

PORTOFOLIO

**COURSE:
FUNDAMENTALS OF AGRONOMY
(PAG 202116)**



TEACHING TEAM:

**Dr. Ir. Yakup, M.S.
Dr. Ir. Firdaus Sulaiman, M. Si.
Dr. Ir. Zaidan Panji Negara, M.Sc.
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**AGRONOMY STUDY PROGRAM
FACULTY OF AGRICULTURE
UNIVERSITAS SRIWIJAYA**

A. COURSE IDENTITY

Module designation	<i>Fundamentals of Agronomy</i>	
Semester (s) in which the module is taught	2 nd semester/1 st year	
Person responsible for the module	1. Dr. Ir. Yakup, M.S. 2. Dr. Ir. Firdaus Sulaiman, M. Si. 3. Dr. Ir. Zaidan Panji Negara, M.Sc. 4. Fitra Gustiar, S.P., M. Si.	
Language	Indonesian	
Relation to curriculum	Compulsory Course	
Type of teaching, contact hours	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)	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)	
Requirements according to the examination regulations	A student must have attended the lecture at least 85% of total lectures and submitted all the assignments prior to join the final exam	
Module objectives/intended learning outcomes	After completing this course, a student is expected to:	
CLO=Course Learning Outcomes	CLO1	Understand and be able to explain the meaning and scope of agronomy, the stages of agricultural development, and the area of origin which is the center of plant diversity.
	CLO2	Understand and be able to explain the role of plant breeding, grouping of plant species, plant growth and development, plant propagation, and the influence of abiotic and biotic factors on plant growth and development.
	CLO3	Understand and be able to explain land preparation, nursery/seeding and planting, embroidery and plant maintenance, cropping pattern and waste management, as well as agricultural production facilities.
Content	1. Understanding and scope of agronomy. 2. Stages of agricultural development and technological advances in crop cultivation.	

	<ol style="list-style-type: none"> 3. Area of origin and center of plant diversity. 4. The role of plant breeding in increasing agricultural production. 5. Classification/ grouping of agronomic plant. 6. Plant growth and development. 7. Plant propagation (sexual and asexual). 8. Influence of abiotic and biotic factors on plants. 9. Preparation of dry land and wet land. 10. Nurseries, seeding, and planting. 11. Embroidery and plant maintenance. 12. Cropping patterns and crop diversification. 13. Land conservation and waste management. 14. Agricultural production facilities.
Examination forms	Quiz, Mid-Terms and Final Examination
Media employed	LCD, whiteboard, websites
Reading List	<ol style="list-style-type: none"> 1. Arya, R. L. 2020. Fundamentals of Agronomy. Scientific Publishers. 171 p. 2. Chandrasekaran, B., K. Annadurai and E. Somasundaram. 2010. A Textbook of Agronomy. New Age International (P) Limited Publishers. New Delhi. 835 p. 3. Dris, R., I. A. Khan and R. Niskanen. 2002. Environmental and Crop Production. CRC Press. 360 p. 4. Gopal, C. D. 2019. Fundamentals of Agronomy. Oxford and IBH Publishers, 2nd edition. 444 p. 5. Jenkins, A. 2016. Agronomy and Crop Production. Syrawood Publishing House. 205 p. 6. Jones Jr, J. B. 2002. Agronomic Handbook, Management of Crops, Soils and Their Fertility. CRC Press. 450 p. 7. Kamburova, V. J. and S. K. Kim. 2018. Fundamentals of Agronomy. Scitus Academic LLC. 370 p. 8. Parashar, A. and M. K. Bishnoi. 2021. Fundamentals of Agronomy and Agricultural Meteorology. Bhavya Books. 200 p. 9. Sharanappa. 2021. Fundamentals of Agronomy. New India Publishing Agency-Nipa. 164 p. 10. Singh, S.S. and R. Singh. 2015. Principles and Practices of Agronomy. Kalyani Publishers. 348 p. 11. Sparks, D. L. 2021. Advances in Agronomy, Volume 167. Academic Press. 320 p. 12. Webster, C. C. and P.N. Wilson. 1998. Agriculture in The Tropics. Wiley-Blackwell, 3rd edition. 552 p.

B. STUDY LEARNING PLAN

Course Name : Fundamentals of Agronomy

Code/Credits : PAG 202116

Course Status : Mandatory

Short Description

This course explains the meaning and scope of agronomy, the stages of agricultural development, the area of origin which is the center of plant diversity, the role of plant breeding, grouping of plant species, plant growth and development, plant propagation, the influence of abiotic and biotic factors on plant growth and development, land preparation, nursery/seeding and planting, embroidery and plant maintenance, cropping pattern and waste management, as well as agricultural production facilities.

Objectives

After the completion of this course, students will be gain basic knowledge about agronomy and various related aspects along with advances in the development of plant cultivation technology; understand the growth and development of plants as well as the abiotic and biotic factors that influence so that we get the production of the plants; able to apply general plant cultivation techniques, especially food crops, horticultural crops, and plantation crops, as well as other crops that are widely cultivated.

Mapping of Course Learning Outcomes (CLO)-Program Learning Outcomes (PLO)

CLO	Description	PLO*			
		AV	KC	GS	SS
CLO1	Understand and be able to explain the meaning and scope of agronomy, the stages of agricultural development, and the area of origin which is the center of plant diversity.	8	2; 4	1; 3	2; 4
CLO2	Understand and be able to explain the role of plant breeding, grouping of plant species, plant growth and development, plant propagation, and the influence of abiotic and biotic factors on plant growth and development.	8	2; 4	1; 3	2; 9
CLO3	Understand and be able to explain land preparation, nursery/seeding and planting, embroidery and plant maintenance, cropping pattern and waste management, as well as agricultural production facilities.	8	2; 4	1; 5	2; 11

AV = Attitude and Value; **KC** = Knowledge Competence; **GS** = General Skills; **SS** = Specific Skills.

