



University of Science and Technology of Hanoi
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COURSE SYLLABUS

Subject: Ecosystem Functioning
Lecturer: GIRLEY S. GUMANAO
Phone:

Academic field: Water-Environmental-
 Oceanography

E-mail : girley.gumanao@dnsc.edu.ph

Academic year: 2016

COURSE DESCRIPTION

Credit points	3	
Level	Undergraduate	
Teaching time Location		
Time Commitment	Lecture	20 hrs
	Tutorial	10 hrs
	Practicals	
	Total	30 hrs
Prerequisites	None required	
Recommended background knowledge	None required	
Subject description:	<p>We all depend on a vast range of services provided by ecosystems, from food and medicines to a stable climate, clean water and storm protection. This course provides an introduction to the ecosystem ecology underlying these services, in particular looking at how ecosystems are structured and function.</p> <p>This course also addresses ecosystems understanding and associated services through different and complementary approaches, from the integrative ecology (including natural abiotic, biotic factors and human impact), the functional and evolutionary relationship between groups (such as parasitism, mutualism, invasive species, engineer species...), to the assessment of environmental threats on ecosystems integrity. This also covers ecosystems management strategies in Vietnam and elsewhere and how it contributes to ecosystem restoration and conservation.</p>	



Objectives & Outcome	<p>Objectives:</p> <p>Each student will understand and be able to explain the general principles of ecosystem functioning, and why they are important for society. Students will understand the scientific basis for many of the environmental issues that society faces and realize the need for Ecosystems Management.</p> <p>Outcomes:</p> <p>The principal points students should be able accomplish upon completion of the course are listed below:</p> <ol style="list-style-type: none"> 1. Describe the general principles of ecosystem functioning, and justify why they are important for society. 2. Characterize disturbance and high stress environments and its effect to ecosystem structure and function. 3. Assess environment risk /ecosystems loss that faces society and demonstrate problem solving skills and use science 4. Evaluate critically a global environment issue such as climate and land use change and environmental pollution affecting communities using literatures from primary authors. 5. Discuss ecosystems management strategies in Vietnam and elsewhere and how it contributes to ecosystem restoration and conservation 								
	Assessment/ Evaluation	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Attendance/Attitude</td> <td style="width: 50%; text-align: center;">10%</td> </tr> <tr> <td>Assignment(s)</td> <td style="text-align: center;">20%</td> </tr> <tr> <td>Mid-term test/Exercise</td> <td style="text-align: center;">20%</td> </tr> <tr> <td>Final exam</td> <td style="text-align: center;">50%</td> </tr> </table>	Attendance/Attitude	10%	Assignment(s)	20%	Mid-term test/Exercise	20%	Final exam
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Final exam	50%								

COURSE CONTENTS & SCHEDULE

Dates	Topics
Sept 19 (2-5PM)	Introduction of ecosystem function Ecology and Ecosystems, Levels of organization and Levels of Biodiversity
Sept 20 (2-5PM)	Energy flow and material cycles in ecosystem Food Chains and Food Web, trophic levels and ecological pyramids
Sept 21 (9-12AM)	Production ecosystems Primary and Secondary Production



	Gross Primary Productivity, Net Productivity and Net Primary Productivity
Sept. 22 (2-5PM)	Ecological Succession and Dynamics within Global Biomes
Sept. 23 (2-5PM)	Disturbance in ecosystem and Species at Risk Ecosystem in high stress environments
Sept 24 (9-12AM)	Introduction to global change biology and impact on biodiversity Biodiversity Hotspots Global environment change and ecosystem response
Sept 26 (9-12AM)	Ecological impacts of climate change, land use change and environmental pollution.
Sept 27 (9-12AM)	The functional consequence of biodiversity loss Biodiversity decline and Species Extinction Change in Ecosystem Structure
Sept. 29 (9-12AM)	Ecosystems Management and Conservation Initiatives In situ and Ex-situ Conservation Protected Areas and Marine Parks
Sept 30 (9-12AM)	Critical assessment of the fragility and resilience of ecosystems Resilience to thermal stress
Sept. 30 (9-12AM)	Adaptability and Transformability in Social– ecological Systems

LITERATURES:

A framework for vulnerability assessment of coastal fisheries ecosystems to climate change— Tool for understanding resilience of fisheries (VA–TURF) S. S. Mamauag, P.M.Alino, Renmar, J. S. Martinez, R. N. Muallil , M. V. A. Doctor, E. C. Dizond, R. C. Geronimo, F. M. Pangaa, R. B. Cabral Fisheries Research 147 (2013) 381– 393

Cumulative Effects of Nutrient Enrichment and Elevated Temperature Compromise the Early Life History Stages of the Coral *Acropora tenuis*. PLOS ONE|DOI:10.1371/journal.pone. By Adriana Humanes, Sam H.C. Noonan, Bette L.Willis1, Katharina E.Fabricsius, Andrew P.Negri. 2009.

Elements of Ecology. 2012. Thomas Smith and Robert Leo Smith. Pearson Education in Southeast Asia. PTE Ltd.

General Ecology. 2012. David T. Chrono. Cengage Learning Asia.

Ecology, second edition, Michael L. Cain, William D. Bowman, Sally D. Hacker
Companion website: sites.sinauer.com/ecology2e



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Human-mediated global dispersion of *Styela plicata* (Tunicata, Ascidiacea) Aquatic Invasions (2009) Volume 4, Issue 1: 45-57 by Rodolfo C. de Barros, Rosana M. da Rocha and Marcio R. Pie.

Fishing Down Food Webs. Daniel Pauly. Villy. Science New Series Vol. 279. 5352. Feb 6, 1988. 860-863. Christensen. Johannes Dalsgaard. Rainer Froese and Francisco Torres Jr.

Prey selection of corallivorous muricids at Koh Tao (Gulf of Thailand) four years after a major coral bleaching event by Michelangelo S. Moerland, Chad M. Scott. Bert W. Hoeksema

Primary and Secondary Production. Ecosystems Status Report. NOAA. Northeast Fisheries Research Center.

Resilience, