment | 30 July 2021 |

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| Module Name | Civic |
| Code | UNI 10216 |
| Semester (s) in which the module is taught | 1 st semester/1 st year |
| Person responsible for the module | DR. LR Retno Susanti, M. Hum dan Team Teaching |
| Language | Indonesian |
| Type of teaching | Lecture, practical, and project |
| Relation to curriculum | Compulsory Course |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3.00 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Understand the important background, concepts, goals, vision, mission and foundation of Civic Education. 2. Able to describe the history of the formation of the Indonesian nation; able to formulate the characteristics of national identity; able to identify the factors causing the fading of national identity 3. Able to describe concepts, urgency, the nature of national integration and be able to identify the factors forming national integration 4. Have the ability to explain the meaning of the elements and goals of the State ; Definition, constitutional function; Outlining the constitution of the State of Indonesia; Explaining the amendment UUD 1945. 5. Able to understand the existing rules of the Indonesian constitution 6. Able to explain the obligations and rights of citizens 7. Able to analyze the rights and obligations of citizens in the life of society, nation and state 8. Able to explain the history of the growth and development of democratic ideas/thoughts; Able to analyze various influential variables in the development of democracy ; Analyze the foundation of democracy in Indonesia and describe the history of the development of democracy in Indonesia |

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| | <ol style="list-style-type: none"> 9. Able to explain basic concepts/definitions <i>Rule of Law</i> and analyze problems <i>Rule of law</i>. 10. Able to explain the history of development HAM and describe various HAM as well as institutions HAM. 11. Able to explain the concept of geopolitics as a national insight 12. Describe the influence of regional and social aspects on existence and be able to analyze the problems of the archipelago's insight in facing the times 13. Able to explain the concept of Indonesian Geostrategy in the form of national resilience 14. Able to explain the background of the importance of national resilience and describe the main ideas and nature of national resilience in Pancasila and UUD 1945. |
| Content | <ol style="list-style-type: none"> 10. Concept, Purpose, Vision, Mission and Background importance of Civid Education 11. National Identity 12. National Integration 13. The State and Constitution of Indonesia 14. The Constitution of Indonesia as a Nation-State 15. Rights and obligations of citizens 16. Indonesian Democracy 17. Law enforcement and HAM 18. Archipelago Insights/ Geopolitics. 19. Gestrategis Indonesia/ National Resilience |
| Examination forms | <ol style="list-style-type: none"> 1. Essays questions 2. Practical works 3. Oral presentation |
| Date of last amendment | 28 April 2021 |

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| Module designation | Principles of Business |
| Semester (s) in which the module is taught | 1 th semester/1 nd year |
| Person responsible for the module | Dr. Ir. Maryadi, M.Si. Dr. Ir. Amruzi Minha, M.S. Dwi Wulan Sari, S.P., M.Si., Ph.D. Eka Mulyana, S.P., M.Si. Indri Januarti, S.P., M.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning, Project based Learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 Practicum = 2040 Structured assignment =1440 Self-study = 1440 Exam = 220 Total : 6540 minutes = 109 hours = 4.36 ects |
| Credit points | 3 (2-1) credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <p>1. Attitude CP-STN 8: Students able to internalize the entrepreneurial spirit</p> <p>2. Ability of the Field of Science CP-KIP 1: Students able to understand the latest issues in the field of agribusiness both at the basic level and at the advanced level of CP-KIP 3 : Studets able to understand the fields of economics, management, business, entrepreneurship, institutional, sociology, counseling and communication, and agricultural sciences for the development of sustainable agribusiness operating systems based on the results of analysis of business basics. CP-KBP 1: Studets able to plan, implement and evaluate the allocation of natural, human, capital, and social resources to improve the operating efficiency of agribusiness systems, and able to operate and develop innovative, accountable agribusiness business units, create added value by prioritizing socio-economic principles of agriculture and quantitative and qualitative approaches to realize sustainable and efficient agribusiness to realize sustainable agribusiness and efficient.</p> <p>3. Competence</p> |

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| | CP-KBP 6: Students able to use econometric methods to formulate strategies for the use of resources to increase the capacity of themselves and society in facing the challenges of agribusiness development in the future. |
| Content | <ol style="list-style-type: none"> 1. Understanding business (business) and company, 2. Company in social system, 3. Forms of economic system, 4. Forms of business / company, 5. Determination or selection of company location, 6. Procedures for company establishment, 7. Corporate relations and sources of capital and /or banking (1) 8. Corporate relations and sources of capital and / or banking (2) 9. Organizational structure and management of the company and job description, 10. Company functions, company management tools, 11. Preparation of business plans (1) 12. Preparation of business plans (2) |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Emrah Yayici. 2020. Business Analysis Methodology Book.B.A Works Inspiring Series. 2. Ismail Solihin. 2015. Pengantar Bisnis.Penerbit Erlangga,Ciracas. Jakarta, 13740 3. Sudaryono, DR. 2015. Pengantar Bisnis ; Teori dan Contoh Kasus. Penerbit CV.Andi Offset, Yogyakarta 4. M.Fuad; Christine, H; Nurlela ; Sugiaharto; Paulus, Y.E.F. 2003. Pengantar Bisnis. Penerbit PT. Gramedia Pustaka Utama. Jakarta. 5. Nugroho J. Setiadi, SE.,MM. 2003. Prakiraan Bisnis ; Pendekatan Analisis Kuantitatif Untuk Antisipasi Bisnis. Penerbit Prenada Media. Rawamangun. Jakarta Timur. |
| Date of last amendment | 15 April 2021 |

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| Module Designation | Crop Physiology |
| Code | PAG 114216 |
| Semester (s) in which the module is taught | 3 rd semester/2 st year |
| Person responsible for the module | Prof. Dr. Ir. Rujito Agus Suwignyo, M. Agr. Dr. Ir. Munandar, M. Agr. Dr. Irmawati, S. P., M. Si., M. Sc. Dr. Ir. Mery Hasmeda, M. Sc. Dr. Ir. Susilawai, M. Si. Dr. Ir. M. Umar Harun, M. S. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | Passed PAG 109116 |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Capable of understanding, describing and explaining basic concept, and scope of crop physiology. 2. Capable of understanding, describing and explaining anatomy, cell structure and plant tissue. 3. Capable of understanding, describing and explaining plant and water relationship. 4. Capable of understanding, describing and explaining physiological function of water in plants. 5. Capable of understanding, describing and explaining plant growth regulator. 6. Capable of understanding, describing and explaining photosynthesis. 7. Capable of understanding, describing and explaining photosynthesis and plant growth. 8. Capable of understanding, describing and explaining plant respiration. 9. Capable of understanding, describing and explaining factors affected respiration and fotorespiration. 10. Capable of understanding, describing and explaining enzyme 1. 11. Capable of understanding, describing and explaining enzyme 2. 12. Capable of understanding, describing and explaining plant growth and development. |

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| | <p>13. Capable of understanding, describing and explaining plant growth analysis.</p> <p>14. Capable of understanding, describing and explaining biomass, yield and yield components, harvest index.</p> |
| Content | <ol style="list-style-type: none"> 1. Introduction, basic concept, and scope of crop Physiology. 2. Anatomy, cell structure and plant tissue. 3. Plant and water relationship. 4. Physiological function of water. 5. Plant growth regulator. 6. Photosynthesis. 7. Photosynthesis and plant growth. 8. Plant respiration. 9. Factors affected respiration and photorespiration. 10. Enzyme 1. 11. Enzyme 2. 12. Plant growth and development. 13. Plant growth analysis. 14. Biomass, yield and yield components, harvest index. |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (essay) 5. Final Exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. Fitter, A.H., Hay, R.K.M. 2002. Environmental Physiology of Plants. Academic Press. 2. Luttge, U. 2008. Physiological Ecology of Topical Plants. Springer. 3. Hay, R., Porter. 2006. The Physiology of Crop Yield. Blackwell Publishing. 4. Sadras, W.O., Calderini, D.F. 2009. Crop Physiology Applications for Genetic Improvement and Agronomy. Academic Press. 5. Wilkins, M.B. 1989. Advanced Plant Physiology. Longman Scientific and Technical. 6. Pessarkli, M. 2004. Handbook of Photosynthesis Second Edition. Taylor and Francis. 7. Rao, K.V.M., Raghavendra, A.S., Reddy, K.J. 2006. Physiology and Molecular Biology of Stress Tolerance in Plants. Springer. 8. Foster, G.D., Johansen, I.E., Hong, Y., Nagy, P.D. 2008. Plant Virology Protocols from Viral Sequence to Protein Function. Humana Press. 9. Hawkesford, M.J., Barraclough. 2011. The Molecular and Physiological Basis of Nutrient Use Efficiency in Crops. 10. Khan, M.A., Weber, D.J. 2008. Ecophysiology of high Salinity Tolerant Plants. Springer. |

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| | <ol style="list-style-type: none"> 11. VK Jain. 2017. Fundamentals of Plant Physiology. Schand. 12. Lambers, H., Chapin III, F.S. 2008. Plant Physiological Ecology. Springer. 13. Stewart, P., Globig, S. 2012. Plant Physiology. Apple Academic Press. 14. William, G.H., Norman., Honer, P.A- Introduction to Plant Physiology 15. Nobel, P. 2009. Physicochemical and Environmental Plant Physiology. Elsevier. 16. Scott, P. 2008. Physiology and Behavior of Plants. Wiley. 17. Burg, S.P. 2004. Postharvest Physiology and Hypobaric Storage of Fresh Produce. CABI Publishing. |
| Date of last amendment | 30 June 2021 |

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| Module Designation | Weed Control |
| Code | PAG 403316 |
| Semester (s) in which the module is taught | 5 th semester/3 rd year |
| Person responsible for the module | Dr. Ir. Yakup, M. S. Dr. Ir. Erizal Sodikin Ir. Teguh Achadi, M. P. Dr. Ir. Maria Fitriana, M. Sc. Dr. Ir. Maria Fitriana, M. Sc. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | Passed PAG 114216 |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Capable of understanding, describing, explaining, conducting and applying conception and development of weed control 2. Capable of understanding, describing, explaining, conducting and applying various weeds preventive control methods 3. Capable of understanding, describing, explaining, conducting and applying various weeds mechanical control methods 4. Capable of understanding, describing, explaining, conducting and applying various control in technical culture methods 5. Capable of understanding, describing, explaining, conducting and applying various weeds biological control methods 6. Capable of understanding, describing, explaining, conducting and applying various weeds chemical control (Role, classification and formulation of herbicides) methods 7. Capable of understanding, describing, explaining, conducting and applying various weeds chemical control methods (Selectivity, properties and effects on the environment) |

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| | <ol style="list-style-type: none"> 8. Capable of understanding, describing, explaining, conducting and applying various weeds chemical control methods (Herbicide application process) 9. Capable of understanding, describing, explaining, conducting and applying various weeds control in rice plants (upland and upland rancah) 10. Capable of understanding, describing, explaining, conducting and applying various weeds control in rice crops (paddy fields and tidal fields) 11. Capable of understanding, describing, explaining, conducting and applying various weeds control in secondary crops 12. Capable of understanding, describing, explaining, conducting and applying various weeds control in horticultural crops 13. Capable of understanding, describing, explaining, conducting and applying various weeds control in plantation crops 14. Capable of understanding, describing, explaining, conducting and applying various Integrated weed control (IWM) 15. Capable of understanding, describing, explaining, conducting and applying various economic threshold (ET) in weed control |
| Content | <ol style="list-style-type: none"> 1. Introduction 2. Preventive control 3. Mechanical control 4. Control in technical culture 5. Biological control 6. Chemical control (Role, classification and formulation of herbicides) 7. Chemical control (Selectivity, properties and effects on the environment) 8. Chemical control (Herbicide application process) 9. Weed control in rice plants (upland and upland rancah) 10. Weed control in rice crops (paddy fields and tidal fields) 11. Weed control in secondary crops 12. Weed control in horticultural crops 13. Weed control in plantation crops 14. Integrated weed control (IWM) 15. Economic threshold (ET) in weed control |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (essay) 5. Final Exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. Dodge, A.D. 2008. Herbicides and Plant Metabolsim. Cambridge University. |

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2. Monaco, T.J., Weller, S.C., Ashton, F.M. 2001. Weed Science Principles and Practices. John Willey & Sons Inc.
3. Rao, V.S. 2002. Principles of Weed Science. CRC Press.
4. Prasad, M.N.V. 2004. Heavy Metal Stress in Plants From Biomolecules to Ecosystems. Springer.
5. Ross, M.A., Lembi, C.A. 2008. Applied Weed Science Including the Ecology and Management of Invasive Plants. Pearson Prentice Hall.
6. Zimdahl, R.L. 2007. Weed Science Third Edition. Academic Press.

Date of last amendment

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| Module Designation | Tissue Culture* |
| Code | PAG 605216 |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | Dr. Ir. Mery Hasmeda, M. Sc. Dr. Ir. Zaidan Panji Negara, M. Sc. Dr. Irmawati, S. P., M. Si., M. Sc. Dr. Ir. Lidwina Niniek S, M. Si. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to understand principles, scopes, and benefits of tissue culture. 2. Students are able to understand about cell totipotency, proliferation, cell differentiation and dedifferentiation, and explain some growth factors that benefit tissue culture. 3. Students are able to understand tissue culture laboratory requirements and principle of sterilization. 4. Students are able to understand the steps of preparing tissue culture media. 5. Students are able to identify the role of explant for the growth and development of tissue. 6. Students are able to understand several techniques of tissue culture. 7. Students are able to understand about micropropagation 8. Students are able to explain the importance of tissue culture for producing the plants with new traits. 9. Students are able to understand about embryo culture. 10. Students are able to understand about anther and pollen culture. 11. Students are able to understand the application of tissue culture in vitro. |
| Content | 1. Introduction to tissue culture. |

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| | <ol style="list-style-type: none"> 2. Cell totipotency, proliferation, cell differentiation and dedifferentiation, growth factors that benefit tissue culture. 3. Tissue culture laboratory requirements and principle of sterilization. 4. Tissue culture media. 5. The influence of explant to the growth and development of tissue. 6. Several techniques of tissue culture. 7. Micropropagation 8. Tissue culture for producing the plants with new traits. 9. Embryo culture. 10. Anther and pollen culture. 11. Application of tissue culture in vitro I. 12. Application of tissue culture in vitro II. 13. Application of tissue culture in vitro III. 14. Application of tissue culture in vitro IV. |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (essay) 5. Final Exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. Kruse Jr., P.F. and M.K. Patterson Jr. (eds). 1973. Tissue Culture: Methods and Application. Academic Press Inc. 2. Smith, R.H. 1992. Plant Tissue Culture: Techniques and Experiments. Academic Press, Inc. 3. Razdan, M.K. 2003. Introduction to Plant Tissue Culture. Science Publishers, Inc. 4. Research publications related to plant tissue culture. 5. Ibaraki, Y., Gupta, S.D. 2006. Plant Tissue Culture Engineering. Springer. 6. Cassells, A.C., Gahan, P.B. 2006. Dictionary of Plant Tissue Culture. FPP, 7. George, E.F., Hall, M.A., Klerk, G-J.D. 2008. Plant Propagation by Tissue Culture. Springer. 8. Laimer, M., Rucker, W. 2003. Plant Tissue Culture. Springer. |
| Date of last amendment | 30 June 2021 |

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| Module designation | Statistics |
| Semester (s) in which the module is taught | 3 rd semester/2 nd year |
| Person responsible for the module | Prof. Dr. Ir. Siti Herlinda, M.Si. Prof. Ir. Suwandi, M.Agr., Ph.D. Dr. Rahmat Pratama, S.Si. Arsi, S.P., M.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 practicum = 2040 structured assignment = 1440 self-study = 1440 exam = 220 total : 6540 minutes = 109 hours = 4.36 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to identify the kinds of biological variables and explain the basic concepts of hypothesis testing. 2. Students are able to calculate the central tendency, dispersion, standard error, and confidence limits and interpret the test results. 3. Students are able to calculate the test of goodness-of-fit and interpret the test results. 4. Students are able to calculate the test of independence and interpret the test results. 5. Students are able to present the test of goodness-of-fit and independence, and describe the test results. 6. Students are able to calculate the test of normality, homoscedasticity, and data transformation and interpret the test results. 7. Students are able to calculate the test of t test and Welch's t-test and interpret the test results. 8. Students are able to calculate the test of paired t test and interpret the test results. |

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| | <ol style="list-style-type: none"> 9. Students are able to present and describe the t-test results 10. Students are able to calculated the test of Linear regression and correlation and interpret the test results. 11. Students are able to calculated the test of Simple logistic regression and interpret the test results. 12. Students are able to present and describe the regression, correlation and logistic regression test results. 13. Students are able to calculated the test of Probit analysis and interpret the test results. 14. Students are able to present and describe the probit test results. |
| <p>Content</p> | <ol style="list-style-type: none"> 1. Scope of statistics in analysis of biological data, kinds of biological variables, basic concepts of hypothesis testing 2. Descriptive statistics (central tendency, dispersion, standard error, and confidence limits) using spreadsheets and R applications 3. Tests for nominal variables - Exact test of goodness-of-fit and Chi-square test of goodness-of-fit using spreadsheets and R applications 4. Tests for nominal variables - Chi-square test of independence, G-test of independence, Fisher's exact test using spreadsheets and R applications 5. Displaying results of statistical tests for nominal variables using spreadsheets and R applications 6. Test for one measurement variable – tests of normality, homoscedasticity, and data transformation using spreadsheets and R applications 7. Test for one measurement variable – t test and Welch's t-test using spreadsheets and R applications 8. Test for one measurement variable – paired t test using spreadsheets and R applications 9. Displaying results of statistical tests for measurement variable variables (t test) using spreadsheets and R applications |

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| | <ol style="list-style-type: none"> 10. Tests for multiple measurement variables - Linear regression and correlation using spreadsheets and R applications 11. Tests for multiple measurement variables - Simple logistic regression using spreadsheets and R applications 12. Displaying results of statistical tests for multiple measurement variables (linear regression and correlation, simple logistic regression) using spreadsheets and R applications 13. Tests for multiple measurement variables – Probit analysis using spreadsheets and R applications 14. Displaying results of statistical tests for multiple measurement variables (linear regression and correlation, simple logistic regression and probit analysis) using spreadsheets and R applications |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. McDonald, J.H. 2014. Handbook of Biological Statistics (3rd ed.). Sparky House Publishing, Baltimore, Maryland. 2. Suwandi, S; Herlinda, S. Pratama, R, Arsi, A. 2022. R-code for statistical analysis of researches in plant protection. |
| Date of last amendment | 4 Juni 2021 |

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| Module name | Entrepreneurship |
| Code | PER 37115 |
| Semester (s) in which the module is taught | 3 rd semester/2 nd year |
| Person responsible for the module | Ir. Suparman SHK, Ph.D. Ir. Bambang Gunawan, M.Si Arsi, S.P., M.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Type of teaching | Lecture, seminar, and project, |
| Workload | Lectures = 1400 minutes Practicum = 0 Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 4500 minutes = 75 hours = 3.0 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to describe the role of entrepreneur in the economic development of a country, and current situation of entrepreneurship in Indonesia 2. Students are able to describe the specific characteristics and behavior of successful entrepreneurs 3. Students are able to explain step by step preparation for everyone wants to be entrepreneur 4. Students are able to differentiate between myths and reality around entrepreneurship issues. 5. Students are able to describe the roles of creativity and innovation in business development 6. Students are able to identify business opportunities especially the ones suitable for them or when they are ready to start a business 7. Student are able to describe and give examples of business sector and business institutions 8. Students are able to explain how to establish and operate business 9. Students are able to explain how to manage human resources appropriately and effectively in enterprise. 10. Students are able to explain how to manage finance appropriately and effectively in enterprise. |

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| | <ol style="list-style-type: none"> 11. Students are able to analyze a running business and present the report in front of others. 12. Students are able to describe step by step of preparing business plan 13. Students are able to prepare business plan 14. Students are able to write business plan. |
| Content | <ol style="list-style-type: none"> 1. Definition and roles of entrepreneurship. Current conditions of entrepreneurship in Indonesia 2. Characteristics and behavior of entrepreneurs 3. Preparation to become entrepreneur 4. Myths around entrepreneurship 5. Creativity and innovation within entrepreneurship 6. Business opportunities. 7. Business sectors and business institutions and requirements of business institution development 8. Establishing and operating business 9. Management of human resources 10. Management of finance 11. Business analyzes 12. Business plan 13. Preparing business plan 14. Writing business plan. |
| Examination forms | <ol style="list-style-type: none"> 1. Write essays 2. Presentation |
| Reading List | <ol style="list-style-type: none"> 1. Gasperaz V. 2002. Pedoman penyusunan rencana bisnis. Gramedia Pustaka Utama. Jakarta. 2. Kasali, R. 2010. Wirausaha Muda Mandiri. Gramedia. Jakarta. 3. Lembang, A. 2002. Who wants to be options entrepreneur. Gramedia. Jakarta. 4. Suharno B. 2006. Langkah jitu memulai bisnis dari nol. Penebar Swadaya Jakarta 5. Suryo,A. 2008. Tata cara mengurus Ijin Usaha. Pustaka Yustisia. Yogyakarta. 6. Sutomo, D. 2007. Menjadi Entrepreneur jempolan. Republika. Jakarta 7. Widyatmoko A. 2006. Seratus peluang usaha. Agromedia Pustaka. Tangerang |
| Date of last amendment | 25 Mein2021 |

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| Module designation | Mycology |
| Semester (s) in which the module is taught | 3 rd semester/2 nd year |
| Person responsible for the module | Prof. Ir. Nurhayati, M.Si. Ir. Suwandi, M.Agr., Ph.D. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students will be able to describe the history, development, and application used of mycology in agriculture. 2. Students will be able to describe and identify morphological characteristics and functions of fungi somatic cell 3. Students will be able to describe and identify morphological characteristics and functions of fungal asexual and sexual structures. 4. Students will be able to describe and differentiate fungal nutrition and the mechanism of nutrient uptake. 5. Students will be able to describe and differentiate methods for fungal classification. 6. Students will be able to describe and differentiate the morphology of somatic and reproductive structures of Oomycetes and used it for the identification case study. 7. Students will be able to describe and differentiate the morphology of somatic and reproductive structures of Zygomycetes and Glomeromycetes and used it for the identification case study. 8. Students will be able to describe and differentiate the morphology of somatic and reproductive structures |

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| | <p>of Ascomycetes and used it for the identification case study.</p> <p>9. Students will be able to describe and differentiate the morphology of somatic and reproductive structures of Basidiomycetes and used it for the identification case study.</p> <p>10. Students will be able to prepare culture media, isolate, and culture fungi.</p> <p>11. Students will be able to describe colony characteristics, make microscopic preparation, take, and describe the microscopic morphology of fungi.</p> |
| Content | <ol style="list-style-type: none"> 1. History and development of mycology, and its application in agriculture. 2. Morphological characteristics and functions of fungi somatic cells. 3. Morphological characteristics and functions of fungi reproductive cells. 4. Fungal Nutrition. 5. Fungal classification. 6. Oomycetes. 7. Zygomycetes and Glomeromycetes. 8. Ascomycetes. 9. Basidiomycetes. 10. Culture media, fungal isolation, and culture. 11. Microscopic examination of fungi. |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (MCQ) 5. Final Exam (MCQ) |
| Reading List | <ol style="list-style-type: none"> 1. Alexopoulos, C.J., Mims, C.W., Blackwell, M.M. 1996. Introductory Mycology, 4th Edition. Wiley. 880p. 2. Webster, J., Weber R. 2007. Introduction to Fungi. Third edition. Cambridge University Press. 841p. 3. Deacon, J. 2006. Fungal Biology. 4th edition. Blackwell Publishing. 371p. 4. Barnett, H.L., Hunter, B.B. 1998. Illustrated Genera of Imperfect Fungi, Fourth Edition. American Phytopathological Society Press. 219p. |

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5. Kubicek, C.P., Harman, G.E. 1998. *Trichoderma and Gliocladium Volume 1: Basic Biology, Taxonomy and Genetics*. Taylor & Francis. 277p.
6. Leslie, J.F., Summerell, B.A. 2006. *The Fusarium Laboratory Manual*. Blackwell Publishing. 388p

Date of last amendment

30 June 2021

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| Module designation | Principles of plant protection |
| Semester (s) in which the module is taught | 3 rd semester/2 nd year |
| Person responsible for the module | Ir. Suparman SHK, Ph.D. Prof. Dr. Ir. Siti Herlinda, M.Si. Ir. Bambang Gunawan, M.Si. Arsi, S.P., M.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 1700 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6200 minutes = 103.33 hours = 4,13 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to accurately explain about scope of crop protection and able to recognize pests and damages they cause on crops. 2. Students are able identify mite and mice as crop pest and able to describe their biology, behavior, impact on crop, and control. 3. Students are able to identify pig, bird, and snail as pest of crops and able to describe their biology, behavior, impact on crop, and control. 4. Students are able to explain how to control insects using and biological control techniques. 5. Students are able to explain how to control insects by using resistant variety, and applying physical and mechanical control techniques. 6. Students are able to explain how to control insects by implementing plant quarantine, and how to apply pesticide appropriately 7. Students are able to explain how to prepare and apply sterile male to control insect and able to describe integrated pest management. 8. Students are able to describe the disturbance caused by microorganisms on crops and its impact on yield losses. 9. Students are able to describe various disease symptoms caused by various pathogens |

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| | <ol style="list-style-type: none"> 10. Students are able to describe general characteristics of plant pathogenic fungi, including their interaction with their host. 11. Students are able to describe general characteristics of plant pathogenic bacteria, including their interaction with their host. 12. Students are able to describe general characteristics of plant pathogenic viruses and nematodes, and their interaction with plant. 13. Students are able to explain how to control plant pathogens using exclusion, eradication physical and cultural techniques. 14. Students are able to explain how to apply pesticide correctly, effectively, efficiently, safely and environmentally friendly. |
| Content | <ol style="list-style-type: none"> 1. Scope of crop protection; insect as crop pest and the impact of their attack to crops 2. Mite and mice as crop pest and the impact of their attack to crops 3. Wild pig, bird and snail as crop pest and the impact of their attack to crops 4. Cultural and biological techniques 5. Resistant variety, physical control and mechanical control techniques. 6. Plant quarantine and chemical control technique. 7. The use of sterile male and Integrated Pest Management. 8. Introducing plant disease: how pathogen cause disease on plants. 9. Plant disease symptoms 10. Fungi as plant pathogen 11. Bacteria as plant pathogen 12. Virus and nematode as plant pathogen 13. Exclusion, eradication, physical and cultural techniques. 14. Chemical control of plant diseases |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) |

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| | 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Chandrasekaran B, Annadurai K and Somasundaram. 2010. A Textbook of Agronomy. New Age International Publishers New Delhi. 2. Pareek A, Sopory SK, Bohnert HJ, and Govindjee. 2010. Abiotic Stress in Plants. Springer, Dordrecht, Nederland. 3. Kethan SK. 2001. Microbial Pest Control. Markel Dekker, Inc. New York. 4. Levine MJ. 2007. Pesticides; A toxic time bomb in our midst. Praeger, London. 5. Agrios GN. 2005. Plant Pathology 5th Ed. Elsevier Academic Press, New York. 6. Ebbels DL. 2003. Principles of Plant Health and Quarantine. CABI Publishing, Cambridge. |
| Date of last amendment | 30 June 2021 |

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| Module designation | Plant Bacteriology |
| Code | PPT22215 |
| Semester (s) in which the module is taught | 3 rd semester/2 nd year |
| Person responsible for the module | Dr. Ir. Abu Umayah, MS. Dr. Ir. Mulawarman, M.Sc. Dr. Rahmat Pratama, S.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Lecture, practical, and project |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 Practicum = 2040 Structured assignment = 1440 Self-study = 1440 Exam = 220 total : 4460 minutes = 109 hours = 4.36 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended | <ol style="list-style-type: none"> 1. Students are able to explain the reflection of history of plant bacteriology 2. Students are able to explain the plant bacterial cell morphology 3. Students are able to explain the understand the classification of plant bacteria 4. Students are able to explain the plant bacterial metabolism 5. Students are able to explain the genetics plant bacteria 6. Students are able to explain the how bacteria grow and develop 7. Students are able to explain the how to identify bacteria 8. Students are able to explain the plant bacteria control techniques and mechanisms 9. Students are able to explain the various cases of important plant diseases caused by bacteria |
| Content | <ol style="list-style-type: none"> 1. Reflection of history of plant bacteriology 2. Plant bacterial cell morphology 3. Understand the classification of plant bacteria 4. Plant bacterial metabolism 5. Genetics plant bacteria 6. How bacteria grow and develop 7. How to identify bacteria |

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| | <ol style="list-style-type: none"> 8. Plant bacteria control techniques and mechanisms 9. Various cases of important plant diseases caused by bacteria |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Fahy, D. C., and Persley, G.F. 1983. Plant Bacterial Diseases: A Diagnostic Guide. Academic Press, New York. 2. Goto, M. 1992. Fundamentals of Bacterial Plant Pathology. Academic Press, San Diego. 3. Schaad, N.W. 1980. Laboratory Guide of Identification of Plant Pathogenic Bacteria. APS Press, St. Paul, Minnesota. 4. Sigee, D.C. 1992. Bacterial Plant Pathology: Cell and Molecular Aspects. Cambridge Univ. Press, New York. 5. Singleton, P., and Sainsbury. 1981. Introduction to Bacteria. John Wiley & Sons, Chichester, New York, Brisbane, Toronto. |
| Date of last amendment | 30 June 2021 |

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| Module designation | Insect Colection |
| Semester (s) in which the module is taught | 4 th semester/2 rd year |
| Person responsible for the module | Dr.Ir. Chandra Irsan, M.Si. Arsi, SP., M.Si. |
| Language | Indonesian |
| Relation to curriculum | compulsory course |
| Teaching methods | lectures and discussions |
| Workload (incl. Contact hours, self-study hours) | Lectures = 700 Practicum = 0 Structured assignment =720 Self-study = 720 Exam = 220 total : 2360 minutes = 39.33 hours = 1.57 ects |
| Credit points | 1 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students understand the importance of insect collection in plant protection program 2. Students understand the benefit of collected the insect in general purpose. 3. Students understand about some tool were able used to collecting insect. 4. Students are able using tool to collecting soil or teresterial insect 5. Students are able using tool to collecting arboreal or diurnal insect 6. Students are able usung tool to collecting nocturnal insect by light trap and malay trap 7. Students are able to make box for collection insect and mantanance the insect were colleted to be collecting insect. 8. Mid exam 9. Students are able to do how to collected the insect in wet system 10. Students are able to do how to collected the insect in dry system 11. Students are able to do how to stab spin at body of insect and how to arrange the wings, anntena and legs of insect 12. Students are able to do how to collected insect in resin 13. Students are able to do how to colleted insect in slaid preparat |

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| | 14. Students are able to identification family of insect based on morphology and make label and put the label on insect collection 15. Student are able to arrange the insect in box collection 16. Final exam. |
| Content | 1. Introduction of insect colletion in plant protection program 2. Benefit of insect colletion 3. Tools are used on collecting insect 4. Collecting soil and tersterial insect 5. Collecting alboreal insect 6. Collecting nocturnal insect 7. Made box for colletion insect 8. Mid exam. 9. Collected insect in wet system 10. Collected insect in dry system 11. Collected insect in resin 12. Collected insect in slaid preparat 13. Identification of insect collection 14. Labelling insect 15. Arange insect collection in box 16. Final exam |
| Examination forms | 1. Write essays 2. Doing practical works |
| Study and examination requirements | 1. Student must attend minimum 85% of delivered courses. 2. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | 1. Centre Riset of Biology. 2007. Co llecting insect 2. Borrer. 1988. Insect collecting and the insect Insect morphology |
| Date of last amendment | 30 June 2021 |

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| Module designation | Plant Nematology |
| Code | PPT1204 |
| Semester (s) in which the module is taught | 3rd semester/2nd year |
| Person responsible for the module | Dr. Ir. Mulawarman, M.Sc. Ir. Bambang Gunawan, M.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Lecture, practical, and project |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 Praktikum = 2040 Structured assignment =1440 Self-study = 1440 Exam = 220 Total : 6540 minutes = 109 hours = 4,36 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain the reflection of plant parasitic nematodes in the tropics and subtropics 2. Students are able to explain the general morphology, cuticula, epidermis, somatic muscle, pseudocolom, cephalic region; sense organs and nervous system, digestive system, secretory-excretory system, reproductive type, life cycle, feeding group and classification. 3. Students are able to explain the phylogenetics & phylogenomics, species concept and species delimiting, phylogenetic and classification, molecular techniques, genes for molecular systematics. 4. Students are able to explain the extraction of methode, identification, order, suborder and family. 5. Students are able to explain the sense organs and sensilla, undulatory propulsion, random movement, nematode feeding and movement in tissue plant. 6. Students are able to explain the Relationship of nematodes with plant parasites, prediction of yield reduction, various nematode responses. 7. Students are able to explain the life cycle and behavior, host response to parasites, post infection biology, influence on plant growth and production and survival. 8. Students are able to explain the Pratylenchids: lesions, burrowing and rice root nematodes; |

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| | <p>Anguinids & stem and bulb nematodes <i>Ditylenchus dipsaci</i> & <i>Aphelenchs</i>.</p> <p>9. Students are able to explain the Suppressive soil, biological control agents, interaction and application of natural enemies.</p> <p>10. Students are able to explain the concept of resistance, mechanism of decreasing resistance, virulent, origin and function, exploitation and success and opportunity.</p> <p>11. Students are able to explain the method, identification, order, suborder and family</p> |
| <p>Content</p> | <ol style="list-style-type: none"> 1. Reflection of plant parasitic nematodes in the tropics and subtropics. 2. General morphology, Cuticula, Epidermis, Somatic muscle, Pseudocolom, Cephalic region; sense organs and nervous system, digestive system, secretory-excretory system, reproductive type, life cycle, feeding group and classification 3. Phylogenetics & phylogenomics, species concept and species delimiting, phylogenetic and classification, molecular techniques, genes for molecular systematics. 4. Method, identification, order, suborder and family. 5. Sense organs and sensilla, undulatory propulsion, random movement, nematode feeding and movement in tissue plant. 6. Relationship of nematodes with plant parasites, prediction of yield reduction, various nematode responses. 7. Life cycle and behavior, host response to parasites, post infection biology, influence on plant growth and production and survival 8. Pratylenchids: lesions, burrowing and rice root nematodes; Anguinids & stem and bulb nematodes <i>Ditylenchus dipsaci</i> & <i>Aphelenchs</i> 9. Suppressive soil, biological control agents, interaction and application of natural enemies 10. Concept of resistance, mechanism of decreasing resistance, virulent, origin and function, exploitation and success and opportunity 11. Method, identification, order, suborder and family |
| <p>Examination forms</p> | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) |

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| | 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Jenkins, W.R & Taylor, D.P. 1967. Plant nematology. Reinhold Books in Biological Sciences. 2. Roland N. Perry & Maurice Moens. 2013. Nematoda Tanaman 3. Dropkin, V.H. 1980. Introduction to plant nematology. John Wiley & Sons 4. Thorne G. 1961. Principle of nematology. McGraw Hill. 5. Sasser, J.N. & Jenkins, W.R. 1975. Nematology. Eurasia. 6. Mic Luc, R.A. Sikora & John Bridge. 2005. Plant Parasitic Nematodes in Subtropical and Tropical Agriculture 7. Coyne, D.L, J.M. Nicol and Claudius - Cole. Practical plant nematology. A field and laboratory guide. |
| Date of last amendment | 30 June 2021 |

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| Module designation | Farm Management |
| Semester (s) in which the module is taught | 4 rd semester/2 nd year |
| Person responsible for the module | Dr. Yunita, S.P., M.Si Henny Malini, S.P., M.Si Ir. Yulius, M.M. Dr. Erni Purbiyanti, S.P.,M.Si |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning, Cased Based Learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 practicum = 2040 structured assignment =1440 self-study = 1440 exam = 220 total : 6540 minutes = 109 hours = 4.36 ecst |
| Credit points | 3 (2-1) credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <p>1. Attitude</p> <p>STN 8 : Able to internalize the entrepreneurial spirit</p> <p>2. Knowledge</p> <p>KIP 3 : Able to understand the fields of economics, management, business, entrepreneurship, institutional, sociology, counseling and communication, as well as agricultural sciences for the development of sustainable agribusiness operating systems.</p> <p>3. Skills</p> <p>KBP 1 : Able to plan, implement and evaluate the allocation of natural, human, capital, and social resources to improve the operating efficiency of the agribusiness system, as well as being able to operate and develop innovative, accountable agribusiness business units, create added value by prioritizing socio-economic principles of agriculture and quantitative and qualitative approaches to realize sustainable and efficient agribusiness.</p> <p>KBPI 2 : Able to manage, develop, and market sustainable agricultural-based agribusiness products by applying socio-economic principles of agriculture through quantitative and qualitative approaches.Kompetensi.</p> <p>KBP 11 : Able to manage and develop agribusiness businesses by implementing a management system that ensures quality output</p> |

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| Content | <ol style="list-style-type: none"> 1. Definition Farm Management 2. Farming and Agribusiness 3. Farm Classification 4. Farming Pattern 5. Types and Patterns of Farming 6. Farming Structure 7. Farm Planning 8. Farm Production Factors 9. Land Management in Farming 10. The Role of Capital in Farming 11. The Role of Human Resources in Farming 12. Farming Costs 13. Farming Income 14. Farming Research |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Tohir, A.K. 1993. A strand of Indonesian Farming Knowledge. Rineka Cipta. Jakarta. 2. Soekartawi, et al. 1990. Farming Science and Research for Small Farmer Development, UI Press. Jakarta. 3. Soekarno. 2002. Farming Analysis. University of Indonesia (UI-Press). Jakarta. 4. Mubyarto. 2000. Introduction to Agricultural Economics. LP3ES. 5. Ken Suratiyah. 2002. Agricultural Science. Penebar Swadaya. 6. Suwardie. 2008. Farm Management. Wimaya Press UPN "Veteran" Yogyakarta. 7. Kay. D. Ronald, Edwards, M. William, Duff, A., Patricia. Farm Management (Text Book). Hill Education. |
| Date of last amendment | 23 December 2021 |

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| Module Designation | Crop Ecology |
| Code | PAG 304216 |
| Semester (s) in which the module is taught | 3 rd semester/2 st year |
| Person responsible for the module | Dr. Ir. Yakup, M. S. Dr. Ir. Erizal Sodikin Dr. Ir. Muhammad Ammar, M. P. Dr. Ir. Maria Fitriana, M. Sc. Dr. Ir. Yernelis Syawal, M. S. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Capable of understanding, describing and explaining definition, development, and plant ecological uses 2. Capable of understanding, describing and explaining vegetation communities, life forms, and ecotones 3. Capable of understanding, describing and explaining description and vegetation analysis of floristic and non-floristic 4. Capable of understanding, describing and explaining vegetation succession, concept and theory of climax 5. Capable of understanding, describing and explaining plant adaptation and plant adaptation test 6. Capable of understanding, describing and explaining distribution of vegetation and plant ecotype 7. Capable of understanding, describing and explaining definition and classification of plants, as well as plant introductions 8. Capable of understanding, describing and explaining plant indicators and types of plant indicators 9. Capable of understanding, describing and explaining preservation of plant germplasm 10. Capable of understanding, describing and explaining management of plant germplasm 11. Capable of understanding, describing and explaining natural environment and natural environmental principles |

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| | <ul style="list-style-type: none"> 12. Capable of understanding, describing and explaining environmental components (soil and water) 13. Capable of understanding, describing and explaining environmental components (temperature and light) 14. Capable of understanding, describing and explaining the impact of the greenhouse effect on plant growth and production 15. Capable of understanding, describing and explaining agricultural perspective in controlled environment |
| Content | <ul style="list-style-type: none"> 1. Definition, development, and plant ecological uses 2. Vegetation communities, life forms, and ecotones 3. Description and vegetation analysis of floristic and non-floristic 4. Vegetation succession, concept and theory of climax 5. Plant adaptation and plant adaptation test 6. Distribution of vegetation and plant ecotype 7. Definition and classification of plants, as well as plant introductions 8. Plant indicators and types of plant indicators 9. Preservation of plant germplasm 10. Management of plant germplasm 11. Natural environment and natural environmental principles 12. Environmental components (soil and water) 13. Environmental components (temperature and light) 14. The impact of the greenhouse effect on plant growth and production 15. Agricultural perspective in controlled environment |
| Examination forms | <ul style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (essay) 5. Final Exam (essay) |
| Reading list | <ul style="list-style-type: none"> 1. Schulze, E-D., Beck, E., Muller-Hohenstein, K. 2002. Plant Ecology. Springer. 2. Johnson, E.A., Miyanishi, K. 2007. Plant Disturbance Ecology the Process and the Response. Academic Press. 3. Lambers, H., Chapin III, F.S., Pons, T.L. 2008. Plant Physiological Ecology. Springer. 4. Myers, J.H., Bazely, D.R. 2005. Ecology and Control of Introduced Plants. Cambridge University. 5. Gurevitch, J., Scheiner, S.M., Fox, G.A. 2006. The Ecology of Plants. Sinauer Associates |
| Date of last amendment | 30 June 2021 |

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| Module designation | Experimental Design |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | Prof. Dr. Ir. Siti Herlinda, M.Si. Prof. Ir. Suwandi, M.Agr., Ph.D. Dr. Rahmat Pratama, S.Si. Arsi, S.P., M.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | Statistics |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to identify basic concepts of experimental design, experimental components and types. 2. Students are able to design a randomized complete design (RCD) experiment and analyze the data. 3. Students are able to design a randomized complete block design (RCBD) experiment and analyze the data. 4. Students are able to design an RCD and RCBD experiment with sub-sampling and analyze the data. 5. Students are able to design an RCD and RCBD experiment with repeated measurement and analyze the data. 6. Students are able to test violations of the ANOVA assumptions, calculate the data transformation, and apply the new robust ANOVA for single factor experiment. 7. Students are able to perform the post-Hoc analyses of single factor experiment and displaying the results of statistical analysis. 8. Students are able to design a factorial randomized complete design and analyze the data. 9. Students are able to design a factorial randomized complete block design and analyze the data. 10. Students are able to design an incomplete factorial design and analyze the data. 11. Students are able to design a split plot design and analyze the data. |

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| | <p>12. Students are able to test the violations of the ANOVA assumptions, calculate the data transformation, and perform a new robust ANOVA for two factor experimental.</p> <p>13. Students are able to perform the post-hoc analyses of two factor experimental design.</p> <p>14. Students are able to report the results of statistical tests for two factor experiment.</p> |
| <p>Content</p> | <ol style="list-style-type: none"> 1. The basic concepts of experimental design, experimental components and types 2. Single factor experimental design –randomized complete design (RCD) (assumption, randomization, layout, linier model, and ANOVA) 3. Single factor experimental design –randomized complete block design (RCBD) assumption, randomization, layout, linier model, and ANOVA) 4. Single factor experimental design –RCD and RCBD with sub-sampling (assumption, randomization, layout, linier model, and ANOVA) 5. Single factor experimental design –RCD and RCBD with repeated measurement (assumption, randomization, layout, linier model, and ANOVA) 6. Violations of the ANOVA assumptions, data transformation, and new robust ANOVA for single factor experimental design 7. Post-Hoc analyses of single factor experiment and displaying results of statistical tests 8. Two factor experimental design – factorial randomized complete design (assumption, randomization, layout, linier model, and ANOVA) 9. Two factor experimental design – factorial randomized complete block design (assumption, randomization, layout, linier model, and ANOVA) 10. Two factor experimental design – incomplete factorial design (assumption, randomization, layout, linier model, and ANOVA) 11. Two factor experimental design – split plot design (assumption, randomization, layout, linier model, and ANOVA) 12. Violations of the ANOVA assumptions, data transformation, and new robust ANOVA for two factor experimental design 13. Post-hoc analyses of two factor experimental design |

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| | 14. Displaying results of statistical tests for two factor experiment |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Structured assignment (essay and paper) 3. Midterm exam (essay) 4. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Kwanchai A. Gomez, Arturo A. Gomez. 1984. Statistical Procedures for Agricultural Research. A Wiley-Interscience publication. 2. McDonald, J.H. 2014. Handbook of Biological Statistics (3rd ed.). Sparky House Publishing, Baltimore, Maryland. 3. Suwandi, S; Herlinda, S. Pratama, R, Arsi, A. 2022. R-code for statistical analysis of researches in plant protection. |
| Date of last amendment | 14 Oktober 2021 |

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| Module designation | Vertebrate pests |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | Ir.Yulia Pujiastuti, M.Si. Ph.D. Arsi, S.Pi., M.Si.. |
| Language | Indonesian |
| Relation to curriculum | Compulsory course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain the importance and scope of vertebrate pests 2. Students are able to explain the taxonomy of animals belonging to vertebrates that become pests, starting from phyla, class, and important orders. 3. Students are able to explain the bio-morphology of mice 4. Students are able to explain various factors that can affect the presence of rats and their population dynamics as well as estimation of rat populations 5. Students are able to explain the existence of rats, conditions for success and ways to control rats 6. Students are able to explain taxonomy, bio-ecology, and how to control wild boar 8. Students are able to explain taxonomy, bio-ecology, and bird control methods 9. Students are able to explain taxonomy, bio-ecology, and ways of controlling Monkeys 10. Students are able to explain taxonomy, bio-ecology, and ways of controlling Bats 11. Students are able to explain bio-ecological taxonomy, and ways of controlling Civets 12. Students are able to explain bio-ecological taxonomy, and ways of controlling hedgehogs 13. Students are able to explain bio-ecological taxonomy, and elephant control methods |
| Contents | <ol style="list-style-type: none"> 1. Introduction. Definition, importance and scope of vertebrate pests |

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| | <ol style="list-style-type: none"> 2. Taxonomy and animals classified as pests, general characteristics and phylum chordata, sub phylum Verteberata, classes and orders that become pests 3. Bio-morphology of mice. Order Rodentia and types of rats 4. Rat ecology (factors affecting population, population dynamics, population growth and estimation of rat population 5. Population, presence of rats, conditions of success and methods of controlling rats 6. Taxonomy, bio-ecology and methods of controlling Wild boar 7. Species, taxonomy, bio-ecology and methods of bird control 8. Taxonomy, bio-ecology and ways of controlling Monkeys 9. Types, taxonomy, bio-ecology, and methods of controlling Bats 10. Taxonomy, bio-ecology and ways of controlling Civets 11. Taxonomy, bio-ecology, and ways of controlling Hedgehogs 12. 12. Bio-ecological taxonomy, and ways of controlling elephants |
| Examination forms | <ol style="list-style-type: none"> 1. Write essays 2. Doing practical works |
| Study and examination requirements | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Student must attend 100% of practicums. 3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. Payne, J. And CM. Francis. 1985. A field guide to the mammals of Borneo. Malaysia 2. Payne, J., C.M. Francis, K. Phillipps, dan S.N. Kartikasari. 2000. <i>Panduan Lapangan Mamalia di Kalimantan, Sabah, Sarawak & Brunei Darussalam</i>. The Sabah Society, Wildlife Conservation Society-Indonesia Programme dan WWF Malaysia. ISBN 979-95964-0-8 3. Corbet, G.G dan J.E. Hill. 1992. The Mammals of the Indomalayan Region. A systematic Review. Oxford University Press, Oxford. 4. Suyanto, A. 1996. Taksonomi Rodentia. Bahan Kuliah Mahasiswa Diploma Hiegien Makanan FKH, IPB, Bogor. |

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5. Suyanto, A. 1999. Pengelolaan Koleksi Mamalia. Balai Penelitian dan Pengembangan Zoologi. Puslitbang Biologi LIPI. Bogor.
6. Suyanto, A. 2001. Penuntun Identifikasi Tikus (suku Muridae) di Jawa. Balai Penelitian dan Pengembangan Zoologi. Puslitbang Biologi LIPI. Bogor..
7. Sudarmaji. 2018. Tikus sawah: Bio-ekologi dan pengendalian.
8. B. Yuliadi Muhidin Siska Indriyani. 2016. TIKUS JAWA Teknik Survei Di Bidang Kesehatan. Badan Penelitian Dan Pengembangan Kesehatan Kementrian Kesehatan Ri
9. Ken P. Aplin, Peter R. Brown, Jens Jacob, Charles J. Krebs & Grant R. Singleton. 2003. Field methods for rodent studies in Asia and the Indo-Pacific. Australian Centre for International Agricultural Research Canberra, Australia.
10. Vincent Herbreteau, Sathaporn Jittapalapong , Worawut Rerkamnuaychoke , Yannick Chaval , Jean-François Cosson and Serge Morand. 2011. Protocols for field and laboratory rodent studies. Kasetsart University Press. 2011.
11. Ecology Asia. 2016. Small Mammals of South East Asia. [<http://www.ecologyasia.com/verts/squirrels-and-other-small-mammals.htm>]. Diakses 19 Juni 2016.
12. Maria, A. 2013. Produksi Kakao Terancam Akibat Serangan Hama Bajing. Balai Besar Perbenihan dan Proteksi Tanaman Perkebunan Surabaya. [<http://ditjenbun.pertanian.go.id/bbpptpsurabaya/berita-241-produksi-kakaoterancam-akibat-serangan-hama-bajing-.html>]. Diakses 19 Juni 2016.
13. Constantine, J. 2006. "Callosciurus notatus" (On-line), Animal Diversity Web. Accessed December 03, 2016 at http://animaldiversity.org/accounts/Callosciurus_notatus/
14. Duckworth, J.W., Lee, B. & Tizard, R.J. 2008. Callosciurus notatus. The IUCN Red List of Threatened Species 2008: e.T3600A9971096. <http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T3600A9971096.en>. Downloaded on 03 December 2016
15. Duckworth, J.W.; Timmins, R.J.; Choudhury, A.; Chutipong, W.; Willcox, D.H.A.; Mudappa, D.; Rahman, H.; Widmann, P.; Wilting, A.; Xu, W. (2016). "*Paradoxurus hermaphroditus*": e.T41693A45217835.

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16. Corbet, G.B. and J.E. Hill, 1992, *The Mammals of the Indomalayan Region: a systematic review*. Nat. Hist. Mus. Publ. and Oxford Univ. Press.
17. Baker N, Kelvin L. 2008. *Wild Animals of Singapore: A Photographic Guide to Mammals, Reptiles, Amphibians, and Freshwater Fishes*. Singapura: Vertebrate Study Group, Nature Society.

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| Module designation | Insect Ecology |
| Semester (s) in which the module is taught | 4 th semester/2 rd year |
| Person responsible for the module | Prof. Dr. Ir. Siti Herlinda, M.Si. Dr. Ir. Yulia Pujiastuti, M.S. Dr. Ir. Chandra Irsan, M.Si. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain the role of insects in human life and the factors that affect the life of insects 2. Students are able to explain about ecological processes in agricultural ecosystems. 3. Students are able to describe about physical factors that affect insects 4. Students are able to explain about biotic factors that affect insects 5. Students are able to explain about food factors 6. Students are able to explain about insect population values. 7. Students are able to explain about insect population control. 8. Students are able to explain about insect adaptation and protection. 9. Students are able to explain about insect bioecological sampling method 10. Students are able to explain about insect diversity analysis method 11. Students are able to explain about ecological services and global change. |
| Content | <ol style="list-style-type: none"> 1. The role of insects in human life and the factors that affect the life of insects 2. Ecological processes in agricultural ecosystems. 3. Physical factors that affect insects 4. The biotic factors that affect insects |

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| | <ol style="list-style-type: none"> 5. The food factors 6. The insect population values. 7. The insect population control. 8. The insect adaptation and protection. 9. The insect bioecological sampling method 10.The insect diversity analysis method 11.The ecological services and global change. |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (MCQ) 5. Final Exam (MCQ) |
| Reading List | <ol style="list-style-type: none"> 1. Herlinda, S. et al. 2021. Pengantar Ekologi Serangga. Unsri Press. Palembang 2. Price P.W. 2007. <i>Insect Ecology</i>. 3rd Edition. John Wiley and Sons. New York. 3. Price P.W, Denno, Environment and R. F. Wilson, Eubanks, M. D., Finke, D.L and Kaplan, I. 2011. <i>Insect Ecology. Behaviour, Population and Communities</i>. Cambridge Univ. Press. |
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| Module designation | Urban Entomology |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | Ir.Yulia Pujiastuti, M.S. Ph.D. Dr. Ir. Arinafril, Arsi, S.P., M.Si. |
| Language | Indonesian |
| Relation to curriculum | Elective course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 1700 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6200 minutes = 103.33 hours = 4,13 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to understand and explain the scope of urban entomology, the definition and importance of entomology in residential areas 2. Students are able to understand and explain insects that play a role in causing harm in residential areas 3. Students are able to understand and explain the importance of the environment in the breeding of insects in residential areas 4. Students are able to understand and explain the order Diptera as a nuisance insect in urban areas 5. Students are able to understand and explain the Isoptera order as a nuisance insect in urban areas 6. Students are able to understand and explain other orders of Orthoptera as nuisance insects in urban areas 7. Students are able to understand and explain other orders including insects (besides Diptera, Isoptera and Orthoptera) as pests in settlements 8. Students are able to understand and explain insects in the final landfill 9. Students are able to understand and explain insects in markets or other public places 10. Students are able to understand and explain insects that act as disease vectors 11. Students are able to understand and explain pest control in settlements by chemical means 13. Students are able to understand and explain pest control in settlements in the traditional way carried out by the wider community |

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| | <p>14. Students are able to understand and explain how to control mechanical physical engineering for insects in urban areas</p> <p>15. Students are able to understand and explain how to do integrated pest management on insects in settlements</p> |
| Contents | <ol style="list-style-type: none"> 1. The scope of urban entomology, definition and importance of entomology in residential areas 2. Insects which play a role in causing harm in residential areas 3. The importance of the environment in the breeding of insects in residential areas 4. Order Diptera as a nuisance insect in urban areas 5. Order Isoptera as nuisance insects in urban areas 6. Order Orthoptera as nuisance insects in urban areas 7. Other orders (excluded Diptera, Isoptera and Orthoptera) as pests in settlements 8. Insects in landfills 9. Insects in markets or other public places 10. Insects acting as vectors of disease 11. Control of pests in settlements by chemical means 12. Pest control in settlements in the traditional way carried out by the wider community 13. Mechanical physical and technical control methods for insects in urban areas 14. How to do integrated pest management on insects in settlement |
| Examination forms | <ol style="list-style-type: none"> 1. Write essays (Mid term-Final term) 2. Doing practical works |
| Study and examination requirements | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Student must attend 100% of practicums. 3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. New, T. 2015. Urban Insect Pest Management: Implications for Insect Conservation. DOI: 10.1007/978-3-319-21224-1_6 In book: Insect Conservation and Urban Environments 2. Robinson, WH. 2005. Urban Insects and Archnids : A hand book of urban entomology. Cambridge University Press. 3. Rust, . dan Nan-Yao Su. 2010. Managing Social Insects of Urban Importance Annual Review of Entomology 57(1):355-75 DOI:10.1146/annurev-ento-120710-100634 4. Bonnefoy X, Helge Kampen Kevin Sweeney 2008.. Public Health Significance of Urban Pests WHO. 292 p. |

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| | <ol style="list-style-type: none"> 5. Hastutiek P dan Fitri LE. 2007. Potensi <i>Musca Domestica</i> Linn. Sebagai vektor beberapa penyakit. <i>Jurnal Kedokteran Brawijaya</i>, vol. 23, no. 3, Desember 2007 6. Prabowo, K. 1992. Petunjuk Praktis Pengendalian Vektor dan Binatang Pengganggu. Jakarta: Depkes RL. 7. Putri PY, Jasmi, Armein, dan Zeswita L. 2013. Keanekaragaman Lalat (Cyclorrapha: Diptera) Pada Lokasi Penjualan Ikan Segar Di Kota Padang. Universitas Andalas Padang. 8. Rozendaal, JA. 1997. Vector Control. Methods for Use by Individual and Communities. Geneva: WHO. 9. Houst MK. 1999. Integrated management in and around home. California university. 10. Ranjeet Kumar. 2017. Insect Pests of stored grain: Biology, Behaviour and Managements strategis. Apple Academic Press. 412 p. |
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| Module designation | Plant Virology |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | Ir. Suparman SHK, Ph.D. Prof. Dr. Ir. Nurhayati, M.Si. Dr. Ir. Abu Umayah, M.S. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 practicum = 1700 structured assignment = 1440 self-study = 1440 exam = 220 total : 6200 minutes = 103.34 hours = 4.13 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students understand the history and development of plant virology 2. Students are able to picture the structure of plant virus particles and identify components constructing plant virus particles. 3. Students are able describe the system of classification and nomenclature of plant viruses. 4. Students are able to figure various types of plant disease symptoms caused by plant viruses. 5. Students are able to describe the mechanism of interaction between plant viruses and their hosts to develop disease 6. Students are able to explain how plant viruses replicate themselves in their host cells. 7. Students are able to explain how plant viruses spread mechanically, spread by seed, and spread by pollen 8. Students are able to explain how plant viruses spread mechanically, spread by seed, and spread by pollen. 9. Students are able to explain how plant viruses spread and distribute by non-persistent, semi-persistent and persistent vectors. 10. Students are able to explain how plant viruses spread by mite, nematode and fungi. 11. Students are able to describe techniques to detect the presence of virus particles in their host plant 12. Students are able to explain factors influencing plant virus epidemic. |

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| | <p>13. Students are able to explain various techniques suitable to control plant viruses.</p> <p>14. Students are able to describe symptoms, transmission and distribution of plant viruses infecting food crops.</p> <p>15. Students are able to describe symptoms, transmission and distribution of plant viruses infecting horticultural crops.</p> <p>16. Students are able to describe symptoms, transmission and distribution of plant viruses infecting estate crops.</p> |
| Content | <ol style="list-style-type: none"> 1. History and development of Plant Virology 2. Plant virus structures and composition 3. Nomenclature and classification of plant viruses 4. Disease symptoms caused by plant viruses. 5. Plant virus infection process 6. Plant virus replication and movement 7. Plant virus transmission: mechanical, seed born, and pollen born 8. Plant virus transmission by insect vectors 9. Plant virus transmission by non-insect vectors 10. Detection and diagnoses of plant virus 11. Ecology and epidemiology of plant virus diseases 12. Control of plant diseases caused by viruses 13. Viral disease of food crops 14. Viral diseases of horticultural crops 15. Viral disease of estate crops |
| Examination forms | <ol style="list-style-type: none"> 1. Write essays 2. Doing practical works 3. Oral presentation |
| Reading List | <ol style="list-style-type: none"> 1. Hull R. 2002. Matthews' Plant Virology. 4th Ed. London: Academic Press. 2. Hull R. 2009. Comparative Plant Virology, London: Academic Press. 3. Mahy, BWJ. and Mortel, VR. 2010. Desk Encyclopedia of plant and fungal Virology. New York: Academic Press. 4. Mayo, MA. 2002. The Principles and Current Practice of Plant Virus Taxonomy In: Khan J.A. and Dijkstra J. eds. Plant Viruses as Molecular Pathogens. New York: Food Products Press, 3-24. 5. Rybicki, E.P. and Pietersen, G. 1999. Plant virus disease problems in the developing world. Adv Virus Res, 53:127-75. 6. Sivakumaran K., Sun, J.H. and Kao. C.C. 2002. Mechanism of RNA Synthesis by a Viral RNA-Dependent RNA Polymerase In: Khan J.A. and Dijkstra J. eds. Plant Viruses |

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| | as Molecular Pathogens. New York: Food Products Press, 147-174 |
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| Module name | Apiology |
| Code | PPT 24615 |
| Semester (s) in which the module is taught | 4 rd semester/2 nd year |
| Person responsible for the module | Dr. Ir. Mulawarman, M.Sc. Ir. Arsy, M.Si. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Type of teaching | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 Practicum = 2040 Structured assignment =1440 Self-study = 1440 exam = 220 Total : 6540 minutes = 109 hours = 4,36 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain the evaluation of honey bees, honey hunting & beekeeping, differences in bee caste 2. Students are able to explain the Honey bee anatomy, wings and internal anatomy, bee nerves, genetics, genetics & genomics, hormones and immunology. 3. Students are able to explain the modern molecular-biology techniques to understand the behavior, health and biological aspects of honey bees. 4. Students are able to explain the hymenoptera, Apoidea, bees, molecular systematics, sociality, parasitism, plant-insect interactions 5. Students are able to explain the sense organs and sensilla, undulatory propulsion, random movement, nematode feeding and movement in tissue plant. 6. Students are able to explain the honey bee social organization, honey bee caste 7. Students are able to explain the life cycle and behavior, host response to parasites, post infection biology, influence on plant growth and production and survival. 8. Students are able to explain the hive, box, hive base, hive mat, hive shield, hive branding, entrance, frame, wire frame, queen cell 9. Students are able to explain the stinging bees, individual equipment, smoker, comb handling, best time to check combs, safety and security procedures . |

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| | <ol style="list-style-type: none"> 10. Students are able to explain the establish bee colony, core colony, bee pack, honey retrieval, colony upgrade, second hive. 11. Students are able to explain the division of tasks, time, distance, foraging choices and behavior, factors influencing foraging and foraging management. 12. Students are able to explain the honey, propolis, beeswax, royal jelly and health therapy. |
| Content | <ol style="list-style-type: none"> 1. Evaluation of honey bees, honey hunting & beekeeping, differences in bee caste. evolution and development and wild bees 2. Honey bee anatomy, wings and internal anatomy, bee nerves, genetics, genetics & genomics, hormones and immunology. 3. Modern molecular-biology techniques to understand the behavior, health and biological aspects of honey bees. 4. Hymenoptera, Apoidea, bees, molecular systematics, sociality, parasitism, plant-insect interactions. 5. Bee foraging behavior of honey bee colonies and preference of various available flora sources, nectar and pollen 6. Honey bee social organization, honey bee caste. 7. Queen selection and production, supply and demand, queen trade, queen biology and reproduction. 8. Hive, box, hive base, hive mat, hive shield, hive branding, entrance, frame, wire frame, queen cell 9. Stinging bees, individual equipment, smoker, comb handling, best time to check combs, safety and security procedures 10. Establish bee colony, core colony, bee pack, honey retrieval, colony upgrade, second hive. 11. Division of tasks, time, distance, foraging choices and behavior, factors influencing foraging and foraging management 12. Honey, propolis, beeswax, royal jelly and health therapy. |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exams (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Noah Wilson-Rich With Kelly Allin, Norman Carreck & Andrea Quigley. 2014. The Bee - A Natural History Princeton University Press Princeton & Oxford 2. Bryan N. Danforth, Sophie Cardinal, Christophe Praz, Eduardo A.B. Almeida, Denis Michez. 2012. The Impact of |

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| | <p>Molecular Data on Our Understanding of Bee Phylogeny and Evolution. Rev. Entomol. 2013.58:57-78. Downloaded from www.annualreviews.org</p> <p>3. Sampat Ghosh, Hyejin Jeon, and Chuleui Jung. 2020. Foraging behaviour and preference of pollen sources by honey bee (<i>Apis mellifera</i>) relative to protein contents. Journal of Ecology and Environment 44:4</p> <p>4. Miriam Bixby, M. Marta Guarna, Shelley E. Hoover, Stephen F. Pernal. 1998. Breeding Techniques And Selection For Breeding Of The Honeybee.</p> |
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| Module designation | Soil Fertility |
| Semester (s) in which the module is taught | 3&4 ^d semester/2&3 rd year |
| Person responsible for the module | <ol style="list-style-type: none"> 1. Prof. Dr. Ir. Dedik Budianta, MS 2. Ir, Marsi, MSc, PhD 3. Dr. Ir. A. Napoleon, MP 4. Dr. Ir. Agus Hermawan, MS 5. Prof. Dr. Ir. Nuni Gofar, MS 6. Dr. Ir. Madjid Rohim, MS 7. Ir. Sabarudin, MSc. PhD 8. Ir. Siti Nurul Aidil Fitri, MS 9. Dr. Ir. Madjid Rohim, MS |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 Praktikum = 2040 structured assignment =1440 self-study = 1440 exam = 220 total : 6540 minutes = 109 hours = 4,36 ects |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain why soil fertility is very important for agriculture. 2. Students are able to explain the definition and the soil fertility 3. Students are able to describe the factors affecting soil fertility 4. Students are able to explain what is plant growth and factors affecting it 5. Students are able to explain the soil nutrient (macro and micro elements essential) |
| Content (14 meetings and two examinations) | <ol style="list-style-type: none"> 1. Introduction of soil fertility for agriculture (definition, function, history of soil fertility) 2. Factors affecting the plant growth and its measurements 3. Principles of soil and plant relationship for plant growth 4. Soil nutrients for agriculture (Macro and micro elements and its role for plant growth) 5. Mechanisms nutrient uptake for plant growth 6. Efforts to improve soil fertility (SOM and liming) 7. Soil fertility evaluation 8. Examination |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) |

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| | <ol style="list-style-type: none"> 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Adams, F. 1984. Soil Acidity and Liming. Soil Sci. Soc. Am. Inc. Madison. USA. 2. Marschner, H. 1986. Mineral nutrition in Higher Plants. Academic. Press Inc. London. 674. P. 3. Mengel, K. and E.A. Kirkby. 1987. Principles of plant nutrition. International Potash Institute. Bern, Switzerland. 687 p. 4. Nyakpa, M.Y., A.M. Lubis, M.A. Pulung, A.G. Amrah, A. Munawar, N. Hakim and G.B. Hong. 1985. Kesuburan Tanah. BKS PTN. WUAE Project, Palembang 5. Tisdale, S.L., W.L. Nelson, and J.D. Beaton. 1984. Soil Fertility and Fertilizer. Macmillan Pub. Co., New York. 6. Budianta, D and D. Ristiani. 2013. Pengelolaan Kesuburan Tanah. Unsri Press |
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| Module designation | International Economics |
| Semester (s) in which the module is taught | 5 th semester/3 rd year |
| Person responsible for the module | Prof. Dr. Ir. Andy Mulyana, M.Sc. Dr. Ir. Laila Husin, M.Sc. Ir. M. Yazid, M.Sc., Ph.D. Dr. Desi Aryani, S.P., M.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning, Case based Learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 practicum = 2040 structured assignment =1440 self-study = 1440 exam = 220 total : 6540 minutes = 109 hours = 4.36 ects |
| Credit points | 3 (2-1) credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | 1. Attitude CP-STN 1 : Devotion to God Almighty. CP-STN 2: Have good morals, ethics and personality in completing their tasks. CP-STN 3: Acting as citizens who are proud and love the homeland and support world peace. CP-STN 4 : Able to work together and have a social sensitivity and high concern for the community and its environment. 2. Ability in the Field of Science CP-KIP 4: Able to understand operationally the social, economic and technological principles that underlie the management of agricultural businesses and agricultural industries as well as social-cultural aspects in rural areas for decision making and problem solving in the field of agribusiness. 3. Skills CP-KBP 4: Able to apply and utilize science and technology in solving problems in the agribusiness field that are adaptive to environmental changes. 4. Competence CP-KBP 8: Able to motivate and empower the community in the field of agribusiness business development quantitatively to improve community welfare. |

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| <p>Content</p> | <ol style="list-style-type: none"> 1. Introduction: Understanding, Scope, and Role 2. Pre-Classical Theory (Mercantilism) 3. Classical Theory: Absolute Advantage (Adam Smith) 4. Classical Theory: Comparative Advantage (David Ricardo) 5. Modern Theory: Heckscher-Ohlin 6. Other Modern Theory 7. Current Theory 8. International Economic Policy 9. International Economic Policy Instruments 10. International Economic Cooperation 11. International Monetary System 12. Foreign Exchange and Exchange Rate 13. International Financing and Payments 14. Balance of Payments |
| <p>Examination forms</p> | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| <p>Reading List</p> | <ol style="list-style-type: none"> 1. Ekonomi Internasional Buku Kesatu Teori dan Kebijakan Perdagangan Internasional. Dr. Hamdy Hady. Ghalia Indonesia. 2. Ekonomi Internasional Buku Kedua Teori dan Kebijakan Keuangan Internasional. Dr. Hamdy Hady. Ghalia Indonesia. 3. An Introduction to International Economics. Dominick Salvatore. John Wiley & Sons, Inc. |
| <p>Date of last amendment</p> | <p>23 May 2021</p> |

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| Module designation | Agricultural Extension |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | Dr. Yunita, S.P., M.Si Dr. Riswani, S.P., M.Si Prof. Dr. Ir. Sriati, M.S. Ir. Fauzia Asyik, M.A., PhD Henny Malini, S.P.,M.Si |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning, Cased Based Learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 practicum = 2040 structured assignment =1440 self-study = 1440 exam = 220 total : 6540 minutes = 109 hours = 4.36 ects |
| Credit points | 3 (2-1) credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <p>1. Attitude STN 6 : Upholding law enforcement and having the spirit to put the interests of the nation and the wider community first. KIP 4 : Able to understand operationally the social, economic and technological principles that underlie the management of agricultural businesses and the agricultural industry and socio-cultural aspects in the countryside for decision making and problem solving in the field of agribusiness</p> <p>2. Skills KBP 5 : Able to communicate and negotiate effectively with stakeholders in the development of agribusiness operating systems by utilizing information technology in the field of agribusiness, to realize sustainable and efficient agribusiness</p> <p>3. Competency KBP 7 : Able to communicate business policy and agribusiness management for farmer empowerment KBP 8 : Able to motivate and empower the community in the field of agribusiness business development to improve community welfare</p> |

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| Content | <ol style="list-style-type: none"> 1. Definition, and Scope of Agricultural Extension 2. Philosophy and Goals of Agricultural Extension 3. Agricultural Extension Method 4. Classification of Agricultural Extension Methods 5. Presentation of Materials and Group Discussion 6. Agricultural Extension Media 7. Agricultural Extension Materials 8. Agricultural Extension Institutions 9. Diffusion of Agricultural Innovation 10. Presentation of Materials and Group Discussion 11. Preparation of Agricultural Extension Planning 12. Revitalization of Agricultural Extension 13. Arrangement of Agricultural Extension System 14. Agricultural Extension in the Digital Age |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Van den Ban, A.W. and H. S Hawkins. 1999. Agricultural Extension. Kanisius, Yogyakarta. 2. Roger, E.M and F.F. Shoemaker.1971. Diffusion of Innovation. New York: Free Press. 3. Cees Leeuwis, 2010. Communication for Rural Innovation. Rethinking Agricultural Extension. Kasinius, Yogyakarta. 4. Nataliningsih. 2018. Participatory Counseling for Women Farmers Groups. C.V. Alfabeta. Bandung. 5. Mardikanto, Totok. 2009. Agricultural Extension System. LPP and UPT Publishing and Printing. UNS. |
| Date of last amendment | 23 November 2021 |

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| Module Designation | Annual Crop Cultivation |
| Code | PAG 204216 |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | Prof. Dr. Ir. Rujito Agus Suwignyo, M. Agr. Ir. Teguh Achadi, M. P. Fitra Gustiar, S. P., M. Si. Ir. Sri Sukarmi, M. P. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to understand annual crops boundaries. 2. Students are able to understand the economic value of annual crops and their functions. 3. Students are able to understand the development of annual crops in Indonesia. 4. Students are able to classify the groups of annual crops. 5. Students are able to understand the growth factors and yield of annual crops. 6. Students are able to explain internal factors determining the growth and yield of annual crops. 7. Students are able to explain external factors determining the growth and yield of annual plants. 8. Students are able to understand the cultivation stages of annual crops. 9. Students are able to understand sugarcane cultivation. 10. Students are able to understand tobacco cultivation. 11. Students are able to understand cereal crops cultivation. 12. Students are able to understand bean crops cultivation. 13. Students are able to understand tuber cultivation. |
| Content | <ol style="list-style-type: none"> 1. Annual crops boundaries. 2. The economic value of annual crops and their functions. 3. The development of annual crops in Indonesia. 4. The classification of annual crops. 5. The growth factors and yield of annual crops. 6. Internal factors determining growth and yield of annual crops. |

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| | <ol style="list-style-type: none"> 7. External factors determining growth and yield of annual crops. 8. Cultivation stages of annual crops. 9. Sugarcane cultivation. 10. Tobacco cultivation. 11. Cereal crops cultivation. 12. Bean crops cultivation. 13. Tuber cultivation. |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (essay) 5. Final Exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. Morachan, Y.B. 1978. Crop Production and Management. Oxford & Ibh Publishing Co., 268 P. 2. Matheson, E.M., Lovet, J.V., Blair, G.Y. & R.Y. Lawn, 1975. Annual Crop Production. A Course Manual in Annual Crop Production Academy Press. Pty. Ltd. Brisbane. 139 P. 3. Kuswanto, H. 1996. Dasar-Dasar Teknologi Produksi Tanaman Pangan. Penerbit Andi. Yogyakarta. 4. Research publications related to annual crops cultivation. |
| Date of last amendment | 30 June 2021 |

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| Module Designation | Perennial Crops Cultivation |
| Code | PAG 205216 |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | <ol style="list-style-type: none"> 1. Dr. Ir. M. Umar Harun, M.S. 2. Dr. Ir. Erizal Sodikin 3. Dr. Ir. Marlina, M. Si |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | <ol style="list-style-type: none"> 1. Lectures (explanation, discussion) 2. Structured assignment (i.e.: article reading and review) 3. The class size 30-75 students per class 4. Contact hours for lecture are 23.33 hours per semester 5. Total hours practical is 34.00 hours per semester |
| Workload (incl. Contact hours, self-study hours) | <ol style="list-style-type: none"> 1. Lectures (2 x 50 minutes) per week or 23.33 hours per semester 2. Structured assignment (i.e.: article reading and review): 2 x 60 minutes per week or 24 hours per semester 3. Self-study: 2 x 60 minutes per week or 24 hours per semester |
| Credit points | 3 credits (equivalent with 4.36 ECTS) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <p>Attitude</p> <ol style="list-style-type: none"> 1. LO-AV-11: Internalize the spirit of independence, struggle, and entrepreneurship. <p>Knowledge</p> <ol style="list-style-type: none"> 1. LO-KC-1: Mastering the theoretical concepts and being able to develop science and technology for the cultivation of food crops, plantations and horticulture based on local wisdom and resources. <p>Specific Skill</p> <ol style="list-style-type: none"> 1. LO-SS-5: Capable of planning and evaluating efficient and effective crop cultivation systems. |
| Content | <ol style="list-style-type: none"> 1. Introduction to perennial crops cultivation. 2. Plant breeding and superior clone of Rubber. 3. Cultivation of rubber plant. 4. Plant breeding and superior variety of oil palm. 5. Cultivation of Oil palm. 6. Plant breeding and superior clone of Coffee. 7. Cultivation of Coffee. 8. Plant breeding and superior variety of coconut. 9. Cultivation of Coconut. 10. Cultivation of Pepper. 11. Cultivation of Cacao. |

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| | <p>12. Cultivation of Clove.</p> <p>13. Cultivation of Areca palm.</p> <p>14. Cultivation of Aren.</p> |
| Examination forms | <p>Quiz, Mid-terms and Final Examination</p> <ol style="list-style-type: none"> 1. Essays questions 2. Practical works 3. Writing Case Paper 4. Oral presentation |
| Media employed | LCD, whiteboard, websites |
| Reading list | <ol style="list-style-type: none"> 1. Tyasmoro S.Y., P.N. Permanasari, dan A. Saitama. 2021. Teknologi Produksi Tanaman Perkebunan. Universitas Brawijaya Press. 168 pp. 2. Sunarko. 2014. Budidaya Kelapa Sawit di Berbagai Jenis Lahan. Agromedia. 208 pp. 3. Corley, R.H.V. and P.B.H. Tinker. 2015. The Oil Palm. Wiley Blackwell. 680 pp. 4. Research publications related to perennial crops cultivation. 5. Research publications related to perennial crops cultivation |
| Date of last amendment | 30 June 2021 |

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| Module Designation | Horticultural Crops Cultivation |
| Code | PAG 206216 |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | 1. Prof. Dr. Ir. Benyamin Lakitan, M.Sc. 2. Dr. Ir. Muhammad Ammar, M.P. 3. Dr. Ir. Susilawati, M.Si. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | 1. Lectures (explanation, discussion) 2. Structured assignment (i.e.: article reading and review) 3. The class size 30-75 students per class 4. Contact hours for lecture are 23.33 hours per semester 5. Total hours practical is 34.00 hours per semester |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS semester |
| Credit points | 3 credits (equivalent with 4.36 ECTS) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | Attitude 1. LO-AV-11: Internalize the spirit of independence, struggle, and entrepreneurship. Knowledge 1. LO-KC-1: Mastering the theoretical concepts and being able to develop science and technology for the cultivation of food crops, plantations and horticulture based on local wisdom and resources. Specific Skill 1. LO-SS-5: Capable of planning and evaluating efficient and effective crop cultivation systems. |
| Content | 1. Definition, development, nutritional and economic value of horticultural crops. 2. Horticultural plant classification. 3. Growth factors and development of horticultural crops: Vegetables, Fruits, Ornamental and Biopharmaceuticals. |
| Examination forms | Quiz, Mid-terms and Final Examination 1. Essays questions 2. Practical works 3. Writing Case Paper 4. Oral presentation |
| Media employed | LCD, whiteboard, websites |

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| <p>Reading list</p> | <ol style="list-style-type: none"> 1. Badan Pusat Statistik.2012. Konsep dan Definisi Baku Statistik Pertanian 2012. Subdirektorat Pengembangan. 2. Standardisasi dan Klasifikasi Statistik Direktorat Pengembangan Metodologi Sensus dan Survei. 478 hal. ISBN : 978-979-064-592-9. 3. Lakitan, B. 1995. Hortikultura Teori, Budidaya dan Pasca Panen. PT RajaGrafindo Persada. Jakarta. 220 hal. 4. Susilawati. 2017. Mengenal Tanaman Sayuran (Prospek dan pengelompokkan). Unsri Press. Palembang. 114 hal 5. Syukur, M., S.Sujiprihati., R.Yunianti. 2012. Teknik Pemuliaan Tanaman. Penebar Swadaya. Bogor. 348 hal. 6. Adams, C., Early, M., Brook, J., Bamford, K. 2014. Principles of Horticulture: Level 2 1st Edition. Routledge. 7. Dawson, P. 2011. A Handbook for Horticultural Students. Peter Dawson. 8. Capon, B. 2010. Botany for Gardeners, 3rd Edition. Timber Press. 9. Bird, C. 2014. The Fundamentals of Horticulture: Theory and Practice 1st Edition. Cambridge university Press. 10. Pollan, M. 2001. The Botany of Desire: A Plant's-Eye View of the World. Random House Trade Paperbacks. 11. Hodge, G. 2013. Practical Botany for Gardeners: Over 3,000 Botanical Terms Explained and Explored. University of Chicago Press. 12. Poerwanto, R., Susula, A.D. 2021. Teknologi Hortikultura. PT Penerbit IPB Press. 13. Jain, S.M., Ochatt, S.J. 2010. Protocols for In Vitro Propagation of Ornamental Plants. Humana Press. 14. Research publications related to horticultural crops cultivation. |
| <p>Date of last amendment</p> | <p>30 June 2021</p> |

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| Module Designation | Organic Farming |
| Code | PAG 602216 |
| Semester (s) in which the module is taught | 4 th semester/2 nd year |
| Person responsible for the module | Dr. Ir. Muhammad Ammar, M. P. Dr. Ir. Susilawati, M. Si. Dr. Ir. Maria Fitriana, M. Sc. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 4500 minutes = 75 hours = 3,00 ECTS |
| Credit points | 3 credits (2 credits theory and 1 practice) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students understand the definition of organic agriculture. 2. Students are able to understand the history, the role and development of organic agriculture. 3. Students are able to classify sustainable agriculture system. 4. Students are able to differentiate organic and inorganic products. 5. Students are able to explain about integrated agriculture. 6. Students are able to understand the SRI rice cultivation system. 7. Students are able to understand the usage of agricultural waste, livestock, and garbage as the source of organic fertilizers. 8. Students are able to understand about compost and composting. 9. Students are able to explain the role of compost in improving the quality and nutrient of organic fertilizer. 10. Students are able to classify the various types of compost. 11. The students are able to understand how to fertilize in organic agriculture. 12. Students are able to explain various organic fertilizers. 13. Students are able to explain nutrient management in organic agriculture and the role of organic matter in providing nutrients. 14. Students are able to explain the benefits of green manure on soil fertility. 15. Students are able to describe various types of cropping patterns in organic agricultural system. |

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| | 16. Students are able to explain how to do product certification in organic agriculture. |
| Content | <ol style="list-style-type: none"> 1. The definition of organic agriculture. 2. The history, role and development of organic agriculture. 3. Sustainable agriculture system. 4. Differences of organic and inorganic products. 5. Integrated agriculture system 6. SRI rice cultivation system. 7. The usage of agricultural waste, livestock, and garbage as the source of organic fertilizer. 8. Compost and composting. 9. The role of compost in improving the quality and nutrient of organic fertilizer. 10. Various types of compost. 11. Fertilization in organic agriculture. 12. The various types of organic fertilizer. 13. Nutrient management in organic agriculture and the role of organic matter in providing nutrients. 14. The benefits of green manure on soil fertility. 15. Various types of cropping patterns in organic agriculture system. 16. Product certification in organic agriculture system |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Structured assignment (essay and paper) 3. Midterm (essay) 4. Final Exam (essay) |
| Reading list | <ol style="list-style-type: none"> 1. Solomons, T.W.G., Fryhle, C.B. 2011. Organic Farming. John Wiley & Sons Inc. 2. Newton, J. 2004. Profitable Organic Farming Second Edition. Blackwell Publishing. 3. Mengel, K., Kirkby, E.A. 2001. Principles of Plant Nutrition. Kluwer Academic Publishers. 4. Altieri, M. A. 1996. Agroecology: The science of Sustainability Agriculture, West View Press. Colorado. 5. Francis, C.H. 2009. Organic Farming; the Ecological System. Agronomy Monograph 54. Amsoc Agron Inc. 6. Reijntjes, C., Bertus Havenkort dan Waters Bayer. 2003. Pertanian Masa Depan. Pengantar untuk Pertanian Berkelanjutan dengan Input Luar Rendah. Penerbit Kanisius, Yogyakarta. 7. Sutanto Rachman, 2002. Penerapan Pertanian Organik (Pemasyarakatan dan Pengembangannya). Penerbit Kanisius. Yogyakarta. 219 pp. 8. Green manure (Pupuk hijau). http://www.lestarimandiri.org.id/pupuk-organik/pupuk-hijau/273-tanaman-pupuk-hijau.html 9. Research publications related to organic agriculture. |
| Date of last amendement | 30 June 2021 |

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| Module Name | Scientific methods |
| Code | PER 31115 |
| Semester (s) in which the module is taught | 5 th semester/3 rd year |
| Person responsible for the module | Prof. Dr. Ir. Siti Herlinda, M.Si. Dr. Ir. Chandra Irsan, M.Si. Ir. Suparman SHK, Ph.D. |
| Language | Indonesian |
| Type of teaching | Compulsory Course |
| Relation to curriculum | Face to face Lecturing, E-Learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 practicum = 0 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3.0 ects |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | After completing the course, students will be able to: <ol style="list-style-type: none"> 1. understand the philosophy and general concepts of research methods course material 2. understand on creativity and extraction of scientific resource information; scientific writing, ethic and plagiarism 3. describe and apply the principle of scientific research proposal writing; scientific paper presentation; problem statement, hypothesis and frame of logical construct. 4. understand and describe type of research, design and variable; data management, analysis and interpretation. 5. understand and describe descriptive quantitative analysis research style; predictive and modelling research style. 6. understand and describe research result discussion and conclusion; scientific report writing and author guideline |
| Content | <ol style="list-style-type: none"> 1. Introduction 2. Creativity and Extraction of Scientific Resource Information 3. Scientific Writing, Ethic and Plagiarism 4. Scientific Paper Presentation 5. Principle of Scientific Research Proposal Writing 6. Problem Statement, Hypothesis and Frame of Logical Construct |

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| | 7. Presentation of Student Group Case Study-I 8. Type of Research, Design and Variable 9. Data Management, analysis and Interpretation 10. Descriptive Quantitative Analysis Research Style 11. Predictive and Modelling Research Style 12. Research Result Discussion and Conclusion 13. Scientific Report Writing and Author Guideline Presentation of Student Group Case Study-I |
| Examination forms | 1. Presentation 2. Essay project |
| Reading list | 1. Basten, G. 2014. Introduction to Scientific Research Project. Graham Baseten & Bookboon.com 2. 1.2. Rawlings, O., S. G. Pentula, and D. A. Dickey1998. Applied Regression Analysis: A Research Tool. Springer-Verlag New York, Inc. 3. Wargiono, J. Hermanto, Sunihardi. 2009. Ubikayu: Inovasi Teknologi dan Kebijakan Pengembangan. Pusat Penelitian dan Pengembangan Tanaman Pangan, Badan Penelitian dan Pengembangan Pertanian. Bogor. Indonesia. 4. Feri Kusnandar, Rahayu, W.P. Marpaung, A.M. Santoso U. Perspektif Global Ilmu dan Teknologi Pangan jilid 2. IPB Press. Bogor. Indonesia. 5. Muchtadi, T.R. Sugiyono, Ayustaningwarno, F. 2014. Ilmu Pengetahuan Bahan Pangan. Alfabeta. Bandung. Indonesia. |
| Date of last emendment | 30 June 2021 |

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| Module name | Introduction to Plant Protection Biotech |
| Code | PPT 35115 |
| Semester (s) in which the module is taught | 5rd semester/3rd year |
| Person responsible for the module | Dr. Ir. Abu Umayah, MS. Dr. Ir. Mulawarman, M.Sc. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Type of teaching | Lecture, practical, and project, |
| Workload | lectures = 1400 practicum = 0 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3.0 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain the DNA structure 2. Students are able to explain the RNA structure 3. Students are able to explain the genes and chromosomes 4. Students are able to explain the process of transcription and translation 5. Students are able to explain the protein biosynthesis 6. Students are able to explain the gene expression control 7. Students are able to explain the bioreaction 8. Students are able to explain the imunolocalization 9. Students are able to explain the biological active cells & enzymes 10. Students are able to explain the cell tissue & organ culture 11. Students are able to explain the genetic engineering 12. Students are able to explain the gene transfer 13. Students are able to explain the recombinant DNA 14. Students are able to explain the hybridoma technique |

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| Contents | <ol style="list-style-type: none"> 1. DNA structure 2. RNA structure 3. Genes and chromosomes 4. Process of transcription and translation. 5. Protein biosynthesis 6. Gene expression control 7. Immunolocalization 8. Biological active cells & enzymes 9. Cell tissue & organ culture 10. Genetic engineering 11. Gene transfer 12. Recombinant DNA 13. Hybridoma technique |
| Examination forms | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Student must attend 100% of practicums. 3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <p>Paul A. Hedin, J.J. Menn, R. M. Hollingworth. 1988. Biotechnology for Crop Protection. American Chemical Society, Washington, DC</p> <p>Ferber, D. 1999. GM crops in the cross hairs. Science 286: 1662-1665.</p> <p>Food and Agriculture Organization (FAO). 1993. "Production year book" FAO, Rome.</p> <p>Hails, R. S. 2000. Genetically modified plants—the debate continues. Tree 15: 14-18.</p> <p>Oerke, E. -C., Dehne, H. -W., Schonbeck, F., and Weber, A. 1994. "Crop production and crop protection: estimated losses in major food and cash crops." Elsevier, Amsterdam.</p> <p>Sagar, A., Daemmrich, A., and Ashiya, M. 2000. The tragedy of the commoners: biotechnology and its publics. Nature Biotechnology 18: 2-5.</p> <p>The Economist, March 25th, 2000 "Agriculture and Technology: Growing pains" pages 1-16 available at: (www.economist.com)</p> <p>Trewavas A. 1999. Gene flow and GM questions. Trends in Plant Science, 4: 339.</p> |
| Date of last emendment | 30 June 2021 |

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| Module designation | Plant Entomology |
| Semester (s) in which the module is taught | 5 th semester/3 rd year |
| Person responsible for the module | Ir.Yulia Pujiastuti, M.Si. Ph.D. Dr.Ir. Arinafril.. |
| Language | Indonesian |
| Relation to curriculum | Compulsory course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 practicum = 1360 structured assignment =1440 self-study = 1440 exam = 220 total : 5860 minutes = 97.66 hours = 3.91 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to to explain definition and scope of Plant Pest Science, the importance of pests in reducing agricultural production levels 2. Students are able to explain the role and relationship between pest attack and agroecosystem 3. Students are able to explain grouping of pest attacking agricultural crop 4. Students are able to explain the basic theory of pest attack 5. Students are able to explain internal factors that affect pest life 6. Students are able to explain external factors that affect the survival of pests 7. Students are able to explain pest behavior and its relationship to population in one growing season 8. Students are able to explain the growth rate of insects 9. Students are able to explain Life Table or insect life balance 10. Students are able to explain distribution pattern of insects 11. Students are able to explain Insect sampling (sampling) 12. Students are able to explain pest attack rate assessment 13. Students are able to explain behavior of insects 14. Students are able to explain Insect Diversity Index |

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| Content | <ol style="list-style-type: none"> 1. Definition and scope of Plant Pest Science, the importance of pests in reducing agricultural production levels 2. The role and relationship between pest attack and agroecosystem 3. Grouping of pest attacking agricultural crop 4. The basic theory of pest attack 5. Internal factors that affect pest life 6. External factors that affect the survival of pests 7. Pest behavior and its relationship to population in one growing season 8. the growth rate of insects 9. Life Table or insect life balance 10. Distribution pattern of insects 11. Insect sampling (sampling) 12. Pest attack rate assessment 13. Behavior of insects 14. Insect Diversity Index |
| Examination forms | <ol style="list-style-type: none"> 1. Write essays 2. Doing practical works |
| Study and examination requirements | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Student must attend 100% of practicums. 3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. Metcalf, R.L. and W.H. Luckmann. 1994. Introduction to Insect Pest Management. 2. Hill, D.S. 1983. Agricultural Insect Pests of the Tropics and Their Control. 3. Kalshoven, 1981. The Pests of Crops in Indonesia. PT Ichtar Baru-van Hoeve. Jakarta. 4. David V. Alford , 2007. Pests of Fruit Crops: A Color Handbook (Plant Protection Handbooks). 5. Wh. H. Dreissig, E.A. Heinrichs, J.A. Litsinger and K Moody.1988. Illustrated Guide to Integrated Pest Management in Rice in Tropical Asia 6. Larry Strand.2013. Integrated Pest Management for Rice. 7. Jim M Waller, M Bigger and Rory J Hillocks. 2007. Coffee Pests, Diseases and their Management. |

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8. Dennis S. Hill. 2008. Pests of Crops in Warmer
Climates and Their Control

Date of last amendment

30 June 2021

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| Module designation | Plant Pathology |
| Semester (s) in which the module is taught | 5 th semester/3 rd year |
| Person responsible for the module | Prof. Dr. Ir. Nurhayati, M.Si. Dr. Ir. A. Muslim, M.Agr |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 1360 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 5860 minutes = 97,666 hours = 3,91 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain the history of disease development and the terminology of plant diseases including their signs and symptoms 2. Students are able to explain the difference between signs and symptoms of disease. 3. Students are able to explain how the process of interaction between the pathogen-host and the environment and the occurrence of plants disease 4. Students are able to explain how the factors that play a role in the development of plant diseases and disease epidemics occur 5. Students are able to explain how plants can defend themselves from pathogenic infections 6. Students are able to explain how pathogens affect various physiological processes in plants. 7. Students are able to explain how external factors affect the development of plant diseases 8. Students are able to explain how abiotic factors can cause damage to plants 9. Students are able to explain various causes of diseases such as fungi, nematodes, bacteria, viruses, etc |

