



MODEL OF LEARNING INOVATION

MODULE OF PLANT BIOTECHNOLOGY PRINCIPLES COURSE

EVEN SEMESTER 2021/2022

Course Module Developer: Dr.Ir. Makhziah, M.P.

Course Coordinator: Dr. Ir. Sukendah, M.Sc.

Teaching team:

Dr. Ir. Sukendah, M.Sc.

Dr. Ir. Makhziah, M.P.

Dr. Ir. Pangesti Nugrahani, M.Si.

Nova Triani, S.P. M.P.

Agroteknologi Department Faculty of
Universitas Pembangunan Nasional "Veteran" Jawa Timur
Jalan Raya Rungkut Madya-Gunung Anyar.Surabaya
2021

TABLE OF CONTENTS

	APPROVAL PAGE	
	TABLE OF CONTENTS	
1.	EXPECTED LEARNING OUTCOME (ELO)	3
2.	COURSE IDENTIFICATION	4
3.	SEMESTER LEARNING PLAN	5
	3.1. Determination of ELO in Course	5
	3.2. Semester Learning Plan of Principles of Plant Biotechnology	8
	3.3. ELO Weight Calculation Results	9
4.	PLAN OF ASSESMENT AND EVALUATION	10
5.	ASSESMENT RUBRIC	11
	5.1. Presentation of task	11
	5.2. Rubric of Ability in Team Cooperation	13
	5.3. Rubric of Writing An Article	14
9.	PROJECT BASE LEARNING	15

Surabaya, Agustus 2021

1. EXPECTED LEARNING OUTCOME (ELO)

ELO-A1	Be defending country character, namely the love of the motherland, national and state awareness, believes in Pancasila as the ideology of the state, willing to sacrifice for the nation and the state, and has the initial ability to defend the country.
ELO-A2	Responsible for work in the field of expertise independently.
ELO-A3	Able to maintain and develop collaborative networks with supervisors, colleagues, colleagues both inside and outside the institution.
ELO-4	Able to apply knowledge of Plant Sciences and basic concepts of Plant Production, Soil and basic concepts of land resources, the concept of crop protection against pests and diseases in an integrated manner.
ELO-5	Able to master the principles of the application of agricultural technology to solve problems in agriculture.
ELO-6	Able to analyze, plan and implement lowland farming systems refers to the principles of sustainable agriculture, modern, raise local wisdom, effectively and productively.
ELO-7	Able to study the implementation of sustainable agriculture systems Base on scientific rules application, procedures and ethics in order to produce solutions, ideas, and designs based on the results of information and data analysis.
ELO-8	The ability to master plant propagation technology, and crop management in accordance with the agro-climate zone.
ELO - 9	The ability to identify, formulate, analyze and solve problems in the field of land resources.
ELO - 10	Ability to diagnose, analyze and solve plant pest problems.
ELO - 11	The ability to handle the current principles and issues of lowland agriculture and its environmental problems.
ELO - 12	Mastery of technology and be able to communicate with the community in solving agricultural problems both oral and written.

2. COURSE IDENTITY

1. Name of Course, Code
2. ELO Performance Indicator
3. ELO charged to the Constitutional Course, this data can be obtained from the ELO course matrix
4. Learning Model used
5. Assessment Form


