



1	Understand the concept of plant cells while mastering problem solving skills to conduct studies of plant cells regarding their function and role	<p>1. Explain the concept of color changes in plants related to pigments contained in plastids.2. Identify plant cell types based on special characteristics of their cell walls.3. Identify the parts that make up plant cell walls.4. Make predictions about cells regarding the function of the spots that are part of the plant cell wall.5. Develop a logical explanation that links the cytological characteristics of dotted cell walls with their role in plants.6. Explain the relationship between ergastic compounds and their role in plants.7. Explain the formation of crystal compounds in plant cells 8. Develop a plan for observing specific cytological characteristics of plant cells.9. Explain the relationship between specific cytological characteristics of plant cells and their role.10. Draw up conclusions based on the collected facts regarding specific cytological characteristics of plant cells.11. Compile the results of reflections on the lecture process experienced.12. Communicates specific cytological characteristics of plant cells related to their function.</p>	<p><b>Criteria:</b> General Assessment Criteria: Reports, practicum products and daily tests are assessed as ASSIGNMENTS with a weight of 30. Essay questions are assessed as daily tests and USS are given a weight of 20. Student activities and responses during learning activities, especially practicals, are assessed as participation, with a weight of 20. Questions essay is assessed as US with a weight of 30 . Performance tasks are carried out integrated during learning</p> <p><b>Form of Assessment :</b> Participatory Activities</p>	<p>1. Exploratory practicum with problem solving strategies regarding the cytological characteristics of plant cells related to their function.2. Presentation discussion on the cytological characteristics of plant cells related to their function. 6 X 50</p>			0%
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2	<p>Understand the concept of plant tissue and at the same time master problem solving skills to carry out studies of plant tissue regarding their function and role. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development</p>	<p>1. Describe embryonal tissue as the initial tissue of the plant body. 2. Explain the concept of basic tissue 3. Explain the concept of periderm tissue 4. Explain the concept of vascular tissue 5. Explain epidermal tissue 6. Identify parenchyma, chlorenchyma, collenchyma, sclerenchyma, aerenchyma tissue and their logical reasons 7. Identify various types of vascular tissue and their logical reasons. 8. Explain the relationship between various types of covering tissue regarding their function and external environment. 9. Develop a plant tissue observation plan. 10. Explain the relationship between plant tissue and its role and the environment in which it lives. 11. Draw conclusions based on the facts collected about plant tissues regarding their role and the environment in which they live. 12. Communicate plant tissue concepts related to their role and the environment in which they live. 13. Compile the results of reflections on the lecture process experienced.</p>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. General Assessment Criteria:</li> <li>2. Reports, practical products and daily tests are assessed as ASSIGNMENTS with a weight of 30</li> <li>3. Essay questions are assessed as daily tests and USS is given a weight of 20</li> <li>4. Student activities and responses during learning activities, especially practicums, are assessed as participation, weight 20</li> <li>5. Essay questions are assessed as US with a weight of 30</li> <li>6. Performance tasks are carried out integrated during learning</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	<p>1. Exploratory practicum with problem solving strategies regarding the cytological characteristics of plant cells related to their function. 2. Presentation discussion about the cytological characteristics of plant cells related to their function. 6 X 50</p>			5%
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3	<p>Understand the concept of plant tissue and at the same time master problem solving skills to carry out studies of plant tissue regarding their function and role. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development</p>	<ol style="list-style-type: none"> <li>1. Describe embryonal tissue.</li> <li>2. Describes a permanent network</li> <li>3. Identify various types of networks and their logical reasons.</li> <li>4. Explain the relationship between various types of cover tissue modifications regarding their function and external environment.</li> <li>5. Explain the relationship between plant tissue and its role and the environment in which it lives.</li> <li>6. Be present on time according to the lecture schedule</li> <li>7. Collect assignments on time</li> <li>8. Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2. Participation assessment is an assessment of attitudes.</li> <li>3. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	<p>Exploratory practicum with problem solving strategies regarding the cytological characteristics of plant cells related to their function. Presentation discussion on the cytological characteristics of plant cells related to their function. 6 X 50</p>			5%