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| | <ol style="list-style-type: none"> 10. Students are able to explain various causes of diseases such as fungi, nematodes, bacteria, viruses etc. 11. Students are able to provide solutions in disease management and control. 12. Students are able to explain how climatic factors such as humidity, temperature, etc. can cause damage to plants. 13. Students are able to explain the symptoms and how fungi and bacteria infect plants. 14. Students are able to explain the symptoms and how viruses and nematodes infect plants. 15. Students are able to explain the difference between pathogens and be able to identify the types of pathogens. Students are able to explain how to manage plant diseases. |
| Content | <ol style="list-style-type: none"> 1. History of plant diseases and plant disease terminology important diseases of rice and the management 2. Plant disease signs and symptoms 3. Plant disease triangle. 4. Plant diseases development and epidemics. 5. Plants defense 6. Interaction of environmental factors and plant disease development. 7. Abiotic plants diseases 8. Plant diseases caused by fungi 9. Plant diseases caused by bacteria 10. Plant diseases caused by viruses 11. Plant diseases caused by nematode 12. Plant diseases caused by mycoplasma and others 13. Plant Diseases Management |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (MCQ) 5. Final Exam (essay) |

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| Study and examination requirements | 6. Student must attend minimum 85% of delivered courses. 7. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. Agrios GN. 2005. Plant Pathology, Elsevier Academic Press San Diego CA 2. Semangun, H . 2006. Pengantar ilmu penyakit tumbuhan.Gajah Mada University Press 3. Campbell (1990). Introduction plant diseases epidemiology. Wiley-Interscience 4. George N Agrios (1978). Plant Pathology. Academic Press. 5. Ronald, C. P (2007). Plant-pathogen interaction.Humana Press Inc |
| Date of last amendement | 30 June 2021 |

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| Module designation | Plant Quarantine |
| Semester (s) in which the module is taught | 5 th semester/3 rd year |
| Person responsible for the module | Dr.Ir. Abu Umayah, M.S. Dr. Ir. Yulia Pujiastuti, M.S. |
| Language | Indonesian |
| Relation to curriculum | compulsory course |
| Teaching methods | lectures and discussions |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 0 Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 4500 minutes = 75 hours = 3.0 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students understand the history and development of plant quarantine 2. Students are able to explain the organizational structure of quarantine 3. Students are able to identify quarantine pests of groups A1 and A2, which are spread in Indonesia 4. Students are able to explain plant quarantine regulations in Indonesia 5. Students are able to describe plant quarantine measures 6. Students are able to explain cases of agricultural quarantine in Indonesia 7. Students are able to explain agricultural quarantine cases abroad 8. Midterm exam 9. Students are able to explain how quarantine rules as non-tariff barriers 10. Students are able to explain sanitary and phytosanitary standards 11. Students are able to explain ISPM (International Standard for Phytosanitary Measures 12. Students are able to explain the ISPM No. 3, about the regulation of the entry and release of exotic biological agents 13. Students are able to explain ISPM No. 15, about guidelines for regulating packaging wood materials in international trade 14. Students are able to describe Pest Risk Analysis (PRA) |

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| | 15. Students are able to describe food safety and WTO 16. Final exam. |
| Content | 1. The scope of plant quarantine, its history and development 2. Quarantine organizational structure 3. pests and quarantine pests 4. Plant quarantine regulations in Indonesia. 5. Plant quarantine measures 6. Agricultural quarantine cases in Indonesia 7. Agricultural quarantine cases abroad 8. Midterm exam 9. Quarantine rules as non-tariff barriers 10. Sanitary and Phytosanitary Standards 11. ISPM (International Standard for Phytosanitary Measures) 12. ISPM No. 3 13. ISPM No. 15 14. Pest Risk Analysis (PRA) 15. Food safety and WTO 16. Final exam |
| Examination forms | 1. Write essays 2. Doing practical works |
| Study and examination requirements | 1. Student must attend minimum 85% of delivered courses. 2. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | 1. FAO. 2005. ISPM (International Standard for Phytosanitary Measures) 2. Pusat Karantina Tumbuhan Dan Keamanan Hayati Nabati Badan Karantina Pertanian Kementerian Pertanian. 2013. Diagnosis protocol kelompok tungau. Jakarta. 3. Badan Karantina Ikan, Pengendalian Mutu dan Keamanan Hasil Perikanan (BKIPM). 2016. Rencana Strategis 2015-2019. Badan Karantina Ikan Pengendalian Mutu dan Keamanan Hasil Perikanan. KKP. Jakarta. 4. Diphayana, W. 2014. Hambatan Non Tarif Dalam Perdagangan. http://wahonodiphayana.blogspot.co.id/2014/12/hambatan-non-tarif-dalam-perdagangan.html . Tanggal diunduh: 1 November 2016 |

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5. Koo, W. W., P. L. Kennedy. 2005. International Trade and Agriculture. United Kingdom: Blackwell Publishing.
6. Peraturan Badan Karantina Ikan Pengendalian Mutu dan Keamanan Hasil Perikanan Nomo PER.03/BKIPM/2011, tentang Tata cara dan persyaratan penerbitan HACCP.
7. . *rismutia hayu deswati, Tajerin Tajerin, Budi Wardono* SERTIFIKAT MUTU SEBAGAI SALAH SATU JENIS HAMBATAN NON TARIF PERDAGANGAN TUNA DAN UDANG: DEFINISI, JENIS DAN PERMASALAHANNYA Buletin Ilmiah "MARINA" Sosial Ekonomi Kelautan dan Perikanan Vol. 2 No. 2 Tahun 2016: 57-72
8. Chand1, Amit Singh1, R. Vishwakarma2* and Chandan Kumar Singh3 Bulletin of Environment, Pharmacology and Life Sciences Bull. Env. Pharmacol. Life Sci., Vol 6[11] October 2017: 08-13 ©2017 Academy for Environment and Life Sciences, India
9. The WTO and the International Plant Protection Convention (IPPC)
https://www.wto.org/english/thewto_e/coher_e/wto_ippc_e.htm
10. Peraturan hukum karantina tumbuhan yang dikeluarkan oleh Pemerintah RI (Keppres, Peraturan menteri, dan lain-lain)
11. Jurnal terkait
12. Kasus-kasus karantina pertanian yang dimuat di media social, baik cetak maupun digital.

Date of last amendment

30 June 2021

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| Module designation | Pesticide and Application Techniques |
| Semester (s) in which the module is taught | 5 th semester/3 rd year |
| Person responsible for the module | Ir. Suwandi, M.Agr., Ph.D. Dr.-phil. Ir. Arinafril |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 practicum = 1700 structured assignment =1440 self-study = 1440 exam = 220 total : 6200 minutes = 103.34 hours = 4.13 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students will be able to identify the classification of agricultural pesticides. 2. Students will understand how to determine insecticides' characteristics and mode of action and use it to create a plant protection case study. 3. Students will understand how to determine fungicides' characteristics and mode of action and use it to create a plant protection case study. 4. Students will understand how to determine the characteristics and mode of action of nematicides and bactericides, and use it to create a plant protection case study. 5. Students will understand how to determine the characteristics and mode of action of herbicides and use it to create a plant protection case study. 6. Students will be able to identify the toxicology and safety aspects of working with pesticides and use it to predict safety aspects in a plant protection case study. 7. Students will be able to calculate correctly, prepare, and operate pesticide spray. 8. Students will be able to properly design, apply, analyze, and make a report of fungicide assay project. 9. Students will be able to properly design, apply, analyze, and make a report of insecticide assay project. |

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| <p>Content</p> | <ol style="list-style-type: none"> 1. History and development, and classification of agricultural pesticides. 2. Insecticides. 3. Fungicides. 4. Nematicides and bactericides. 5. Herbicides. 6. Pesticides toxicology and application safety. 7. Spray Calibration. 8. Fungicide assay. 9. Insecticide assay. |
| <p>Examination forms</p> | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| <p>Reading List</p> | <ol style="list-style-type: none"> 1. Djojsumarno, Panut. 2008. Pesticides and their Applications. PT. Agromedia Library. 340 p. 2. Mizuho, Nita. 2013. Fungicides - Showcases of Integrated Plant Disease Management from Around the World. Intech Publications. 340 p. 3. Carisse, Odile. 2010. Fungicides. Intech Publications. 548 p. 4. Carson, R. 1962. Silent Spring. Fawcett Crest, Connecticut, USA. 155 p. 5. Matsumura, F. 1985. Toxicology of Pesticide. 2nd Edition. Plenum Press, New York. 598 p. 6. Oudejans, JH 1982. Agro-pesticides: Their Management and Application. ARAP, Bangkok. 368 p. 7. Römbke, J., and JF Moltmann. 1996. Applied Ecotoxicology. CRC Press, Florida. 282 p. 8. Ware, GW 1994. The Pesticide Book. Thompson Publ., California, USA. 386 p. 9. Norris, F., EP Caswell-Chen, and M. Kogan. 2003. Concepts in Integrated Pest Management. Prentice-Hall, New Jersey, USA. 2003. 10. Ohkawa, H., H. Miyagawa and PW Lee. (Editors). 2007. Pesticide Chemistry: Crop Protection, Public Health, Environmental Safety. Wiley-VCH Verlag, Weinheim, Germany. 538 p. 11. Klein, R., and M. Paul. 1995. Umweltproben für die Schadstoffanalytic im Biomonitoring. Gustav-Fischer, Jena. 365 p. 12. Römbke, J., and JF Moltmann. 1996. Applied Ecotoxicology. CRC Press, Florida. 282 p. |

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13. Angerer, J. 2001. Biological Monitoring. Wiley-VCH, Weinheim. 208 p.
14. Minister of Agriculture Regulation: Pesticide Registration.
15. Grainge, M. and S. Ahmed. 1985. Handbook of plants with pest-control properties. John Wiley and Sons, New York. USA. 470 p.
16. Guidelines for Supervision of Fertilizers and Pesticides. 2018.
17. Schmutterer, H. 1995. The Neem Tree: Source of Unique Natural Products for Integrated Pest Management and Medicinal, Industrial and Other Purposes. Wiley-VCH Verlag, Weinheim, Germany. 680 p.

Date of last amendment

28 December 2021

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| Module designation | Silkworm Farming |
| Semester (s) in which the module is taught | 5 th semester/3 rd year |
| Person responsible for the module | Ir.Yulia Pujiastuti, M.Si. Ph.D. Arsi, S.P., M>Si... |
| Language | Indonesian |
| Relation to curriculum | Elective course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 0 Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 4500 minutes = 75 hours = 3.0 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain definition and scope of silkworm cultivation, goals and benefits as well as future prospects 2. Students are able to prepare silkworm feed, starting from land preparation, seed preparation, planting, maintenance, harvesting consumption leaves 3. Students are able to explain characteristics of silkworms, both wild and cultivated, types and ways of life (metamorphosis) 4. Students are able to prepare silkworm from eggs to first instar caterpillars 5. Students are able to prepare silkworm breeding place 6. Students are able to to take care silkworm larvae and feed regularly 7. Students are able to massrearing silkworms until pre pupae phase 8. Students are able to transfer prepupae into seriframe 9. Students are able to harvest cocoons 10. Students are able to handle post-harvest cocoons. |
| Content | <ol style="list-style-type: none"> 1. Definition and scope of silkworm cultivation, goals and benefits as well as future prospects 2. Preparation of silkworm feed, starting from land preparation, seed preparation, planting, maintenance, harvesting consumption leaves 3. Characteristics of silkworms, both wild and cultivated, types and ways of life (metamorphosis) |

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| | <ol style="list-style-type: none"> 4. Development and growth silkworm from eggs to first instar caterpillars 5. Preparation of silkworm breeding place 6. Breeding silkworm larvae and feed regularly 7. Massrearing silkworms until pre pupae phase 8. Transferring prepupae into seriframe 9. Harvesting cocoons 11. Handling post-harvest cocoons. |
| Examination forms | <ol style="list-style-type: none"> 1. Doing practical works 2. Write essays |
| Study and examination requirements | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Student must attend 100% of practicums. 3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. Andadari, L. S. Pudjiono, Suwandi, Tri Rahmawati 2013. Budidaya murbei dan ulat sutera. Pusat Penelitian dan Pengembangan Peningkatan Produktivitas Hutan 2. Andadari, Lincah, dkk. 2015. Buku Seri Iptek V Kehutanan. Pusat Penelitian Dan Pengembangan Peningkatan Produktivitas Hutan. Bogor. 3. Machii, H. Akio Koyama, Hiroaki Yamanouchi. 2002. Mulberry Breeding, Cultivation and Utilization in Japan. https://www.researchgate.net/publication/237445963_Mulberry_Breeding_Cultivation_and_Utilization_in_Japan 4. Dishutbunyogya. 2016. BUDIDAYA TANAMAN MURBEI. http://dishutbun.jogjaprovo.go.id/assets/artikel/murbei_.pdf 5. Pujiono, S., L. Andadari, Darwo. 2016. Pemilihan hibrid murbei untuk dikembangkan di dataran tinggi. Jurna penelitian Hutan Tanaman. Vol 13 No 2. PP. 133-138 6. Sánchez M.D. 2016. World Distribution and Utilization of Mulberry, Potential for Animal Feeding. http://www.fao.org/ag/aga/AGAP/FRG/Mulberry/Papers/PDF/Intro.pdf 7. Adeduntan, S.A. 2015. Influence of different varieties of mulberry leaves (<i>Morus alba</i>) on growth and cocoon performance of biovoltine strain of silkworm (<i>Bombyx mori</i>). International Journal of Biological and Chemical Sciences 9(2):751 |

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| | <p>8. Estetika & Y. C. Endrawati. 2018. Produktivitas Ulat Sutera (<i>Bombyx mori</i> L.) Ras BS-09 di Daerah Tropis Silkworm Productivities of <i>Bombyx mori</i> L. BS-09 Race in Tropic Y. <i>Jurnal Ilmu Produksi dan Teknologi Hasil Peternakan</i> ISSN 2303-2227 eISSN 2615-594X Vol. 06 No. 3 Oktober 2018 Hlm: 104-112</p> <p>9. Nunuh, A. dan Andikarya O. 2006. Budidaya Sutera Alam (<i>Bombyx mori</i> Lin). Vedca Joint program. https://docplayer.info/32229291-Budidaya-sutera-alam-bombyx-mori-lin.html</p> |
| Date of last amendment | 28 April 2022 |

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| Module designation | Fertilizer and Fertilizing Technology |
| Semester (s) in which the module is taught | 6 rd semester/3 rd year |
| Person responsible for the module | Prof. Dr. Ir. Nuni Gofar, M.S. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 Practicum = 2040 structured assignment =1440 self-study = 1440 exam =220 total : 6540 minutes = 109 hours = 4,36 ects |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Provide knowledge to students about knowledge and skills related to plant nutrients and fertilizers, properties and types of fertilizers, fertilizer manufacture and their reactions in the soil which include nitrogen, phosphorus, potassium, macro and micro fertilizers. 2. Students are able evaluate the status of nutrients in soil and plants through soil and plant testing. 3. Students are able to understand the basic of fertilization. 4. Students are able to explain and calculate of fertilizer needs on the basis of economy, yield, efficiency of fertilization and liming. 5. Students are able to explain and preparation of fertilizer recommendations. |

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| <p>Content</p> | <ol style="list-style-type: none"> 1. Nutrients, fertilizers, development history and fertilization concepts 2. Meaning, availability of nutrients and the basic problems of fertilization, the history and concept of fertilization: 1. Definition of fertilizer, 2. types of fertilizer, 3. Why plants need to be fertilized 3. The manufacture of N fertilizers, reactions in the soil: 4. The manufacture, properties, reactions of P fertilizers 5. The manufacture, properties and use of K fertilizer 6. The importance of organic fertilizers and organic fertilizer technology: Understanding of organic and inorganic fertilizers and organic fertilizer technology 7. Topics 1-6 Discussion 8. The properties and reactions of fertilizers containing primary and secondary macro nutrients in the soil: Understanding of secondary macro fertilizers Ca, Mg, S 9. The properties and reactions of micro fertilizers in the soil: 1.Understanding microfertilizers, 2.Fe fertilizers, 3.Mn fertilizers, 4.Zn fertilizers, 5.Cu fertilizers, 6.B and Mo fertilizers 10. The manufacture, properties and reactions of compound fertilizers: Compound fertilizers,Types of compound fertilizers, NPK ratio/grade in compound fertilizers The role of nutrient evaluation 11. The method of evaluating soil nutrient status 12. The plant analysis method: 1. Soil and plant characteristics, 2. Plant tissue analysis method, 3. Plant parts analyzed, 4. Treat plant tissue to be analyzed 13. The basics of applying fertilizer and recommendations for fertilizing/liming 14. The basic economic considerations and the efficiency of fertilization and liming |
| <p>Examination forms</p> | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| <p>Reading List</p> | <ol style="list-style-type: none"> 1. Gofar, N. 2015. Teknologi Pupuk dan Pemupukan di Lahan Suboptimal. Polimedia Publishing, Jakarta. 2. Havlin, J.L, Tisdale, S.L., Nelson, W.L., Beaton, J.D. 2013. Soil Fertility and Fertilizers: an introduction to nutrient management(6th Ed). Macmillan Publishing Company. New York, NY. 3. Jones, J.B. 2012. Plant Nutrition and Soil Fertility Manual. 2nd Ed. CRC Press. |
| <p>Date of last amendment</p> | <p>30 June 2021</p> |

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| Module designation | Organic Material Management |
| Semester (s) in which the module is taught | 7 ^d semester/4 nd year |
| Person responsible for the module | 10. Prof. Dr. Ir. Dedik Budianta, MS 11. Dr. Ir. A. Napoleon, MP |
| Language | Indonesian |
| Relation to curriculum | Optional/elective Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam =220 total : 4500 minutes = 75 hours = 3 ects |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain what is the soil organic matter 2. Students are able to explain the function of soil organic matter for soil improvement 3. Student ae able to explain the role of organic matter for plant growth 4. Students are able to explain the soil organic matter decomposition 5. Students know the source of soil organic matter 6. Students know the role of organic matter for chelating agent |
| Content (14 meetings) and two examinations | <ol style="list-style-type: none"> 1. Introduction and definition of soil organic matter 2. Characteristic and properties of soil organic matter 3. Function of soil organic matter for soil improvement 4. Organic matter for nutrient sources 5. Decomposition process of organic matter 6. Factors inhibiting organic matter decomposition 7. Soil organic matter transformation 8. Humus forming and characterization 9. Dynamic of soil organic mater 10. Functional groups for chelating process |

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| | 11. Efforts to supply organic matter |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Stevenson, F.J. 1994. Humus Chemistry: Genesis, composition and reaction. 2nd edition. Wiley. |
| Date of last amendment | 21 Juni 2021 |

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| Module Designation | Swamp Farming |
| Code | PAG 213316 |
| Semester (s) in which the module is taught | 6 th semester/3 rd year |
| Person responsible for the module | Prof. Dr. Ir. Rujito Agus Suwignyo, M. Agr. Dr. Ir. Firdaus Sulaiman, M. Si. Dr. Ir. Irmawati, S. P., M. Si., M. Sc. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning and assignment |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 4500 minutes = 75 hours = 3,00 ECTS |
| Credit points | 2 credits (2 credits theory and 0 practice) |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Capable of understanding, describing and explaining the concept, potential and deployment of agriculture in swamplands. 2. Capable of understanding, describing and explaining various nontidal swamp land typology and its soil characteristics. 3. Capable of understanding, describing and explaining pyrite formation and effects of pyrite oxidation. 4. Capable of understanding, describing and explaining formation of peat soil, characteristics and damage impact. 5. Capable of understanding, describing and explaining water management in tidal and nontidal swamplands. 6. Capable of understanding, describing, explaining reclamation of water management network in swamplands. 7. Capable of understanding, describing and explaining several crop management system in tidal swampland. 8. Capable of understanding, describing and explaining several crop management system in nontidal swampland. 9. Capable of understanding, describing and explaining several nursery system in nontidal swampland. 10. Capable of understanding, describing and explaining plant management on peat. 11. Capable of understanding, describing and explaining characteristic of various Mangrove ecosystem on the coastal area. |

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| | <ol style="list-style-type: none"> 12. Capable of understanding, describing and explaining various strategies how to restore Mangrove ecosystem. 13. Capable of understanding, describing and explaining and providing various plans how to restore the degraded peatland ecosystem. |
| Content | <ol style="list-style-type: none"> 1. Introduction of agriculture in swamplands 2. Typology of tidal swamps and its soil characteristics. 3. Nontidal swamp land typology and its soil characteristics. 4. Pyrite pyrite formation and effects of pyrite oxidation. 5. Formation of peat soil, characteristics and damage impact. 6. Water management in tidal and nontidal swamplands. 7. Reclamation of water management network in swamplands. 8. Crop management in tidal swampland. 9. Crop management in nontidal swampland. 10. Nursery system in nontidal swampland. 11. Plant management on peat. 12. Mangrove ecosystem on the coastal area. 13. Mangrove ecosystem restoration. 14. Restoration of degraded peatland ecosystem. |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Structured assignment (essay and paper) 3. Midterm (essay) 4. Final Exam (essay) |
| Reading list | 1. |
| Date of last amendment | 2. 30 June 2021 |

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| Module designation | Important pests of essentials crops |
| Semester (s) in which the module is taught | 6 th semester/3 rd year |
| Person responsible for the module | Ir.Yulia Pujiastuti, M.Si. Ph.D. Dr. Ir. Chandra Irsan, M.Si. Arsi, S.Pi., M.Si.. |
| Language | Indonesian |
| Relation to curriculum | Compulsory course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4.36 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain the meaning of important pests in reducing main crop productivity 2. Students are able to explain a number of main insect pest species on plants. Pests of oil palm, coconut, coffee, how to attack, symptoms of attack, bio-ecology and how to control them 3. Students are able to explain a number of main insect pest species on pepper, tea, sugar cane, how to attack, symptoms of attack, bio-ecology and how to control them 4. Students are able to explain a number of main insect pest species on cocoa, clove, tobacco how to attack, symptoms of attack, bio-ecology and how to control it 6. Students are able to explain a number of main insect pest species in rice, corn, how to attack, symptoms of attack, bio-ecology and how to control it 7. Students are able to explain a number of main insect pest species of cassava, sweet potato, soybean, how to attack, symptoms of attack, bio-ecology and how to control it 8. Students are able to explain a number of main insect pest species in sorghum, peanut and taro, how to attack, symptoms of attack, bio-ecology and how to control it. 9. Students are able to explain a number of main insect pest species on highland vegetable crops, how to attack them, symptoms of attack, bio-ecology and how to control them |

