



THE MODULE HANDBOOK
FACULTY OF BIOLOGY
MASTER PROGRAMME

PLANT EMBRYOLOGY

Module code	BIO - 60604
Module level	1 st year of Master Program in Biology
Abbreviation, if applicable	-
Courses related	-
Semester	Even
Course coordinator(s)	DR. Suharyanto MS., M.Sc
Lecture(s)	1. DR. Suharyanto MS., M.Sc 2. Prof. Dr.Issirep Sumardi
Language	Bahasa Indonesia and English
Classification within the Curriculum	Compulsory Courses for Specific Field of Interest
Teaching format/class hours per week during the semester	This course is organized into one class and planned to have 14 teaching weeks and 2 weeks of examination. This course also has laboratory works credits.
Workload	Estimated working hour: 10.5 hours/week.
Credit	2-1 credits
Requirements	-
Course Learning Outcome	<ol style="list-style-type: none">1. Able to master the embryogenesis of bryophytes and pteridophytes2. Able to master the embryogenesis of gymnosperms and angiosperms as well anomalies in spermatophyte embryogenesis3. Able to explain the current development in plant embryology as a part of plant biotechnology (such



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	as somatic embryogenesis, embryo culture, pollen culture, etc)
Syllabus	<p>Plant Embryology is a compulsory subject of interest in botany learning about the differences and processes in the embryogenesis of cryptogams and spermatophytes. Differences in embryogenesis between Cryptogamae and Spermatophyta; Embryogenesis in cryptogams: Germination of spore and gametophyte, Development of reproductive organ (archegonium and antheridium) and gametogenesis; Fertilization, Embryogenesis, Development of sporophyte and Sporogenesis</p> <p>Spermatophyta: Microsporogenesis, Microgametogenesis, Megasporogenesis Megaga-metogenesis, Pollination and Fertilization, Endosperm, Embryogenesis, dan Seed development; Apomixis and Polyembryony</p> <p>Experimental Embryology</p>
Study/exam achievements	<ol style="list-style-type: none">Midterm: 40%Final examination: 40%Personal Assignments: 15%Quizzes : 5%
Forms of media	White board, notebook, LCD
Reference	<ol style="list-style-type: none">Batygina, T. B. 2009. Embryology of Flowering Plants. Science Publisher. United States of America.2. Biwas, C. and B.M Johri 1997. The Gymnosperms, Springer Verlag, Berlin, Heidelberg, NY3. Bhojwani, S.S. and S.P. Bhatnagar. 1978. The Embryology of Angiosperms. Vikas Publ.House PVT Ltd4. Bhojwani, S.S. and S.P. Bhatnagar. 1999. The Embryology of Angiosperms. Revised edition .Vikas Publ.House PVT Ltd5. Foster, A. S. and E. M. Gifford. 1974. Comparative Morphology of Vascular Plants. W. H. Freeman and Company. San Francisco6. Johri, B. M. (edit.) 1984. Embryology of Angiosperms. Springer Verlag, Berlin, Heidelberg, NY.7. Vasishta, B.R. 1983. Botany for Degree Student: BRYOPHYTA. S. Chand and Company LTD. Ram Nagar New Delhi8. Vasishta, P. C. 1983. Botany for Degree Students: PTERIDOPHYTA. S. Chand and Company LTD. Ram Nagar New Delhi



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9. Vasishtha, P. C. 1983. Botany for Degree Students :GYMNOSPERMAE. S. Chand and Company LTD. Ram Nagar New Delhi.
10. Wang T.L. and A.Cuming.1996. Embryogenesis, the generation of plant; 1st edit. Bio Scientific Publ.Ltd.UK