*Details are in the Study Program Curriculum file.

Course Outlines :

Face-to-Face :

No.	Course materials	Duration (face-to-face) (minutes)	CLO		
			1	2	3
1	Understanding and scope of agronomy.	110	v		
2	Stages of agricultural development and technological advances in crop cultivation.	110	v		
3	Area of origin and center of plant diversity.	110	v	v	
4	The role of plant breeding in increasing agricultural production.	110	v	v	
5	Classification/ grouping of agronomic plant.	110		v	
6	Plant growth and development.	110		v	v
7	Plant propagation (sexual and asexual).	110		v	v
8	Evaluation (1 – 7)	110	v	v	v
9	Influence of abiotic and biotic factors on plants.	110		v	v
10	Preparation of dry land and wet land.	110		v	v
11	Nurseries, seeding, and planting.	110		v	v
12	Embroidery and plant maintenance.	110		v	v
13	Cropping patterns and crop diversification.	110		v	v
14	Land conservation and waste management.	110			v
15	Agricultural production facilities.	110		v	v
16	Evaluation (9 – 15)	110		v	v

Outcomes and Assessment

No.	Week	Sub-CLO	Assessment	Percentage of score weight to final score (%)
1	I	1. Understand and be able to explain the meaning of agronomy and its basic elements. 2. Understand and be able to explain the and scope of agronomy.	Ask and answer question (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	5 %
2	II	3. Understand and be able to explain the stages of agricultural development. 4. Understand and be able to explain advances in plant cultivation technology.	Ask and answer question (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %

3	III	5. Understand and be able to explain area of origin of plant species. 6. Understand and be able to explain centers of plant diversity.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
4	IV	7. Understand and be able to explain the role of plant breeding improving genetic traits. 8. Understand and be able to explain the role of plant breeding in increasing production.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
5	V	9. Understand and be able to explain the role of plant breeding improving genetic traits. 10. Understand and be able to explain the role of plant breeding in increasing production.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
6	VI	11. Understand and be able to explain plant growth. 12. Understand and be able to explain plant development. 13. Understand and be able to explain between plant growth and development.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
7	VII	14. Understand and be able to explain sexual reproduction plants. 15. Understand and be able to explain asexual reproduction plants.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
		EVALUATIONI (I to VII)	Essay exams Discussion on the answers of the essay exams	50 %
8	VIII	16. Understand and be able to explain the influence of abiotic factors on plant growth and development. 17. Understand and be able to explain the influence of biotic factors on plant growth and development.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	5 %
9	IX	18. Understand and be able to explain the dryland preparation. 19. Understand and be able to explain the wetland preparation.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %

10	X	20. Understand and be able to explain nurseries and seeding planting. 21. Understand and be able to explain the planting.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
12	XI	22. Understand and be able to explain plant embroidery. 23. Understand and be able to explain plant maintenance.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
13	XII	24. Understand and be able to explain cropping patterns. 25. Understand and be able to explain crop diversification.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
14	XIII	26. Understand and be able to explain land conservation. 27. Understand and be able to explain waste management.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
15	XIV	28. Understand and be able to explain the agricultural production facilities.	Ask and answer questions (face-to-face). At least 5% of students in the class are able to answer the question correctly. Assignment.	7,5 %
16		EVALUATION II (VIII – XIV)	Essay exams Discussion on the answers of the essay exams.	50 %

Assignment

No.	Week	Assignment Instructions	Submission Methods	Weight (%)	CLO		
					1	2	3
1	I	Students search, discuss and review of the definition, elements, and studies in agronomy. The results of the review are written on a power point slide of a maximum of 5 pages.	Print out	3 % to total score in the Evaluation I	v		

2	II	Students make a review of agricultural developments along with advances in plant cultivation technology.	Print out	5 % to total score in the Evaluation I	v		
3	III	Students make a list of plant species based on their area of origin.	Soft file in CD	7 % to total score in the Evaluation I	v		
4	IV	Students read references on the role of plant breeding in increasing agricultural production.	Print out	5 % to total score in the Evaluation I		v	
5	V	Students make groupings of plant types based on the purpose of planting and their characteristics.	Soft file in CD	5 % to total score in the Evaluation I		v	
6	VI	Students read references on plant growth and development.	Print out	4% to total score in the Evaluation I		v	
7	VII	Students make list the propagation of plant species by sorting them out sexually and/or asexually.	Soft file in CD	6 % to total score in the Evaluation I		v	
8	IX	Students read references on the influence of abiotic and biotic factors on plants.	Print out	5 % to total score in the Evaluation II		v	
9	X	Students make a review on land preparation practices for plant cultivation.	Print out	5 % to total score in the Evaluation II			v
10	XI	Students make a review on the practice of seeding/nursery and planting.	Print out	5 % to total score in the Evaluation II			v
11	XII	Students make a review of the practice of embroidery and plant maintenance.	Print out	5 % to total score in the Evaluation II			v
12	XIII	Students collect photos of cropping patterns and plant diversification along with explanations.	Soft file in CD	7.5 % to total score in the Evaluation II			v
13	XIV	Students read references on land conservation and agricultural waste management.	Print out	5% to total score in the Evaluation II			v
14	XV	Collect photos of agricultural production facilities with explanations.	Soft file in CD	7.5 % to total score in the Evaluation II			v

Practicum:

