



THE MODULE HANDBOOK

FACULTY OF BIOLOGY

Bryology

Module code	BIO 21004
Module level	1 st year of Undergraduate Program in Biology
Abbreviation, if applicable	-
Sub-heading, if applicable	-
Courses included in the module, if applicable	-
Semester/term	Even
Module coordinator(s)	Drs. Heri Sujadmiko, M.Si.
Lecture(s)	Drs. Heri Sujadmiko, M.Si.
Language	Indonesia
Classification within the Curriculum	Elective course
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.
Workload	Estimated working hour: 7 hours/week.
Credit points	1-1 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. The scope of mossesb. The basics to recognize the diversity of mosses and its importance to human life, animals and plants.c. Understand the basic theory and laboratory equipment to carry out practical work and research.2. Ability/intellectual skill<ol style="list-style-type: none">a. To plan, implement and report on a study related to mosses.b. To analyze and solve problems where moss with a biological approach.c. To formulate moss benefits for human life, animals and plants



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	<p>3. Practical skill</p> <ol style="list-style-type: none">Planning a study of mosses in terms of various approaches to good science.Make algae growth media for the purpose of research or cultivation.Designing and using field equipment and laboratory equipment for the collection and identification of moss.Using the scientific literature and make notes effectively.Analyzing the results of research. <p>4. Managerial and transferable skill</p> <ol style="list-style-type: none">Effective communication (written, oral or with pictures).Organize time effectively and efficiently to accomplish tasks.Applying the principles of mathematics, chemistry and physics through a chart or image writing competition or seminar.Working together in groups.Using information technology to achieve information.Using and applying research techniques and knowledge acquired to be applied in the field of science to another. <p>5. Attitude</p> <ol style="list-style-type: none">Ability to write, report and communicate the research results either orally or writtenAbility to resolve problems and finding resolution which connected to their specialty.Respect the originality of an idea, concept and other discoveries.Professional responsibility and scientific ethic as biological scientist to the scientific progress.
Content	Briology course is the study of the biology of mosses. Briology material include: Limitation of mosses, lichens plant morphology and anatomy, classification of mosses, lichens How to breed plants, mosses Physiology, Ecology mosses, mosses collection Engineering, Mechanical identification of mosses, lichens plant cultivation techniques and plant utilities moss. The method of delivery of content is lecture pulpit with views transparency, discussion and independent tasks. To give and increase knowledge and skills to students in understanding mosses, students are required to follow the laboratory work.
Study/exam achievements	<p>1. Theory</p> <ol style="list-style-type: none">Midterm



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	<ul style="list-style-type: none">b. Final examinationc. Assignment and attendanced. Quize. Activities <p>2. Laboratory work</p> <ul style="list-style-type: none">a. Pretestb. Weekly reportsc. Activitiesd. Final test
Forms of media	White board, notebook, specimen, LCD
Literature	<p>Books:</p> <ol style="list-style-type: none">1. Ando, H. & A. Matsuo, 1989, Applied Bryology, Botanical Institute, Faculty of Science, Hiroshima University, Nagashisenda-Machi, Naka-Ku, Hiroshima, Japan.2. Asakawa, Y. (1990). Biologically Active Substances From Bryophytes. In : <i>Bryophyte Development : Physiology And Biochemistry</i>. CRC Press, Inc. Boca Rotan, Florida.3. Bridson D. and Forman L., 1992, The Herbarium Hand Book, Revised Edition, Royal Botanic Garden, Kew.4. Chopra R.N. and Kumra P.K., 1988, Biology of Bryophytes, Wiley Eastern Limited, New Delhi, Bangalore, Bombay, Calcuta, Hyderabad, Madras.5. Chopra R.N. and Bhatla S.C., 1990, Bryophite Development : Physiology and Biochemistry, Academic press, Boca Rotan Ann Arbor, Boston.6. Conard, H.S., 1981, How to Know The Mosses And Liverworts, W.M.C., Brown Company Publishers, Dubuque, Iowa, America.7. Deguchi, H. & Sujadmiko, H., 1996. Three Pottiaceus Mosses From Indonesia, Majalah Ilmiah Hikobia Vol. 12, No. 1, Japan.8. Dewi, K. & H. Sujadmiko, 1998. The Effects of Gibberellin and CCC (2-Chloroethyl trimethyl ammonium chloride) on Spore Germination of the Moss <i>Funaria luzonensis</i> Broth. Majalah Ilmiah Biologi Vol.2, No.6, Fakultas Biologi UGM, Yogyakarta.9. Dyer, A.F. and Duckett J.G., 1984, The Experimental Biology of Bryophytes, Academic press, INC. (London) LTD., New York.10. Frey, W., Kurschner, H., Seifert, U.H., 1995, Life strategies of Epiphytic Bryophytes of Tropical Lowland and Montane Forest. <i>Tropical Bryology</i> 11 : 129-14911. Glime, J.M. and Saxena, D.K. (1990). Uses of Bryophytes. Today and Tomorrow Printers and Publishers, New Delhi, India.



