

KSH 433 Conservation of Tropical Forest Medicinal Plants

Credit	:	3(2-3)
Semester	:	7 (odd)
Course format	:	Classroom lectures, group assignment, and field practice. 100 minutes per week, 16 weeks
Pre-requisite	:	-
Lecturers	:	Dr. Ervizal A.M. Zuhud, MS. (Course coordinator) Dr. Agus Hikmat, MScF. Mr. Siswoyo, MSi Mr. Edhi Sandra, MSi

Course Description

This course provides the students with knowledge on the scope of medicinal plants conservation with the following main topics: Introduction, ethnophytomedica, and related matters on medicinal plants including potentials, related problems in Indonesia, prospects of development, conservation, captive breeding, products and packaging, bioregional-based development, bioprospecting and patents and commercialization.

Course Objectives

This course is intended to support the development of knowledge and conservation technology (preservation and utilization) on various Indonesian tropical medicinal plants for human welfare.

Learning Outcomes

1. General learning outcomes

Upon successful completion of this course the students will be able to:

Understand and explain conservation principles of tropical medicinal plants in Indonesia and can apply their management for human welfare

2. Specific learning outcomes

Upon successful completion of this course the students will be able to:

Understand and explain Indonesian tropical forest biodiversity potentials that can be use as medicinal plants and able to apply their conservation and development for community self health.

Structure of Course Delivery

1. Lectures.
2. Individual and group assignments.

Major References

1. Nor, S.M., Kadir, A.A., Shaari, K. dan Jantan, I. 1995. Medicinal Products From the Tropical Rainforests of the Far East, *in*: Zakri, A.H. (ed.) *Prospects in Biodiversity Prospecting*. Genetics Society of Malaysia. Kuala Lumpur. 5 : 95-105.
2. Principe, P.P. 1989. The Economics significance of plants and their constituents as drugs, *in* : H. Wegner, H.Hikino and N.R. Farnsworth (eds.) *Economic and Medicinal Plant Research*, Volume 3. Academic Press, Lonon, UK. 1-17.
3. Akerele, O. 1991. Proposals for International Collaboration, *in* : O. Akerele, V. Heywood and H. Synge (eds) *Conservation of Medicinal Plants*. Cambridge University Press. Cambridge. 359-362.
4. Synge, H and Heywood, V. 1991. Information Systems and Databases for the Conservation of Medicinal Plants, *in* : O. Akerele, V. Heywood and H. Synge (eds) *Conservation of Medicinal Plants*. Cambridge University Press. Cambridge. 148-164.
5. Plotkin, M.J. 1991. Traditional Knowledge of Medicinal Plants-the Search for New Jungle Medicines, *in* : O. Akerele, V. Heywood and H. Synge (eds) *Conservation of Medicinal Plants*. Cambridge University Press. Cambridge. 55-63.
6. Mathe, 1988. An Ecological Approach to Medicinal Plant Introduction, *in* : Craker, L.E. and Simon, J.E. (eds) *Herbs, Spices, and Medicinal Plants: Recent Advances in Botany, Horticulture, and Pharmacology*, Volume 3. The Oryx Press. Phoenix. USA. 176-198.
7. Klemm, C. 1990. Wild Plant Conservation and the Law. IUCN.
8. Lokubandara, W.J.M. 1991. Policies and Organisation for Medicinal Plant Conservation in Sri Lanka, *in* : O. Akerele, V. Heywood and H. Synge (eds) *Conservation of Medicinal Plants*. Cambridge University Press. Cambridge. 241-248.

