



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 Systematics	4620104163	Compulsory Study Program Subjects	T=4	P=0	ECTS=6.36	3	May 1, 2023																																																																																																																					
AUTHORIZATION	SP Developer		Course Cluster Coordinator			Study Program Coordinator																																																																																																																						
	Dr. Wisanti, M.S.		Dr. Wisanti, M.S.			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																																																																																																																											
	PLO-5	Able to communicate scientific ideas, both orally and in writing using appropriate communication media according to the target, as a means of lifelong learning for academic self-development.																																																																																																																										
	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-12	Able to demonstrate basic knowledge of biology relevant to science and mathematics to understand current scientific phenomena and issues and apply them in problem solving																																																																																																																										
	Program Objectives (PO)																																																																																																																											
	PO - 1	Mastering the diversity of plants with variations in their characters and life cycles; principles and components of systematics and taxonomy; and kinship																																																																																																																										
	PO - 2	Able to apply the concept of plant systematics with relevant technology in managing plant diversity																																																																																																																										
	PO - 3	Able to apply the concept of plant systematics with relevant technology in managing plant diversity																																																																																																																										
	PO - 4	Able to communicate ideas and monographic research results effectively, both orally and in writing																																																																																																																										
	PO - 5	Able to make decisions based on data/information on taxonomic evidence in order to complete plant systematics monographs as part of their responsibilities in carrying out project tasks																																																																																																																										
	PLO-PO Matrix																																																																																																																											
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	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th rowspan="2">P.O</th> <th colspan="16">Week</th> </tr> <tr> <th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th><th>7</th><th>8</th><th>9</th><th>10</th><th>11</th><th>12</th><th>13</th><th>14</th><th>15</th><th>16</th> </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> <tr> <td>PO-2</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> <tr> <td>PO-3</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> <tr> <td>PO-4</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> <tr> <td>PO-5</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																	PO-2																	PO-3																	PO-4																	PO-5																
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Short Course Description	Plant Systematics studies: basic principles of taxonomy and their relationship to the diversity of non-vascular plants and vascular plants. The basic principles of taxonomy include characters and character traits, characterization, description, taxonomic evidence, identification, nomenclature and classification systems. Kinship includes phenetic, phylogenetic, and primitive/advanced character traits. The diversity of non-vascular plants (bryophytes) and vascular plants (ferns and their relatives, as well as fruit-bearing plants) discusses the development of sporophytes and gametophytes in relation to their characteristics, variations and life cycles. This material is not only discussed theoretically but also in practice (namely compiling descriptions, using identification tools, compiling classification systems, compiling and analyzing relationships. Lecture material is studied through discussions, field practicums and project assignments																																																																																																																											
References	Main :																																																																																																																											
	<ol style="list-style-type: none"> 1. Simpson, M.G. 2010. Plant Systematics . Amsterdam: Elsevier. 2. Van Steenis, C.G.G.J. 1993. Flora untuk Sekolah di Indonesia. Jakarta : PT Pradnya Paramita. 3. Wisanti, Kurniawan, A. & Indah, N.K. Website Botanical Clearinghouse Unesa, http://bch.unesa.ac.id. 4. Wisanti, Indah, N.K. & Putri, E.K. 2016. Taksonomi Tumbuhan 1: Ruang Lingkup Taksonomi, Bryophyta . Surabaya: Unesa University Press. 5. Wisanti, Indah, N.K. & Putri, E.K. 2018. Buku Panduan Praktikum Sistematika Tumbuhan . Surabaya: Unesa University Press. 																																																																																																																											

