



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																																																		
Microtechnical Practicum	4620102223	Compulsory Study Program Subjects	T=2 P=0 ECTS=3.18	4	July 17, 2024																																																		
AUTHORIZATION	SP Developer		Course Cluster Coordinator	Study Program Coordinator																																																			
		Dr. Nur Duchu, S.Si., M.Si	Dr. H. Sunu Kuntjoro, S.Si., M.Si.																																																			
Learning model	Project Based Learning																																																						
Program Learning Outcomes (PLO)	PLO study program which is charged to the course																																																						
	PLO-7	Able to work independently and collaboratively, as well as responsibly, in completing various tasks in class, in the laboratory and in the field.																																																					
	PLO-14	Able to apply biological knowledge and technology to solve natural resource and environmental problems both in the laboratory and in real practice that supports profession and/or entrepreneurship																																																					
	Program Objectives (PO)																																																						
	PO - 1	Mastering microtechnical concepts in methods for making various types of histology preparations Able to choose methods for making preparations that are appropriate to the type of specimen Having the skills to produce histology preparations as an eco-opportunity Producing histology preparations with reference to Biosafety and Good Laboratory Practices																																																					
	PLO-PO Matrix																																																						
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>P.O</td> <td>PLO-7</td> <td>PLO-14</td> <td></td> <td></td> <td></td> </tr> <tr> <td>PO-1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					P.O	PLO-7	PLO-14				PO-1																																											
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PO-1																																																							
PO Matrix at the end of each learning stage (Sub-PO)																																																							
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td rowspan="2">P.O</td> <td colspan="16">Week</td> </tr> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td> </tr> <tr> <td>PO-1</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>					P.O	Week																1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	PO-1																
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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16																																							
PO-1																																																							
Short Course Description	Studying microtechniques in making preparations with plant and animal specimens, including whole preparations, pejetan (squash), smears and slices, smears, immunohistochemistry. Starting from collection, fixation, dehydration, infiltration, making paraffin blocks, slicing with a microtome, staining methods both single staining and double staining. This course is presented in the form of theory and practice by producing preparatory products.																																																						
References	Main :																																																						
	<ol style="list-style-type: none"> 1. Mahadevamma S, Tharanathan RN. 2007. Processed rice starch characteristics and morphology. Eur. Food Res. Technol . 225: 603-612. 2. Noor R. R. 2001. Scanning Electron Microscope [diktat]. Bogor: Lab. Pemuliaan dan Genetika Ternak, Fakultas Peternakan, IPB. 3. Pilling E, Smith AM. 2003. Growth ring formation in the starch granules of potato tubers. Plant Physiol. 132: 365-371. 4. Sass, JE. 1971. Botanical Microtechnique, Third Edition. IOWA: The IOWA State University Press. 5. Sujka M, Jamroz J. 2009. A-amylolysis of native potato and corn starches 13SEM, AFM, nitrogen and iodine sorption investigations. LWT-Food Science and Technology 42: 1219-1224. 6. Suntoro S. H. 1983. Metode Pewarnaan (Histologi dan Pewarnaan). Jakarta: Bhrata Karya Aksara. 7. Tutus A, Ates S dan Deniz I. 2010. Pulp and paper production from spruce wood with kraft and modified kraft methods. Afr J Biotechnol . 9(11) 1648-1654 8. Wang S, Yu J, Zhu Q, Yu J, Jin F. 2009. Granular structure and allomorph position in c-type Chinese yam starch granule revealed by SEM, 13C CP/MAS NMR and XRD. Food Hydrocolloids 23: 426-433. 9. Jurnal-jurnal ilmiah terkait 																																																						
	Supporters:																																																						
Supporting lecturer	Dr. Nur Duchu, S.Si., M.Si. Ahmad Bashri, S.Pd., M.Si. Firas Khaleyla, 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	Understand the basic principles of microtechniques	<ol style="list-style-type: none"> 1.Explain the meaning of microtechniques 2.Explain the scope of microtechniques 3.Explain the types of specimens 4.Explain the various methods of making preparations 	Form of Assessment : Participatory Activities, Tests	Discussion, demonstration 2 X 50		Material: Basic Principles of Microtechniques Literature:	5%
2	Understand various types of microtechnical equipment	<ol style="list-style-type: none"> 1.Explain the types of glassware and their functions 2.Explain the types of small equipment and their functions 3.Explain several types of large equipment and their functions 4.Explain the working mechanisms of several types of large equipment 5.Write down various types of specimens 6.Explain the method of providing specimens 7.Explain the meaning of fixation 8.Describes several fixation methods 	Form of Assessment : Participatory Activities	Discussion, demonstration 2 X 50		Material: Microtechnical Equipment and Specimen Preparation Reference: <i>Suntoro SH 1983. Staining Methods (Histology and Staining). Jakarta: Bhrata Karya Aksara.</i> <hr/> Material: Basic Principles of Microtechniques Literature:	5%

