



THE MODULE HANDBOOK

FACULTY OF BIOLOGY

Plant Tissue Culture Techniques

Module code	BIO 30201
Module level	Undergraduate
Abbreviation, if applicable	-
Sub-heading, if applicable	-
Courses included in the module, if applicable	-
Semester/ term	Odd
Module coordinator(s)	Dr.rer.nat. Ari Indrianto, S.U.
Lecture(s)	1. Dr.rer.nat. Ari Indrianto, S.U. 2. Dr. Endang Semiarti, M.S., M.Si. 3. Dr. Eko Agus Suyono, M.App.Sc. 4. Aries Bagus Sasongko, M. Biotech.
Language	Indonesia
Classification within the Curriculum	Elective course
Teaching format/ class hours per week during the semester	This course is planned to have 14 teaching weeks and 2 weeks of examination
Workload	Estimated working hour: 2 credit of theory and 1 credit of laboratory work
Credit points	3-1 credits
Requirements	General Biology (BIO 10001)
Learning goals/ competencies	1. Knowledge and understanding <ol style="list-style-type: none">The basic principles of Mathematics / Statistics, Physics and Chemistry were related to structures and processes in biological systems.The basic concepts, principles and theories related to the structure, function engineering, diversity, reproduction, and evolution of biological systems.Facts, concepts, principles and theories that apply to biological sciences, especially in the field of plant tissue culture.Basic theory and instrumentation to carry out scientific research using plant tissue culture techniques.



THE MODULE HANDBOOK

FACULTY OF BIOLOGY

- e. The role of biologists in the field of plant tissue culture in society at large, especially the scientific world.
- f. The responsibility of professional and scientific ethics as a biologist on the impact of scientific advances in plant tissue culture to the community and the world.

2. Ability/intellectual skill

- a. Research in the field of plant tissue culture.
- b. Analyze and solve a problem and develop a draft research activities in the field of plant tissue culture
- c. To formulate and prove a hypothesis.
- d. Integrate and evaluate information and data on plant tissue culture from a variety of sources.
- e. To evaluate for improvement of design, process and results of research in the field of plant tissue culture.
- f. Conduct a holistic approach to solve problems and create a design; applying professional judgment of the costs, benefits, risks, security, trust, aesthetic and environmental impact of aspects of plant tissue culture.

3. Practical skill

- a. Plan and implement validly an experiment / research in the field of plant tissue culture.
- b. Designing and use of laboratory equipment and workshop (workshop) for obtaining data in the fields of plant tissue culture.
- c. To analyze the results of experiments in the field of plant tissue culture and determine the validity and truth.
- d. Using the scientific literature and make notes effectively on tissue culture plants.
- e. A computational program (computational program) for research and plant tissue culture.
- f. Create and present a technical report scientifically plant tissue culture.

4. Managerial and transferable skill

- a. Perform effective communication (writing, oral, and with pictures) on plant tissue culture.
 - b. Applying the principles of mathematics, chemistry, and physics in the field of plant tissue culture.
 - c. Working in groups to carry out research in the field of plant tissue culture.
 - d. Implement and integrate into plant tissue culture techniques in other branches of science.
 - e. Using information and communication technologies in the field of plant tissue culture.
 - f. Set the time and resources effectively and efficiently in plant tissue culture research.
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THE MODULE HANDBOOK

FACULTY OF BIOLOGY

	<p>g. Learn effectively to the development of the profession and wider scope in pursuing a career with the basic techniques of plant tissue culture .</p> <p>5. Attitude</p> <p>a. Being able to anticipate problems and find a way of solving the problems associated with plant tissue culture in the community.</p> <p>b. Have a curiosity in the field of plant tissue culture.</p> <p>c. Appreciate the originality of ideas, concepts, and other inventions.</p> <p>d. Be sensitive to face the problems of plant tissue culture in the global scope/regional/ local, as well as trying to solve them, either individually or in groups.</p> <p>e. Respect for interdisciplinary efforts in exploring, exploiting and preserving natural resources by the application of plant tissue culture techniques.</p> <p>f. Have entrepreneurship in the field of plant tissue culture</p>
Content	<p>Plant Tissue Culture Techniques course explains the basic principles and history of the development of plant tissue culture techniques, including tissue culture equipment, technical equipment laboratory, tissue culture medium, aseptic technique, callus, suspension cell culture, and isolation, fusion and culture of protoplast, microspores embryogenesis, micropropagation, molecular bases of plant growth and development, culture of algae and the recent research on plant tissue culture.</p>
Study/ exam achievements	<p>1. Theory</p> <p>a. Quiz: 5%</p> <p>b. Presentation and course task: 30%</p> <p>c. Midterm: 30%</p> <p>d. Final examination: 40%</p> <p>2. Laboratory Work</p> <p>Practical Examination, pretest, picture and plant description: 100%</p>
Forms of media	<p>White board, LCD</p>
Literature	<p>1. Bhojwani, S.S. and S.P. Bhatnager. 1999. The Embryology of Angiosperms. Vikas Publishing House PVT. LTD.</p> <p>2. Eames, A.J. 1961. Morphology of Angiospermae. Mc Graw-Hill Book Company, New York.</p> <p>3. Esau, K. 1965. Plant Anatomy, 2nd edition. Wiley Eastern Private United, New Delhi.</p> <p>4. Esau, K. 1979. Anatomy of Seed Plants. Wiley Eastern LTD.</p>



THE MODULE HANDBOOK

FACULTY OF BIOLOGY

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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.