		Supporters:					
		<ol style="list-style-type: none"> 1. Backer & Bakhuizen van Den Brink. 1965. Flora of Java. Netherlands: N. V.P. Noordhoff Groningen. 2. Keng, H. 1978. Order and Families of Malayan Seed Plants. Singapore: Singapore University 3. Eddy, A. 1988. A handbook of Malesian mosses. Volume 1,2,3. London: British Museum (Natural History) 4. Min, B-C &, Chew, SYJ & Yong, JWH. 2014. Plants in Tropical Cities. Singapore: Uvaria Tide 					
Supporting lecturer		Dr. Wisanti, M.S. Dr. Novita Kartika Indah, S.Pd., 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	<ol style="list-style-type: none"> 1.Understand the scope of Taxonomy and Systematics 2.Understand the purpose and main activities of taxonomy: classification 	<ol style="list-style-type: none"> 1.Explain the difference between Systematics and Taxonomy 2.Explain the systematic approach 3.Explain the stages of development of taxonomy in Indonesia 4.Explains that taxonomy is basic and culminating 5.Explain the differences between description, identification and classification. 6.Explain the factors causing the emergence of various classification systems 7.Compare the basis of several classification systems 8.Develop an artificial classification system 	Criteria: Quantitative (C2 and C4); test and non-test Form of Assessment : Participatory Activities, Practical Assessment	Lectures, questions and answers and assignments 6 X 50		Material: Scope of systematics and classification References: <i>Wisanti, Indah, NK & Putri, EK 2016. Plant Taxonomy 1: Scope of Taxonomy, Bryophyta. Surabaya: Unesa University Press.</i>	0%
2	Apply understanding of variations in anatomical and morphological characteristics in Bryophyta diversity	<ol style="list-style-type: none"> 1.Explain the general characteristics of Bryophyta 2.Describe the comparative anatomical and morphological characteristics of liverworts, hornworts and leaf mosses 3.Explain the field identification characteristics of liverworts, hornworts and leaf mosses 4.Examining the phylogenetic relationships of liverworts, leaf mosses and hornworts 5.Explain the classification and characteristics of divisions 	Criteria: Quantitative (C2 and C4); test and non-test Forms of Assessment : Project Results Assessment / Product Assessment, Practical Assessment	Lecture, question and answer, practical 6 X 50		Material: Bryophyta Literature: <i>Wisanti, Kurniawan, A. & Indah, NK Unesa Botanical Clearinghouse Website, http://bch.unesa.ac.id/.....</i> Material: Bryophyta Reference: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i>	5%

3	Applying an understanding of variations in morphological and anatomical characteristics in the diversity of ferns	<ol style="list-style-type: none"> 1.Explain the characteristics of ferns based on observations and descriptions of herbarium specimens 2.Explain the characteristics of the fern division as identification characters 3.Prepare parallel keys as a means of identifying ferns in accordance with the requirements for making identification keys 4.Identify ferns at the division level 	Forms of Assessment : Project Results Assessment / Product Assessment, Practical Assessment	Lecture, question and answer, practical 6 X 50		Material: Ferns Reference : <i>Simpson, MG 2010. Plant Systematics . Amsterdam: Elsevier.</i> Material: Identification of ferns References: <i>Min, BC &, Chew, SYJ & Yong, JWH. 2014. Plants in Tropical Cities. Singapore: Uvaria Tide</i>	5%
4	<ol style="list-style-type: none"> 1.Understand the life cycle of moss 2.Understanding the life cycle of ferns 	<ol style="list-style-type: none"> 1.Explain the types of moss life cycles 2.Differentiate the ploidy of each stage of the moss life cycle 3.Describe the structural characteristics of the sporophytes of liverworts, hornworts and leaf mosses 4.Explain the types of life cycles of ferns 5.Differentiate the ploidy of each stage of the fern life cycle 6.Explain the causes of high diversity in certain groups of ferns 	Criteria: Quantitative (C2 , C3 and C4); test and non-test Forms of Assessment : Project Results Assessment / Product Assessment, Practical Assessment	Discussion and practicum 6 X 50		Material: Plant life cycle Reference: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i> Material: Moss life cycle and fern life cycle Reference: <i>Wisanti, Indah, NK & Putri, EK 2018. Plant Systematics Practical Handbook. Surabaya: Unesa University Press.</i>	5%
5	<ol style="list-style-type: none"> 1.Understanding the main goals and activities of taxonomy: taxonomic description and evidence 2.Apply understanding and identification skills. description, classification in the preparation of monographs 	<ol style="list-style-type: none"> 1.Applying phytographic terms in descriptions 2.Compile a description of the plants in the surrounding environment 3.Explain the importance of evidence in taxonomic research 4.Determining appropriate evidence from a taxonomic study 5.Determine the object, sampling location and time line of minimonographic research 	Forms of Assessment : Project Results Assessment / Product Assessment, Practical Assessment	Discussion, practicum, minimonography project guidance (Phase 1): determining the object of minimonography research 6 X 50; independently outside of face-to-face lectures		Material: Description and taxonomic evidence Reader: <i>Wisanti, Kurniawan, A. & Indah, NK Unesa Botanical Clearinghouse Website, http://bch.unesa.ac.id/...</i> Material: Description and taxonomic evidence References: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i>	5%