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12. Gradstein, S.R., 2011. Guide to the Liverworts and Hornworts of Java. Published SEAMEO BIOTROP. Southeast Asian Regional Centre for Tropical Biology. Bogor. Indonesia.
13. Haris, E.S.J. (2008). Ethnobotany Traditional Use And Folk Classification of Bryophytes. In : *The Bryologist*. The American Bryological and Lichenological Society, Inc.
14. Hirota, J. (1978). Bonkei : Tray Landscape. First Edition. Published Kodansha International Ltd. Otawa, Bunkyo-ku, Tokyo, Japan. and Kodansha International/USA Ltd. New York.
15. Kalkman, C., 1985, Methodological Research of Plant Taxonomy : Instruction for Collecting Special Plant Groups, Bogor Indonesia.
16. Kurschner, H., W. Frey and G. Parolly, 1999, Pattern and Adaptive trends of Life Form, Life Strategies and Ecomorphological Struktur in Tropical Epiphytic Bryophytes. *Nova Hedwigia* 69 : 73-99.
17. Pandey, S.N., Misra S.P., Trivedi P.S., 1977, A text Book of Botany, Vol. II, Vikas Publishing House PVT LTD, New Delhi, Bombay, Bangalore Calcuta, Kanpur.
18. Pudjoarinto, A., 1984, Pengantar dan dasar-Dasar Sistematis Tumbuhan, Laboratorium Taksonomi Tumbuhan, Fakultas Biologi UGM, Yogyakarta.
19. Schofield, W.B. and C. Hebert 1984, New Manual of Bryology : The Morphology and Anatomy of The Moss Gametophore, Vol. 2, Published by The Hattori Botanical Laboratory, Nichinan, Miyazaki, Japan.
20. Schuster, R.M., 1983, New Manual of Bryology, The Hattori Botanical Laboratory, Nichinan, Miyazaki, Japan.
21. Schuster, R.M., 1984, New Manual of Bryology : Comparative Anatomy and Morphology of The Hepaticae, Vol. 2, Published by The Hattori Botanical Laboratory, Nichinan, Miyazaki, Japan.
22. Schuster, R.M., 1984, New Manual of Bryology : Morphology, Phylogeny and Classification of The Anthocerotae, Vol. 2, Published by The Hattori Botanical Laboratory, Nichinan, Miyazaki, Japan.
23. Smith, A.J.E., 1982, Bryophyte Ecology, Chapman and Hall LTD., London, New York.
24. Srivastava, K.C., Dattatreya B.S., Raizada A.B., 1977, Vikas Hand Book of Botany, Vikas Publishing House PVT LTD, New Delhi.
25. Sujadmiko, H., 1992. Some Liverwort in Merapi Mountain's slope, Central Java, Second Flora Malesiana Symposium, Convened in Gadjah Mada University, Yogyakarta.



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27. Watson, E.V., 1987, The Struktur and Life of Bryophytes, Hutchinson University Library, London.

Scientific journals (for retrospective case series study materials):

Hattori Botanical laboratory, Bryophytorum Bibliotheca, Philippine Journal of Science, Annales Bryologici Fennici, Hikobia, Natural History Research, Bryology, Japanese Botany, Acta Botanica Fennica, Buxbaumia, Phytotaxa, Linbergia, Nova Hedwigia, The Bryologist, Bryologie, dll.

Website

1. Glime, J.M., 2006. Bryophyte Ecology : Physiological Ecology. Vol. 1. Published online at <http://www.bryoecol.mtu.edu/>
 2. Glime, J.M., 2006. Bryophyte Ecology : Uses Moss. Vol. 5. Published online at <http://www.bryoecol.mtu.edu/>
 3. Vanderpoorten, A. and Goffinet B., 2009. Introduction Bryophytes, Cambridge University press, New York. Published online at www.cambridge.org/9780521877121
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