



# LEYTE STATE UNIVERSITY

6521-A Visca, Baybay, Leyte, Philippines

Office of the Secretary of the University  
and of the Board of Regents

EXCERPT FROM THE APPROVED MINUTES OF THE  
14<sup>th</sup> LSU Board of Regents Meeting  
2 December 2003 \* CHED Central Office, Pasig City


Proposal to Offer Tropical Ecology as a  
Major Field in the Master of Science Program  
of Leyte State University

BOR RESOLUTION NO. 95, s. 2003

Approving the proposal to Offer Tropical Ecology as a  
Major Field in the Master of Science Program of Leyte State  
University, as presented.

BOARD ACTION: **APPROVED**  
Date : 2 December 2003  
ATTACHMENT: I

Certified True and Correct:

  
**DANIEL M. TUDTUD JR.**  
Board Secretary

cc: University Registrar *HS*  
Graduate School *HS*  
ITE *HS*

PROPOSAL TO OFFER  
TROPICAL ECOLOGY AS A MAJOR FIELD IN THE  
MASTER OF SCIENCE PROGRAM OF LSU

I. RATIONALE

The Earth Summit in Rio de Janeiro in 1992 emphasized the need to conserve, protect and restore the health and integrity of the earth's ecosystems. It also recognized the vital role of the tropical region in the preservation of the global environmental balance. Thus, the Summit gave primary importance to the protection, rehabilitation and sustainable management of tropical ecosystems.

The global attention given to tropical ecosystems is due to the widespread recognition that in many parts of the tropics, including the Philippines, terrestrial and aquatic ecosystems are destroyed at an unprecedented rate as a result of unsuitable land use systems and destructive cultural practices. In addition, increased human population and spread of "urbanization" to the countryside has considerable impacts on the quality of the biological, water and soil resources. These in effect seriously threaten not only the already marginalized food production in the tropics but the global environmental quality as well.

The protection and sustainable management of tropical ecosystems is now widely recognized as a complex issue. It requires an in-depth understanding of the biological, physical and sociological factors and processes that govern their functioning. Effective management of these fragile ecosystems thus requires professionals with advanced training in tropical ecology. Until now, no institution in the country offers a graduate degree program in tropical ecology, hence this proposal.

The proposed masteral degree program in tropical ecology is designed to address the above-mentioned human resource need. Results of surveys conducted in state universities and colleges as well as government and non-government institutions in and outside Region 8 revealed widespread interest in such a degree program (Appendix Table 1). In fact, in the last four years alone, the Institute of Tropical Ecology (ITE) has received numerous inquiries from professionals working in the Philippines and abroad about the possible offering of a graduate degree program in tropical ecology.

The Institute of Tropical Ecology is in the position to offer the proposed degree program for the following reasons: First, it has already accumulated and published many scientific and teaching materials on tropical ecology and it has acquired facilities more than enough to meet the minimum requirements of the proposed degree program. Secondly, the institute has already attained national and international status in the field of tropical ecology as a result of the scientific linkages that it has established with educational and research institutions, government and non-government organizations involved in ecology research and advocacy both locally and abroad. Lastly, it has carved a reputation as an international training center for tropical ecology through its co-sponsorship of the annual international tropical ecology seminar series whose participants are mostly foreign graduate students of ecology.



## II. OBJECTIVES

1. Produce professionals with advanced knowledge of tropical ecosystems' components, functions and processes and the response of tropical ecosystems to human interventions;
2. Produce highly trained graduates equipped with in-depth theoretical and practical knowledge of ecosystems and natural resource protection, rehabilitation and management; and
3. Produce environmental/ecosystem specialists who can conceptualize, design and implement research and development programs dealing with natural and disturbed ecosystems.

## III. TARGET CLIENTELE

### A. Academic and Research Institutions

1. Instructors in colleges and universities
2. Researchers

### B. Government Agencies, NGOs, LGUs and Private Agencies

Technical and managerial staff of the following institutions:

1. Department of Environment and Natural Resources (DENR)
2. Department of Tourism (DOT)
3. Department of Agriculture (DA)
4. Bureau of Fisheries and Aquatic Resources (BFAR)
5. NGOs involved in natural resources management and conservation
6. Local Government Units
7. Private Corporations

## IV. GRADUATE PROFILE

### A. Cognitive

1. Conceptualize research problems related to management and conservation of natural resources.
2. Explain current practices and advances in tropical ecology.
3. Analyze and evaluate issues vital to sustainable development of tropical ecosystems.