9. Peters, C..M. 1995. Pemungutan Secara Lestari Sumberdaya Tumbuhan Non-Kayu dalam Hutan Tropis Basah. (terjemahan). Biodiversity Support Program, Konsorsium WWF, TNC dan WRI.
10. McNeely, J.A. and Thorsell, J.W. 1991. Enhancing the Role of Protected Areas in Conserving Medicinal Plants, *in* : O. Akerele, V. Heywood and H. Synge (eds) *Conservation of Medicinal Plants*. Cambridge University Press. Cambridge. 213-228.
11. Undang-Undang Republik Indonesia Nomor 5 Tahun 1990 tentang Konservasi Sumberdaya Alam Hayati dan Ekosistemnya.
12. Cunningham, A.B. 1993. Ethics, Ethnobiological Research and Biodiversity.WWF. Meyrin, Switzerland.
13. IUCN, UNEP and WWF. 1991. Carring for the Earth, A Strategy for Sustainable Living. Switzerland.
14. Zuhud, E.A.M. 1997. Mencari Nilai Tambah Potensi Hasil Hutan Non Kayu Tumbuhan Obat Berbasisakan Pemberdayakan Masyarakat Tradisional Sekitar Hutan. Tidak dipublikasi.
15. WHO, IUCN dan WWF. 1993. Guidelines on the Conservation of Medicinal Plants. IUCN. Gland, Switzerland.
16. WHO, IUCN, WWF and TRAFFIC. 2008. Guidelines on the Conservation of Medicinal Plant, Revised for the 2nd Millennium. Draft for Final Review.
17. Muhtaman, D.R. dan Zuhud, E.A.M. 1997. Akses Pemanfaatan Sumberdaya Keanekaragaman Hayati Indonesia. FAHUTAN IPB – LATIN. Bogor.
18. Zuhud, E.A.M. dan Haryanto (Ed). 1994. Pelestarian Pemanfaatan Keanekaragaman Tumbuhan Obat Hutan Tropika Indonesia. Kerjasama Jurusan Konservasi Sumberdaya Hutan, Fahutan IPB dengan LATIN. Bogor.
19. Zuhud, E.A.M., Siswoyo, E. Adhiyanto, E. Sandra, A. Hikmat. 2003. Buku Acuan Umum Tumbuhan Obat Indonesia, Jilid VI – XI. Akan terbit.
20. Zuhud, E.A.M. dan Siswoyo. 2001. Strategi Konservasi Tumbuhan Obat Indonesia. Jurusan KSH-FAHUTAN IPB, tidak dipublikasikan
21. Berbagai laporan proyek penelitian tumbuhan obat di Jawa, Sumatera dan Kalimantan. Laboratorium Konservasi Tumbuhan. Dep. KSH.

Teaching Material Support

The choice of media and type of technology use include:

1. Face-to-face contact.

2. Printed power point presentation.
3. Plants materials. Various medicinal plants found in campus arboretum, campus area, forest and local villages around IPB Darmaga Campus.
4. Computer
5. Projector Infocus

Course Outline

Topics	Sub-topics	Bloom's Taxonomy	Week
Introduction	<ol style="list-style-type: none"> 1. Meaning, scope and objectives 2. Other supporting disciplines 	C1	1
Ethnophytomedica	<ol style="list-style-type: none"> 1. Traditional wisdom in natural resources utilization. 2. Utilization of medicinal plants by various Indonesian's ethnicity 	C1, C2	2
Indonesia's medicinal plants potentials	<ol style="list-style-type: none"> 1. Forest as gene plasm for medicinal plants 2. Potentials of Indonesian medicinal plants according to families, forest formations, habitus, parts that are use, utilization for group of diseases 	C1, C2	3, 4 & 5
Problems related to utilization of Indonesia's medicinal plants	<ol style="list-style-type: none"> 1. Institutional problems 2. Habitat degradation and forest land conversion 3. Extinction of local cultures and knowledge 4. Imbalance supply and demands for medicinal plants 5. Slow progress of cultivation efforts 6. Low price of medicinal plants products 7. Slow progress of research development 	C1, C2	6
Medicinal plants development prospects	<ol style="list-style-type: none"> 1. Tendency for medicinal plants raw materials 2. Tendency of medicinal plants utilization in Indonesia 3. Development of traditional pharmacies in Indonesia 4. Availability of Indonesian human resources from various disciplines 5. Availability of research institutions 6. Opportunities for new medicines' discoveries 	C1	7 & 8
Medicinal plants conservation	<ol style="list-style-type: none"> 1. In-situ conservation: protected area management for medicinal plants; sustainable harvesting of medicinal plants from nature; restocking of rare species to their original habitat 2. Ex-situ conservation: botanical garden; scara in vitro conservation; development of bioregional concept 	C1, C2	9
Medicinal plants propagation	<ol style="list-style-type: none"> 1. Domestication, propogation and cultivation techniques for wild medicinal plants; selection of priority/ top species; site selection; development of cultivation 	C1, C2, C3	10 & 11