Name of course	PRINCIPLES OF PLANT BIOTECHNOLOGY
Code of course	MK 1529
Semester credit unit	3
Learning Model	Tutorial and Discuss Discuss Group Learning Field and Laboratory Practice Problem Base Learning/Project Base Learning Evaluations
Expected Learning Outcomes	ELO 2: Able to internalize academic values, norms, and ethics; spirit of independence, effort and entrepreneurship. ELO 3: Able to maintain and develop collaborative networks with supervisors, colleagues, colleagues both inside and outside the institution. ELO 4: Able to apply knowledge of Plant Science and Basic Concepts of Plant Production, Soil and Basic Concepts of Land Resources, as well as plant pests and diseases and the concept of plant protection against pests and diseases in an integrated manner. ELO 5: Ability to master the principles of applying agricultural technology to solve problems in agriculture.
Performance Indicator	
ELO 2-A	2. Able to apply technopreneurship principles and be able to make a business plan canvas proposal for commercial plant biotechnology products (LLO 7).
ELO 3-A	3. Able to explain and provide arguments about ethics and regulations on biosafety of genetically engineered products (LLO 5).
ELO 4-P	4.1. Able to explain between tissue culture techniques and plant breeding to produce superior agricultural products (LLO 2). 4.2. Able to explain molecular marker analysis techniques in supporting plant breeding programs (LLO 4).
ELO 5-C	5.1. Able to explain and apply in-vitro propagation techniques to produce plant seeds from tissue culture (LLO1). 5.2. Able to explain the devices and techniques of recombinant DNA and the process of gene transformation in genetic engineering (LLO 3). 5.3. Able to design a household-scale tissue culture laboratory for mass propagation (LLO 6).

3. SEMESTER LESSON PLAN

3.1. DETERMINATION OF EXPECTED LEARNING OUTCOMES (ELO) IN COURSES

No	Sem.	Code of Subject	Name of Subject	Semester Credit System	Percentage (%)			
					ELO 2	ELO 3	ELO 4	ELO 5
	2	MK 1529	Principles of Plant Biotechnology	3	X	X	X	X

3.2. SEMESTER LESSON PLAN OF PLANT BIOTECHNOLOGY PRINCIPLES

 UNIVERSITAS PEMBANGUNAN NASIONAL "VETERAN" JAWA TIMUR AGRICULTURE FACULTY AGROTECHNOLOGY DEPARTMENT BACHELOR DEGREE						
COURSE	CODE	Science Clump	Credit Point (CP)	SEMESTER		Date of Making
AUTOMATIC CONTROL SYSTEM	MK 1529	Biotechnology	3		II	23/04/2021
AUTHORIZATION	Developer of Semester Lesson Plan		Course Coordinator	Head of Department		
	Dr.Ir. MAKHZIAH, MP		Dr.Ir. SUKENDAH, MSc.	Dr.Ir. BAKTI WISNU W, MP		
Learning Outcomes (LO)	Expected Learning Outcomes (ELO)					
	ELO2: Able to internalize academic values, norms, and ethics; spirit of independence, effort and entrepreneurship. ELO3: Able to maintain and develop collaborative networks with supervisors, colleagues, colleagues both inside and outside the institution. ELO4: Able to apply knowledge of Plant Science and basic concepts of Plant Production, Soil and basic concepts of land resources, as well as plant pests and diseases and the concept of plant protection against pests and diseases in an integrated manner. ELO5: Ability to master the principles of applying agricultural technology to solve problems in agriculture.					
	Course Learning Outcome (CLO)					
	1. Able to do all tasks independently with full responsibility, able to work well with a team and able to develop a technopreneurship spirit related to Agricultural Biotechnology courses (ELO 2 and ELO 3). 2. Capable of applying tissue culture technology and mass producing plant seeds and is also able to explain the process of assembling the transgenic plants (ELO 4 and ELO5).					
	LLO					
	Fourth semester student of AGROTEKNOLOGI of UPN VETERAN JAWA TIMUR 1. Able to explain in-vitro propagation techniques and produce plant seeds from tissue culture. 2. Able to explain the relationship between tissue culture techniques (genetic variability) and plant breeding to produce superior agricultural products. 3. Be able to explain the tools and techniques of recombinant DNA and the process of gene transformation in genetic engineering. 4. Able to explain molecular marker analysis techniques in supporting plant breeding programs. 5. Able to explain and provide arguments about ethics and regulations on biosafety of genetically engineered products. 6. Able to apply household-scale tissue culture technology and able to produce plant biotechnology products commercially. 7. Able to apply technopreneurship principles and make a business model canvas for plant biotechnology products.					
Short Description of Course	Principles of Plant Biotechnology provide knowledge and insight into the development of plant biotechnology as well as its techniques and applications in a technopreneurship perspective for crop improvement and the development of commercial plant products. Students are provided with basic concepts of plant biotechnology, the role of biotechnology in agriculture, knowledge and expertise about tissue culture techniques and their applications to produce and commercialize plant tissue culture seeds, recombinant DNA technology and gene transformation, molecular analysis techniques to support the development of superior plant products and ethics and regulation of genetically modified organism.					
Lessons	Basic concepts and developments in industrial biotechnology, in vitro techniques, explant regeneration through organogenesis and somatic embryogenesis, somaclonal variation for agricultural product development, basic principles of genetic engineering in problem solving, recombinant DNA techniques and gene transformation for agricultural products, genetic markers and its applications, ethics and regulation of biosafety of genetically engineered products, management of plant biotechnology laboratories in commercial product development, basic principles of technopreneurship and strategic planning for businesses in plant biotechnology.					