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4	<p>Understand the concept of morphological characteristics of plant stems while mastering problem solving skills to conduct studies on the morphological characteristics of plant stems related to their function and external environment. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development</p>	<ol style="list-style-type: none"> <li>1. Comparing the branching of true dichotomies with pseudo.</li> <li>2. Explain the development of microphylls and megaphylls</li> <li>3. Explain the differences between the development of dicot stems and monocot stems</li> <li>4. Identify the shape of the rod in relation to its function.</li> <li>5. Prepare reports on branching construction patterns along with logical reasons through exploration.</li> <li>6. Conclude various results of trunk and branch modifications based on relevant facts.</li> <li>7. Be present on time according to the lecture schedule</li> <li>8. Collect assignments on time</li> <li>9. Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2. Participation assessment is an assessment of attitudes.</li> <li>3. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b>  Project Results  Assessment / Product  Assessment</p>	<p>Exploratory practicum on the morphological characteristics of plant stems related to their function  Presentation discussion on the morphological characteristics of plant stems related to their function  6 X 50</p>			5%
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5	<p>Understand the concept of plant stems while mastering problem solving skills to study the anatomical structure of stems related to their function and external environment. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development.</p>	<ol style="list-style-type: none"> <li>1.Explain the concept of primary and secondary stem structure.</li> <li>2.Identify the network that makes up the stem along with its logical reasons.</li> <li>3.Presenting the results of studies on the anatomical structure of stems related to their adaptation to the environment</li> <li>4.Designing solutions to problems related to the anatomical structure of stems as a form of adaptation to the environment.</li> <li>5.Prepare problem solving reports related to the anatomical structure of stems as a form of adaptation to the environment.</li> <li>6.Be present on time according to the lecture schedule</li> <li>7.Collect assignments on time</li> <li>8.Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2.Participation assessment is an assessment of attitudes.</li> <li>3.Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	<p>Exploratory practicum with problem solving strategies regarding the anatomy of plant stems related to their function. Presentation discussion on the morphological characteristics of plant stems related to their function 6 X 50</p>			5%
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6	<p>Understand the concept of plant stems while mastering problem solving skills to study the anatomical structure of stems related to their function and external environment. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development.</p>	<ol style="list-style-type: none"> <li>1.Explain the concept of primary and secondary stem structure.</li> <li>2.Identify the network that makes up the stem along with its logical reasons.</li> <li>3.Presenting the results of studies on the anatomical structure of stems related to their adaptation to the environment</li> <li>4.Designing solutions to problems related to the anatomical structure of stems as a form of adaptation to the environment.</li> <li>5.Prepare problem solving reports related to the anatomical structure of stems as a form of adaptation to the environment.</li> <li>6.Be present on time according to the lecture schedule</li> <li>7.Collect assignments on time</li> <li>8.Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2.Participation assessment is an assessment of attitudes.</li> <li>3.Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	<p>Exploratory practicum with problem solving strategies regarding the anatomy of plant stems related to their function. Presentation discussion on the morphological characteristics of plant stems related to their function 6 X 50</p>			5%