No.	Topics	Duration	CLO			Practicum Activities
			1	2	3	
1	Practice regarding plant pollination.	170		v		Pre-test, explanation from assistant, practice according to the practical manual, writing the results in worksheet, approval by assistant.
2	Practice on grouping plant species.	170	v	v		
3	Practice on plant growth and development.	170	v	v		
4	The practice of vegetative and generative plant propagation.	170	v	v		
5	Practice on observation influence of abiotic and biotic factors on plants.	170	v	v		
6	Practice on implementation land preparation on dry land	170			v	
7	Practice on implementation land preparation on wet land.	170			v	
8	Practice on nursery/ seeding and planting.	170			v	
9	Practice on embroidery and plant maintenance.	170			v	
10	Practice on regulation of cropping patterns and implementation of crop diversification.	170			v	
11	Practice on ways of land conservation and agricultural waste management.	170			v	
12	Practice on introduction and utilization of agricultural production facilities.	170	v		v	
<p>Distribution of weight in the practicum score: Pre-Test (20%), practicum report (20%), participation (10%), final practicum exam (50%). All student should have 100% of presence in the practicum, and for those who are unable to attend practicum, she/he must take a follow-up practicum at another time. Percentage of score weight of practicum to final score is 25%.</p>						

Contribution of Course Assessment to PLO

Course Assessment	AV	KC	GS	SS	Type
Assignments	8; 10; 11	1; 2	1; 2	2; 4	Formative
Questions in Quiz	8; 10	1; 2	1; 2	2; 4	Summative
Questions in Mid-Term	8; 10	1; 2; 4	1; 3; 4	2; 4; 9; 10	Summative
Questions in Final Exam	8; 10	1; 2; 4	1; 3; 4	2; 4; 9; 10	Summative
Practicum	5; 6; 8; 10	1; 2; 4	1; 3; 4	2; 4; 9; 10	Formative

Assignment Assessment Rubric

No.	Criteria	Weight (%)	Score			
			≥ 86	71-85.99	56-70.99	40-55.99
			Excellent	Good	Enough	Bad
1	Format and presentation of written assignment	10	The assignment is presented in accordance with the instructions	There are parts (10%) of the assignment not in accordance with the instructions	There are parts (25%) of the assignment not in accordance with the instructions	There are half of the assignment not in accordance with the instructions
2	Discussion in the written assignment	50	Information to support the discussion in the assignment is adequate, and the discussion is well organized	Information to support the discussion in the assignment is adequate; however the information is not well written	Information to support the discussion in the assignment is adequate; however the information is copied and pasted in the assignment without paraphrasing	There is not enough information in the assignment. It is just a compilation of information derived from internet searching
3	Publication year of literature cited in the assignment	15	Most of literatures cited are up-to date (≤ 5 years)	Most of literatures cited are between 5-10 years	Most of literatures cited are (≥ 10 years)	There is no literature cited
4	Number of literatures cited in the assignment	15	There are ≥ 3 literature cited	There are ≤ 3 literature cited	One literature cited	There is no literature cited
5	Submission time	10	Assignment is submitted before the deadline	Assignment is submitted one day after the deadline	Assignment is submitted two days after the deadline	Assignment is submitted after two days from deadline

Benchmark for Scoring

No.	Range of Score	Grade	Description
1	86.00 - 100.00	A	Excellent
2	71.00 – 85.99	B	Good
3	56.00 – 70.99	C	Fair
4	40.00 – 55.99	D	Bad
5	<40.00	E	Worst

Remedial Exam: Course materials in Power Point Slides

Students are allowed to join Remedial Exam if the score is under 60 out of 100.

Course materials in Power Point Slides :

Week 2

STAGES OF AGRICULTURAL DEVELOPMENT AND TECHNOLOGICAL ADVANCES IN CROP CULTIVATION

1

Principle of Plant Production


$$Y = f(G, E, P, T)$$

- ⊗ Y = Yield
- ⊗ G = Genetic
- ⊗ L = Environment
- ⊗ F = Physiology
- ⊗ T = Technology

2

PLANT PRODUCTIVITY

- The ability of plants to produce photosynthate and allocate it to organs is of economic value.
- Factors affecting :
 - Genetic
 - Environment
 - Physiology
 - Cultivation



3

PRODUCTION AND PRODUCTIVITY

- Plant production is part or all of the plant parts that are used for human purposes.
- Crop production can be :
 - Seeds, fruits, flowers, bulbs, leaves, stems, roots.
 - Certain substances or materials such as gum and dyes.
 - Beauty and comfort.
- The unit of yield or yield power is expressed in units of weight or volume.
- Productivity: unit yield per unit area or per tree.

4

Example: productivity of some commodities in Indonesia

- Food crop
 - Rice : 4.8 ton
 - Corn : 4.0 ton
 - Soybean : 1.2 ton
- Fruits, vegetables, and plantation
 - Orange : 50 kg/tree
 - Mango : 200 kg/tree
 - Chilli : 6 ton/ha
 - Oil palm : 15 ton FFB/ha/year
 - Rubber : 800 kg dry rubber /ha/year.

YIELD OF HARVEST

PACKAGING

STAGES OF AGRICULTURAL DEVELOPMENT

- Gatherers and hunters
 - Humans do not cultivate crops and livestock, only take from nature.
- Early stages of agriculture
 - Domestication & selection, migration with plant material.
- Sedentary farming
 - Beginning in Mesopotamia (700 BC): agriculture developed, resulting in an economic surplus → early culture.
 - Wheat, barley, dates, figs, olives, grapes
 - Already familiar with irrigation from bricks with asphalt joints.

- Roman Times
 - Dry storage, pickles, pickles, sweets.
 - Green manure rotation.
 - Manure.
 - Return of soil fertility.
 - Cold storage.
 - "Specularium" greenhouse.
 - Greek Age
- Greek Age
 - Theophratus (student of Aristotle) Father of Botany.

- Agricultural Revolution :
 - A drastic change in the way of farming from subsistence to commercial agriculture on a wider scale, by utilizing new technologies and food ingredients.
 - The agricultural revolution was marked by :
 - The emergence of agricultural techniques 17-18 centuries
 - New food discoveries in Europe
 - Cattle in the cage
 - Mechanization.
 - The fallow system is replaced by crop rotation:
 - Disease and weed prevention
 - Easier and more efficient
 - Improvement of soil fertility (green fertilizer)
 - Prevent erosion
 - The risk is divided between different plants.

TECHNOLOGICAL ADVANCES IN CROP CULTIVATION

- Drastic increase in food production due to the discovery of new varieties resulting from plant breeding with high productivity, stunted habitus and responsiveness to high N fertilizers, which were successful in India and in Indonesia, thus achieving food self-sufficiency in 1984.
- Example in Indonesia IR or PB rice from the 1960s.
- Breeding results at that time: High Yielding Varieties (HYV) with idio type (for rice):
 - ✓ Thick leaves, short & upright
 - ✓ Panicles short & strong
 - ✓ Lots of tillers, high productive tillers
 - ✓ Responds to high N fertilization
 - ✓ High harvest index.

New Type Superior Variety Rice Idiotype

- Low tillers (9-10)
- All panicles are productive
- Number of grain content per panicle > 250 grains
- Sturdy trunk
- The leaves are thick, erect, dark green
- Mature age 100-130 days
- Resistant to a number of pests and diseases
- The quality of grain and rice can be accepted by stakeholders
- Examples : Sintanur, Batang Gadis, Cimelati, Gilirang, Ciapus

THE ROLE OF BIOTECHNOLOGY

- Biotechnology is a technology that applies biological processes to increase production, which is safe for humans, environmentally friendly, and sustainable. This technology has actually been going on for hundreds of years.
- Biotechnology is not only genetic engineering, but includes everything that utilizes biological processes such as plant tissue culture, producing secondary metabolites in vitro.

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- Genetic Engineering: technology used to change the genetics of living cells through human intervention in an effort to make these cells able to produce the desired compounds or carry out different functions from other cells that have not been manipulated.
 - Inserting genes that control certain traits into the chromosomal arrangement of plants in order to obtain the desired plant.
 - Genes inserted into chromosomes can come from bacteria, fungi, viruses, animals, plants of different species or families.
 - Genes are transferred with the help of microbes, physically, electrically, chemically.
 - GMOs, also known as Genetically Modified Organisms (GMOs).

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Biotechnology opportunities

- The main goal of 21st century genetic engineering is to produce new cultivars with the "Harvest Plus" paradigm, which is to produce new cultivars that are rich in iron, Zn, and provitamin A to improve public health.

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- Enables plant breeding that cannot be done with conventional technology:
 - Increases germplasm source of new transferable characters.
 - Allows rapid transfer of specific genes directly to existing cultivars without having to cross several generations; and does not change the initial phenotype of the cultivar.
 - It is possible to change the gene formulation that will produce new characteristics in plants and make plants a bioreactor. For example :
 - assemble plants that are resistant to certain pests and diseases
 - assemble plants that can produce vaccines
 - assemble plants with certain colors and shapes on ornamental plants.

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Examples of genetically engineered products that have been commercially :

- Tomatoes are resistant to storage;
- Herbicide tolerant soybeans
- Bt corn (maize containing the gene for the bacterium *Bacillus thuringiensis*, making it resistant to *Lepidoptera* caterpillars)
- Bt Cotton, Bt Potato
- Herbicide resistant canola
- Tobacco resistant to CMV and TMV viruses
- Golden rice, which is rice that contains vitamin A
- Jagung Bt (jagung yang mengandung gen bakteri *Bacillus thuringiensis*).

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Some GMO Plants:

Golden Rice



• Derived from the gene of the Narsis plant and *Erwinia* bacteria inserted into the rice.

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Tomato Flavr Savr



- Produced by infection from a combination of *Escherichia Coli* bacteria and antisenesescens gene transferred into tomatoes to inhibit the polygalacturonase enzyme.

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Corn Bt (*Bacillus thuringiensis*)



•Source: www. Wikipedia.com

- Produced from the Bt gene of *Bacillus thuringiensis* bacteria, namely Crystal protein (Cry) which is an endotoxin protein that is toxic to insects (insects) which is inserted into the corn chromosome. So that it is resistant to *Lepidoptera* caterpillar attacks.

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Concerns about genetic engineering by the Environmentalist group

- There may be crosses with weeds (super weeds)
- Once released it cannot be taken back
- Patents/intellectual property rights are owned by certain entities
- Safety when consumed

The answer to those are :

- Crossing between species or families naturally is not easy. To avoid crossing over, genes are integrated into chloroplast or mitochondrial chromosomes
- There is a rule in the Cartagena protocol that regulates the patent rights of an organism is the country/citizen in which the organism is found
- Before being released a GMO cultivar must go through a food safety test regulated by the state until the GMO is declared safe.

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21st Century Development Trends

- Organic farming -> to respond to food safety requirements and environmental issues (e.g. ecolabeling).
- Integrated crop management by reducing the use of inorganic materials
- Utilization of biotechnology for breeding
- Hyponica: greenhouse technology
- Aeroponics: growing in the air.

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A PARADIGM SHIFT

- The production system of a type of plant is not just the ability to "produce as much as possible" or just the achievement of a target.
- The choice of plants to be cultivated must pay attention to and prioritize the carrying capacity of natural resources, harmony and sustainability.
- The principle in production must be market oriented.