REFERENCES		Utama:					
		<ol style="list-style-type: none"> 1. C. N. Stewart, Jr.. 2008. PLANT BIOTECHNOLOGY AND GENETICS: Principles, Techniques, and Applications. John Wiley & Sons, Inc. 2. A.J. Nair, Ph.D. 2007. Introduction To Biotechnology And Genetic Engineering. Infinity Science Press Llc. 3. PRINCIPLES OF PLANT BIOTECHNOLOGY. ICAR eCourse. 4. PRINCIPLES OF PLANT BIOTECHNOLOGY. TNAU (ICAR) 					
		Pendukung :					
		<ol style="list-style-type: none"> 1. Estiati, A. dan M. Herman. 2015. Regulasi Keamanan Hayati Produk Rekayasa Genetik di Indonesia. <i>Analisis Kebijakan Pertanian</i>. 13 (2): 129-146 2. Tanaman Genetically Modified Organism (GMO) dan Perspektif Hukumnya di Indonesia. <i>Jurnal Kauniah</i> 					
Instructional Media		Software:			Hardware:		
		OS Windows, PPT, Video			References Book, LCD, sound system, Office stationery		
Team Teaching		<ol style="list-style-type: none"> 1. Dr.Ir. Sukendah, MSc. 2. Dr.Ir. Makhziah, MP 3. Dr. Ir. Pangesti Nugrahani, MSi. 4. Nova Triani, SP.MP. 					
Requirements course		-					
Week	Final ability at each learning stage (Sub-LLO)	Evaluation		Forms of Learning, Learning Methods and Student Assignments [Time estimation]		Subjects [References]	Evaluation (%)
		Evaluation Indicator	Criteria & Assessment Form	Online	Offline		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	LLO 1: Able to explain cell biology systems, the function of DNA genetic material, and the role of plant biotechnology in improving human welfare.	<ul style="list-style-type: none"> • Accuracy in explaining the biological system of cells, the function of the genetic material DNA. • Accuracy describes the role of plant biotechnology and discovery in improving human welfare. 	- Able to make a review of lectures.	PPT, text book, video, jurnal	- Tutorial and discussion - Make a review of lectures.	- Understanding and the underlying science of plant biotechnology. - The role of plant biotechnology in human life. - The history of the development of plant biotechnology in the perspective of the industrial world.	3%
2,3	LLO 1: Able to explain and apply mass propagation techniques in-vitro.	<ul style="list-style-type: none"> • Ability to apply tissue culture techniques for plant propagation (mass propagation) • Accuracy explains the meaning of somatic embryogenesis and can distinguish between somatic and zygotic embryogenesis and the process. 	- Make questions in essays. - Practice: preparation of the solution and tissue culture media, planting and incubation of explants, subculture and acclimatization.	PPT, text book, video, journal	- Tutorials - Practises preparation of the solution and tissue culture media, planting and incubation of explants, subculture and acclimatization.	- In-vitro propagation technique - Solution and composition of tissue culture media. - Regeneration of explants through somatic and zygotic embryogenesis. - MS media creation - Micro propagation - Sub culture and acclimatization	17%
4-5	LLO 2: Able to explain tissue culture in mutation induction for formation somaclonal variation and able to relate it to plant breeding program.	<ul style="list-style-type: none"> - Ability to analyze and review research results related to somaclonal variation. - Accuracy in explaining the relationship of somaclonal variation with plant breeding 	- Ability to analyze and review research results related to somaclonal variation. - Accuracy in explaining the relationship of somaclonal variation with plant breeding	PPT, text book, research journal	- Presentation and discussion between groups - research journal about somaclonal variation	Somaclonal variation for agricultural product development.	10%

