



THE MODULE HANDBOOK

FACULTY OF BIOLOGY

Plant Structure and Development

Module code	BIO 20601
Module level	Undergraduate
Abbreviation, if applicable	-
Sub-heading, if applicable	-
Courses included in the module, if applicable	-
Semester/ term	Odd
Module coordinator(s)	Dr. Maryani, M.Sc.
Lecture(s)	<ol style="list-style-type: none">1. Prof. Dr. L. Hartanto Nugroho, M.Agr.Sc.2. Dr. E. Suharyanto, M.Sc.3. Dr. Purnomo, M.S.4. Dra. Siti Susanti, S.U.5. Drs. Sutikno, S.U.6. Abdul Razak Chasani, M.Sc.7. Rina Sri Kasiamndari, M.Si., Ph.D.
Language	Indonesia
Classification within the Curriculum	<ol style="list-style-type: none">1. Compulsory2. This course studies the theory and concepts related to the structure and development of plants, both external structure and internal structure of Angiosperm plants. Course material is divided into 3 chapters: morphology, anatomy and embryology.
Teaching format/ class hours per week during the semester	Plant Structure and Development course is given on the second semester to S1 regular students in Faculty of Biology. Each week there are 2 meetings with time allocation of 100 minutes (Monday, at 07:00- 09:00 am) and 50 minutes (Thursday, 11:00 - 12:00 am).
Workload	This course consists of 3 credits of theory and 1 credit of laboratory work.
Credit points	3-1 credits
Requirements	General Biology (BIO 10001)
Learning goals/ competencies	<ol style="list-style-type: none">1. Knowledge and understanding<ol style="list-style-type: none">a. Basic concepts, principles and theories related to the external and internal structures of higher plants.



THE MODULE HANDBOOK

FACULTY OF BIOLOGY

- b. Facts, concepts, and principles, and theories that apply to the branch of biology, especially the structure and development of plants.
- c. Biological phenomena at various levels and are able to explain how the theory of evolution related with the structure and development of plants.

2. Ability/intellectual skill

- a. Planning, executing, and reporting on a research in the field of structure and development of plants.
- b. Analysing and resolving problems and developing activities plan in the field of plant structure and development.
- c. Formulating and proving a hypothesis.

3. Practical skill

- a. Planning and implementing an experiment with high validity in the field of structure and development of plants.
- b. Designing and using laboratory tools to obtain data on the structure and development of plant.
- c. Analysing the results of experiments in the field of structure and development of plants and determining the validity of teh experiments.
- d. Using the scientific literature and making notes effectively.

4. Managerial and transferable skill

- a. Communicating effectively both written and oral related to the structure and development of plants.
- b. Communicating effectively matters relating to the structure and development of plants in English.
- c. Working in groups.
- d. Applying and integrating branch of the structure and development of plants in other branches of biological sciences and interdisciplinary.
- e. Using of information communication technology .
- f. Independently and critically learning in the new environment and that has been known previously, with an open spirit.

5. Attitude

- a. Able to anticipate problems and seek ways completion of a problem related to the structure and development of plants in the community.
 - b. Having a curiosity.
 - c. Appreciating the originality of ideas, concepts and discoveries particularly in the structure and development of plants.
 - d. Sensitive to changes and biological problems, especially the structure and development of plants
-