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| | <ol style="list-style-type: none"> 10. Students are able to explain a number of main insect pest species on lowland vegetable crops, how to attack them, symptoms of attack, bio-ecology and how to control them 11. Students are able to explain a number of main insect pest species on highland ornamental plants, how to attack, symptoms of attack, bio-ecology and how to control them 12. Students are able to explain a number of main insect pest species on lowland ornamental plants, how to attack, symptoms of attack, bio-ecology and how to control them |
| Content | <ol style="list-style-type: none"> 1. Understanding important pests (especially insects) and main crops 2. Pests of plantation crops: Pests of oil palm, coconut, coffee 3. Pests of plantation crops: Pests of pepper, tea, sugar cane 4. Pests of plantation crops: Pests of cocoa, cloves, tobacco 5. Pests of food crops: Pests of rice, corn 6. Pests of food crops: Pests of cassava, sweet potato, soybean 7. Pests of food crops: Pests of sorghum, peanuts and taro 8. Horticultural crop pests: Upland vegetable crop pests 9. Horticultural crop pests: Pests of lowland vegetable crops 10. Horticultural plant pests: Upland ornamental plant pests 11. Horticultural crop pests: Pests of lowland ornamental plants |
| Examination forms | <ol style="list-style-type: none"> 1. Write essays 2. Doing practical works |
| Study and examination requirements | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Student must attend 100% of practicums. 3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. David V. Alford. 2007. Pests of Fruit Crops: A Color Handbook (Plant Protection Handbooks). 2. Wh. H. Dreissig, E.A. Heinrichs, J.A. Litsinger and K Moody. 1988. Illustrated Guide to Integrated Pest Management in Rice in Tropical Asia |

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| | <ol style="list-style-type: none"> 3. 3.Larry Strand.2013. Integrated Pest Management for Rice. 4. 4.Jim M Waller, M Bigger and Rory J Hillocks. 2007. Coffee Pests, Diseases and their Management. 5. 5.Novonita Baruah, A. C. Deka and J.C. Kalita . 2011. Biocontrol Prospects Of Red Spider Mite - A Major Pest Of Tea: Entomopathogenic fungi play an important role in. 6. Dennis S. Hill. 2008. Pests of Crops in Warmer Climates and Their Control 7. Ken P. Aplin, Peter R. Brown, Jens Jacob, Charles J. Krebs & Grant R. Singleton. 2003. Field methods for rodent studies in Asia and the Indo-Pacific. Australian Centre for International Agricultural Research Canberra, Australia. |
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| Module designation | Important diseases of essential crops |
| Semester (s) in which the module is taught | 4 rd semester/2 nd year |
| Person responsible for the module | Prof. Dr. Ir. Nurhayati, M.Si. Dr. Ir. Harman Hamidson, MP Dr. Ir. Mulawarman, M.Sc Prof. Dr. Ir. A. Muslim, M.Agr |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students can explain what is meant by an important disease in the main plant. 2. Students have the ability to explain important diseases in rice plants, factors that influence infection and development and how to manage diseases. 3. Students have the ability to explain important diseases in corn plants, factors that influence infection and development and how to manage diseases 4. Students have the ability to explain important diseases in potato plants, factors that influence infection and development and how to manage diseases. 5. Students have the ability to explain important diseases in sweet potato plants, factors that influence infection and development and how to manage diseases. 6. Students have the ability to explain important diseases in peanut plants, factors that influence infection and development and how to manage diseases 7. Students have the ability to explain important diseases in soybean plants, factors that influence infection and development and how to manage diseases. 8. Students have the ability to explain important diseases in rubber plants, factors that influence infection and development and how to manage diseases 9. Students have the ability to explain important diseases in palm oil plants, factors that influence |

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| | <p>infection and development and how to manage diseases</p> <ol style="list-style-type: none"> 10. Students have the ability to explain important diseases in palm coffee plants, factors that influence infection and development and how to manage diseases 11. Students have the ability to explain important diseases in sugarcane plants, factors that influence infection and development and how to manage diseases 12. Students have the ability to explain important diseases in tea plants, factors that influence infection and development and how to manage diseases 13. Students have the ability to explain important diseases in cabbage and tomato plants, factors that influence infection and development and how to manage diseases 14. Students have the ability to explain important diseases in chilli plants, factors that influence infection and development and how to manage diseases 15. Students have the ability to explain important diseases in pineapple, banana and orange plants, factors that influence infection and development and how to manage diseases 16. Students have the ability to explain important diseases in ornamental plants such as roses and orchids, factors that influence infection and development and how to manage diseases |
| <p>Content</p> | <ol style="list-style-type: none"> 1. Terminology of important diseases of essential crops 2. important diseases of rice and the management 3. important diseases of corn and the management 4. important diseases of potato and the management 5. important diseases of sweet potato and the management 6. important diseases of peanut and the management 7. important diseases of soybean potato and the management 8. important diseases of rubber and the management 9. important diseases palm oil and the management 10. important diseases of coffee and the management 11. important diseases of sugarcane and the management 12. important diseases of tea and the management 13. important diseases of horticultural plants and the management |

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| | 14. important diseases of ornamental plants and the management |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (MCQ) 5. Final Exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Agrios GN. 2005. Plant Pathology, Elsevier Academic Press San Diego CA 2. Chaube CS and Pundhir VS. 2005. Crop Diseases and their management 3. Nurhayati, D. 2011. Epidemiology of plant diseases 4. Devasahayam HL and Hendri LDC. 2009. Illustrated Pant Pathology: basic concept. New Indian Publishing Agency. 5. Pirone PP. 1978. Disease and pest of ornamental plants. John Willey and sons, New York, Cicaster, Brisbane, Toronto 6. Verma LR and Sharma RC. 1999. Diseases of Horticultural Crops. Indus Publishing Company. New Delhi. |
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| Module designation | Plant DiseaseEpidemiology |
| Semester (s) in which the module is taught | 6 rd semester/3 rd year |
| Person responsible for the module | Prof. Dr. Ir. Nurhayati, M.Si. Dr. Ir. Harman Hamidson, MP Dr. Ir. Mulawarman, M.Sc |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload | Lectures = 1400 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 4500 minutes = 75 hours = 3,00 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students have the ability to explain definitions and limitations disease epidemiology plants and history epidemiology development 2. Students are able describe the scope of plant disease epidemiology and its supporting sciences 3. Students are able describe how do environmental factors influence the occurrence and development of plant disease epidemics 4. Students have the ability to explain how environmental factors affect the occurrence and development of plant disease epidemics 5. Students are able to describe the infectious disease process and plant disease cycle 6. Students are able to explain how the dynamics of patterns disease progression 7. Students can explain the difference between models development of monocyclic and polycyclic diseases 8. Students are able to explain the mode of transmission and spread of pathogens 9. students are able to explain how pathogens affect production 10. Students are able to explain what is meant by loss of potential and actual results 11. Students are able to explain what is meant by the loss of farmers, communities, consumers, the environment 12. Students are able to explain what is meant by direct and indirect loss. Primary and secondary losses. 13. Students are able to explain how to assess plant diseases. |

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| | <ol style="list-style-type: none"> 14. Students are able to explain the estimation model of yield lost. 15. Students are able to explain how to manage disease based on epidemiological principles. 16. Students are able to explain how to manage disease based on epidemiological principles. |
| Content | <ol style="list-style-type: none"> 1. History and development of Plant Epidemiology, Terminology of Plant Epidemiology 2. Scope of plant disease epidemiology 3. Environmental factors and development of plant disease epidemics. 4. The infectious disease process and plant disease cycle 5. The dynamics of patterns diseases progression 6. Monocyclic and polycyclic diseases 7. The mode of transmission and spread of pathogens. 8. Pathogens and Plants production 9. Potential loss and actual results 10. Kinds of loss cause by plant disease epidemic. 11. Plant disease assessment 12. Yield loss 13. Disease management 14. Plant disease management and principles of Epidemiology |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Structured assignment (essay and paper) 3. Midterm (MCQ) 4. Final Exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Nurhayati, D. 2011. Epidemiology of plant diseases 2. Agrios GN. 2005. Plant Pathology, Elsevier Academic Press San Diego CA 3. Friensland H and H Schrodte. 1988. The analysis of weather factor in Epidemiology 4. Kranz J. 1974. Epidemic of plant disease: Mathematical analysis and modeling, Ecol Stud. 13 Springer-verlag. Berlin and New York 5. Zadock JC and Schein RD.1979. Epidemiology and plant disease management. Oxford Univ Press London and New York. |
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| Module designation | Integrated pest management |
| Semester (s) in which the module is taught | 6 th semester/3 rd year |
| Person responsible for the module | Prof. Dr. Ir. Siti Herlinda, M.Si. Dr. Ir. Suparman SHK Dr. Ir. Abu Umayah, M.S. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload | Lectures = 1400 minutes Practicum = 1700 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6200 minutes = 103,333 hours = 4,13 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to describe definition and scope of integrated pest management 2. Students are able to explain precisely the concept of integrated pest management 3. Students are able to describe the agricultural ecosystem as a management unit 4. Students are able to explain precisely about pests, pest population dynamics and the damage caused 5. Students are able to explain precisely about ecosystem monitoring systems and observation techniques. 6. Students are able to explain about pest control techniques in technical, physical and mechanical culture. 7. Students are able to explain the technique of controlling pests in technical, biological and chemical culture. 8. Students are able to explain about plant disease as a limiting factor in agricultural production. 9. Students are able to explain about plant diseases are strongly influenced by biotic and abiotic environmental factors 10. Students are able to explain how to control plant diseases 11. Students are able to explain about IPM is not a combination of control techniques, but the integration of control techniques into a healthy plant cultivation system 12. Students are able to explain how to calculate the economic damage threshold and the economic threshold and its application in IPM |

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| | 13. Students are able to explain about pesticides are dangerous poisons and in their use must follow safety and security procedures |
| Content | <ol style="list-style-type: none"> 1. Definition and scope of integrated pest management 2. The concept of integrated pest management 3. The agricultural ecosystem as a management unit 4. Pests, pest population dynamics and the damage caused 5. Ecosystem monitoring systems and observation techniques. 6. Pest control techniques in technical, physical and mechanical culture. 7. The technique of controlling pests in technical, biological and chemical culture. 8. Plant disease as a limiting factor in agricultural production. 9. Plant diseases are strongly influenced by biotic and abiotic environmental factors 10. The control plant diseases 11. IPM is not a combination of control techniques, but the integration of control techniques into a healthy plant cultivation system 12. Calculating the economic damage threshold and the economic threshold and its application in IPM 13. Pesticides are dangerous poisons and in their use must follow safety and security procedures |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (MCQ) 5. Final Exam (MCQ) |
| Reading List | <ol style="list-style-type: none"> 1. Agrios GN. 2005. Plant pathology. Fifth Edition. Academic Press. New York 2. Ciancio A and Mukerji KG. 2007. General Concepts in Pest and Disease Management. Springer. Dordrecht 3. Hugh A. Smith HA and Liburd OE. 2012. Intercropping, Crop Diversity and Pest Management. Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. (http://edis.ifas.ufl.edu). 4. Levine MJ. 2007. Pesticides : a toxic time bomb in our midst. Praeger Publishers, Westport, 5. Peshin, R and Dhawan AK. (Editors) 2009. Integrated Pest Management: Dissemination and Impact Volume 2. Springer, India. 6. K. Untung. Pengantar Pengendalian Hama Terpadu |
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| Module designation | Biological Control and Habitat Management |
| Semester (s) in which the module is taught | 6 th semester/3 rd year |
| Person responsible for the module | Prof. Dr. Ir. Siti Herlinda, M.Si. Dr. Ir. Suwandi, M.Agr. Dr. Ir. A. Muslim, M.Agr. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain scope of biological control and habitat management 2. Students are able to explain ecological fundamentals of insect pest biological control 3. Students are able to explain mechanism of action and biology of parasitoids and predators 4. Students are able to explain introduction of natural enemies 5. Students are able to explain methods/approaches of augmentation and conservation of natural enemies 6. Students are able to explain biological control of insect pests with entomopathogens 7. Students are able to explain biological control of agricultural insects with entomopathogens 8. Students are able to explain the history and concept of biological control for plant pathogens 9. Students are able to explain ecological fundamentals of plant pathogen biological control 10. Students are able to explain components of plant pathogenic biological control 11. Students are able to explain plant disease biological control mechanisms 12. Students are able to demonstrate isolation techniques and evaluation of plant disease biological agents from the field 13. Students are able to demonstrate the application of plant disease biological control techniques |

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| | <p>14. Students are able to describe the role of plant disease biological control in its application to integrated control</p> |
| <p>Content</p> | <ol style="list-style-type: none"> 1. Scope of biological control and habitat management 2. Ecological fundamentals of insect pest biological control: the concept of population and community; the concept of natural balance; natural control 3. Mechanism of action and biology of parasitoids and predators: characteristics and biology of parasitoids and predators; parasite-host relationship; predator-prey relationship. 4. Introduction of natural enemies: biogeography of pests and exotic plants; exploration of exotic natural enemies; introduction procedures; ecological factors affecting exotic natural enemies; mass breeding and colonization procedures; recovery and evaluation 5. Methods/approaches of augmentation and conservation of natural enemies: manipulation of natural enemies; periodic colonization procedures: inundation and inoculation; improvement of farming methods: intercropping, intercropping, spacing; provision of space and food resources; reduce disturbance and death to natural enemies: competitive interference, adverse crop effects, pesticides 6. Biological control of insect pests with entomopathogens 7. Biological control of agricultural insects with entomopathogens 8. The history and concept of biological control for plant pathogens 9. Ecological fundamentals of plant pathogen biological control 10. Components of plant pathogenic biological control 11. Plant disease biological control mechanisms 12. Isolation techniques and evaluation of plant disease biological agents from the field 13. The application of plant disease biological control techniques 14. The role of plant disease biological control in its application to integrated control |
| <p>Examination forms</p> | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (MCQ) 5. Final Exam (MCQ) |
| <p>Reading List</p> | <ol style="list-style-type: none"> 1. Herlinda, S & C Irsan. 2011. Pengendalian Hayati Hama Tumbuhan. Penerbit Universitas Sriwijaya. Indralaya. 2. DeBach, P. 1973. Biological control of insect pests & weeds. Chapman & Hall, California |

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| | <ol style="list-style-type: none"> 3. van den Bosch, R., P.S. Messenger & A. P. Gutierrez. 1985. An introduction to biological control. Plenum Press, New York. 4. Quicke, D.L.J. 1997. Parasitic wasps. Chapman & Hall, London 5. Hochberg, M.E. & A. R. Ives. 2000. Parasitoid population Biology. Princeton University Press, New Jersey. 6. Tanada, Y. & H.K. Kaya. 1993. Insect pathology. Academic Press, Inc. 7. Van Emden, H.I. 1976. Pest control and its ecology. Edward Arnold 8. Baker, k.F. & R.J. Cook. 1974. Biological control of plant pathogens. W.h. Freeman and Co. San Francisco 9. Cook, R.J. and K. F. Baker. 1983. The nature and practice of biological control of plant pathogens. The American Phytopathological Society, Minnesota 10. Bellows, T.S. & T.W. Fisher. 1999. Handbook of Biological Control. Academic Press |
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| Module designation | Monitoring of Pests and Diseases |
| Semester (s) in which the module is taught | 6 rd semester/3 rd year |
| Person responsible for the module | Dr.Ir. Harman Hamidson, MP. Dr. Ir. Chandra Irsan, M.Si. Dr. Rahmat Perdana, S.Si |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 700 minutes Practicum = 2040 minutes Structured assignment = 720 minutes Self-study = 7220 minutes Exam = 220 minutes Total: 4440 minutes = 73.33 hours = 2.93 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Jim M Waller, M Bigger and Rory J Hillocks. 2007. Coffee Pests, Diseases and their Management. 2. Students are able to understand the mechanism of the learning process and be able to explain the scope of observing plant pests and diseases. 3. Students are able to understand the observation mechanism, especially the sampling technique for observing pests and plant diseases in general.. 4. Students are able to understand the mechanism of observation, especially the philosophy of determining the percentage and intensity of pest attacks 5. Students are able to understand the mechanism of determining the index value of species diversity, dominance and evenness 6. Students are able to understand the mechanism: Coffee Fruit Borer Observation Techniques 7. Students are able to understand the mechanism of observation, especially: Distribution / distribution of plant diseases: Types of distribution of plant diseases based on distribution 8. Students are able to understand the mechanism of observation, especially: Philosophy of determining the percentage and intensity of pest attacks and Random and Purposive Sampling in observing plant diseases 9. Students are able to understand the mechanism of observation, especially: Systemic disease surveillance: Observation method analysis of observational data and attack intensity |

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| | <ol style="list-style-type: none"> 10. Students are able to understand the mechanism of observation, especially: Observation of non-systemic disease: Observation method analysis of observational data and attack intensity 11. Students are able to understand the mechanism of observation, especially: Observation of Symptoms, Possible Causes, and Consideration of Plant Disease Sampling 12. Students are able to understand the mechanism of observation, especially: How to Sampling Plant Diseases and Their Analysis 13. Students are able to understand the mechanism of observation, especially: How to Sampling Plant Diseases and Their Analysis 14. Students are able to understand the mechanism of field observations, especially: How to Calculate Spore Density and Recognition of Selective Medium 15. Students are able to understand the mechanism of field observations, especially: Symptoms, Possible Causes, and Considerations of Plant Pest Sampling 16. Students are able to understand the mechanism of field observations, especially: Symptoms, Possible Causes, and Considerations of Plant Pest Sampling 17. David V. Alford. 2007. Pests of Fruit Crops: A Color Handbook (Plant Protection Handbooks) 18. Dennis S. Hill. 2008. Pests of Crops in Warmer Climates and Their Control |
| <p>Content</p> | <ol style="list-style-type: none"> 1. Lecture contract and syllabus Introduction and Definition and Objectives of Observing Plant Pests 2. Sampling technique for observing plant pests and diseases in general 3. Philosophy determines the percentage and intensity of pest attacks 4. Determine the value of the diversity index, dominance and evenness of species 5. Coffee Fruit Borer Observation Techniques 6. Distribution / distribution of plant diseases: Types of distribution of plant diseases based on distribution 7. The philosophy of determining the percentage and intensity of pest attacks and random and purposive sampling 8. Systemic disease surveillance: Observation 9. method analysis of observational data and 10. attacintensity 11. Observation of non-systemic disease: Observation method analysis of observational data and attack intensity |

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| | <p>12. Symptoms, Possible Causes, and Sampling Considerations of Plant Diseases.</p> <p>13. How to Sampling Plant Diseases and Their Analysis.</p> <p>14. How to Sampling Plant Diseases and Their Analysis</p> <p>15. How to Calculate Spore Density and Selective Medium Recognition.</p> <p>16. Symptoms, Possible Causes, and Sampling Considerations of Plant Pests</p> <p>17. Symptoms, Possible Causes, and Sampling Considerations of Plant Pests</p> |
| Examination forms | <ol style="list-style-type: none"> 1. Write essays 2. Doing practical works |
| Study and examination requirements | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Student must attend 100% of practicums. 3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. Agrios, G.N. 1997. Plant Pathology. 4 th Edition. Academic Press. 2. Directorate of Food Crop Protection. 2018. Technical Guidelines for Observing and Reporting Plant Destruction Organisms Impacted by Climate Change (OPT-DPI). 2015 Revised Edition. Directorate General of Food Crops, Ministry of Agriculture, Plant Protection. 3. Maramorosch, K and Harris, K.F. 1981. Plant Diseases and Vectors: Ecology and Epidemiology. Academic Press. 4. Plantation Office of East Java Province. 2013. Operational Technical Guidelines for Observing and Controlling Pests and Plant Diseases.. 5. McMaugh, T. 2007. Guidelines for surveillance of plant-disturbing organisms in Asia and the Pacific k. ACIAR Monograph No. 119a, 192p. 6. Semangun, H. 2000. Horticultural Plant Diseases in Indonesia. Gadjah Mada University Press. Yogyakarta. 7. Semangun, H. 2000. Plantation Diseases in Indonesia. Gadjah Mada University Press. Yogyakarta 8. Semangun, H. 2000. Food Crop Diseases in Indonesia. Gadjah Mada University Press. Yogyakarta 9. Wellman, F. L. 1972. Tropical American Plant Disease: Neotropical Phytopathology Problem. The Scarecrow Press, Inc Metuchen, N.J.. 10. Zadoks, J. C and Scheinm R.D. 1979. Epidemiology and Plant Disease Management. Oxford University Press. |
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| Module name | Mushroom Farming |
| Code | PPT 37415 |
| Semester (s) in which the module is taught | 6th semester/3rd year |
| Person responsible for the module | 1. Dr. Ir. Mulawarman, M.Sc. 2. Dr. Ir. Abu Umayah, MS. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Lecture, seminar and project, |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 0 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 4500 minutes = 75 hours = 3.0 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able understand the taxonomy and systematics of mushroom 2. Students are able understand the biology and ecology 3. Students are able understand the breeding and variety mushroom cultivation 4. Students are able understand the spawn production and spawning 5. Studentds are able understand the mushroom compost 6. Students are able understand the making and casing beds 7. Students are able understand the growing conditions for mushrooms 8. Students are able understand the pests, diseases and growing mushrooms outside. 9. Students are able understand the harvesting, storing and using mushrooms 10. Students are able understand the marketing of mushrooms and special assignment |
| Contents | <ol style="list-style-type: none"> 1. Taxonomy and systematics of mushroom 2. Biology and ecology of mushroom 3. Breeding and variety mushroom cultivation 4. Spawn production and spawning 5. Mushroom compost 6. Making and casing beds 7. Growing conditions for mushrooms |

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| | 8. Pests, diseases and growing mushrooms outside. 9. Harvesting, storing and using mushrooms 10. Marketing of mushrooms and special assignment |
| Examination forms | 1. Write essays 2. Report project 3. Presentation |
| Reading List | 1. Beelman, R.B., D.J. Royse, and N. Chikthimmah. 2004. Bioactive components in <i>Agaricus bisporus</i> of nutritional, medicinal or biological importance. <i>Mushroom Science</i> 16:1-16. 2. Beyer, D.M. 2003. Basic procedures for <i>Agaricus</i> mushroom growing. College of Agricultural Sciences, The Pennsylvania State University, University Park, PA. 3. Carroll, A.D. and L.C. Schisler. 1976. Delayed release nutrient supplement for mushroom culture. <i>Applied and Environmental Microbiology</i> 31:499-503. 4. Chang, S.T. 2006. The world mushroom industry |
| Date of last amendment | 30 June 2021 |