### B. Affective

1. Manifest a sense of responsibility for the conservation of natural tropical ecosystems.
2. Appreciate natural states and processes of tropical ecosystems as foundations for sustainable growth, social equity and economic success.

### C. Psychomotor

1. Develop and promote environment-friendly approaches and technologies for the welfare of human society.
2. Conduct research related to tropical ecology.
3. Spearhead the governance and sustainable use of natural resources.

V. ADMISSION AND COURSE REQUIREMENTS

A. Admission Requirements

The admission requirement will adhere to the Graduate School Code of LSU. The Graduate Admission Committee of the Institute will evaluate the applicants.

B. Course Requirements

COURSES	NUMBER OF UNITS REQUIRED
Major Courses	21
Minor Courses	9
Thesis	6
Graduate Seminar	1
Total minimum course work	37

VI. GRADUATE COURSES FOR INSTITUTION

1. TREC205 - BIOLOGICAL DIVERSITY OF TROPICAL ECOSYSTEMS. Biodiversity components, levels, patterns, distribution, value, current status, threats, measurements and conservation initiatives; speciation and phylogeny; endemism and extinction.

Prerequisites : Ecol 21 (Fundamentals of Ecology)  
Credit : 3 units (5 hours a week; 2 lec., 3 lab)

Rationale : This course provides the students with a comprehensive knowledge of the biological resources and diversity of the tropics to enable them to better understand, appreciate and value the richness of tropical ecosystems.

2. TREC206 - SOCIOECOLOGICAL SYSTEMS. Social, economic, cultural, technological and bio-physical problems and issues confronting tropical terrestrial and aquatic ecosystems including strategies and approaches to averting/solving these problems.

Prerequisites : Ecol 21 (Fundamentals of Ecology) or its equivalent

Credit : 3 units (3 hours a week, lecture)

Rationale : This course provides the students with in-depth knowledge of the structure of and interactions between socio-economic systems and ecosystems as well as the structural determinants and processes in order for them to formulate possible solutions in environmental degradation.



1           3. TREC207 - **TROPICAL GEOMORPHOLOGY AND GEO-ECOLOGY.**  
2           Evolution of landforms and earth's surface processes,  
3           nature and functions of the geosystem component of  
4           ecosystems with emphasis on the tropics.

5  
6           Prerequisite : SS 22 (Fundamentals of Soil Science) or  
7           its equivalent

8           Credit : 3 units (5 hours a week; 2 lec., 3 lab)

9  
10          Rationale : The course enables the students to  
11          better understand the nature and  
12          characteristics of the abiotic component  
13          of tropical ecosystems which is  
14          necessary for the sustainable  
15          management of these fragile  
16          ecosystems.

17  
18          4. TREC208 - **ECOSYSTEMS ANALYSIS.** Systems approach to the  
19          analysis of terrestrial and aquatic ecosystem processes  
20          and functions.

21  
22          Prerequisite : Ecol 21 (Fundamentals of Ecology) or its  
23          equivalent

24          Credit : 3 units (5 hours a week; 2 lec., 3 lab)

25  
26          Rationale : The course provides a comprehensive  
27          knowledge that would help students in  
28          appraising, monitoring and managing  
29          natural resources in specific ecosystems.

30  
31          5. TREC209 - **NATURAL RESOURCE MANAGEMENT AND**  
32          **CONSERVATION.** Sustainable management and  
33          conservation of soil, water, and biological resources in  
34          tropical areas including the application of GIS.

35  
36          Prerequisite : Ecol 21 (Fundamentals of Ecology) or its  
37          equivalent

38          Credit : 3 units (3 hours a week, lecture)

39  
40          Rationale : The course provides students with in  
41          depth knowledge on the management of  
42          natural resources in the humid tropics for  
43          sustainable development, including the  
44          application of Geographic Information  
45          System (GIS) in natural resource use,  
46          planning and monitoring.