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7	<p>Understand the concept of morphological characteristics of plant roots while mastering problem solving skills to conduct studies on the morphological characteristics of plant roots related to their function and external environment. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development</p>	<ol style="list-style-type: none"> <li>1. Compare the process of forming tap and fibrous root systems.</li> <li>2. Distinguish between the morphological structures of tap roots and fiber roots.</li> <li>3. Identify the types of specialized roots (photosynthetic roots, suction roots, contractile roots, post roots, buttress roots, knee roots, and hanging roots, reproductive roots).</li> <li>4. Present the function or role of specialized root types for these plants (photosynthetic roots, suction roots, contractile roots, peg roots, buttress roots, knee roots, and hanging roots, reproductive roots).</li> <li>5. Write down the results of the study, a logical prediction of the process of forming specialized roots.</li> <li>6. Be present on time according to the lecture schedule</li> <li>7. Collect assignments on time</li> <li>8. Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2. Participation assessment is an assessment of attitudes.</li> <li>3. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b>  Project Results  Assessment / Product  Assessment</p>	<p>Practical exploration of root morphology related to its function. Presentation discussion on the morphological characteristics of roots related to their function  6 X 50</p>			5%
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8	UTS		<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2. Participation assessment is an assessment of attitudes.</li> <li>3. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities, Tests</p>	3 X 50		10%
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9	<p>Mastering problem solving skills to carry out studies of plant root anatomy related to their function and role. Having a responsible, independent and honest attitude towards performance in lectures on the structure of plant development</p>	<ol style="list-style-type: none"> <li>1. Describe the arrangement of tissues that make up primary and secondary roots</li> <li>2. Identify the primary and secondary constituent tissues of monocot and dicot roots.</li> <li>3. Explain the relationship between the structure of root tissue and its role.</li> <li>4. Explain the process of secondary growth of roots.</li> <li>5. Designing solutions to problems related to the anatomical structure of roots as a form of adaptation to the environment.</li> <li>6. Prepare problem solving reports related to the anatomical structure of roots as a form of adaptation to the environment.</li> <li>7. Be present on time according to the lecture schedule</li> <li>8. Collect assignments on time</li> <li>9. Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2. Participation assessment is an assessment of attitudes.</li> <li>3. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	<p>Exploratory practicum with problem solving strategies regarding the anatomy of plant roots related to their function. Presentation discussion on the anatomical properties of roots related to their function 6 X 50</p>			5%
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10	Understand the concept of morphological characteristics of plant leaves while mastering problem solving skills to conduct studies on the morphological characteristics of plant leaves related to their function and external environment. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development	<ol style="list-style-type: none"> <li>1.Explain the process of leaf formation.</li> <li>2.Describe the morphological characteristics of leaves</li> <li>3.Presents the explored leaf phyllotaxis</li> <li>4.Describe leaf modifications</li> <li>5.Explain the logical relationship between modified leaf structure and its role and habitat conditions.</li> <li>6.Be present on time according to the lecture schedule</li> <li>7.Collect assignments on time</li> <li>8.Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2.Participation assessment is an assessment of attitudes.</li> <li>3.Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	Practical exploration of leaf morphology related to its function. Presentation discussion on the morphological characteristics of leaves related to their function 6 X 50			5%
11	Understand the concept of morphological characteristics of plant leaves while mastering problem solving skills to conduct studies on the morphological characteristics of plant leaves related to their function and external environment. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development	<ol style="list-style-type: none"> <li>1.Explain the process of leaf formation.</li> <li>2.Describe the morphological characteristics of leaves</li> <li>3.Presents the explored leaf phyllotaxis</li> <li>4.Describe leaf modifications</li> <li>5.Explain the logical relationship between modified leaf structure and its role and habitat conditions.</li> <li>6.Be present on time according to the lecture schedule</li> <li>7.Collect assignments on time</li> <li>8.Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2.Participation assessment is an assessment of attitudes.</li> <li>3.Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	Practical exploration of leaf morphology related to its function. Presentation discussion on the morphological characteristics of leaves related to their function 6 X 50			5%

