

MASTER OF SCIENCE IN INFORMATION TECHNOLOGY FOR NATURAL RESOURCES MANAGEMENT

**Head of Study Program/Coordinator of Major:
Hartrisari Hardjomidjojo**

Teaching Faculty:

Agus Kristijono	Iwan Setiawan
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Hartanto Sanjaya	Suria D. Tarigan
Hartrisari Hardjomidjojo	Taufik Djatna
Herry Purnomo	Toto Haryanto
Hidayat Pawitan	Toto Toharmat
Ibnu Sofian	Ulfah J.Siregar
Idat Galih Permana	Vincentius Paulus Siregar
I Nengah Surati Jaya	Widiatmaka
I Putu Santikayasa	Yeni Herdiyeni
I Wayan Astika	Yuli Suharnoto
Iwan Gunawan	

Objectives

One of the greatest challenges facing the environment today is to achieve a balance between developing natural resources and maintaining an optimal natural environment. The main purpose of the establishment of Master of Science in Information Technology for Natural Resources Management Program.

Master of Science (S2)

MSc in IT for NRM is an international program under the Faculty of Mathematics and Natural Sciences in coordination with the Graduate School of Bogor Agricultural University. The academic activities are conducted at SEAMEO BIOTROP Campus, which is located at Km. 6-Tajur, Bogor. The Supervisory Comitee consists of national and international institutions including some from the private sectors.

CURRICULUM

Master of Science Program

MSc in IT for NRM program is divided into 4 (four) semesters. The first three semesters are dedicated to lectures and applied laboratory works while the fourth semester is devoted to conducting a special project or research and thesis writing. Odd semesters are from September to January while even semesters are from February to June.

There are four main core (major) courses and several supporting (minor) courses. Students are advised to take minor subjects that are relevant to their background. The primary aim of the program is to deal with quantitative approaches to enable the development of a reliable decision-support system for natural resources management.

The core (major) courses consist of:

1. Modeling System Dynamics
2. Geographical Information System
3. Remote Sensing/Image Processing
4. Decision Support Systems

Supporting (minor) courses include topics in:

1. Agriculture
2. Forestry
3. Animal Husbandry
4. Fisheries

5. Hydrology
6. Geo-Statistics
7. Coastal Application

In the fourth/final semester, students will determine a special project approved by their supervisors who are experts in their respective fields. The project combine most of the program content for advanced analysis and application of Information Technology into a comprehensive, practical exercise that is relevant to the student's background and training.

Code		Course	Cr.	Semester
IPB (Graduate School) Courses, 8 Credits (17,8%)				
PPS	500	English for Academic Purposes	0	Even
ITM	601	Colloquium	1 (1-0)	Even
PPS	690	Seminar	1 (1-0)	Even
PPS	699	Thesis	6 (6-0)	Even
Major Required Courses 37 Credits (82,2%)				
ITM	501	Natural Resources Inventory and Management	2 (2-0)	Odd
ITM	511	Introduction to Programming	3 (2-1)	Odd
ITM	512	Modeling of System Dynamic	3 (3-0)	Odd
ITM	521	Fundamental of Geographic Information System	3 (2-1)	Odd
ITM	522	Information System and Technology	3 (3-0)	Even
ITM	523	GIS and Remote Sensing Applications	3 (2-1)	Odd
ITM	524	Advanced Geographic Information System	3 (2-1)	Even
ITM	531	Fundamentals of Remote Sensing/Digital Image Processing	3 (2-1)	Odd
ITM	532	Advanced Remote Sensing / Digital Image Processing	3 (2-1)	Even
ITM	602	Selected Topic	1 (1-0)	Odd
ITM	613	Decision Support System for NRM	3 (2-1)	Odd
ITM	625	Spatial Database Management	3 (2-1)	Odd
ITM	693	Project Design	1 (1-0)	Odd
ITM	61x	Elective Courses	3 (2-1)	Even
Total Credits: 45 credits (100%)				
Major Elective Courses or Major Supporting courses			Cr.	Semester
ITM	614	Computer Simulation Modeling in Agriculture	3 (2-1)	Odd/Even
ITM	615	Fisheries Modeling	3 (2-1)	Odd/Even

Code		Course	Cr.	Semester
ITM	616	Hydrological Modeling	3 (2-1)	Odd/Even
ITM	617	Geostatistics	3 (2-1)	Odd/Even
ITM	618	Modeling in Animal Industry	3 (2-1)	Odd/Even
ITM	619	Modeling in Forestry	3 (2-1)	Odd/Even

Note :

Credit 3(2-1) : 3 is total credits including lecture and practical
2 is lecture credit or equivalent to 2 hours of lectures
1 is practical credit or equivalent to 3 hours of practicals

SYLLABUS

ITM 501 Natural Resources Inventory Management 2(2-0)

Lectures on subsequent MIT Program in the context of Remote Sensing, Digital Image Processing and Applied RS/GIS applications

Hartrisari Hardjomidjojo
Etty Riani
Ulfah J. Siregar
Widiatmaka

ITM 511 Introduction to Programming 3(2-1)

Lectures on fundamental techniques of computer programming as a basic skill for advanced studies. The attention is stressed on the techniques of manipulating numeric and alphanumeric data, constructing logical and iterative program flows, database handling, and image data processing. Early topics will be explored with Quick Basic programming languages, while the more advanced topics with Visual Basic

I Wayan Astika

ITM 512 Modeling of System Dynamic 3(3-0)

This course consists of basic understanding of system and model, process mechanism of interactions between model variables using Forrester Diagram, model development including flow diagram (descriptive presentation), quantitative relationships, computer programming using available software (e.g. Visual Basic), calibration and validation. The students are encouraged to develop models relevant to their backgrounds in quantitative approach. The model development will be part of assignments and the model should be presented in seminars

Handoko
Hartrisari Hardjomidjojo
Herry Purnomo
Taufik Djatna

ITM 521 Fundamentals of Geographic Information System 3(2-1)

An introduction to Geographic Information System (GIS) theory and practice. Basic concepts and issues in GIS are presented in both formal and practical setting. The course provides a general exposure to GIS, algorithms, general methodology, and its applications. The major components of a GIS, the functionality of the components, and the interrelationship between GIS and other sciences and technologies are also discussed. A state of the art of GIS will be used to carry out practical assignments concerned with basic data entry and database building, data analysis and modelling, cartographic production and data transfer.

Iwan Gunawan
Suria D. Tarigan
Hartanto Sanjaya
Iwan Setiawan

ITM 522 Information System and Technology 3(3-0)

Study the fundamental concept of information systems and information technology, the classification and development of information systems, and examine the role and design of database and database management systems (DBMS) to strongly support information systems. Several major data models (relational, object-oriented) and types (spatial, temporal) are discussed.

Kudang Boro Seminar
Yeni Herdiyeni
Harry Imantho

ITM 523 GIS and Remote Sensing Applications 3(2-1)

GIS and Remote Sensing Approach to Natural Resource Management, Natural Resource Planning using GIS and RS Technology, Natural Resource Analysis with advanced GIS and RS operations, GIS and RS capabilities. All covers the theory and practice. Advanced concepts, issues and applications of GIS and RS are presented in both a formal and a practical setting. A state of the art of Information Technology will be used to carry out GIS and RS application development using various modules of GIS and RS analysis.

Prerequisite :

ITM 524 : Advanced of GIS

ITM 532 : Advanced of Remote Sensing

Antonius Bambang Wijanarto
M. Buce Saleh
Iwan Gunawan
Fahmi Amhar
Ibnu Sofian
Vincentius Paulus Siregar
Yuli Suharnoto
M. Arief Syaff'i

ITM 524 Advanced of Geographic Information System 3(2-1)

An advanced to Geographic Information System (GIS) theory and practice. Advanced concepts, issues and applications in GIS are presented in both a formal and a practical setting. A state of the art of CIS will be used to carry out practical assignments concerned with GIS application development using avenue, spatial analysis which is include raster and vector analysis, 3D analysis and surface modeling and analysis

Prerequisite :

ITM 521 : Fundamentals of GIS

Iwan Gunawan
Suria D. Tarigan
Iwan Setiawan
Hartanto Sanjaya

ITM 531 Fundamentals of Remote Sensing/Digital Image 3(2-1)
Processing

This course will cover a range of basic subjects such as: electromagnetic energy, platforms from airborne to satellite remote sensing; scanner systems; imaging properties, geometric and radiometric aspects; visual; and digital image interpretation and classifications. Radar remote sensing and remote sensing below the ground surface will be added to obtain a broad view of remote sensing technology development

Antonius Bambang Wijanarto
Vincentius P. Siregar
M. Buce Saleh
Bambang Hendro Trisasongko

ITM 532 Advanced Remote Sensing / Digital Image 3(2-1)
Processing

Some newly remote sensing systems either space-borne or airborne have been developed and the students should learn the technical specification. The advanced digital image processing techniques will be discussed and examined in the laboratory such like; Filtering, Gridding and analyzing digital terrain model, SAR processing, Image fusion, Coastal and marine application using Lizenga formulae, Change detection and 3D – Analysis.

Prerequisite :

ITM 531 : Fundamentals of Remote Sensing

Antonius Bambang Wijanarto
Vincentius P. Siregar
M. Buce Saleh
Ibnu Sofian
Machmud A. Raimadoya
M. Arief Syafi'i

Discussion will be stressed on the many parameters affecting animal husbandry at the farm level as well as the population level.

Asep Saefuddin
Toto Toharmat
Idat Galih Permana
Nahrowi
Despal

ITM 619 Modeling in Forestry 3(2-1)

Upon the completion of this course, the students are expected to master how to conduct, design analysis, and implement modeling in forestry using GIS and Remote Sensing.

Prerequisite :
ITM 521 : Fundamentals of GIS
ITM 524 : Fundamentals of Remote Sensing

Burhanuddin Sarbini

ITM 625 Spatial Database Management 3(2-1)

The database has evolved from storing cash flow, competing companies, or information about employees to managing the spatial data. This is the result of public needs to acquire information in terms of map and analyze the data spatially. Several techniques have been developed for efficient storage and fast retrieval of spatial data. This course is designed for advanced GIS users to understand several approaches in spatial data management. In addition, other topics to be discussed are data storage, data mining, data exchange standard and web-based GIS.

Prerequisite :
ITM 511 : Introduction to Programming
ITM 521 : Fundamentals of GIS
ITM 524 : Advanced of GIS

Gatot Haryo Pramono

ITM 693 Project Design 1(1-0)

Is to improve level of understanding in designing a project comprising a combined aspect of Remote Sensing, GIS, and Information System. Lecture on a typical project preparation and project management are also given. A group discussion on particular project is carried out in class. At the end of the course each student is expected to write an individual project proposal or reviewing any particular project

Bambang Sapto Pratomosunu

PPS 500 English for Academic Purposes

This 24-hour elementary course, emphasizing on writing skill, introduces students to the necessary steps in the writing process for academic purposes. First, in the prewriting phase, students open up their mind-settings and familiarize