47  
48          6. TREC299 - **GRADUATE SEMINAR.**

49          Credit : 1 unit

50  
51          7. TREC300 - **MASTER'S THESIS.**

52          Credit : 6 units  
53  
54  
55

VII. EXISTING MAJOR COURSES OFFERED BY OTHER DEPARTMENTS

1. FORY224 - ENVIRONMENTAL IMPACT ASSESSMENT.

Environmental laws, procedures of environmental impact assessment; biophysical and social aspects.

Prerequisites : Consent of Instructor  
Credit : 3 units (5 hours a week; 2 Lec., 3 lab.)

2. STAT210 - STATISTICS FOR BIOLOGICAL SCIENCES. Models for biological data; analysis of factorial and nested experiments; analysis of combined experiments; regression and correlation; path analysis; probit analysis; introduction to multivariate methods.

Prerequisite : Stat 130 (Basic Statistical Methods) or PB117 (Experimental Design & Field Plot Techniques)  
Credit : 3 units (5 hours a week; 2 Lec., 3 lab.)

VIII. MINOR COURSES

In consultation with his/her Graduate Advisory Committee, the student selects his/her minor field from an array of MS courses offered by the other Colleges in LSU.

IX. GRADUATE COURSE ANALYSIS

A. Major Courses

- TREC205 - Biological Diversity of Tropical Ecosystems
- TREC206 - Socioecological Systems
- TREC207 - Tropical Geomorphology and Geo-ecology
- TREC208 - Ecosystems Analysis
- TREC209 - Natural Resource Management and Conservation
- STAT210 - Statistics for Biological Sciences
- FOR224 - Environmental Impact Assessment
- TREC299 - Graduate Seminar
- TREC300 - Master's Thesis

X. COMPARISON OF RELATED UNDERGRADUATE AND GRADUATE COURSES:

RELATED UNDERGRADUATE COURSES	PROPOSED GRADUATE COURSES
Biol 141 – INTRODUCTION TO BIOSYSTEMATICS. Systematics, identification and nomenclature of organisms.	TREC205 – BIOLOGICAL BIODIVERSITY OF TROPICAL ECOSYSTEMS. Biodiversity components, levels, patterns, distribution, value, current status and threats; biodiversity measurements and conservation initiatives; speciation and phylogeny; endemism and extinction.



<b>Ecol 172 – SOCIOECOLOGY.</b> Human history, human impact on the environment and urbanization.	<b>TREC206 –SOCIOECOLOGICAL SYSTEMS.</b> Social, economic, cultural, technological and biophysical problems and issues confronting tropical terrestrial and aquatic ecosystems including strategies and approaches to averting/solving these problems.
<b>Ecol 185 – GEOMORPHOLOGY.</b> Landscape history and landscape development under given environmental conditions.  <b>Ecol 181 – BIOGEOGRAPHY.</b> Ecological and historical aspects of spatial distribution of plants and animals.	<b>TREC207 – TROPICAL GEOMORPHOLOGY AND GEO-ECOLOGY.</b> Evolution of landforms and earth's surface processes, nature and functions of the geosystem component of ecosystems with emphasis on the tropics.
<b>No counterpart</b>	<b>TREC208 – ECOSYSTEMS ANALYSIS.</b> Systems approach to the analysis of terrestrial and aquatic ecosystems, processes and functions.
<b>Ecol 182 – RESOURCE CONSERVATION AND MANAGEMENT.</b> Principles, methods and strategies of water and terrestrial resources conservation and management including national, international and local policies.	<b>TREC209 – NATURAL RESOURCE MANAGEMENT AND CONSERVATION.</b> Sustainable management and conservation of soil, water, and biological resources in tropical areas including the application of GIS.
<b>Ecol 199 – UNDERGRADUATE SEMINAR</b>	<b>TREC299 – GRADUATE SEMINAR.</b>
<b>Ecol 200 – UNDERGRADUATE THESIS</b>	<b>TREC300 – MASTER' S THESIS.</b>