6	<p>1. Understand the objectives and main activities of taxonomy: identification, taxonomic work and plant nomenclature</p> <p>2. Apply understanding and skills of identification, description, classification in minimonography projects</p>	<p>1. Analyze unqualified identification key errors</p> <p>2. Explain the main differences between monograph, flora, revision and manual.</p> <p>3. Explain the principles of plant nomenclature</p> <p>4. Write the authorship of the scientific name of the plant correctly</p> <p>5. Explain the noun conservanda with examples</p> <p>6. Analyze the history of the nomenclature of five plant taxa by accessing the scientific name index of plants using relevant technology</p>	<p>Forms of Assessment : Project Results Assessment / Product Assessment, Practical Assessment</p>	<p>Discussion. practicum and project assignments (2nd class): determine the topic of minimonography; (3rd class): prepare a timeline for planning 6 X 50 minimonography research activities; independently outside of face-to-face lectures</p>		<p>Material: Identification and nomenclature Bibliography: <i>Wisanti, Kurniawan, A. & Indah, NK Unesa Botanical Clearinghouse Website, http://bch.unesa.ac.id/....</i></p> <hr/> <p>Material: Identification and nomenclature References: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i></p>	5%
7	<p>Explore and inventory the diversity of mosses and ferns at the field practicum location</p>	<p>1. Identifying collections of moss and ferns, exploration results</p> <p>2. Create documentation of results</p> <p>3. Making preserved moss from exploration results</p>	<p>Form of Assessment : Project Results Assessment / Product Assessment</p>	<p>8 X 50 field practicum</p>		<p>Material: Identification of ferns References: <i>Min, BC &, Chew, SYJ & Yong, JWH. 2014. Plants in Tropical Cities. Singapore: Uvaria Tide</i></p> <hr/> <p>Material: Moss identification Reference: <i>Eddy, A. 1988. A handbook of Malesian mosses. Volumes 1,2,3. London: British Museum (Natural History)</i></p>	5%
8	<p>UTS</p>	<p>UTS</p>	<p>Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Tests</p>	<p>UTS 2 X 50</p>			10%
9	<p>Applying an understanding of the variation in morphological characteristics in gymnosperm diversity</p>	<p>1. Explain the reason that the diversity of gymnosperms is limited compared to angiosperms</p> <p>2. Describe the morphological characteristics of the vegetative and generative organs of pine, cycad and melinjo</p> <p>3. Determine the characteristics of cycads, pines and melinjo</p> <p>4. Explain the characters that support cycads, including primitive plants in the gymnosperm group</p> <p>5. Explain the characters that support melinjo as the most advanced plant among members of the gymnoperms</p>	<p>Form of Assessment : Project Results Assessment / Product Assessment</p>	<p>Discussion and practicum: completing the minimonography project assignment (Phase 4): independent collection of taxonomic evidence data outside of face-to-face lectures X 50;</p>		<p>Material: Gymnosperms Reference: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i></p> <hr/> <p>Material: Gymnosperms References: <i>Keng, H. 1978. Order and Families of Malayan Seed Plants. Singapore: Singapore University</i></p>	5%