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Achievement of CLO (Indralaya Class)

STUDY PROGRAM : AGRONOMY (INDRLAYA CLASS)
 ACADEMIC YEAR : 2021/2022 (EVEN)
 COURSE : FUNDAMENTALS OF AGRONOMY (3 CREDITS)
 ROOM : RK C1102
 SCHEDULE : THURSDAY (07:30 - 09:10 WIB)

NO.	NIM	NAMA	EV1	EV2	EV3	FINAL SCORE	GRADE	OVERALL ASSESSMENT
1	05091182126001	LINGGA TENTI	80	95	86	87,65	A	Achieved
2	05091182126002	RIZKA YUNIARTI ANGGRAINI	81	92,5	86	87,03	A	Achieved
3	05091182126003	MELANY AGUSTINE	82	95	94	91,35	A	Achieved
4	05091182126004	RIHANI INAYA	84	87,5	86	86,03	A	Achieved
5	05091182126005	FEBI RISKY WULANDARI	81	87,5	88	86,08	A	Achieved
6	05091182126006	THERESIA HOTNARIA MARBUN	87	85	94	89,10	A	Achieved
7	05091182126007	DESI TRIMALASARI	85	95	87	89,30	A	Achieved
8	05091182126008	NIKEN	83	85	89	86,10	A	Achieved
9	05091182126009	FILIA SYAFITRI	82	85	90	86,25	A	Achieved
10	05091182126010	BINTANG ZWARI OGANDY	83	87,5	88	86,58	A	Achieved
11	05091182126012	INTAN AULIA SARI	86	92,5	90	89,88	A	Achieved
12	05091182126013	JLHAM HERIYADI	86	90	87	87,80	A	Achieved
13	05091182126014	APRILIZAH	85	92,5	90	89,63	A	Achieved
14	05091182126015	YENI ANISA PUTRI	80	90,5	92	88,48	A	Achieved
15	05091182126016	SHOFI AMELIA RACHMAWATI	82	90	87	86,80	A	Achieved
16	05091182126017	SEPTIANI	85	95	87	89,30	A	Achieved
17	05091182126018	ANI NURMALA	83	85	90	86,50	A	Achieved
18	05091182126019	NANDI EFRIANSYAH	85	85	88	86,20	A	Achieved
19	05091282126020	FEBRIANTO	84	87,5	87	86,43	A	Achieved
20	05091282126021	ADLI KOMARUZ ZAMAN	86	95	87	89,55	A	Achieved
21	05091282126022	RIZKA NURHIDAYATI	85	87,5	86	86,28	A	Achieved
22	05091282126023	GALUH MAHARANI	83	90	90	88,25	A	Achieved
23	05091282126024	DEWI ARYANI	83	86	88	86,05	A	Achieved
24	05091282126025	VANESA AHISTA NURHALIZA	82	90	86	86,40	A	Achieved
25	05091282126026	NINA ALFIANA	83	87,5	87	86,18	A	Achieved
26	05091282126027	NADIYA ZAHRA NAFISA LAILA	82	90	94	89,60	A	Achieved
27	05091282126028	SYAFIRA SYAWALIZA	86	85	87	86,05	A	Achieved
28	05091282126029	LISA AMALIA PUTRI SETYAWAN	89	95	86	89,90	A	Achieved
29	05091282126030	FISIKA WULANDARI	83	87,5	90	87,38	A	Achieved
30	05091282126031	KYRA DYAHMARSHA SYEAR	83	87	87	86,00	A	Achieved
31	05091282126032	M. MIFTAHUL AKBAR	87	86	86	86,25	A	Achieved
32	05091282126033	MUHAMMAD RAFLI ASSYANDI	80	60	75	71,00	B	Not Achieved
33	05091282126034	FARHAN HABIB	82	85	90	86,25	A	Achieved
34	05091282126035	SALSABILLA DWI RAHAYU	84	87,5	88	86,83	A	Achieved
35	05091282126036	ZIKRA WANDIRA	85	87,5	86	86,28	A	Achieved
36	05091282126037	GABY TARINDAH	86	95	92	91,55	A	Achieved
37	05091282126038	WULANDARI SAPITRI	82	87,5	88	86,33	A	Achieved
38	05091282126039	SARMILA	82	92,5	85	86,88	A	Achieved
39	05091282126040	KARINA MEILIA TONIDA	82	85	90	86,25	A	Achieved
40	05091282126041	PETIYANA	85	92,5	87	88,43	A	Achieved
41	05091282126042	SELLI INDAH PUTRI	87	90	85	87,25	A	Achieved
42	05091282126043	AMANDA WULANDARI	84	92,5	96	91,78	A	Achieved
43	05091282126045	PUTRI SAELAL ARIMI	84	90	88	87,70	A	Achieved
44	05091282126046	JORDI MAHESA RAYA	85	86	87	86,15	A	Achieved
45	05091282126047	NURUL HUSNAH	86	95	88	89,95	A	Achieved
46	05091282126048	ARIEL NAINGGOLAN	86	85	88	86,45	A	Achieved
47	05091282126049	IRSYAD PHYTO ANGGITO	75	92,5	88	86,33	A	Achieved
48	05091282126050	MUHAMMAD RAFLI HIDAYATULLAH	85	86	87	86,15	A	Achieved
49	05091282126051	RAHMAN HABIL AKSA	86	90	85	87,00	A	Achieved
50	05091282126052	FAUZIAH MURDIAN	83	92,5	88	88,33	A	Achieved
51	05091282126053	IZZATUL FADILLAH	85	92,5	92	90,43	A	Achieved
52	05091282126054	FEBY TRILAMEDY PANGARIBUAN	88	90	82	86,30	A	Achieved
53	05091282126055	DITA RIAULY TAMPUBOLON	87	90	87	88,05	A	Achieved
54	05091282126056	KRISTINA	85	87,5	86	86,28	A	Achieved
55	05091282126057	ENDAH DWI PUTERI	85	92,5	92	90,43	A	Achieved
56	05091282126058	MUHAMMAD ASRI AZMI	86	86	86	86,00	A	Achieved
57	05091282126059	RAIHAN AMIKO WARDANA ZEIN	77	92,5	86	86,03	A	Achieved
58	05091282126061	NURHILDAH ALFIATUL PITRI	83	86	88	86,05	A	Achieved
59	05091282126062	RHIYOSE ARRIDHO PUTRA	84	90	86	86,90	A	Achieved
60	05091282126063	MUHASYITA CAHYA RHEFY	84	86	88	86,30	A	Achieved
61	05091282126065	KHARISMA INDA SAFITRI	80	90	88	86,70	A	Achieved
62	05091382126069	RISKI OKTA RIYANTO	80	90	87	86,30	A	Achieved
63	05091382126071	SAFRILLAH	83	90	85	86,25	A	Achieved
64	05091382126081	AYU RAHMA SELA	80	87,5	90	86,63	A	Achieved
65	05091382126083	ARYA DANUARTA	85	86	87	86,15	A	Achieved
66	05091382126089	BAGAS SETIAWAN	81	92,5	94	90,23	A	Achieved
67	05091382126091	M. DESWA ADITIAN	75	50	87	71,05	B	Not Achieved
		AVERAGE PER CLASS	83,48	88,37	87,94	86,97		
		ACHIEVEMENT	Not Achieved	Achieved	Achieved	Achieved		

