Course Syllabus

1. Name of Curriculum Bachelor of Science Program in Environment
Faculty/Institute/College Mahidol University International College,
Faculty of Science,
Faculty of Environment and Resource Studies (FERS),
Mahidol University

2. Course Code ICEN 212
Course Title Ecological Systems Analysis

3. Number of Credits 4 **(Lecture/Lab)** 4 (4-0)

4. Prerequisite ICNS 153

5. Type of Course Required

6. Trimester / Academic Year
Third / 2003

7. Course Description

In order to manage complex problems in environment, it is necessary to understand the mechanisms and interactions in ecosystems. The focus is put on some important ecosystem theories such as control theory, information theory, thermodynamics, and hierarchy theory. In addition the overview of different scientific philosophies are covered in assistant the student for the better understanding of ecosystem theory

8. Course Objectives

8.1 To provide students with basic knowledge on general system theory, system approach and analysis

8.2 To provide students with model procedure and examples relating to ecosystems

9. Course Outline

Week	Topic				Instructor
	Lecture/Seminar	Hour	Lab	Hour	
1	-History and scope of ecological systems analysis -Ecological systems analysis and resource management	4	-		To be announced
2	-Philosophy of science	4	-		
3	-System and systems approach -Ecosystem description: components and internal relationships -Ecosystem properties	4	-		
4	-General system theory *Thermodynamics and hierarchy theory	4	-		
5	*Self-organization and emergent properties	4	-		
6	*Cybernetics and control theory	4	-		
7	*Chaos and Fractals	4			
8-9	Models and modelling process *definition of problem, bounding of the problem in time, space and	8	-		

	subsystem, data requirement, conceptual diagram, equation, verification, calibration and validation				
10	Forest dynamics and models	4	-		
11	Catchment basin systems and models	4	-		
	Total	**44**			

10. Teaching Method

10.1 Lecture
10.2 Practical Exercises
10.3 Discussion
10.4 Quiz
10.5 Self-Study

11. Teaching Media

11.1 Texts and Teaching Materials
11.2 Transparencies
11.3 Power Point Presentation

12. Course Achievement

Assessment made from the set-forward criteria. Students who get 80% up, will have Grade A.

13. Course Evaluation

13.1 Exercises 10%
13.2 Oral Presentation 10%
13.3 Midterm Examination 40%
13.4 Final Examination 40%

14. References

1. Deaton, M.L. and Winebrake, J. 1999. Dynamic modeling of environmental systems. Springer, New York. 194 pp.
2. Halfon, E. 1979. Theoretical systems ecology: advances and case studies. Academic Press, New York. 516 pp.
3. Hansen, P.E. and Jorgensen, S.E. 1991. Introduction to environmental management. Elsevier, Amsterdam. 403 pp.
4. Holling, C.S. 2001. Understanding the complexity of economic, ecological, and social systems. Ecosystem, 4, pp. 390-405.
5. Jorgensen, S.E. and Muller, F. 2001. Handbook of ecosystem theories and management. Lewis Publishers, London. 584 pp.
6. McGlade, J. 1999. Advanced ecological theory: principles and applications. Blackwell Science Ltd., London. 354 pp.
7. Odum, H. T. 1983. Systems ecology. John Wiley & Sons, New York.
8. Muller, F. 1997. State-of-the art in ecosystem theory. Ecological modelling, 100, p 135-161.
9. Odum, H.T. and Odum E.C. 2000. Modeling for all scales: an introduction to system simulation. Academic Press, London. 458 pp.
10. White, I. D., Mottershead, D. N., Harrison, S. J. 1984. Environmental systems: an introductory text. Allen & Unwin, London. 495 pp.

15. Instructors

Dr. Wayne Phillips
Assistant Professor Dr. Chirapol Sintunawa
Assist. Prof. Dr. Kampanard Bhaktikul
Assistant Professor Raywadee Roachanakanan

16. Course Coordinator

Assistant Professor Raywadee Roachanakanan