					O=(2x50") SA=(2x60") IS=(2x60")		
6	LLO 3: Able to explain the basic principles of genetic engineering (recombinant DNA) and gene isolation and cloning techniques	1. Accuracy in explaining the principles of genetic engineering & tools needed in genetic engineering. 2. Accuracy in explaining gene isolation and cloning procedures.	- Make questions in essays.	- PPT, text book, jurnal	Tutorial and discussion about principles of genetic engineering & tools needed in genetic engineering.	- Recombinant DNA technique - Genetic engineering tools - DNA isolation of target genes and gene cloning	10%
					O=(2x50") SA=(2x60") IS=(2x60")		
7	LLO: Able to identify problems of cultivated plants and design the process of genetically engineered products (GM).	Ability to draft the transformation process of the target genes into crops through biological methods, physical, and chemical.	Create a research design for genetically engineered plant assembly.	- PPT, text book, jurnal	- Tutorial - Presentation & discussion	- Biological, physical and chemical gene transformation methods - Research journal	10%
					O=(2x50") SA=(2x60") IS=(2x60")		
8	Mid Test						
9-10	LLO 4: Able to explain genetic markers, DNA marker techniques and their benefits.	1. Accuracy in explaining the meaning, terms and types of genetic markers/DNA markers. 2. The accuracy of explaining the DNA marker technique and the benefits of DNA markers.	- Make questions in the essay. - Presentations and discussions	- PPT, text book, jurnal	Tutorial Presentation & discussion	- Genetic markers: morphology, cell and molecular - Types and techniques of molecular analysis - Molecular marker applications	10%
					O=(2x50") SA=(2x60") IS=(2x60")		
11	LLO 5: Able to explain and provide arguments regarding the regulation of genetic engineering product regulation.	1. Accuracy in explaining regulation in regulating GMO products. 2. Ability to provide arguments for Regulation of transgenic plants.	Discussion on Law no. 21 of 2004 concerning the ratification of the Cartagena protocol, and Government Regulation no. 21 of 2005.	- PPT, text book, jurnal	Discussion between groups about Discussion on Law no. 21 of 2004 concerning the ratification of the Cartagena protocol, and Government Regulation no. 21 of 2005.	1.2004 concerning the ratification of the Cartagena protocol, and Government Regulation no. 21 of 2005. 2. Journal of Biosafety of Genetically Engineered Products.	10%
					O=(2x50") SA=(2x60") IS=(2x60")		
12	LLO 6: Able to explain the management of plant biotechnology laboratories in the development of commercial products for household-scale tissue culture laboratories.	1. Accuracy in explaining laboratory management and tissue culture laboratory development. 2. Ability to create a vision, mission and program for the development of a household scale tissue culture laboratory.	Applying and managing household-scale tissue culture laboratories.	- PPT, text book, jurnal	Practice of designing and managing household-scale tissue culture laboratories.	Plant biotechnology laboratory management in commercial product development.	10%
					O=(2x50") SA=(2x60") IS=(2x60")		
13	LLO 7: Able to explain the basic principles of technopreneurship in the field of plant biotechnology.	- Accuracy in explaining the role of technopreneurship and professionalism in the field of plant biotechnology.	- Membuat soal dalam essay. - Diskusi.	- PPT, text book, jurnal	- Tutorial and discussion	The basic principles of technopreneurship in the field of plant biotechnology.	5%
					O=(2x50") SA=(2x60") IS=(2x60")		

