	Universitas Negeri Surabaya Faculty of Mathematics and Natural Sciences Biology Undergraduate Study Program	Document Code

SEMESTER LEARNING PLAN

Courses	CODE	Course Family	Credit Weight			SEMESTER	Compilation Date
Plant tissue isolation method	4620103108		T=3	P=0	ECTS=4.77	4	July 17, 2024

AUTHORIZATION	SP Developer	Course Cluster Coordinator	Study Program Coordinator
	.....	.....	Dr. H. Sunu Kuntjoro, S.Si., M.Si.

Learning model	**Project Based Learning**
Program Learning Outcomes (PLO)	**PLO study program that is charged to the course**
	Program Objectives (PO)
	PLO-PO Matrix

P.O

PO Matrix at the end of each learning stage (Sub-PO)

P.O	Week															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Short Course Description	In this course, students will study the concepts and working principles related to plant tissue culture and animal tissue culture and carry out various practices to implement the concepts related to tissue culture that they have learned and will be able to develop skills in carrying out tissue culture work in vitro.
References	**Main :**

1. Dixon (Ed). 1985. Plant Cell Culture : A Practical Approach. IRL Press :
2. Freshney. 2000. Animal Cell Culture. New York: Academic Press
3. Gamborg, OI and Wetter RI. 1975. Culture Method. Canada: National Research Council.
4. George, E.F. & Sherrington PD. 1984.Plant Propagation by Tissue Culture. England:Exegetis Limited
5. Pierik. 1987. In Vitro Culture of Higher Plants. Martinus-Nijhoff.
6. Reinert, Yeoman. 1982. Plant Cell and Tissue Culture : A Laboratory Manual. Springer-Verlag.
7. Ratnasari, E. & Isnawati. 2011. Handout Bioteknologi. Surabaya: Jurusan Biologi FMIPA UNESA
8. Ratnasari, E. 2014. Handout Kultur Jaringan Tanaman. Surabaya :Jurusan Biologi FMIPA UNESA
9. Thomes, D.T B.E. Ellys P.M. Harley K.J. Kasha and R.I. Peterson, 1982. Application of Plant Cell and Tissue Culture in Agriculture and Industry.Canada: The University of Galeph

Supporters:	
Supporting lecturer	Dra. Evie Ratnasari, M.Si. Dr. Nur Ducha, S.Si., M.Si. Sari Kusuma Dewi, S.Si., M.Si.

Week-	Final abilities of each learning stage (Sub-PO)	Evaluation		Help Learning, Learning methods, Student Assignments, [Estimated time]		Learning materials [References]	Assessment Weight (%)
		Indicator	Criteria & Form	Offline (*offline*)	Online (*online*)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

1	Students can 1. Describe and apply the concept of plant tissue culture 2. Know the function of the equipment in the Tissue Culture lab and be able to use it and understand how to care for it	After attending the lecture, students are expected to be able to: 1. explain the concept of plant tissue culture, its scope and the relationship between kjt and other sciences. 2. Can use and maintain equipment in the Tissue Culture laboratory.	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	Presentation, discussion 4 X 50			0%
2	Students can: 1. Get to know the tools and materials for making KJT media 2. Calculate the chemicals needed to make MS media stock 3. Make stock solutions for MS media 4. Know the process of making simple KJT media and MS media	After attending the lecture, students are expected to be able to: 1. Get to know the tools and materials for making simple KJT media and MS media 2. Calculate the chemicals needed to make MS media stock 3. Make stock solutions for MS media 4. Know the media making process Simple KJT 5. Know the process of making MS media	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1. Presentation, discussion and reflection 2. Practicum on making MS media stock solutions, making simple KJT media and MS media. 3. Preparation of a 4 X 50 practical report			0%
3	Students can 1. Identify factors that influence plant material 2. Understand the process of explant isolation, sterilization and inoculation	After attending the lecture, students are expected to be able to: 1. Identify the factors that influence plant material/explants 2. Understand the procedures for isolating, sterilizing and inoculating explants.	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1. Presentation, discussion and reflection 2. Practicum on isolation, sterilization and inoculation of explants 3. Preparation of practical report 4 X 50			0%