12	<p>Mastering problem solving skills to study the anatomy of plant leaves related to their function and role. Having a responsible, independent and honest attitude towards performance in lectures on the structure of plant development</p>	<ol style="list-style-type: none"> <li>1. Describe the arrangement of leaf tissues.</li> <li>2. Explain the relationship between leaf tissue structure and its role and habitat.</li> <li>3. Designing solutions to problems related to the anatomical structure of roots as a form of adaptation to the environment.</li> <li>4. Prepare problem solving reports related to the anatomical structure of roots as a form of adaptation to the environment</li> <li>5. Be present on time according to the lecture schedule</li> <li>6. Collect assignments on time</li> <li>7. Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2. Participation assessment is an assessment of attitudes.</li> <li>3. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Project Results Assessment / Product Assessment</p>	<p>Exploratory practicum with problem solving strategies regarding the anatomy of plant leaves related to their function and habitat. Presentation discussion on the anatomical properties of leaves related to their function and habitat 6 X 50</p>			5%
13	<p>Mastering problem solving skills to study the anatomy of plant leaves related to their function and role. Having a responsible, independent and honest attitude towards performance in lectures on the structure of plant development</p>	<ol style="list-style-type: none"> <li>1. Describe the arrangement of leaf tissues.</li> <li>2. Explain the relationship between leaf tissue structure and its role and habitat.</li> <li>3. Designing solutions to problems related to the anatomical structure of roots as a form of adaptation to the environment.</li> <li>4. Prepare problem solving reports related to the anatomical structure of roots as a form of adaptation to the environment</li> <li>5. Be present on time according to the lecture schedule</li> <li>6. Collect assignments on time</li> <li>7. Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1. Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2. Participation assessment is an assessment of attitudes.</li> <li>3. Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities, Project Results Assessment / Product Assessment</p>	<p>Exploratory practicum with problem solving strategies regarding the anatomy of plant leaves related to their function and habitat. Presentation discussion on the anatomical properties of leaves related to their function and habitat 6 X 50</p>			10%

14	Understand the concept of flower morphological characters. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development	<ol style="list-style-type: none"> <li>1.Explain the development of flowers.</li> <li>2.Describe the parts that make up a flower.</li> <li>3.Identify the parts that make up a flower.</li> <li>4.Describe flower diagrams and formulas.</li> <li>5.Identify different types of inflorescences.</li> <li>6.Compare various types of flowers based on their pollination</li> <li>7.Be present on time according to the lecture schedule</li> <li>8.Collect assignments on time</li> <li>9.Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2.Participation assessment is an assessment of attitudes.</li> <li>3.Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities, Practical Assessment</p>	Practical exploration of flower morphology related to its function. Presentation discussion on the morphological characteristics of flowers related to their function 6 X 50			10%
15	Understand the concept of morphological characteristics of plant fruit and seeds while mastering problem solving skills to conduct studies on the morphological characteristics of fruit and seeds related to their function and external environment. Have a responsible, independent and honest attitude towards performance in lectures on the structure of plant development	<ol style="list-style-type: none"> <li>1.Explain the development of fruit and seeds.</li> <li>2.Describe the constituent parts of fruit and seeds.</li> <li>3.Identify the constituent parts of fruit and seeds.</li> <li>4.Identify various types of fruit and seeds related to their function, habitat and distribution process.</li> <li>5.Be present on time according to the lecture schedule</li> <li>6.Collect assignments on time</li> <li>7.Actively express opinions during discussions and presentations</li> </ol>	<p><b>Criteria:</b></p> <ol style="list-style-type: none"> <li>1.Assessment is based on benchmarks (PAP). The assessment components consist of sub-summative, assignment, summative and participation scores.</li> <li>2.Participation assessment is an assessment of attitudes.</li> <li>3.Performance assessment in the form of presentation performance is carried out integrated during learning as an assignment grade</li> </ol> <p><b>Form of Assessment :</b> Participatory Activities</p>	Practical exploration of the morphology of fruit and seeds related to their function. Presentation discussion on the morphological characteristics of fruit and seeds related to their function, habitat and distribution process 6 X 50			10%
16			<b>Form of Assessment :</b> Participatory Activities				10%

#### Evaluation Percentage Recap: Project Based Learning

No	Evaluation	Percentage
1.	Participatory Activities	35%
2.	Project Results Assessment / Product Assessment	55%
3.	Practical Assessment	5%
4.	Test	5%
		100%

## 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.