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| Module designation | Ornamental Crop Diseases |
| Semester (s) in which the module is taught | 6 rd semester/3 rd year |
| Person responsible for the module | Dr. Ir. Harman Hamidson, M.P Prof. Dr. Ir. Nurhayati, M.Si. Dr. Ir. Abu Umayah, M.S. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 700 minutes Practicum = 2040 minutes Structured assignment = 720 minutes Self-study = 7220 minutes Exam = 220 minutes Total: 4440 minutes = 73.33 hours = 2.93 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Student able to Understand the definition of ornamental plants and the scope of horticulture courses; Understand the importance of studying ornamental plant science; Understand the importance of studying diseases in ornamental plants; and Classify ornamental plants based on their benefits for humans. 2. Student able to Understand Disease progression is important in decorative plants. 3. Student able to recognize the development of rose disease 4. Students are able to recognize the development of rose flower disease 5. Students are able to recognize the development of chrysanthemum flower disease 6. Students are able to recognize the development of orchid flower diseases 7. Students are able to recognize the development of carnation plant diseases 8. Students are able to recognize the development of Lily flower disease 9. Students are able to recognize the disease development of Begonia and Dahlia flower plants 10. Students are able to recognize the development of diseases of Kana flower plants, taro mice and paper flowers 11. Students are able to recognize the development of elephant ear plant diseases, ferns |

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| | <ol style="list-style-type: none"> 12. Students are able to recognize the development of plant diseases Mother-in-law's tongue, bananas, and dendrons 13. Students are able to recognize the development of plant diseases such as Aloe Vera, Cocor Duck, and Aglaonema 14. Students are able to recognize the development of ornamental plant diseases in urban gardens 15. Students are able to recognize the development of ornamental plant diseases in urban gardens 16. Students are able to recognize the development of ornamental plant diseases in urban gardens |
| <p>Content</p> | <ol style="list-style-type: none"> 1. 1. Scope of decorative study; Economic prospects of ornamental plants; Ornamental relationship with pathogens; and Classification of ornamental plants 2. Ornamental plant diseases, the concept of disease development in ornamental and control 3. Main Diseases of roses: Description of symptoms, bioecology of the disease, supporting factors of the disease, and methods of control 4. Main Diseases of roses: Description of symptoms, bioecology of disease, disease supporting factors, and methods of control 5. Main Diseases of Chrysanthemum: Description of symptoms, disease bioecology, disease supporting factors, and methods of control 6. Penyakit Utama pada tanaman bunga anggrek : <u>Deskripsi gejala, bioekologi penyakit, 148factor pendukung penyakit, dan cara pengendalian</u> 7. Main Diseases of Carnation Orchid: Description of symptoms, disease bioecology, disease supporting factors, and methods of control 8. Main Diseases of Lily plants: Description of symptoms, disease bioecology, disease supporting factors, and methods of control 9. Penyakit Utama pada tanaman bunga Begonia dan dahlia: <u>Deskripsi gejala, bioekologi penyakit, factor pendukung penyakit, dan cara pengendalian</u> 10. Main Diseases of Kana flower plants, rodent tuber and paper flower: Description of symptoms, disease bioecology, disease supporting factors, and methods of control 11. Main Diseases of Elephant Ears, horn ferns and umbrella palms, areca nut : Description Description of symptoms, disease bioecology, disease supporting factors, and ways to control symptoms, disease bioecology, disease supporting factors, and control methods |

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| | <p>12. Main Diseases in Flower Plants Mother-in-law's tongue, Banana Banana, and Dendron: Description of symptoms, disease bioecology, disease supporting factors, and methods of control</p> <p>13. Main Diseases of Aloe Vera, Cocor duck, and Aglaonema: Description of symptoms, disease bioecology, disease supporting factors, and methods of control</p> <p>14. Diskusi hasil pengamatan lapangan dan praktikum</p> <p>15. Diskusi hasil pengamatan lapangan dan praktikum</p> <p>16. Diskusi hasil pengamatan lapangan dan praktikum</p> |
| Examination forms | <p>1. Write essays</p> <p>2. Doing practical works</p> |
| Study and examination requirements | <p>1. Student must attend minimum 85% of delivered courses.</p> <p>2. Student must attend 100% of practicums.</p> <p>3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work.</p> |
| Reading List | <p>1. Agrios, G.N. 1997. Plant Pathology. 4 th Edition. Academic Press.</p> <p>2. Culpan, G. 1995. Pests, Diseases and Common Problem, Hamlyn.</p> <p>3. Sastrahidayat, I.R. 2015. Ornamental Plant Diseases. UB Press.</p> <p>4. Semangun, H. 2000. Horticultural Plant Diseases in Indonesia. Gadjah Mada University Press. Yogyakarta.</p> |
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| Module designation | Pesticide and Environment |
| Semester (s) in which the module is taught | 6 th semester/3 rd year |
| Persons responsible for the module | Dr.-phil. Arinafril Prof. Dr. Nurhayati |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 700 minutes Practicum = 2040 minutes Structured assignment = 720 minutes Self-study = 720 minutes Exam = 220 minutes Total: 4440 minutes = 73.33 hours = 2.93 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are informed on Semester Learning Plan 2. Students are able to explain history, supporting sciences, basic principles of Pesticide and the Environment as well. 3. Students are able to explain the existence of pesticide as component in managing plant pest and disease 4. ---- continued as above, No. 3 ---- 5. Students are able to figure out the understanding on label in pesticide container, and the formulation of pesticide 6. Students are able to figure out the interaction of pesticide between target organisms and non-target organisms 7. ---- continued as above, No. 6 ---- 8. Midterm Exam 9. Students are able to describe the equipment to protect the applicators during pesticide application. 10. Students are able to figure out the assessment of pesticide risk and biological monitoring on the environment 11. ---- continued as above, No. 9 ---- 12. Students are able to figure out how to store, transport and to dispose pesticide wastes 13. ---- continued as above, No. 11 ---- 14. Students are able to explain the toxic effects of pesticides on the environment 15. Students are able to describe and assess the methods of toxicity test 16. Final Semester Exam |

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| Content | <ol style="list-style-type: none"> 1. Semester Learning Plan 2. History, Supporting Sciences, Basic Principal of Pesticide and Environment 3. Pesticide in Plant Pests and Diseases Management Component 4. ---- continued as above, No. 3 ---- 5. Understanding on Label and Pesticide Formulation 6. Pesticide Interaction between Target Organisms and Non-target Organisms 7. ---- continued as above, No. 6 ---- 8. Midterm Exam 9. Pesticide Application and Self-Protection Equipment 10. Risk Assessment and Biological Monitoring 11. ---- continued as above, No. 10 ---- 12. Storage, Transportation, and Pesticide Waste Disposal 13. ---- continued as above, No. 12 14. Pesticide Toxic Effect on the Environment 15. Toxicity Test Methods 16. Final Semester Exam |
| Examination forms | <ol style="list-style-type: none"> 1. Writing essays 2. Assignments |
| Study and examination requirements | Student must attend minimum 85% of delivered course. |
| Reading List | <ol style="list-style-type: none"> 1. Carson, R. 1962. Silent Spring. Fawcett Crest, Connecticut, USA. 155 p. 2. Matsumura, F. 1985. Toxicology of Pesticide. 2nd Edition. Plenum Press, New York. 598 p. 3. Anderson, K. E. and R. M. Scott. 1981. Fundamentals of Industrial Toxicology. Ann Arbor Science Publishers, Michigan. 120 p.2. Williams, P. L., and J. L. Burson. 1985. 4. Industrial Toxicology. Van Nostrand Reinhold, New York. 502 p.3. Koch, R. 1993. Umweltchemikalien. Wiley-Vch, Weinheim. 389 p.4. 5. Klein, R., and M. Paulus. 1995. Umweltproben für die Schadstoffanalytik im Biomonitoring. Gustav-Fischer, Jena. 365 p.5. 6. Römbke, J., and J. F. Moltmann. 1996. Applied Ecotoxicology. CRC Press, Florida. 282 p.6. 7. Angerer, J. 2001. Biological Monitoring. Wiley-VCH, Weinheim. 208 p.7. 8. Any literatures or journal articles related to the course |
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| Module designation | Community Service (KKN) |
| Semester (s) in which the module is taught | 6 rd semester/3 rd year |
| Person responsible for the module | Academic Committee of Plant Protection Study |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Project-Based Learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 200 minutes Practicum = 5100minutes Structured assignment = 720 minutes Self-study = 720 minutes Exam = 220 minutes Total: 6960 minutes = 116 hours = 4.64 ECTS |
| Credit points | 4 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Debriefing for students at KKN. 2. KKN students are introduced to the neighborhood where KKN is located. 3. Research the village's potential as a site for the KKN Village in order to create a work schedule. 4. Schedule tasks or activities, including general and professional programs (professional programs are programs carried out according to the study program of students who take part in community service and general programs are programs that are carried out together outside the professional program). 5. Seminars that are held to assist KKN initiatives, including both specialized and general initiatives. 6. Create a schedule of professional and general work programs. 7. Execution of tasks in accordance with professional and general work programs. 8. Evaluation of activities carried out during KKN both professional programs and general programs. 9. Preparation of Community Service Reports. 10. Reviewing and gathering of reports. |
| Content | <ol style="list-style-type: none"> 1. Preparation for departure, condition of community service locations, professional and general professional programs and report generation. 2. Introduction of community service students to the community, community leaders and village officials. 3. Assessing the potential of the village to support professional program activities and general programs. 4. Arrange professional program activities that are tailored to the community service student study program and |

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| | <p>general programs carried out jointly by groups of KKN students.</p> <ol style="list-style-type: none"> 5. Seminars are held by inviting speakers depending on the request of the community at the KKN location. 6. Prepare a plan of activities carried out during KKN for all KKN students, both professional programs and general programs. 7. Carry out activities that have been arranged according to professional programs and general programs. 8. Evaluation of activities carried out and professional programs and general programs. 9. Preparation of KKN reports in accordance with the activities carried out with the field supervisor. 10. Report consultation, report improvement and KKN report collection. |
| Examination forms | <ol style="list-style-type: none"> 1. Field activity 2. Reports |
| Reading List | <ol style="list-style-type: none"> 1. Suparman. 2017. Scientific Paper Writing Guide-Book. Faculty of Agriculture, Sriwijaya University. 90 p. 2. Final Academic Completion Guidance. Department of Plant Protection. Faculty of Agriculture, Sriwijaya University. 23 p. |
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| Module designation | Field Practice |
| Semester (s) in which the module is taught | 7 th semester / 4 st year |
| Person responsible for the module | Lecturer Plant Protection Team |
| Language | Indonesian |
| Relation to curriculum | compulsory course |
| Teaching methods | Special Meetings and Discussions |
| Workload (incl. Contact hours, self-study hours) | Field works 3x 24x170 = 12340 minutes = 204 hours Equal to 8.16 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | Reach 105 credits |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are aware of fieldwork. 2. Students can identify the topic for practicing in the field. 3. Students are competent in data collecting and research techniques. Students can arrange information in tables, graphics, and narrative form. 4. The acquired data can be read and analyzed by students. 5. Students may create preliminary reports. 6. The writing of a report is understandable to students. 7. The final report can be completed by students accurately and completely. 8. Students receive the highest possible marks. |
| Content | <ol style="list-style-type: none"> 1. Discussion of fieldwork for students who will participate in fieldwork 2. A number of field practice plans submitted by students will be carried out 3. Lecturers and students debate the subject of field experience and choose a title. 4. The lecturer requests that students develop a plan for carrying out fieldwork. 5. The lecturer corrects the student's research methodology. 6. The instructor permits the pupils to begin conducting fieldwork. 7. Students engage in fieldwork 8. Students provide updates on the implementation of field practice. 9. Students offer information gleaned from the field. 10. Students draft the field practice report, which the instructor then reviews. |

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| | <ol style="list-style-type: none"> 11. Students make corrections to the draft report in light of the lecturer's corrections. 12. The lecturer checks the final report given, and the student makes the final revision. 13. The lecturer gives permission to the students to bind the field practice report 14. 14.Students provide field practice reports that have been bound 15. The lecturer gives value to the field practice 16. Lecturers submit grades to students and administrative staff of the study program. |
| Study and examination requirements | Students are required to provide a bound field practice report that is based on instructions. |
| Reading List | Guidebook scientific paper, Department of plant pests and diseases, Faculty of Agriculture Unsri. |
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| Module designation | Seed and Post-harvest Disease |
| Semester (s) in which the module is taught | 7 rd semester/4 nd year |
| Person responsible for the module | Prof. Dr. Ir. Nurhayati, M.Si. Prof. Dr. Ir. A. Muslim, M.Agr |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 2040 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 6540 minutes = 109 hours = 4,36 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to explain the importance of seed and post-harvest diseases. 2. Students are able to explain losses due to seed and postharvest diseases. 3. Students can explain the types of post-harvest damage 4. Students can explain various causes of seed and postharvest diseases 5. Students can explain the types of post-harvest diseases in vegetables 6. Students can explain the types of post-harvest diseases in vegetables 7. Students can explain the types of post-harvest diseases in grains 8. Students can explain the types of post-harvest diseases in grains 9. Students can explain the factors that influence post-harvest diseases. 10. Students can explain how post-harvest pathogens affect seed quality. 11. Students can explain how pathogenic toxins affect seed quality 12. Students can explain how the quality standards of healthy seeds 13. Students can explain how to manage post-harvest diseases |
| Content | <ol style="list-style-type: none"> 1. Importance of seed and post-harvest diseases 2. Post-harvest losses 3. Post-harves damage |

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| | <ol style="list-style-type: none"> 4. Causes of seed and post harvest diseases 5. Post-harvest diseases of vegetable crops . 6. Post-harvest diseases in grain 7. Factors influencing post-harvest disease development 8. Effect of pathogens on seed quality 9. Toxin 10. Seed quality 11. Post-harvest disease control |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm (MCQ) 5. Final Exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Booth, RH & O. J. Burden. 1983. Pest Harvest Losses. Dalam Plant Pathologist's Pocketbook. CMI, England. 2.. Hadlington P, Gerozisis J. 2001. Urban Pest Control in Australia. University of New South Wales Press Ltd. Sydney 3.. Mardinus. 2003. Patologi Benih dan Jamur Gudang. Andalas University Press. 4. Martoredjo, T. 1986. Ilmu Penyakit Lepas Panen. Ghalia Indonesia. Jakarta. 5. Mundro, J. W. 1996. Pests of Stored Product. Hutchin Soc. London 6. Neergaard, P. 1977. Seed Pathology-Macmillas Press Ltd, London. Vol I. |
| Date of last amendment | 30 June 2021 |

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| Module designation | Storage Pest |
| Semester(s) in which the module is taught | 7 rd semester/4 th year |
| Persons responsible for the module | Dr.-phil. Arinafril Dr. Chandra Irsan Arsi, M.S. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 0 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 4500 minutes = 75 hours = 3.0 ECTS |
| Credit points | 3 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are informed on Semester Learning Plan 2. Students are able to explain roles of pests of stored products, classification and economic loss occurred as well. 3. Students are able to explain biology and ecology of pests of stored products and development-supporting factors to grow, i.e. climate, food, competition, and behavior. 4. ---- continued as above, No. 3 ---- 5. Students are able to figure out the association between stored products and insects from orders of Hymenoptera, Diptera, Hemiptera and Lepidoptera 6. ---- continued as above, No. 5 ---- 7. Students are able to figure out the association between stored products and insects from order of Coleoptera 8. Midterm Exam 9. Students are able to figure out the association between stored products and insects from orders of Coleoptera and Isoptera 10. ---- continued as above, No. 9 ---- 11. Students are able to figure out the association between stored products and non-insects, i.e. rats and ticks 12. ---- continued as above, No. 11 ---- 13. Students are able to explain population dynamic and growth rate of pests of stored products 14. Students are able to mention how to prevent and manage pest-of stored products attacks and damages. 15. ---- continued as above, No. 14 ---- |

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| | 16. Final Semester Exam |
| Content | <ol style="list-style-type: none"> 1. Semester Learning Plan 2. Roles of Pests of Stored Products, Classification, Economic Loss 3. Biology and Ecology of Pests of Stored Products and Development-Supporting Factors: Climate, Food, Competition and Behavior 4. Biology and Ecology of Pests of Stored Products and Development-Supporting Factors: Climate, Food, Competition and Behavior 5. Stored Products-Association Insects (Hymenoptera, Diptera Hemiptera and Lepidoptera) 6. Stored Products-Association Insects (Hymenoptera, Diptera Hemiptera and Lepidoptera) 7. Stored Products-Association Insects (Coleoptera) 8. Midterm Exam 9. Stored Products-Association Insects (Coleoptera, Isoptera) 10. Stored Products-Association Insects (Coleoptera, Isoptera) 11. Stored Products-Association Non-Insects (Rat, Tick) 12. Stored Products-Association Non-Insects (Rat, Tick) 13. Population Dynamic and Pests of Stored Product Growth Rate 14. Prevention and Pests of Stored Product Management 15. Prevention and Pests of Stored Product Management 16. Final Semester Exam |
| Examination forms | <ol style="list-style-type: none"> 1. Writing essays 2. Doing practical works |
| Study and examination requirements | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Student must attend 100% of practicums. 3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. Munro, J. W. 1966. Pests of Stored Products. Hutchinson, London. 2. Hill, D.S. 2002. Pests of stored foodstuffs and their control. Springer, Amsterdam, Netherlands. 3. Rees, D. 2004. Insects of Stored Products. CSIRO Publishing, Australia. 4. Meaney, P. 2005. Insect Pests of Stored Food and Preparation Premises. Harvard Pest Consultancy, Boston. 5. Meaney, P. 2007. Cockroaches and Their Control. Harvard Pest Consultancy, Boston. |

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| | <ol style="list-style-type: none">6. Abe, T., Bignell, D.E., and M. Higashi. (Eds). 2014. Termites: Evolution, Sociality, Symbiosis, Ecology. Kluwer, Amsterdam.7. Buckle, A.P., and R. Smith. 2015. Rodent Pests and Their Control. CABI, London. |
| Date of the last amendment | 20 June 2021 |

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| Module designation | Pest Forecasting System |
| Semester(s) in which the module is taught | 7 rd semester/4 th year |
| Persons responsible for the module | Dr. Yulia Pujiastuti Dr.-phil. Arinafril |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 1400 minutes Practicum = 0 minutes Structured assignment = 1440 minutes Self-study = 1440 minutes Exam = 220 minutes Total: 4500 minutes = 75 hours = 3.0 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are informed on Semester Learning Plan 2. Students are able to explain concept, definition and supporting disciplines 3. Students are able to explain the roles of Pest Forecasting System in Pest Management 4. Students know tools or software which will be used in Pest Forecasting System and its advantages 5. Students understand basic principles to operate Pest Forecasting System and then interpret the results 6. Students can operate Time Series Analysis in Microsoft Excel (1) 7. Students can operate Time Series Analysis in Microsoft Excel (2) 8. Midterm Examination 9. Students can operate PAST Software: Correspondence Analysis (1) 10. Students can operate PAST Software: Correspondence Analysis (2) 11. Students can operate SIMILE Software in creating Model of Forecasting and Population Dynamic (1) 12. Students can operate SIMILE Software in creating Model of Forecasting and Population Dynamic (2) 13. Students can operate SIMILE Software in creating Model of Forecasting and Population Dynamic (3) 14. Students can operate SPSS Software: Survival Analysis (1) 15. Students can operate SPSS Software: Survival Analysis (2) |

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| Content | 16. Final Semester Exam 1. Semester Learning Plan 2. Concepts, definitions and supporting disciplines. 3. Roles of Pest Forecasting System in Pest Management 4. Understanding of software as tool in Pest Forecasting System and Advantages 5. Understanding and Applying Software and Data Interpretation 6. Microsoft Excel Application for Time Series Analysis (1) 7. Microsoft Excel Application for Time Series Analysis (2) 8. Midterm Examination 9. PAST Software Application for Correspondence Analysis (1) 10. PAST Software Application for Correspondence Analysis (2) 11. SIMILE Program Application for Models of Forecasting and Population Dynamic (1) 12. SIMILE Program Application for Models of Forecasting and Population Dynamic (2) 13. SIMILE Program Application for Models of Forecasting and Population Dynamic (3) 14. SPSS Program Application for Survival Analysis (1) 15. SPSS Program Application for Survival Analysis (2) 16. Final Semester Exam |
| Examination forms | 1. Writing essays 2. Discussing in Group |
| Study and examination requirements | Student must attend minimum 85% of delivered courses. |
| Reading List | 1. Chakravarthy, A.K. 2020. Innovative Pest Management Approaches for the 21st Century: Harnessing Automated Unmanned Technologies. Springer, Singapore. 2. Björkman, C., and P. Niemelä. 2015. Climate Change and Insect Pests. CABI, the UK. 3. Venette, R.C. 2015. Pest risk modelling and mapping for invasive alien species. CABI. https://www.cabi.org/isc/ebook/20153099608 4. Mathyam, P., and P. Yen. 2012. Pest monitoring and forecasting. In Integrated Pest Management: Principles and Practices. Editors: Abrol, D.P., and U. Shankar. CABI Publisher, the UK. 5. Varley, G.C., G.R. Gradwell, and M.P. Hassell. 1975. Insect Population Ecology: An Analytical Approach. University of California Press, USA. 6. Microsoft Excel. 7. PAST Program. |

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| | 8. SIMILE Program. 9. All journal articles and or books related to the subject. |
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| Module designation | Plant Clinique |
| Semester (s) in which the module is taught | 7 rd semester/4 th year |
| Person responsible for the module | Dr.Ir. Harman Hamidson, M.P Dr. Ir. Chandra Irsan, M.Si. |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | Lectures = 700 minutes Practicum = 2040 minutes Structured assignment = 720 minutes Self-study = 720 minutes Exam = 220 minutes Total: 4400 minutes = 73.33 hours = 2.93 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able understand the mechanism learning and able to explain the role of the Tanaaman Clinic. 2. Students are able explain the procedure/workflow in the plant clinic 3. Students are able explain and skilled in determining the sample and sampling 4. Students are able explain and skilled in determining the diagnosis of plant diseases 5. Students are able explain and select isolation techniques from plant diseases 6. Students are able identify the causes of disturbances in plants caused by biotic and abiotic factors 7. Students are able designing recommendations for dealing with disturbance problems in plants 8. Students are able explain and skilled in determining sample criteria (Pests) 9. Students are able explain and skilled in determining the diagnosis of signs and symptoms of pest attack. 10. Students are able explain and choose isolation techniques from the causes of plant damage (pests) 11. Students are able identify the causes of disturbances in plants caused by pests 12. Students are able designing recommendations for dealing with disturbance problems in plants 13. Students know and are skilled in making dry and wet collections of various symptoms of disturbances in plants, |

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| | 14. Students know and are skilled at making work reports |
| Content | <ol style="list-style-type: none"> 1. Lecture rules, lecture contracts, schedule, assessment and evaluation. Introduction : Plant Clinic Facilities, Media and Chemicals 2. The workflow in the plant clinic starts from serving clients to providing recommendations to clients. receive samples, store samples, identify disturbances and formulate recommendations 3. Criteria for a good sample, sampling method, acceptance and handling of plant/plant/soil samples and procedures 4. Stages and how to diagnose a disturbance in plants, and 5. Symptoms of diseases and disorders in plants, isolation techniques and media and Koch's Postulates 6. Disturbances in food crops, secondary crops, plantations and horticulture caused by biotic and abiotic factors 7. The relationship between the results of the diagnosis with providing recommendations as well as the stages and methods and techniques for compiling recommendations control/ handling of disturbance problems in plants 8. Criteria for a good sample, sampling method, acceptance and handling of plant/plant/soil samples and procedures 9. Diagnosis of signs of pest attack on Plants and: Diagnostic clinical tools; Materials for diagnostic clinics; Methods in diagnosing pest attacks: 10. Stages and how to diagnose symptoms of attacks on plants, and Symptoms of Pest attacks on plants, techniques and isolation media 11. Disruption of pest attacks on food crops, secondary crops, plantations and horticulture 12. The relationship between the results of pest attack diagnosis and providing recommendations as well as the stages and methods and techniques for compiling recommendations control/handling of disturbance problems in plants. 13. Methods, techniques and handling in making dry and wet collections of plants Attacked by diseases and pests. 14. Plant Clinic Report Writing 15. Plant Clinic Report Writing |
| Examination forms | <ol style="list-style-type: none"> 1. Write essays 2. Doing practical works |