## XI. FACULTY PROFILE

<u>Name of Faculty</u>	<u>Degree</u>	<u>Field of Specialization</u>	<u>Courses to be handled</u>
1. Asio, Victor B.	PhD	Soil Science, Geo-ecology	TREC207, TREC209
2. Balbarino, Edwin A.	PhD	Education/Extension	TREC209
3. Belonias, Beatriz S.	PhD	Plant Systematics	TREC205
4. Bulay-og, Salome B.	PhD	Ag. Economics/ Resource Economics	TREC209
5. Caliente, Alejandro C.	MS	Fisheries Biology	TREC205
6. Cesar, Senona A.	MS	Marine Biology	TREC205, TREC208
7. Ceniza, Ma. Juliet C.	PhD	Agroecology/Entomology	TREC205,
8. Dargantes, Buenaventura B.	PhD	Agroecology/Socioecology	TREC206
9. Ferraren, Dilberto O.	MS	Genetic Resources Conservation and Utilization	TREC205, TREC209
10. Gabunada, Fe M.	PhD	Ag. Economics/Resource Economics	TREC209

11. Garcia, Pastor P.	PhD	Agricultural Machinery	TREC209
12. Germano, Bernardita P.	PhD	Marine Biology	TREC208
13. Patindol, Teofanes A.	PhD	Environmental Management	TREC205
14. Quimio, Justino M.	PhD	Phytosociology & Vegetation Science	TREC 208
15. Salas, Felix M.	PhD	Environmental Chemistry	TREC207, TREC209

## XII. FACILITIES

### A. Rooms and Instructional Materials

1. Rooms : Office  
Mini Library  
Classrooms  
Laboratories: Marine & Terrestrial  
Laboratories
2. Instructional Materials : Slides  
Transparencies  
Video Films  
Posters

### B. Field Facilities and Equipment\*

1. Speed Boat 1
2. SCUBA Diving gear set 10
3. Marine Station (Mahaba) 1
4. Underwater still cameras 1
5. Underwater video camera 1
6. Multiparameter Field Test Kit 1
7. Water Sampler 1
8. Plankton net 1
9. Grab sampler 1
10. Secchi disc 1
11. Aluminum boxes 2
12. Current meter 1
13. Air compressor for SCUBA tank refilling 1
14. Marine magnetic compass 1
15. Depth sounder 1
16. Writing slates 8
17. Digital Camera 1
18. GPS – Geographic Positioning System 2
19. Dive Computer 1

### C. Laboratory Facilities and Equipment\*

1. Refractometer 2
2. Vespa air compressor for aerating culture tanks 1
3. Microscopes 3
4. Magnetic stirrer (battery-operated) 1
5. Fixed speed shaker 1
6. Ion exchange filter cartridges 1
7. Aquarium with accessories 2
8. Stereoscopes 3



1	9. Spectrophotometer Hach DR 2000	1
2	10. Plastic dessicator	1
3	11. Assorted glassware	
4	12. Automatic pipettes	2
5	13. Pipette pump	1
6	14. Small-volume Homogenizer	1
7	15. Micro filtration apparatus	2
8	16. Centrifuge	1
9	17. Vacuum/pressure station	1
10	18. Nitrate reductor columns	2
11	19. Analytical balance Bosch SAE 200	1
12	20. Horiba water quality checker	1
13	21. Oxygen Filtration Apparatus	1
14	22. Hand covers	3
15	23. Muffle furnace	1
16	24. Dissecting sets	6
17	25. Thermometer, ordinary mercury	2
18	26. Weighing scale (1kg)	1
19	27. Dissolved Oxygen bottles	18
20	28. Calipers, plastic	3
21	29. Water Quality Analyzer	1
22	30. Spectrophotometer UV Vis	1
23	31. Camera, SLR	1
24	32. Photomicroscope	1

\*Most of this equipment are in the Marine Laboratory of the Institute of Tropical Ecology

### XIII. REFERENCES

#### BOOKS

##### At ITE Terrestrial and Aquatic Ecosystems Library

1. CRC Books on Coastal Resource Management topics (1993-2002)
2. Agroecology books (1991-1998)
3. Biology books (1987-1992)
4. Books on Economic evaluation, policy and market economy (1998)
5. Books on Philippines Flowers and Trees (1982-1999)
6. Books on Soils (1998)
7. Conservation and Biodiversity books (1992-1999)
8. Ecology books, PLITS series (1995-2000)
9. Entomology books (1986-1998)
10. Environmental books (1985-2002)
11. Forestry books (1990-1997)
12. Limnology books (1987-1995)
13. Marine Ecology books (1983-2000)
14. Rainforestation books (1986-2002)
15. Taxonomy books (1991-1994)
16. The Philippine Recommends Series (1977, 1979, 1980)
17. Zoology books (1985-1990)
18. PROSEA books (1992-1994)