3	Understand the method of making slice preparations in animals	<ol style="list-style-type: none"> 1.Explain the washing methods of various types of fixed specimens 2.Explain the meaning of dehydration 3.Explain the method of dehydration of animal specimen preparations 4.Explain the meaning of dealcoholization 5.Explain the method of dealcoholization of animal specimen preparations 6.Explain the meaning of infiltration 7.Explain the method of infiltration of animal specimen preparations 8.Explain the meaning of embedding 9.Explain the embedding method of animal specimen preparations 10.Explain the sectioning method of animal specimen preparations 11.Explain the meaning of affixing 12.Explain the affixing method of animal specimen preparations 13.Explain the meaning of deparaffinization 14.Explain the method of paraffinization of animal specimen preparations 15.Explain the staining method using a general dye for animals (hematoxylin eosin) 	Form of Assessment : Participatory Activities	Discussion, demonstration, practice 2 X 50		Material: Methods for Making Slice Preparations in Animals References: <i>Suntoro SH 1983. Staining Methods (Histology and Staining). Jakarta: Bhrata Karya Aksara.</i>	10%
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4	Understand the method of making chromosome and squash preparations in plants	<ol style="list-style-type: none"> 1.Explain the method for preparing plant chromosomes 2.Explain the steps for each method of making chromosome preparations 3.Explain the use of making squash preparations 4.Explain the types of squash preparation specimens 5.Explain the method of making squash preparations 	Form of Assessment : Participatory Activities	Discussion, demonstration, practice 2 X 50		Material: Methods for Making Chromosome and Squash Preparations in Plants References: Sass, JE. 1971. <i>Botanical Microtechnique, Third Edition.</i> IOWA: The IOWA State University Press.	10%
5	Understand the method of making slice preparations on plants	<ol style="list-style-type: none"> 1.Mention the types of plant specimens and the stages of the plant slice preparation method 2.Explains fixation, fixatives, fixation methods, and processes for plant slice preparations 3.Explain the mechanism of washing material from fixative solution, dehydration, clarification, infiltration of plant slice preparations 4.Explain the embedding of plant slices 5.Explains various problems in cutting and gluing plant slices 6.Explain the various colorings of plant slice preparations (general coloring or safranin double coloring and natural coloring variations) 7.Explain closure and labeling 	Form of Assessment : Participatory Activities	Discussion, demonstration, practice 2 X 50		Material: Methods for Making Sliced Preparations on Plants References: Sass, JE. 1971. <i>Botanical Microtechnique, Third Edition.</i> IOWA: The IOWA State University Press.	10%
6	Understand the method for making whole mount preparations	<ol style="list-style-type: none"> 1.Explain the use of making whole mount preparations 2.Explain the types of whole mount specimen preparations 3.Explain the method for making whole mount preparations 	Form of Assessment : Participatory Activities	Discussion, demonstration, practice 2 X 50		Material: Methods for Making Whole Mount Preparations References: Tutus A, Ates S and Deniz I. 2010. <i>Pulp and paper production from spruce wood with kraft and modified kraft methods.</i> Afr J Biotechnol . 9(11) 1648-1654	5%