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| Study and examination requirements | <ol style="list-style-type: none"> 1. Student must attend minimum 85% of delivered courses. 2. Student must attend 100% of practicums. 3. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | <ol style="list-style-type: none"> 1. Bernett, HL and Hunter,. 1972. Illustrated genera of imperfect fungi. Third Ed. Burgess Publishing Company, Minneapolis. 246 p. 2. Waller, J. M., Ritchie, B, J and Holderness. 1998. Plant Clonic Handbook. IMI Technical Handbooks No. 3. CAB Internet national 3. Kalshoven, LJE. 1981. The Pest of Crops Indonesia. PT Ikhtiar Baru. Jakarta 4. Pirone, P.P. . Diseases & Pests of Ornamentals 5 th Ed. 5. Semangun, H. 2001. Introduction to Plant Diseases. Gadjah Mada University Press. 754 p. 6. Semangun, H. 2000. Horticultural Plant Diseases in Indonesia. Gadjah Mada University Press. Yogyakarta. 7. Semangun, H. 2000. Plantation Plant Diseases in Indonesia. Gadjah Mada University Press. Yogyakarta 8. Semangun, H. 2000. Food Crop Diseases in Indonesia. Gadjah Mada University Press. Yogyakarta 9. Streets, RB. 1985. Diagnosis of plant diseases. The University of Arizona Press 10. Sherff, AC, A. and Mac Nab, AA. 1986. Vegetable diseases and their control. Second Ed. John Wiler, New York 11. Shepard, BM, Carner GR, Barrion AT, Ooi PAC, and van den Berg H. insects and their natural enemies associated with vegetables and soybean in Southeast Asia. 1999. Quality Printing Company, SC. USA 12. Shurtleff, M.C and Averre III, C. W. 1997. The Plant Disease Clinic and Field Diagnosis of Abiotic Diseases. APS Press. The American Phytopathological Society. St. Paul, Minn. |
| Date of last amendment | 30 June 2021 |

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| Module designation | Plant Pest Identification |
| Semester (s) in which the module is taught | 7 th semester/4 th year |
| Person responsible for the module | Dr.Ir. Chandra Irsan, M.Si. Dr.Ir. Yulia Pujiastuti, M.S. Arsi, SP., M.Si. |
| Language | Indonesian |
| Relation to curriculum | compulsory course |
| Teaching methods | lectures and discussions |
| Workload (incl. Contact hours, self-study hours) | Lectures = 700 minutes Practicum = 2040 minutes Structured assignment = 720 minutes Self-study = 720 minutes Exam = 220 minutes Total: 4400 minutes = 73.33 hours = 2.93 ECTS |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students understand the importance of pest identification 2. Students are able to understand some kind of symptom on crops caused by any pest 3. Student are able to understand some term of morphology of insects 4. Students are able to explain some morphology egg of insect can be used to identification 5. Students are able to explain some morphology larval and nymph of insect can be used to identification 6. Students are able to explain some morphology pupa of insect can be used to identification 7. Students are able to explain some morphology imago (adult) of insect can be used to identification 8. Midterm exam 9. Students are able to identification the family of insect based on morphology 10. Students are able to identification the genus of insect based on morphology 11. Students are able to identification the species of insect based on morphology 12. Students are able to identification the acarina based on morphology 13. Students are able to identification the molusca |

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| | 14. Students are able to identification the vertebrate pest based on morfology 15. Students are able to identification the bird pest based on morfology 16. Final exam. |
| Content | 1. The scope of pest identification 2. Symptom of attaced pest on crops 3. Morphology insect in general 4. Kind of eggs morfology. 5. Kind of larval and nymph morfology 6. Kind of pupa morfology 7. Kind of imago (adult) morfology 8. Midterm exam 9. Identification of family based on morfology 10. Identification genus based on morfology 11. Identification species based on morfologi 12. Identification acarina pest 13. Identification molusca pest 14. Identification Vertebrate pest 15. Identification bird pest 16. Final exam |
| Examination forms | 1. Write essays 2. Doing practical works |
| Study and examination requirements | 1. Student must attend minimum 85% of delivered courses. 2. Practical work is assigned to groups of students and every member of each group should take part thoroughly in the work. |
| Reading List | 1. Khalshoven LGE. 1981. Pest of Crops in Indonesia, Revised and translated by Van Del Laan PA. Univ. Of Amsterdam. PT Ichtiar Baru- Van Hoeve, Jakarta 2. Kranz J, chumetterer H, Koch W, 1977. Diseases, Pests and Weeds in Tropical Crops, John Wiley & Sons. Chichaster. 3. Hill DS. 1997. The Economic Importance of Insects. Chapman & Hall, London. 4. Alford DV. 2007. Pests of Fruit Crops, A Color Handbook. Academic Press. Boston. |
| Date of last amendment | 30 June 2021 |

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| Module designation | Plant Disease Identification |
| Semester (s) in which the module is taught | 5 th semester/3 rd year |
| Person responsible for the module | Ir. Suwandi, M.Agr., Ph.D. Dr. Ir. Harman Hamidson, M.P. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 700 structured assignment = 2625 self-study = 850 exam = 220 total : 4395 minutes = 73.25 hours = 2.93 ects |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students will understand concepts of plant disease and how to differentiate between pathogenic plant disease and abiotic plant disorders and correctly demonstrated it in the plant disease diagnosis projects. 2. Students will understand how to design a disease survey, take a photograph and video of diseased plants, describe symptoms, calculate disease severity and yield losses, take the samples, handle, and transport diseased plants, and correctly demonstrated it in the plant disease diagnosis projects. 3. Students will understand how to induce sporulation, determine disease signs, make the microscopic examinations, and correctly demonstrated it in the plant disease diagnosis projects. 4. Students will understand how to isolate fungi and bacteria from diseased plants, examine the cultures, characterize morphological characteristics, and correctly demonstrated them in the plant disease diagnosis projects. 5. Students will understand how to identify plant pathogens using serological and molecular methods and interpret the identification result to create case studies 6. Students will understand how to identify plant pathogens using spectroscopy and remote sensing and interpret the identification result to create case studies. |

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| | <ol style="list-style-type: none"> Students will understand how to conduct a Koch postulate and correctly reported it in the plant disease diagnosis projects. |
| Content | <ol style="list-style-type: none"> Concepts of plant disease, diagnosis of pathogenic plant disease and abiotic plant disorders. Disease survey, measurements, samplings, handling, and transporting samples. Examine disease symptoms and signs. Isolation, culture, and microscopic examination of pathogenic agents. Serological and molecular methods for identification of plant pathogens. Spectroscopy and remote sensing for identification of plant disease. Implementing Koch postulates and reporting a plant disease diagnosis project. |
| Examination forms | <ol style="list-style-type: none"> Assignment rubric Case study report. Project report. |
| Reading List | <ol style="list-style-type: none"> Ownley, B.H., Trigiano, R.N. 2016. Plant Pathology Concepts and Laboratory Exercises. CRC Press. 600p. Burns, R. 2009. Plant Pathology: Techniques and Protocols. Humana Press. 326p. Kurouski, D. 2021. Diagnostics of Plant Diseases. Intechopen. 142p. Barnett, HL, Hunter, BB 1998. Illustrated Genera of Imperfect Fungi, Fourth Edition. Americal Phytopathological Society Press. 219p. Refai, M., El -Yazid, HA 2014. Monograph on Dematiaceous fungi. Department of Microbiology, Faculty of Veterinary Medicine, Cairo University. Bolton, M.D., Thomma, B.P.H.J. 2012. Plant Fungal Pathogens: Methods and Protocols. Humana Press. Watanabe, T. 2002. Pictorial Atlas of Soil and Seed Fungi- Morphologies of Cultured Fungi and Key to Species. CRC Press.484p. Leslie, JF, Summerell, BA 2006. The Fusarium Laboratory Manual. Blackwell Publishing. 388p. |

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| | <ol style="list-style-type: none">9. Semangun, H. 2008. Diseases of Plantation Crops in Indonesia. Gadjah Mada University Press. 808p.10. Semangun, H. 2008. Diseases of Food Crops in Indonesia. Gadjah Mada University Press. 451p.11. Semangun, H. 2007. Diseases of Horticultural Crops in Indonesia. Gadjah Mada University Press. 845p. |
| Date of last amendment | 25 June 2021 |

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| Module designation | Pesticide residue analysis and bioassay |
| Semester(s) in which the module is taught | 7 th semester/4 th year |
| Persons responsible for the module | Dr.-phil. Arinafril Prof. Dr. Nurhayati |
| Language | Indonesian |
| Relation to curriculum | Elective Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3.0 ects |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are informed on Semester Learning Plan 2. Students are able to explain history, supporting sciences, basic principles of Pesticide and Environment as well. 3. Students are able to explain the existence of pesticide as component in managing plant pest and disease 4. ---- continued as above, No. 3 ---- 5. Students are able to figure out the understanding on label in pesticide container, and the formulation of pesticide 6. Students are able to figure out the interaction of pesticide between target organisms and non-target organisms 7. ---- continued as above, No. 6 ---- 8. Midterm Exam 9. Students are able to describe the equipment to protect the applicators during pesticide application. 10. Students are able to figure out the assessment of pesticide risk and biological monitoring on the environment 11. ---- continued as above, No. 9 ---- 12. Students are able to figure out how to store, transport and to dispose pesticide wastes 13. ---- continued as above, No. 11 ---- 14. Students are able to explain the toxic effects of pesticides on the environment |

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| | 15. Students are able to describe and assess the methods of toxicity test 16. Final Semester Exam |
| Content | 1. Semester Learning Plan 2. Definition, Concept and Supporting Sciences 3. Classification, Physical and Chemical Properties, and Formulation of Pesticide 4. Pesticide Residues and Classification 5. Pesticide Bioassay Roles and Rules 6. Pesticide Residues Analysis Methods 7. ---- continued as above, No. 6 ---- 8. Midterm Exam 9. Pesticide Residues Analysis Result Evaluation and Interpretation 10. ---- continued as above, No. 9 ---- 11. Bioassay Test Methods (Sandwich, Leaf Discs, Soil Drenching, Seed Coating, Filter Paper) 12. ---- continued as above, No. 10 ---- 13. ---- continued as above, No. 10 ---- 14. Bioassay Test Result Evaluation and Interpretation 15. ---- continued as above, No. 13 ---- 16. Final Semester Exam |
| Examination forms | 1. Writing essays 2. Assignments |
| Study and examination requirements | Student must attend minimum 85% of delivered course. |
| Reading List | 1. Carson, R. 1962. Silent Spring. Fawcett Crest, Connecticut, USA. 155 p. 2. Matsumura, F. 1985. Toxicology of Pesticide. 2nd Edition. Plenum Press, New York. 598 p. 3. Koch, R. 1993. Umweltchemikalien. Wiley-Vch, Weinheim. 389 p.4. 4. Klein, R., and M. Paulus. 1995. Umweltproben für die Schadstoffanalytik im Biomonitoring. Gustav-Fischer, Jena. 365 p.5. 5. Römbke, J., and J. F. Moltmann. 1996. Applied Ecotoxicology. CRC Press, Florida. 282 p.6. 6. Angerer, J. 2001. Biological Monitoring. Wiley-VCH, Weinheim. 208 p.7. 7. Nolle, L.M.L., and H.S. Rathore. 2010. Handbook of Pesticides: Methods of Pesticide Residues Analysis. CRC Press, Roca Baton, USA. 8. Soundrarajan, R.P. 2012. Pesticides: Recent Trends in Pesticide Residue Assay. InTech, Rijeka, Croatia. |

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| | <p>9. Munawar, M., G. Dixon, C.I. Mayfield, M.H. Sadar and T.B. Reynoldson. 2013. Environmental Bioassay Techniques and their Application. Springer, Amsterdam, Netherlands.</p> <p>10. Any literatures or journal articles related to the course</p> |
| Date of last amendment | 30 Juni 2021 |

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| Module designation | Swamp Management |
| Semester (s) in which the module is taught | 6 th semester/3 rd year |
| Person responsible for the module | Dr. Ir. Marsi, M.Sc Dr. Ir. Moh. Bambang Prayitno Dr. Momon Sodik Imanuddin, S.P., M.Sc. Dr. Ir. Bakri, M.P. |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3 ects |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are able to understand the meaning and scope of Lowland 2. Students are able to understand and differentiate tidal and freshwater swampland 3. Students are able to understand the typology of swampland based on soil hydro-topography and soil type 4. Students are able to understand the pyrite formation, oxidation and how to minimize pyrite oxidation and its impact. 5. Students are able to understand soil salinity concept and its effect on soil characteristics and plant growth 6. Students are able to understand water management on tidal and freshwater swamplands 7. Students are able to understand peatland formation and its characteristics. 8. Students are able to understand management concept of peatland for agricultural and non-agricultural Uses 9. Students are able to understand peatland and coastal ecosystem restoration |
| Content | <ol style="list-style-type: none"> 1. Introduction: Definition and scope of swampland; Conditions For the formation of swamp land. |

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| | <ol style="list-style-type: none"> 2. Typology of Tidal Swamp land and its Soil Characteristics. 3. Typology of the Freshwater swamp land and its soil characteristics 4. Process of pyrite formation in tidal swamp land, pyrite oxidation and its management 5. Impact of pyrite oxidation on soil and water quality 6. Effect of salinity on soil and water characteristics and its management 7. Effect of height and duration of inundation on soil characteristics of freshwater swamp land. 8. Water Management of Tidal Swamp and Freshwater Swamp land 9. Formation of Peat Soil and its characteristics 10. Peatland management for agriculture 11. Peatland management for non-agricultural sector 12. Peat Ecosystem Restoration 13. Swamp and Coastal Ecosystem |
| Examination forms | <ol style="list-style-type: none"> 1. Quiz (essay) 2. Doing practical works (report) 3. Structured assignment (essay and paper) 4. Midterm exam (essay) 5. Final exam (essay) |
| Reading List | <ol style="list-style-type: none"> 1. Haryono. 2013. Lahan Rawa: Lumbung Pangan Masa Depan Indonesia. Badan Penelitian dan Pengembangan Pertanian Kementerian Pertanian. 2. Didi Ardi S., Undang Kurnia, Mamat H.S., Wiwik Hartatik, dan Diah Setyorini. 2006. Karakteristik Dan Pengelolaan Lahan Rawa. Balai Besar Penelitian Dan Pengembangan Sumberdaya Lahan Pertanian. Badan Penelitian dan Pengembangan Pertanian Departemen Pertanian. 3. Najiyati, S., Lili Muslihat dan I Nyoman N. Suryadiputra. 2005. Panduan pengelolaan lahan gambut untuk pertanian berkelanjutan Bogor: Wetlands International - xi + 231 hlm; ISBN: 979-97373-2-9 4. Reddy, K.R. and R.D. DeLaune. 2008. Biogeochemistry of Wetland: Science and Application. CRC Press. 806 pp. 5. Perillo, G.M.E., E. Wolanski, D.R. Cahoon, and M.M. Brinson (Eds). 2009. Coastal Wetlands: An |

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| | <p>Integrated Ecosystem Approach. Elsevier. 975 pp.</p> <p>6. Richardson, J.J. and M.J. Vepraskas (Eds). 2001. Wetland Soils: Genesis, Hydrology, Landscapes and Classification. Lewis Publishers. 432 pp.</p> <p>7. Corner, W.H., T.W. Doyle, K.W. Krauss (Eds). 2007. Ecology of Tidal Freshwater Forested Wetlands of the Southern United States. Springer. 508 pp</p> <p>8. Kadlec, R.H. and S.D. Wallace. 2009. Treatment Wetland. 2nd Ed. CRC Press. 1048 pp.</p> |
| Date of last amendment | 30 June 2021 |

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| Module designation | Land and Agrarian Law |
| Semester (s) in which the module is taught | 7th semester/Fourth year |
| Person responsible for the module | Dr. Ir. Dwi Setyawan, M.Sc Prof. Dr. M. Edi Armanto |
| Language | Indonesian |
| Relation to curriculum | Elective course |
| Teaching methods | Contextual Learning, Cooperative learning |
| Workload (incl. Contact hours, self-study hours) | lectures = 1400 structured assignment =1440 self-study = 1440 exam = 220 total : 4500 minutes = 75 hours = 3 ectis |
| Credit points | 2 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students are expected to have an understanding and be able to: 2. Understanding the importance of land law in the lives of individuals, society, nation and state; 3. Understand the importance of knowing the applicable land law in the period before and after independence as well as in the present; 4. Knowing the general concept of agrarian law and understanding the principles and concepts as well as knowing the sources of agrarian law; 5. Knowing land rights according to law and the UUPA and how to obtain them for each land right, and being able to behave and apply as citizens in daily life; 6. Understanding the concept of the state and the principle of land reform, as well as knowing and understanding the provisions of alternative land for maximum and minimum land limits 7. Understand land problems/conflicts and be able to find the background of land problems/conflicts that occur in the surrounding community. |
| Content | <ol style="list-style-type: none"> 1. The definition and scope of land law, both in the curriculum and in land law science; |

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| | <ol style="list-style-type: none"> 2. History of Land through the search for Land Politics, namely during the period of customary law communities, kingdoms and colonialism (the Netherlands and Japan) and the efforts made after Agrarian Reform 3. Positive Agrarian Law includes an overview, principles, concepts and sources of Agrarian law 4. Land rights according to the history of Agrarian law and UUPA 5. Land reform and absente land as well as minimum and maximum land limits 6. Registration of Land Rights 7. Land issues/conflicts |
| Examination forms | <ol style="list-style-type: none"> 1. Essays questions 2. Writing paper |
| Reading List | <ol style="list-style-type: none"> 1. Boedi Harsono. Hukum Agraria Indonesia: Sejarah dan Pembentukan Undang-Undang dan penjelannya 2. Saleh Adiwinata, Hukum Perdata dan Tanah, buku I & II 3. G.Kartasapoetra. Hak-hak dan Jaminan Atas tanah 4. Irawan Soerodjo, Kepastian Hukum Atas Tanah 5. AP. Parlindungan, Pendaftaran Tanah di Indonesia 6. Karl.J. Pelzer, Sengketa Agraria, 7. Noer Fauzi, Otoda dan sengketa Tanah |
| Date of last amendment | 30 June 2021 |

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| Module designation | Research Project (Bachelor Thesis) |
| Semester (s) in which the module is taught | 7 th -8 th semester/4 th year |
| Person responsible for the module | Academic Committee of Plant Protection Study |
| Language | Indonesian |
| Relation to curriculum | Compulsory Course |
| Teaching methods | Project-Based Learning |
| Workload (incl. Contact hours, self-study hours) | Practical works: 24480 minutes =408 hours Equal to 16.32 ECTS |
| Credit points | 6 credits |
| Required and recommended prerequisite for joining the module | - |
| Module objectives/intended learning outcomes | <ol style="list-style-type: none"> 1. Students will understand concepts and apply methods of researches in plant protection and acknowledge them in a thesis proposal. 2. Students will able to present a research plan in a study program committee. 3. Students will able to perform independence research in the laboratory and fields experiments. 4. Students will able to analyze experiment data and write the results in a seminar paper and thesis. 5. Students will able to develop the effective communicative skills to present a final research seminar in a study program committee. 6. Student will able to write and produce a thesis according to the thesis university format and rule. 7. Students will able to effectively present and defend the thesis orally in a defense thesis meeting. |
| Content | <ol style="list-style-type: none"> 1. Writing the thesis proposal based on concepts and various research techniques in plant protection under guidance of the supervisors. 2. Preparing a presentation under guidance of the supervisors and presenting the thesis proposal. 3. Performing the independence research on plant protection in the laboratory and fields under guidance of the supervisors. 4. Analyzing the experiment data and write the results in a seminar paper and thesis under guidance of the supervisors. 5. Presenting a final research seminar using the effective communicative skills to present in a study program committee. |

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| | 6. Writing the thesis according to the thesis university format and rule under guidance of the supervisors. 7. Presenting and defending thesis orally in a defense thesis meeting. |
| Examination forms | Thesis assessment |
| Reading List | 1. Suparman. 2017. Scientific Paper Writing Guide-Book. Faculty of Agriculture, Sriwijaya University. 90 p. 2. Final Academic Completion Guidance. Department of Plant Protection. Faculty of Agriculture, Sriwijaya University. 23 p. |
| Date of last amendment | 10 Oktober 2021 |

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| Module designation | Seminar |
| Semester (s) in which the module is taught | ⁸ th Semester |
| Person responsible for the module | Supervisor |
| Language | Indonesian |
| Relation to Curriculum | Mandatory |
| Teaching / Delivery Methods | Presentation based on research |
| Workload (incl. Contact hours, self-study hours) | Writing and discussion =4080 minutes = 68 hours = 2.72 ECTS |
| Semester Credit Unit | 1 credit |
| Required and recommended prerequisite for joining the module | Finished Field Practice |
| Module Objectives/Intended Learning Outcomes | <ol style="list-style-type: none"> 1. Students will be able to prepare information sources, such as articles, textbooks, and proceedings, in Plant Protection which correlate for research writing paper 2. Students will be able to collect information from sources. 3. Students will be able to compile raw data prior to data analysis 4. Students will be able to order raw data obtained from the research they conduct. 5. Students will be able to figure out statistical method based on design they use. 6. Students will be able to analyze data 7. Students will be able to interpret data 8. Students will be able to figure out interpreted data and to couple those data with knowledge they know 9. Students will be able to conclude information and statement. 10. Students will be able to give suggestion for next researcher for further experiment 11. Students will be able to obtain new paradigm and to improve their understanding from discussion with supervisor. |
| Contents | <ol style="list-style-type: none"> 1. Information sources, e.g. articles, textbooks, and proceedings. 2. Collecting Information 3. Compiling Raw Data 4. Organizing Raw data 5. Design for research 6. Data analysis 7. Data interpretation 8. Figuring out and coupling data |

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| | 9. Writing conclusion 10. Proposing suggestion 11. Discussing with supervisor on paper draft written |
| References | 1. Suparman SHK. Main Author, 2017. Scientific Writing Guidebook. Faculty of Agriculture, Universitas Sriwijaya, Indralaya. 2. Anonymous 2017. Final Project Procedure Guidelines. Plant Protection Study Program, Faculty of Agriculture, Universitas Sriwijaya, Indralaya. |
| Date of last amendment | 10 Oktober 2021 |