		- Ability to explain innovative ideas in plant biotechnology production.					
14-15	LLO 7: Able to plan and make business plan proposals about plant biotechnology products.	Ability to make strategic business/business planning in plant biotechnology.	Making a proposal for the Entrepreneurship Student Creativity Program (PKM-K) for a business plan canvas in the production of tissue culture seeds.	PPT, text book, journal	Presentation and discussion about proposal for the Entrepreneurship Student Creativity Program (PKM-K) for a business plan canvas in the production of tissue culture	Proposal for Entrepreneurship Student Creativity Program Network culture for small/home industries.	15%
				O= (2x50") SA = (2x60") IS= (2x60")			
16	Final Test Evaluation of CLO achievement put upon course						
Total							


Notes:

- Expected Learning Outcomes (ELO)** is the ability of each graduate which is the internalization of attitudes, mastery of knowledge and skills in accordance with the level of study program obtained through the learning process.
- ELO** charged to the course are several learning outcomes of study program graduates (ELO) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
- Course Learning Outcomes (LLO)** is an ability that is specifically described from ELO which is charged to the course, and is specific to the study material or learning material of the course.
- Lesson Learning Outcomes (LLO)** is the ability that is described specifically from the SLO that can be measured or observed and is the final ability that is planned at each stage of learning, and is specific to the learning material of the course.
- Assessment Indicators** is ability in the process and student learning outcomes is a specific and measurable statement that identifies the ability or performance of student learning outcomes accompanied by evidence.
- Assessment Criteria** is a benchmark that is used as a measure or benchmark for learning achievement in an assessment based on predetermined indicators. The assessment criteria are guidelines for assessors so that the assessment is consistent and unbiased. Criteria can be either quantitative or qualitative.
- Assessment form** are test and non-test.
- Learning form:** Lecture, Response, Tutorial, Seminar or equivalent, Practice, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
- Learning methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
- Lectures** are details or descriptions of topics that can be presented in the form of several main points and sub-topics.
- Point weight** is the percentage of assessment for each achievement of the sub-CPMK which is proportional to the level of difficulty of achieving the sub-CPMK, and the total is 100%.
- O=offline, SA=Structured Assignments, IS=Independent Study**

3.3. ELO Weight Calculation Results

No.	Sem.	Code of Subject	Name of Subject	Course Credits	Percentage (%)			
					ELO 2	ELO 3	ELO 4	ELO 5
1.	2	MK 1529	Principles of Plant Biotechnology	3	15	10	20	55

3. PLAN OF ASSESSMENT AND EVALUATION

	UPN "VETERAN" JAWA TIMUR AGRICULTURE FACULTY AGROTECHNOLOGY DEPARTMENT BACHELOR DEGREE		RA & E
	PLAN OF ASSESSMENT AND EVALUATION PRINCIPLES OF PLANT BIOTECHNOLOGY		Edisi
Code: MK 1529	Credits Points(T/P): (2/1)	Science Clump: Biotechnology	Smt: 2
AUTHORIZATION	RA & E Compiler	Course Coordinator:	Head of Department
	Dr.Ir. Makhziah, M.P.	Dr.Ir.Sukendah, M.Sc	Dr.Ir. Bakti Wisnu W., M.P.
Tasks (week to)	LLO	Form Assesment	Weight (%)
2,3	1. Able to apply in-vitro propagation techniques and produce plant seeds from tissue culture.	Task 1: Non test: Doing practice: making solutions and tissue culture media, planting & incubating explants, sub-cultures and acclimatization. (15%) Test: Making questions in essays (5%)	20
4,5	2. Able to explain between tissue culture techniques and plant breeding to produce superior agricultural products.	Task 2: Non test - Make a review of research journals related to somaclonal variation (5%) Test: Making questions in essays (5%)	10
7	3. Be able to explain the devices and techniques of recombinant DNA and the process of gene transformation in genetic engineering.	Task 3: Non test: - Make a research design to develop plant from genetically modified organism (GMO) (Group)(15%) Test: Making questions in essays (5%)	20
9-10	4. Able to explain molecular marker analysis techniques in supporting plant breeding programs.	Task 4: Test - Make questions in essay.	15
11	5. Able to explain and provide arguments about ethics and regulations on biosafety of genetically	Task 5: Non test Discussion on Law no. 21 of 2004 concerning the ratification of the Cartagena protocol, and PP no. 21 of 2005.	5