7	Understand the method of making smear preparations	<ol style="list-style-type: none"> 1.Explain the use of making smear preparations 2.Explain the types of smear preparation specimens 3.Explain the method of making smear preparations 	Criteria: test Form of Assessment : Participatory Activities	Discussion, demonstration, practice 2 X 50		Material: Methods for Making Blood Smear Preparations References: Tutus A, Ates S and Deniz I. 2010. <i>Pulp and paper production from spruce wood with kraft and modified kraft methods.</i> Afr J Biotechnol . 9(11) 1648-1654	5%
8	Midterm Exam (UTS)	All indicators from meetings 1-7	Criteria: test Form of Assessment : Participatory Activities	2 X 50		Material: Mid-Semester Exam Reference: Suntoro SH 1983. <i>Staining Methods (Histology and Staining).</i> Jakarta: Bhrata Karya Aksara.	0%
9	Able to produce animal slice preparations	<ol style="list-style-type: none"> 1.Able to apply the slice method for animal preparations 2.Able to produce animal slice preparations 	Criteria: Performance and product assessment Form of Assessment : Assessment of Project Results / Product Assessment, Practices / Performance	practice 2 X 50		Material: Project assignment for making animal slice preparations Reference: Suntoro SH 1983. <i>Staining Methods (Histology and Staining).</i> Jakarta: Bhrata Karya Aksara.	5%
10	Students are able to make animal slice preparations	<ol style="list-style-type: none"> 1.Able to apply the slice method for animal preparations 2.Able to produce animal slice preparations 	Criteria: Performance and product assessment Form of Assessment : Project Results Assessment / Product Assessment	Practice 2 X 50		Material: Project assignment for making animal slice preparations References:	5%
11	Students are able to make chromosome preparations, squash preparations in plants	<ol style="list-style-type: none"> 1.Able to apply methods for making chromosome preparations, squash in plants 2.Able to produce chromosome preparations, squash in plants 	Form of Assessment : Assessment of Project Results / Product Assessment, Practices / Performance	Discussion, demonstration, practice 2 X 50		Material: Project assignment for making chromosome and squash preparations in plants. Reference: Sass, JE. 1971. <i>Botanical Microtechnique, Third Edition.</i> IOWA: The IOWA State University Press.	5%
12	Students are able to make slice preparations on plants	<ol style="list-style-type: none"> 1.Able to apply the slice method to plants 2.Able to produce slice preparations on plants 	Form of Assessment : Project Results Assessment / Product Assessment	Practice 2 X 50		Material: Methods for Making Sliced Preparations on Plants References: Sass, JE. 1971. <i>Botanical Microtechnique, Third Edition.</i> IOWA: The IOWA State University Press.	5%

13	Students are able to produce whole mount preparations	1. Able to apply the whole mount method 2. Able to produce whole mounth preparations	Criteria: Performance and product assessment Form of Assessment : Assessment of Project Results / Product Assessment, Practices / Performance	Practice 2 X 50		Material: Project assignment for making whole mounth preparations References: <i>Tutus A, Ates S and Deniz I. 2010. Pulp and paper production from spruce wood with kraft and modified kraft methods. Afr J Biotechnol . 9(11) 1648-1654</i>	5%
14	Students are able to produce blood smear preparations	1. Able to apply the blood smear method 2. Able to produce blood smear preparations	Form of Assessment : Project Results Assessment / Product Assessment	Practice 2 X 50		Material: Project assignment for making blood smear preparations References: <i>Tutus A, Ates S and Deniz I. 2010. Pulp and paper production from spruce wood with kraft and modified kraft methods. Afr J Biotechnol . 9(11) 1648-1654</i>	5%
15			Form of Assessment : Project Results Assessment / Product Assessment	demonstration, practice 2 X 50		Material: Assessment of Preparation Product Project Assignments Library: <i>Suntoro SH 1983. Staining Methods (Histology and Staining). Jakarta: Bhrata Karya Aksara.</i>	20%
16							0%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	47.5%
2.	Project Results Assessment / Product Assessment	42.5%
3.	Practice / Performance	7.5%
4.	Test	2.5%
		100%

Notes

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Forms of assessment:** test and non-test.
- 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.
- 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.