Topics	Sub-topics	Bloom's Taxonomy	Week
	techniques; community facilitations, partners, pemuliaan, post harvest handling, and preparation of simplisia 2. Captive breeding of medicinal plants through tissue culture technique.		
Medicinal plants products and packaging	1. Various medicinal plants products 2. Development of packaging for medicinal plants 3. Preparation technique for of traditional medicine ingredients	C1, C2, C3	12
Regional-based medicinal plants development	1. Potentials of medicinal plants in various bioregions (examples from east java, West Sumatra, West java, etc); survey methodology for bioregional medicinal plants resources; Ethnopharmacology data and research results for bioregional medicinal plants development	C1, C2	13 & 14
Medicinal plants bioprospecting and patent rights	1. Government general policies 2. Available regulations 3. Bioprospecting 4. Patent for medicinal plants products	C1, C2	15
Medicinal plants commercialization	1. National and global tendencies in utilizing natural medicines, green wave. 2. Development strategy for natural medicine industry	C1, C2, C3	16

Potential Course Overlap

No course overlap

Evaluation and Grading

1. Midterm examination

Midterm examination will be held during examination period scheduled by Registrar's office (after 7 weeks lecture). Each exam is composed of 100% essay. Duration of exam is 90-120 minutes. The exam will cover course topics delivered in week 1-7. A key and score will be attached on announcement board after exam paper is graded.

2. Final examination

Final examination will be held during examination period scheduled by Registrar's office (after 14 weeks lecture). Each exam is composed True-False (25), Multiple Choice (25), Pair question (20), and essay (10). Duration of exam is 90-120 minutes. The exam will cover course topics delivered in week 8-14. A key and score will be attached on announcement board after exam paper is graded.

3. Assigned Paper

Group of student are required to submit some practices reports. This assigned reports are objected to help students make connection between lecture material and field application. The due date of reports submission is one week after practice during lecture/practice period. Standardized format for paper writing is expected. The reports are graded based on formulas and calculation format.

Compositions of grading are as follows:

Assessment Tools	Maximum Score	% of Grade
Midterm Examination	100	35
Final Examination	100	40
Assigned paper	100	25

Final grade classification: A (≥ 75); B (65-74); C (55-64); D (45-54); E (<45)

**Coverage of DFORCE Core Competence
in Conservation of Tropical Forest Medicinal Plants (KSH 433)**

Code : KSH 433

Course : Conservation of Tropical Forest Medicinal Plants

Credit : 3(2-3)

Code	Core Competencies	Course Content Covered	Cognitive Level	Topics
I	Students will be able to explain the meaning, scope and linkages between various supporting disciplines	Meaning, scope and objectives	C1	Introduction
		Other supporting disciplines		
II	Students will be able to explain medicinal plants utilizations by various ethnics in Indonesia	Traditional wisdom in natural resources utilization.	C1, C2	Ethnophytomedica
		Utilization of medicinal plants by various Indonesian's ethnicity		
III	Students will be able to explain with examples, Indonesian tropical forest as raw materials and germ plasm of Indonesian medicinal plants	Forest as gene plasm for medicinal plants	C1, C2	Indonesia's medicinal plants potentials
		Potentials of Indonesian medicinal plants according to families, forest formations, habitus, parts that are use, utilization for group of diseases		
IV	Students will be able to explain conservation related-problems of medicinal plants in Indonesia, from institutional and technical aspects	Institutional problems	C1, C2	Problems related to utilization of Indonesia's medicinal plants
		Habitat degradation and forest land conversion		
		Extinction of local cultures and knowledge		
		Imbalance supply and demands for medicinal plants		
		Slow progress of cultivation efforts		
		Low price of medicinal plants products		
Slow progress of research development				
V	Students will be able to explain development prospects of	Tendency for medicinal plants raw materials	C1	Medicinal plants development
		Tendency of medicinal plants utilization in		

Code	Core Competencies	Course Content Covered	Cognitive Level	Topics
	medicinal plants from various aspects	Indonesia Development of traditional pharmacies in Indonesia Availability of Indonesian human resources from various disciplines Availability of research institutions Opportunities for new medicines' discoveries		prospects
VI	Students will be able to explain conservation strategy of Indonesian medicinal plants	In-situ conservation: protected area management for medicinal plants; sustainable harvesting of medicinal plants from nature; restocking of rare species to their original habitat Ex-situ conservation: botanical garden; scara in vitro conservation; development of bioregional concept	C1, C2	Medicinal plants conservation
VII	Students will be able to explain propagation of Indonesian medicinal plants	Domestication, propogation and cultivation techniques for wild medicinal plants; selection of priority/ top species; site selection; development of cultivation techniques; community facilitations, partners, pemuliaan, post harvest handling, and preparation of simplisia Propagation of medicinal plants through tissue culture technique	C1, C2, C3	Medicinal plants breeding
VIII	Students will be able to explain the development of products and packaging for Indonesian medicinal plants	Various medicinal plants products Development of packaging for medicinal plants Preparation technique for of traditional medicine ingredients	C1, C2, C3	Medicinal plants products and packaging
IX	Students will be able to explain development concept for bioregional resources-based medicinal plants	Potentials of medicinal plants in various bioregions (examples from east java, West Sumatra, West java, etc); survey methodology for bioregional medicinal plants resources; Ethnopharmacology data and research results for bioregional medicinal plants development	C1, C2	Regional-based medicinal plants development
X	Students will be able to explain bioprospecting and patents for medicinal plants products	Government general policies Available regulations Bioprospecting	C1, C2	Medicinal plants bioprospecting and patent rights