Achievement of CLO (Palembang Class)

STUDY PROGRAM : AGRONOMY (PALEMBANG CLASS)
 ACADEMIC YEAR : 2021/2022 (EVEN)
 COURSE : FUNDAMENTALS OF AGRONOMY (3 CREDITS)
 ROOM : ROOM 08
 SCHEDULE : MONDAY (09:20 - 11:00 WIB)

NO.	NIM	NAME	EV1	EV2	EV3	FINAL SCORE	GRADE	OVERALL ASSESSMENT
1	05091382126066	AANG WINARTA	83	85	89	86,10	A	Achieved
2	05091382126067	MEIHUA PUTRI UTAMI	85	80	94	86,85	A	Achieved
3	05091382126068	GEDE ARIE SWITE	84	85	90	86,75	A	Achieved
4	05091382126070	INTAN PUTRI KIRANA	86	95	86	89,15	A	Achieved
5	05091382126074	DITA PUTRI ANJELYNA	84	95	88	89,45	A	Achieved
6	05091382126075	MAHESAH	81	75	87	81,30	B	Not Achieved
7	05091382126077	HELEN	86	90	90	89,00	A	Achieved
8	05091382126082	AL HUSAIRI	82	85	90	86,25	A	Achieved
9	05091382126084	WAHYU EKO SYAPUTRA	83	90	86	86,65	A	Achieved
10	05091382126085	M.AIRLANGGA PRAYUDHA	86	85	87	86,05	A	Achieved
11	05091382126086	KHARISMA DARMAWANGSYAH	82	100	87	90,30	A	Achieved
12	05091382126087	MUHAMMAD OKTA PATRIO PUTRA	85	85	88	86,20	A	Achieved
13	05091382126088	SALSABILLA NAJRI	85	85	88	86,20	A	Achieved
14	05091382126090	YOLANDA SUTRISNO	77	85	80	81,00	B	Not Achieved
		AVERAGE PER CLASS	83,50	87,14	87,86	86,52		
		ACHIEVEMENT	Not Achieved	Achieved	Achieved	Achieved		

Percentage of CLO Achievement (Indralaya Class)

No.	Evaluation	Max. Score	Score	CLO1	CLO2	CLO3
1	Evaluation 1	100	83.48	v	v	v
2	Evaluation 2	100	88.37	v	v	v
3	Evaluation 3	100	87.94		v	v
	Total	300	259.78	171.84	259.78	259.78
				85.92	86.59	86.59
	Minimum achievement is 80			v	v	v

Percentage of CLO Achievement (Palembang Class)

No.	Evaluation	Max. Score	Score	CLO1	CLO2	CLO3
1	Evaluation 1	100	83.50	v	v	v
2	Evaluation 2	100	87.14	v	v	v
3	Evaluation 3	100	87.86		v	v
	Total	300	258.50	170.64	258.50	258.50
				85.32	86.17	86.17
	Minimum achievement is 80			v	v	v

Rencana Pembelajaran Semester (RPS)



UNIVERSITAS SRIWIJAYA FAKULTAS PERTANIAN JURUSAN BUDIDAYA PERTANIAN PROGRAM STUDI AGRONOMI

RENCANA PEMBELAJARAN SEMESTER

A. IDENTITAS MATA KULIAH

Mata Kuliah	:	Dasar-Dasar Agronomi	Kode : PAG 202116	Semester : 2	SKS : 3 (2 – 1)
Bahan Kajian	:	Produksi Tanaman			
Deskripsi Mata Kuliah	:	Pengertian dan ruang-lingkup agronomi; Perkembangan pertanian dan kemajuan teknologi budidaya tanaman; Daerah asal-usul dan pusat keragaman tanaman; Peranan pemuliaan tanaman dalam peningkatan produktivitas pertanian; Klasifikasi/pengelompokan tanaman agronomi; Pertumbuhan dan perkembangan tanaman; Perbanyakan tanaman secara seksual dan aseksual; Pengaruh faktor-faktor abiotik dan biotik terhadap tanaman; Penyiapan lahan kering dan lahan basah; Penyemaian/pembibitan dan penanaman; Penyulaman dan Pemeliharaan tanaman; Pola tanam dan diversifikasi tanaman; Sarana produksi pertanian; Konservasi lahan dan pengelolaan limbah pertanian.			
CPMK	:	CPMK-1 : Menguasai konsep teoritis dalam pengembangan teknologi tepat guna yang aplikatif di masyarakat untuk meningkatkan produksi pertanian (KIP4), CPMK-2 : Mampu menerapkan pemikiran logis, kritis, sistematis, dan inovatif dalam konteks pengembangan atau implementasi ilmu pengetahuan dan teknologi di bidang pertanian (KBP1), CPMK-3 : Mampu mengaplikasikan dan memodifikasi kearifan lokal dengan menggunakan ilmu dan teknologi mutakhir untuk diterapkan dalam praktek budidaya tanaman yang spesifik lokasi (KBP12).			
Dosen Pengampu :		Dr.Ir. Yakup, M.S. (YK) Fitra Gustiar, S.P., M.Si. (FG)	Dosen Penanggungjawab : Dr.Ir. Yakup, M.S. (YK)		

