

Bachelor of Biology**MODULE HANDBOOK**Email: biologi.fmipa@um.ac.idWebsite: <http://biologi.fmipa.um.ac.id/>

Module designation	Plant Tissue Culture
Module level, if applicable	Undergraduate
Code, if applicable	NBIOUM6310
Subtitle, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	Even semester
Person responsible for the module	Rahmi Masita, S.Si, M.Sc
Lecturer	Dr. Betty Lukiati, M.S Rahmi Masita, S.Si, M.Sc
Language	Bahasa Indonesia
Relation to curriculum	Undergraduate degree program, Elective, 6th semester
Type of teaching, contact hours	Undergraduate degree program: cooperative learning, presentation, laboratory work, 2 x 50 = 100 minutes and 1 x 170 minutes
Workload	1. Lectures: 2 x 50 = 100 minutes (1.67 hours) per week. 2. Exercises and Assignments: 2 x 60 = 120 minutes (2 hours) per week. 3. Laboratory work: 1 x 170 minutes (2.83 hours) per week. Private study: 2 x 60 = 120 minutes (2 hours) per week.
Credit points	3 Credit points (~5 ECTS-eq)
Requirements according to the examination regulations	A student must have attended at least 80% of the lectures to be eligible for the final examination.
Recommended prerequisites	Plant Physiology
Module objectives/intended learning outcomes	Students are able to: (LO4) Apply basic concepts, principles and procedures of biology to design investigations as an effort to solve problems in the health, food and environment sectors using technological applications.
Course learning outcomes	1. Mastering and applying concepts, principles, and procedures in the field of plant tissue culture, logically, critically, systematically, and innovatively and their utilization in the food sector 2. Designing and conducting research independently and in groups creatively and innovatively by

	<p>finding, analyzing, and solving problems in the food sector by utilizing plant tissue culture techniques.</p> <p>3. Utilizing technology in the field of plant tissue culture to obtain valid and accurate data for analysis so as to produce solutions to solve problems in the food sector</p>										
Content	<p>This course covers following main topics:</p> <ul style="list-style-type: none"> ● Basic concepts and principles in plant tissue culture ● Advantages and disadvantages of plant tissue culture ● Sterilization methods and basic techniques in plant tissue culture ● Nutritions, phytohormones and culture media preparation ● Student group project in plant tissue culture 										
Learning activity	<table border="1"> <tr> <td>Week 1</td> <td> <ul style="list-style-type: none"> - Introduction, explanation of lecture rules and distribution of learning resources - Group division for assignments and practicum - Classical discussion on the basic concepts of plant tissue culture - Classical discussion on totipotent theory, types of culture, types of PGR, how to choose explants </td> </tr> <tr> <td>Week 2</td> <td> <ul style="list-style-type: none"> - Discussion on spatial planning, preparation room, weighing room, inoculation room, culture maintenance room - Discussion on the procedures of the autoclave, LAF, how to make stock of macronutrient, micronutrient, ZPT </td> </tr> <tr> <td>Week 3</td> <td> <ul style="list-style-type: none"> - Stocking macro and micronutrients - Making stock of auxin and cytokinin ZPT - Practicum: making MS0 medium and sterilizing medium - Discussion & consultation on the design results to make macro, micro stocks, and procedures for making medium </td> </tr> <tr> <td>Week 4</td> <td> <ul style="list-style-type: none"> - Discussion: selection and technique of sterilization of explants based on the referenced journal - Discussion: explant inoculation technique - Perform explant sterilization - Inoculation of explants in MS0 medium </td> </tr> <tr> <td>Week 5</td> <td> <ul style="list-style-type: none"> - Practicum: doing subculture - Practicum: acclimatization </td> </tr> </table>	Week 1	<ul style="list-style-type: none"> - Introduction, explanation of lecture rules and distribution of learning resources - Group division for assignments and practicum - Classical discussion on the basic concepts of plant tissue culture - Classical discussion on totipotent theory, types of culture, types of PGR, how to choose explants 	Week 2	<ul style="list-style-type: none"> - Discussion on spatial planning, preparation room, weighing room, inoculation room, culture maintenance room - Discussion on the procedures of the autoclave, LAF, how to make stock of macronutrient, micronutrient, ZPT 	Week 3	<ul style="list-style-type: none"> - Stocking macro and micronutrients - Making stock of auxin and cytokinin ZPT - Practicum: making MS0 medium and sterilizing medium - Discussion & consultation on the design results to make macro, micro stocks, and procedures for making medium 	Week 4	<ul style="list-style-type: none"> - Discussion: selection and technique of sterilization of explants based on the referenced journal - Discussion: explant inoculation technique - Perform explant sterilization - Inoculation of explants in MS0 medium 	Week 5	<ul style="list-style-type: none"> - Practicum: doing subculture - Practicum: acclimatization
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		<ul style="list-style-type: none"> - Inoculation progress report - Discussion: goals and ways of doing subculture
	Week 6	<ul style="list-style-type: none"> - Practicum: doing subculture - Practicum: acclimatization - Inoculation progress report - Discussion: goals and ways of doing subculture
	Week 7	<ul style="list-style-type: none"> - Analysis of success and failure in practice and how to correct failure - Searching for at least 5 journals related to simple research designs - Developing research design
	Week 8	MIDTERM EXAMINATION
	Week 9	<ul style="list-style-type: none"> - Designing simple research related to nursery problems and products containing certain plant bioactive compounds - Presentation and discussion: Simple research design related to seeding and increasing the content of certain plant bioactive compounds through tissue culture techniques - Preparing the medium to be used with the addition of variations in the ZPT combination - Sterilization of the medium and equipment to be used
	Week 10	<ul style="list-style-type: none"> - Simple research implementation - Continuing simple research - Progress report
	Week 11	<ul style="list-style-type: none"> - Simple research implementation - Continuing simple research - Progress report
	Week 12	<ul style="list-style-type: none"> - Simple research implementation - Continuing simple research - Result analysis
	Week 13	<ul style="list-style-type: none"> - Simple research implementation - Continuing simple research - Result analysis - Preparing Report
	Week 14	<ul style="list-style-type: none"> - Result analysis - Preparing Report
	Week 15	<ul style="list-style-type: none"> - Compiling articles - Discussion: compiling articles based on the results of simple research carried out
	Week 16	FINAL EXAMINATION
Study and examination requirements and forms of examination	Project group report, Mid-term exam, Final exam, work activities in the project group.	

Media employed	LCD, whiteboard, and SIPEJAR UM
Reading list	<ol style="list-style-type: none"> 1. Taiz, L & E. Zeiger. 2010, Plant Physiology, pp. 370-396. Sinauer Associates 2. Gamborg, O.L. dan G.C. Philips. 1995. Plant Cell, Tissue and Organ Culture – Fundamental Methods. Berlin: Springer - Verlag 3. George, E.F. 2008. Plant Tissue Culture Procedure – Volume I: Background. 3rd Edition. Edited: E.F. George, Michael A. Hall, and Geert-Jan De Klerk. Springer. Netherlands. 4. More scientific articles from credible journals related to the subject matter.
Date of Class Amendment Made	January, 2022