Code	Core Competencies	Course Content Covered	Cognitive Level	Topics
		Patent for medicinal plants products		
XI	Students will be able to explain medicinal plants commercialization	National and global tendencies in utilizing natural medicines, green wave. Development strategy for natural medicine industry	C1, C2, C3	Medicinal plants commercialization

**Assessment Tools to Measure the Achievement of
Learning Outcomes in Conservation of Tropical Forest Medicinal Plants (KSH 433)**

Code : KSH 433

Course : Conservation of Tropical Forest Medicinal Plants

Credit : 3(2-3)

Code	Core Competencies	Learning Outcome	Bloom's Taxonomy	Assessment Tool(s)	Learning Activities
I	Students will be able to understand the meaning, scope and linkages between various supporting disciplines	Students will be able to explain the meaning, scope and linkages between various supporting disciplines	C1	Written examinations at different cognitive level (mid-term exam).	Classroom lecture and discussion
II	Students will be able to understand medicinal plants utilizations by various ethnics in Indonesia	Students will be able to explain medicinal plants utilizations by various ethnics in Indonesia	C1, C2	Written examinations at different cognitive level (mid-term exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text , looking for answers to stated learning objectives
III	Students will be able to understand with examples, Indonesian tropical forest as raw materials and germ plasm of Indonesian medicinal plants	Students will be able to explain with examples, Indonesian tropical forest as raw materials and germ plasm of Indonesian medicinal plants	C1, C2	Written examinations at different cognitive level (mid-term exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text , looking for answers to stated learning objectives
IV	Students will be able to understand conservation related-problems of medicinal plants in Indonesia, from institutional and technical	Students will be able to explain conservation related-problems of medicinal plants in Indonesia, from institutional and technical	C1, C2	Written examinations at different cognitive level (mid-term exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text , looking for answers to stated learning objectives

Code	Core Competencies	Learning Outcome	Bloom's Taxonomy	Assessment Tool(s)	Learning Activities
	aspects	aspects			
V	Students will be able to understand development prospects of medicinal plants from various aspects	Students will be able to explain development prospects of medicinal plants from various aspects	C1	Written examinations at different cognitive level (mid-term and final exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text , looking for answers to stated learning objectives
VI	Students will be able to understand conservation strategy of Indonesian medicinal plants	Students will be able to explain conservation strategy of Indonesian medicinal plants	C1, C2	Written examinations at different cognitive level (final exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text , looking for answers to stated learning objectives
VII	Students will be able to understand captive breeding of Indonesian medicinal plants	Students will be able to explain captive breeding of Indonesian medicinal plants	C1, C2, C3	Written examinations at different cognitive level (final exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text , looking for answers to stated learning objectives
VIII	Students will be able to understand the development of products and packaging for Indonesian medicinal plants	Students will be able to explain the development of products and packaging for Indonesian medicinal plants	C1, C2, C3	Written examinations at different cognitive level (final exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text , looking for answers to stated learning objectives
IX	Students will be able to understand development concept for bioregional resources-based medicinal plants	Students will be able to explain development concept for bioregional resources-based medicinal plants	C1, C2	Written examinations at different cognitive level (final exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text , looking for answers to stated learning objectives
X	Students will be able to understand bioprospecting and	Students will be able to explain bioprospecting and patents for medicinal	C1, C2	Written examinations at different cognitive level (final exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text ,

Code	Core Competencies	Learning Outcome	Bloom's Taxonomy	Assessment Tool(s)	Learning Activities
	patents for medicinal plants products	plants products			looking for answers to stated learning objectives
XI	Students will be able to understand medicinal plants commercialization	Students will be able to explain medicinal plants commercialization	C1, C2, C3	Written examinations at different cognitive level (final exam).	<ul style="list-style-type: none"> • Classroom lecture and discussion • Reading text , looking for answers to stated learning objectives