	engineered products.		
12	6. Able to apply household-scale tissue culture technology and able to produce plant biotechnology products commercially.	Task 6: Non test: - The practice of designing and managing household-scale tissue culture laboratories.	10
13-15	7. Able to apply technopreneurship principles and make a business model canvas for plant biotechnology products.	Task 7 Non-test: Project Base Learning Making a proposal in group for the Student Entrepreneurship Creativity Program (PKM-K) and make the business model canvas for the production of seedlings from tissue culture. (15%) Test: Making questions in essays (5%).	20

4. ASSESMENT RUBRIC

4.1 PRESENTATION OF TASK 7 and 11

ARGUMENT RUBRIC

GRADE	SCORE	PERFORMANCE INDICATORS
<i>GRADE</i>	<i>SCORE</i>	<i>PERFORMANCE INDICATOR</i>
Very less	<41	The argument doesn't make sense and there's no logical connection
<i>More Less</i>		<i>The argument</i>
		<ul style="list-style-type: none"> • does not make sense and • there is no logical relationship
Not enough	41–55	The argument is quite logical, but it doesn't make sense
<i>Less</i>		<i>The argument is</i>
		<ul style="list-style-type: none"> • <i>quite logical, but</i> • it doesn't make sense
Enough	56– 70	Logical argument, plausible, but less innovative
<i>Enough</i>		<i>The arguments:</i>
		<ul style="list-style-type: none"> • <i>logical arguments,</i> • <i>reasonable, but</i> • <i>less innovative</i>
Well	71- 85	Logical argument, reasonable, innovative
<i>good</i>		<i>The arguments:</i>
		<ul style="list-style-type: none"> • <i>logical arguments,</i> • <i>reasonable, and</i> • <i>innovative</i>
Very good	86 - 100	Logical argument, innovative and easy
<i>Very Good</i>		implemented in the real world
<i>(Excellent)</i>		<i>The arguments:</i>
		<ul style="list-style-type: none"> • <i>logical arguments,</i> • <i>innovative and</i> • can be easily implemented in the real world

4.2 RUBRIC ABILITY IN TEAM COOPERATION

ASSESSMENT OF TEAM WORK

Appraised peer <i>Peer name be assessed</i>
Assessed Peer NRP <i>NRP – peer be assessed</i>

No	Rated aspect <i>Aspect be assessed</i>	1	2	3	4	5	6	Value in number (50 – 100) <i>Grade in score (50-100)</i>
1	Teamwork leads to CP achievement (Achievements Learning) <i>Team work towards achieving LO (Learning Outcomes)</i>							
2	Demonstrate good interpersonal skills effective <i>Demonstrate effective interpersonal skills</i>							
3	Very active in group discussion participation							
4	Sharing of learning resources owned by group member <i>Sharing of learning resources owned by group members</i>							
5	Help the group if you miss information compared to other groups <i>Help groups if they miss information compared to other groups</i>							
6	Provide constructive feedback (build) and provide solutions if any difficulty <i>Provide constructive feedback (to build) and provide solutions if there are difficulties</i>							
7	Work hard for the benefit of the group <i>Work hard for group interests</i>							
8	Willing to receive feedback openly (no emotion) <i>Want to receive feedback openly (not emotionally)</i>							
9	React positively to positive feedback critical <i>React positively to criticize feedback</i>							
10	Manage emotions well <i>Manage emotions well</i>							
11	Always stick to his point of view <i>Always stick to his / her point of view</i>							
12	Making efforts to improve behavior while working in a group							