B. RENCANA PEMBELAJARAN								
CPMK	Sub-CPMK	Materi pembeajaran		Metode Pembelajaran dan Waktu	Deskripsi Tugas Mandiri dan Waktu	Indikator	Bobot	Dosen
		Pokok Bahasan	Referensi					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
CPMK-1	Sub-CPMK 1 : Mampu menjelaskan pengertian agronomi, unsur-unsur yang mendasari agronomi, dan bidang kajian dalam agronomi.	Pengertian dan ruang-lingkup agronomi.	1. Hand Out 2. Chandra-sekaran <i>et al.</i> (2010) 3. Harjadi, M.M.S.S. 2019.	Kuliah TM (2x50'), Diskusi kelompok (2x60').	Membuat review tentang pengertian, unsur-unsur, dan kajian dalam agronomi (2x60').	- Ketepatan dalam menjelaskan pengertian mengenai agronomi beserta unsur-unsur yang mendasari dan lingkup bidang kajiannya.	5 %	YK
	Sub-CPMK 2 : Mampu menjelaskan perkembangan pertanian seiring dengan kemajuan dalam teknologi budidaya tanaman.	Perkembangan pertanian dan kemajuan tekno-logi budidaya tanaman.	1. Hand Out 2. Ankerman, D. and R. Large. 2007. 3. Harjadi, M.M.S.S. 2019.	Kuliah TM (2x50'), Diskusi kelompok (2x60')	Membuat review perkembangan pertanian seiring kemajuan teknologi budidaya tanaman (2x60').	- Ketepatan dalam menjelaskan tahap-tahap perkembangan pertanian seiring dengan kemajuan yang terjadi dalam teknologi budidaya tanaman.	7,5 %	YK
	Sub-CPMK 3 : Mampu menyebutkan daerah asal-usul yang menjadi pusat keragaman	Daerah asal-usul dan pusat keragaman tanaman.	1. Hand Out 2. Jenkins, A. 2016. 3. Jumin, H.B. 2005.	Kuliah TM (2x50'), Diskusi kelompok (2x60').	Membuat daftar jenis-jenis tanaman berdasarkan daerah asal-usulnya (2x60').	- Ketepatan dalam menyebutkan daerah asal-usul yang menjadi pusat keragaman masing-masing	7,5 %	YK

	tanaman.					jenis tanaman.		
CPMK-2	Sub-CPMK 4 : Mampu menjelaskan peranan bidang pemuliaan tanaman dalam meningkatkan produktivitas pertanian.	Peranan pemuliaan tanaman dalam peningkatan produksi pertanian.	1. Hand Out 2. Ankerman, D. and R. Large. 2007. 3. Rai, I.N. 2018.	Kuliah TM (2x50'), Praktikum mengenai penyerbukan tanaman (1 x 170').	Membaca referensi mengenai peranan pemuliaan tanaman dalam meningkatkan produksi pertanian (3x60').	- Ketepatan dalam menjelaskan peranan bidang pemuliaan tanaman dalam meningkatkan produksi pertanian melalui perbaikan sifat-sifat genetik tanaman.	7,5 %	YK
	Sub-CPMK 5 : Mampu mengenali jenis-jenis tanaman agronomi berdasarkan tujuan penanaman dan sifat-sifatnya.	Klasifikasi /pengelompokan tanaman agronomi.	1. Hand Out 2. Jenkins, A. 2016. 3. Jumin, H.B. 2005.	Kuliah TM (2x50'), Praktikum mengenai pengelompokan jenis-jenis tanaman (1 x 170').	Membuat pengelompokan jenis tanaman berdasarkan tujuan penanaman dan sifat-sifatnya (2x60').	- Ketepatan dalam mengenali jenis-jenis tanaman agronomi berdasarkan tujuan penanaman dan sifat-sifatnya .	7,5 %	YK
	Sub-CPMK 6 : Mampu menjelaskan pertumbuhan dan perkembangan tanaman serta fase-fasenya.	Pertumbuhan dan perkembangan tanaman.	1. Hand Out 2. Harjadi, M.M.S.S. 2019. 3. Sitompul, S.M. dan B. Guritno. 1995.	Kuliah TM (2x50'), Praktikum mengenai pertumbuhan dan perkembangan tanaman (1 x 170').	Membaca referensi mengenai pertumbuhan dan perkembangan tanaman (3x60').	- Ketepatan dalam memberikan penjelasan pengertian dan perbedaan pertumbuhan dan perkembangan tanaman serta fase-fasenya.	7,5 %	YK
	Sub-CPMK 7 : Mampu menjelaskan dan membedakan perbanyakan tanaman secara seksual dan	Perbanyakan tanaman secara seksual dan aseksual.	1. Hand Out 2. Harjadi, M.M.S.S. 2019. 3. Hartman <i>et al.</i> (1997).	Kuliah TM (2x50'), Praktikum tentang perbanyakan tanaman secara vegetatif	Membuat daftar perbanyakan jenis-jenis tanaman dengan memilahnya secara seksual dan/atau aseksual (2x60').	- Ketepatan dalam menjelaskan dan membedakan cara perbanyakan tanaman secara seksual dan aseksual.	7,5 %	YK