**At the LSU Main Library**

19. Tropical Ecosystems (1991)
20. Environment (1996)
21. Coastal Marine Environmental Management (1996)
22. Coastal Resource Management for Food Security (1999)
23. Ecosystem Management (1999)
24. Biotechnology and Biodiversity in Agriculture (1998)
25. Biological and Cultural Diversity (1999)
26. Catalogue for Conservation Practices for Agriculture on Sloping Lands (1998)
27. Soil Management Strategies to Sustain Continuous Crop (2000)
28. Sustainable Development Through Organic Agriculture (2000)
29. Soil and Water Conservation (1999)
30. Manual on Integrated Soil Management and Conservation (2000)
31. Sustainable Management of Soil Resources (1999)
32. A Guide to the Birds of the Philippines (2000)
33. Endangered Species (1999)
34. Readings in Ecology (1999)
35. Systems Analysis and Design in a Changing World (2000)
36. Environmental Geography (2002)

**JOURNALS**

**At the ITE Terrestrial and Aquatic Ecosystems Library**

1. Annals of Tropical Research (1994-1999)
2. Ecology Update Nos. 1, 2 and 3 (1993-1998)
3. Ecology Volumes 55-60 No. 1-6 (1974-1979)
4. Ecological Monograph (1974-1979)
5. Canadian Journal of Zoology (1981-1984)
6. Journal of Tropical Forest, Science Volumes 1-6 (A publication of the Forest Research Institute Malaysia) 1988-1994
7. Annalen Vol. 97B-99B, 1995-1997
8. Reproductive Ecology of Tropical Forest Plants, Vol. 7 (1990)
9. Symposium of the Ecology and Management of Some Tropical Shallow Water Communities: Coral Reef, Tidal Forest and Estuaries, Volumes 17-20
10. Journal of Applied Ecology (Vols. 3 to 22) 1974-1985
11. The American Naturalist, Volumes 112-114 No. 1-6 (1978-1979)
12. Bibliotheca Diatomologica (1987-1991)
13. The Journal of Animal Ecology, Volumes 1 to 51 (1975-1980)
14. Canadian Journal of Fisheries and Aquatic Sciences (1980-1990)
15. Flora Malesiana (1992-1996)
16. The Philippine Scientist, Volumes 12, 20, 21, 22, 23, 24, 25, 27, 28, 29 & 32
17. Status of Coral Reefs of the World (2000)
18. Tropical Limnology, Volumes 1 to 3 (1995-1996)

**At the LSU Main Library**

19. TEAL Electronic library: Ecology topics
20. Journal of Chemical Education (1990-1999)
21. Accounts of Chemical Research (1995-2001)
22. Chemical Society Reviews (1994-2000)
23. Chemical Reviews (1995-1997)



24. Annual Reports on the Progress of Chemistry-Inorganic Chemistry (1980-2000)
25. Annual Reports on the Progress of Chemistry-Physical Chemistry (1980-2000)
26. Annual Review of Physical Chemistry (1970-2000)

#### Other Technical Publications/Case Studies

1. Resources and Ecological Assessment Of Ormoc Bay, Philippines (1998)
2. The Distribution and Ecology of Mammals on Leyte, Biliran, and Maripipi Islands, Philippines
3. Lecture Notes for the International Seminar-Workshop on Tropical Ecology Series (1993-2002)
4. Project Reports, ViSCA-GTZ Tropical Ecology Program (1991-2000)
5. Thesis Manuscripts on ecology topics (MS and PhD)

#### APPENDIX

**Table 1.** Result of survey conducted in LSU, SCUS including those outside of Region VIII and other Non-Government and Government agencies in Region VIII.

Agency	Total no. of Respondents	No. and Percentage (%) of respondents who would pursue MS Tropical Ecology
LSU	73	38 (52.10%)
Other SUCs (UEP, NORMISIST, ADU, SPCP, USC, SLSCST)	44	27 (61.00%)
Other Agencies (BFAR, DENR, DA, ELAC)	33	20 (60.60%)