10	Applying understanding of morphological trait variation in angiosperm diversity	<ol style="list-style-type: none"> 1.Explain the general characteristics of angiosperms 2.Distinguishing characteristics of selected families of angiosperms 3.Explain the APG classification system 	<p>Criteria: Quantitative (C2 and C3); test and non-test</p> <p>Forms of Assessment : Project Results Assessment / Product Assessment, Practical Assessment</p>	Lectures, practicums, project assignment guidance (Phase 4); collection of 6 X 50 taxonomic evidence data; independently outside of face-to-face lectures		<p>Material: Angiosperms and the APG classification system References: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i></p>	5%
11	<ol style="list-style-type: none"> 1.Apply understanding and skills of identification, description, classification in preparing minimonographies 2.Communicate ideas and monographic research designs in group discussions 	<ol style="list-style-type: none"> 1.Presents taxonomic evidence data from a minimonography project 2.Able to identify plants through Tropicos, Kew: Data & Digital Resources 3.Able to trace the nomenclature of plant taxa using the IPNI website, Tropicos 4.Honestly present taxonomic evidence data and identification results 	<p>Criteria: Quantitative and qualitative; non-test</p> <p>Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment</p>	Discussion and presentation of the minimonography project assignment (Phase 4): presenting the results of the collection of taxonomic evidence and identification results 6 X 50; independently outside of face-to-face lectures		<p>Material: Plant identification Reference: <i>Backer & Bakhuizen van Den Brink. 1965. Flora of Java. Netherlands: NVP Noordhoff Groningen.</i></p> <p>Material: Plant identification Reference: <i>Keng, H. 1978. Order and Families of Malayan Seed Plants. Singapore: Singapore University</i></p>	10%
12	Understand the life cycle and changes in 9. generation of seed plants	<ol style="list-style-type: none"> 1.Explain the types of life cycles of seed plants 2.Distinguish the ploidy of each stage of the life cycle of gymnosperms and angiosperms 3.Explain the differences in the life cycle stages of gymnosperms and angiosperms in terms of gametophyte, sporophyte, pollination and fertilization structures. 	<p>Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment</p>	Discussion and practicum; project assignment (4th Phase): finishing, revision of data presentation and identification results 6 X 50; independent outside of face-to-face lectures		<p>Material: Life cycle of seed plants References: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i></p> <p>Material: Pine life cycle Reference: <i>Wisanti, Indah, NK & Putri, EK 2018. Plant Systematics Practical Guidebook. Surabaya: Unesa University Press.</i></p>	5%
13	Understanding the evolution of seed plants	<ol style="list-style-type: none"> 1.Explain the forms of adaptation of seed plants to terrestrial conditions 2.Explaining seeds and fruit as the key to the success of seed plants in dominating land life 3.Explain how to pollinate seed plants effectively to expand the distribution area 4.Analyze the flower status of certain species based on primitive and advanced characteristics 	<p>Criteria: Quantitative (C2 and C4), test</p> <p>Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Practical Assessment</p>	Lectures and questions and answers; practice; project assignments (4th phase); drafting a minimonography project report and 6 X 50 poster design; independently outside of face-to-face lectures		<p>Material: Evolution of seed plants References: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i></p>	5%

14	Understanding the relationships between seed plants	1.Analyzing kinship trees from selected examples of family clans 2.Compile a kinship tree based on data collected from taxonomic evidence with selected software programs	Criteria: Quantitative (C2 and C4); test and non-test Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment	Discussion and practicum; project tasks (5th Phase): finishing, data analysis of taxonomic evidence 6 X 50; independently outside of face-to-face lectures		Material: Relationship Analysis Bibliography: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i>	10%
15	1.Communicate the results of taxonomic work orally and in writing 2.Able to make decisions based on taxonomic evidence and data in order to complete a plant systematics monograph as part of his responsibilities in carrying out project tasks	1.Presenting the results of monographic research on selected plants in the form of seminar activities (CPMK5) 2.Presenting monographic research results on selected plants in poster form. (CPMK5)	Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment	6 X 50 Seminars		Material: Plant monographs References: <i>Simpson, MG 2010. Plant Systematics. Amsterdam: Elsevier.</i>	10%
16			Forms of Assessment : Participatory Activities, Project Results Assessment / Product Assessment, Tests	UAS			10%

Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	25%
2.	Project Results Assessment / Product Assessment	50%
3.	Practical Assessment	18.34%
4.	Test	6.66%
		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.
- Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
- 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%.
- TM=Face to face, PT=Structured assignments, BM=Independent study.