	aseksual.			dan generatif (1 x 170').				
UJIAN MIDSEMESTER								
	Sub-CPMK 8 : Mampu menjelaskan faktor-faktor abiotik dan biotik serta pengaruhnya terhadap pertumbuhan dan perkembangan tanaman.	Pengaruh faktor-faktor abiotik dan biotik terhadap tanaman.	1. Hand Out 2. Dris <i>et al.</i> (2002). 3. Webster, C. C. and P. N. Wilson. 1998.	Kuliah TM (2x50'), Praktikum mengenai pengamatan pengaruh faktor-faktor abiotik dan biotik terhadap tanaman (1 x 170').	Membaca referensi mengenai pengaruh faktor-faktor abiotik dan biotik terhadap tanaman (3x60').	- Ketepatan dalam menjelaskan faktor-faktor abiotik dan biotik serta hubungannya dengan pertumbuhan dan perkembangan tanaman.	5 %	FS
CPMK-3	Sub-CPMK 9 : Mampu menjelaskan cara penyiapan lahan untuk tanaman baik pada lahan kering maupun lahan basah.	Penyiapan lahan kering dan lahan basah.	1. Hand Out 2. Djafar <i>et al.</i> (1990). 3. Shiddieq <i>et al.</i> (2020).	Kuliah TM (2x50'), Praktikum mengenai praktek pelaksanaan penyiapan lahan baik lahan kering maupun lahan basah (1 x 170').	Membuat review mengenai praktek penyiapan lahan untuk budidaya tanaman (2x60').	- Ketepatan dalam menjelaskan cara penyiapan lahan untuk budidaya tanaman baik pada lahan kering maupun lahan basah.	7,5 %	FS
	Sub-CPMK 10 : Mampu menjelaskan cara melakukan penyemaian/pembibitan dan	Penyemaian/pembibitan dan penanaman.	1. Hand Out 2. Djafar <i>et al.</i> (1990). 3. Parashar, A. and M. K.Bishnoi.	Kuliah TM (2x50'), Praktikum mengenai praktek penyemaian/	Membuat review mengenai praktek penyemaian/pembibitan dan penanaman (2x60')..	- Ketepatan dalam menjelaskan cara melakukan penyemaian dan pembibitan serta pelaksanaan	7,5 %	FS

	pelaksanaan penanaman.		2021.	pembibitan dan penanaman. (1 x 170').		penanaman.		
	Sub-CPMK 11 : Mampu menjelaskan cara melakukan penyulaman dan teknik pemeliharaan tanaman.	Penyulaman dan Pemeliharaan tanaman.	1. Hand Out 2. Harjadi, M.M.S.S. 2019. 3. Rai, I.N. 2018.	Kuliah TM (2x50'), Praktikum mengenai penyulaman dan pemeliharaan tanaman (1 x 170').	Membuat review mengenai praktek penyulaman dan pemeliharaan tanaman (2x60').	- Ketepatan dalam menjelaskan cara melakukan penyulaman dan teknik pemeliharaan tanaman.	7,5 %	FS
	Sub-CPMK 12 : Mampu menjelaskan pengertian pola tanam dan diversifikasi tanaman serta memberikan contoh-contohnya.	Pola tanam dan diversifikasi tanaman.	1. Hand Out 2. Djafar <i>et al.</i> (1990). 3. Webster, C. C. and P. N. Wilson. 1998.	Kuliah TM (2x50'), Praktikum mengenai pengaturan polatanam dan pelaksanaan diversifikasi tanaman (1 x 170').	Mengumpulkan foto-foto tentang pola tanam dan diversifikasi tanaman disertai penjelasannya (2x60').	- Ketepatan dalam menjelaskan pengertian pola tanam dan diversifikasi tanaman serta memberikan contoh-contohnya.	7,5 %	FS
	Sub-CPMK 13 : Mampu menjelaskan pengertian sarana produksi pertanian dan mengenali jenis-jenisnya.	Sarana produksi pertanian	1. Hand Out 2. Jenkins, A. 2016. 3. Shiddieq <i>et al.</i> (2020).	Kuliah TM (2x50'), Praktikum mengenai pengenalan dan pemanfaatan sarana produksi pertanian (1 x 170').	Mengumpulkan foto-foto tentang sarana produksi pertanian disertai penjelasannya (2x60').	- Ketepatan menjelaskan pengertian sarana produksi pertanian dan mengenali jenis-jenisnya.	7,5 %	FS
	Sub-CPMK 14 :	Konservasi	1. Hand Out	Kuliah TM	Membaca referensi	- Ketepatan	7,5 %	FS

Mampu menjelaskan cara-cara pelaksanaan konservasi lahan dan teknik pengelolaan limbah pertanian.	lahan dan pengelolaan limbah pertanian.	2. Djafar <i>et al.</i> (1990). 3. Shiddieq <i>et al.</i> (2020).	(2x50'), Praktikum mengenai cara koservasi lahan dan pengelolaan limbah pertanian (1 x 170').	mengenai konservasi lahan dan pengelolaan limbah pertanian (3x60').	menjelaskan cara-cara pelaksanaan konservasi lahan dan teknik pengelolaan limbah pertanian.		
UJIAN AKHIR SEMESTER							

Work load: Kuliah TM 1400 menit, diskusi kelompok 360 menit, praktikum 1870 menit, tugas mandiri 1920 menit, ujian 180 menit.

Total = 5730 menit = 95,5 jam = **3.82 ECTS**.

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