4	Students can 1. Carry out the sub-culture process 2. Identify factors that influence the growth and development of plant tissue culture.	After attending the lecture, students are expected to be able to: 1. Understand the procedures for the sub-culture process. 2. Be able to identify factors that influence the growth and development of plant tissue culture.	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1. Presentation, discussion and reflection 2. Sub-culture practicum 3. Preparation of practicum report 4 X 50			0%
5	Students can 1. Identify the factors that influence the transfer of plants from in vitro to in vivo 2. Students will be able to: Apply techniques for making protocorm like bodies	After attending the lecture, students are expected to: 1. Be able to identify factors that influence the transfer of plants from in vitro to in vivo 2. After attending the lecture, students are expected to be able to apply techniques for making protocom like bodies	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1. Presentation and discussion 2. Making a paper 3. Practical work on making protocom like bodies 3. Making a 4 X 50 practical report			0%
6	Students can apply basic embryo culture techniques	After attending the lecture, students are expected to understand the basic techniques of embryo culture. 2. Can carry out embryo culture practicum according to the correct procedures	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1. Presentation, discussion, 2. Practicum on embryo culture 3. Preparation of practical report 4 X 50			0%

7	Students can apply the principles of orchid culture	After attending the lecture, students are expected to 1. understand the principles of orchid culture for orchid cultivation 2. be able to carry out orchid culture practicum according to the correct procedures	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1.Presentation, discussion, 2.Practicum on orchid culture 3.Make a practical report 4 X 50			0%
8	SUB SUMATIVE TEST, 1ST MEETING - 7TH MEETING			2 X 50			0%
9	Students can 1.describe the history, development and examples of the benefits of animal tissue culture in everyday life. 2. Explain and relate the benefits of animal tissue culture to human life	After attending the lecture, students are expected to 1. be able to describe the history, development and examples of the benefits of animal tissue culture in everyday life. 2. Can explain, relate the benefits and carry out animal tissue culture techniques for human life	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	Presentation and discussion 4 X 50			0%
10	Students can 1. differentiate plant tissue culture and animal tissue culture 2. Describe and apply KJH procedures.	After attending the lecture, students are expected to 1. understand the differences in principles that exist between KJT and KJH 2. be able to describe and apply KJH procedures correctly	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	Presentation and discussion 4 X 50			0%

11	Students can 1. Describe and create a suitable chemical environment at KJH. 2. Describe and create a suitable physical environment at KJH	After attending the lecture, students are expected to be able to 1. Communicate chemical factors that are suitable for KJH 2. Communicate physical factors that are suitable for KJH	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	Presentations, discussions, writing papers 4 X 50			0%
12	Students can explain and apply techniques in vertebrate tissue culture	After attending the lecture, students are expected to be able to 1. Explain the techniques in vertebrate KJH 2. Apply the techniques in vertebrate KJH	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1. Presentation and discussion 2. Make a 4 X 50 paper			0%
13	Students can explain and apply procedures for making KJH media and primary cell culture	After attending the lecture, students are expected to be able to: 1. Carry out the manufacture of KJH media 2. Culture primary cells in vitro.	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1. Presentation, discussion, reflection 2. Making KJh media 3. Practical work on making chicken embryo primary cell culture 4. Making a 4 X 50 practical report			0%

14	Students can explain and apply in vitro vertebrate tissue sub-culture procedures	After attending the lecture, students are expected to be able to carry out sub-cultures of vertebrate tissue in vitro	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1. Presentation, discussion, reflection 2. In vitro vertebrate tissue subculture practicum 3. Make a 4 X 50 practicum report			0%
15	Students can observe primary cell cultures of chicken embryos	After attending the lecture, students are expected to be able to: 1. Understand the procedures for making tissue, organ and embryo cultures 2. understand cell morphology in culture 3. understand cell chromosomes in culture 4. understand cell changes and transformations	**Criteria:** 1.1. Practical papers and reports, including 30 practical marks 2.2. Activeness in discussions and presentations, including a participation score of 20 3.3. UTS questions are material from the 1st to 7th meeting, UTS value is 20 4.4. UAS questions are material from the 9th to 16th meeting, UAS score is 30	1. Presentation, discussion, reflection 2. Observation of primary cell culture of chicken embryos 3. Make a practical report 4 X 50			0%
16							0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
		0%

Notes

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **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.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.

12. TM=Face to face, PT=Structured assignments, BM=Independent study.