	<i>Make efforts to improve behavior while working in groups</i>							
13	Demonstrate the ability to change view in receiving new information <i>Demonstrate the ability to change views in receiving new information</i>							
14	Be present at each group work on time <i>Present on time at each group job</i>							
15	Demonstrate responsibility and commitment <i>Demonstrate responsibility and commitment</i>							
16	Honest <i>Honest</i>							

1 = very bad / very non-constructive - very bad / very non-constructive
6 = very good/ very constructive - very good / very constructive

4.3. ANSWER RUBRIC WRITING AN ARTICLE 7

Current Event Article Summary Grading Rubric

CATEGORY	4 - Above Standards	3 - Meets Standards	2 - Approaching Standards	1 - Below Standards
Introduction	The introduction has a strong hook or attention. This could be a strong concept sentence, a relevant quotation, statistic, or question addressed to the reader.	The introduction has a hook or attention grabber. Includes a good concept sentence and/or interesting quote.	The author has a weak introductory paragraph, the connection to the topic is not clear. Paragraph includes a weak concept sentence or quote.	The introductory paragraph is not interesting AND is not relevant to the topic. No concept sentence or quote.
Quotes and Concept Words	All of the examples are specific, relevant and full explanations are given.	Most of the evidence and examples are specific, relevant and explanations are given.	Some of the pieces of evidence and examples are relevant and include an explanation.	Evidence and examples are NOT relevant AND/OR most are not explained.
5 W's	All supportive facts and statistics are reported accurately. Article is fully explained and summarized in own words.	Almost all supportive facts and statistics are reported accurately. Article is mostly explained and summarized in own words.	Some supportive facts and statistics are reported accurately. Weak explanation and summary that is partially plagiarized.	Most supportive facts and statistics were inaccurately reported. Article is poorly explained and summary is mostly plagiarized.
Grammar & Spelling	Author makes no errors in grammar, sentence structure, or spelling that distract the reader from the content.	Author makes 1-3 errors in grammar, sentence structure, or spelling that distract the reader from the content.	Author makes 4-6 errors in grammar, sentence structure, or spelling that distract the reader from the content.	Author makes more than 6 errors in grammar, sentence structure, or spelling that distract the reader from the content.
Conclusion	The conclusion is strong and leaves the reader solidly understanding the writer's response and personal reaction to the article.	The conclusion is good. Includes the author's response and personal reaction to the article.	Conclusion is weak or incomplete. Limited response and personal reaction to the article.	There is no conclusion - the paper just ends.
Proper Format and Organization	Article summary is typed, has a heading, title, and is submitted on time. Summary is organized into 4 or more paragraphs. A challenging newspaper article of sufficient length is attached.	Article summary is typed, has a heading, title, and is submitted on time. Summary is organized into 4 paragraphs. Acceptable newspaper article of sufficient length is attached.	Article summary is typed but submitted late. Incomplete heading and title. Summary has 3 or less paragraphs. Attached item is not a current event newspaper article and/or it is not a sufficient length.	Article summary is not typed. No heading. No article is attached. No title.

5. PROJECT BASE LEARNING

1. Introduction

Propagation of plant tissue culture today has grown rapidly and has several advantages that make a lot of seedlings in a short time, does not require a large place, free of pests and diseases, has exactly the same characteristics as its parent, and uniforms. Tissue culture is also used for generative plant propagation which is difficult to do and can also be used to save embryos (embryo rescue). Therefore, the business of plant tissue culture propagation currently has excellent prospects.

2. Task

Make a business plan for the production of plant seeds from tissue culture in the form of a student-Entrepreneurship Creativity Program (PKM-K) proposal.

- a. Choose the right plant commodity, namely a commodity that has a lot of market demand or good market opportunities but there are problems in producing seeds on a large scale.
- b. Make business model of canvas as a framework to plan the business activities of production and marketing of tissue culture seedlings with a commodity that has been selected.
- c. Make a home-scale tissue culture laboratory design to produce these plant seeds.

3. Proposal Assessment

Assessment of proposal includes: repeatability of topics, weight of intellectual challenges, and emphasis on creativity/substantial aspects.