THE MODULE HANDBOOK

FACULTY OF BIOLOGY

	<p>in the global scope / regional / local as well as trying to solve either individually or in group</p> <p>e. Appreciating the efforts in exploring, exploiting and preserving natural resources</p>
Content	<p>This course studies the theory and concepts related to the structure and development of plants, both external structure and internal structure of Angiosperm plants. Course material is divided into 3 Chapters, Morphology, Anatomy and Embryology. In the first lecture will be delivered learning contract containing class rules, references needed, lecturing system, students evaluation and assessment, as well as assessment components. Morphology section discusses the roots, stems, leaves, flowers, fruits and seeds. At root morphology, it will discuss the characteristics, function, origin, organisation and modification of roots. In the stem morphology, discussion includes the characteristics, shape, organisation, classification, and modification of the stem. Morphology of leaves covers the origins, the leaves position on the stem, leaves parts and modification. Flowers morphology covers flowers organisation, flowers position on stems, flowers formulas and diagrams. In the fruit will be discussed fruit parts dan fruits types portions, while seeds morphology covers the arrangement and types of seeds. Anatomy chapter discusses about cytological aspects including plant cell structure, structure and function of plant cell components, plant cell division (mitosis and meiosis); histological aspects will cover the characteristics, origin, location, and function of meristem tissues (cambium, felogen, shoot apical meristem) and permanent tissues (epidermis, parenchyma, schlerenchyma, vascular bundles). In Embryology Chapter will be discussed anther structure, microsporogenesis and microgametogenesis, the internal structure of the ovaries and ovule, megasporogenesis and megagametogenesis, pollination, fertilization, endosperm, embryogenesis, embryo structure, fruit and seeds. This course occupys with practical work to explore the theories and concepts given in the lectures. Laboratory work is carried out in the field and laboratory and is divided into 11 meeting and one laboratory examination.</p>
Study/ exam achievements	<ol style="list-style-type: none">1. Theory: Midterm, final examination, presentation and quiz.2. Laboratory work: laboratory work, laboratory examination, pretest, drawing and describe plant sample.
Forms of media	White board, LCD



THE MODULE HANDBOOK

FACULTY OF BIOLOGY

Literature

1. Bhojwani, S.S. and S.P. Bhatnager. 1999. The Embryology of Angiosperms. Vikas Publishing House PVT. LTD.
2. Eames, A.J. 1961. Morphology of Angiospermae. Mc Graw-Hill Book Company, New York.
3. Esau, K. 1965. Plant Anatomy, 2nd edition. Wiley Eastern Private United, New Delhi.
4. Esau, K. 1979. Anatomy of Seed Plants. Wiley Eastern LTD.
5. Fahn, A. 1990. Plant anatomy, 4th edition. Pergamon Press.
6. Gifford, E.M. and A.S. Foster. 1987. Morphology and Evolution of Vascular Plants. 3rd edition. W.H. Freeman and Company, New York.
7. Halle, F. and R.A.A. Oldeman. 1975. An Assay on the Architecture and Dynamics of Growth of Tropical Trees. Pen. Universitas Malaya, Kuala Lumpur.
8. Hidayat, E.B. 1995. Anatomi tumbuhan berbiji. Penerbit ITB Bandung.
9. Johansen, D.A. 1950. Plant Embryology: Embryology of the Spermathophyta, Chronica Botanica Co.
10. Jones, B.J. and A.E. Luchsinger. 1986. Plants Systematics. 2nd edition. Mc Graw-Hill Book Company. London.
11. Lawrence, G.H.N. 1968. Taxonomy of Vascular Plants. The Millan Company, New York.
12. Maherwari, P., 1955, An Introduction to the Embryology of Angiosperms. 1st edition, Mc Grow-Hill Book Co.Inc. New York.
13. Mauseth, J.D. 1998. Botany: An Introduction of Plant Biology. Jones and Bartlet Publishers, Inc. United States.
14. Pandey, B.P.1982. Plant anatomy, 3rd edition, S. Chan and Company Ltd. New York.
15. Robert, A. 2002. Plant Anatomy (online).
16. Sporne, K.R. 1974. The morphology of angiospermae; the structure and evolution of homering plants. Hitchinson University Library, London.
17. Sumardi, I. dan Pudjoarinto A. 1993. Struktyur dan Perkembangan Tumbuhan. Departemen Pendidikan dan Kebudayaan, Direktorat Pendidikan Tinggi. Proyek Pembinaan Tenaga Kependidikan Pendidikan Tinggi.
18. Tjitrosoepomo, G. 1988. Morfology tumbuhan, Gadjah mada University Press, Yogyakarta.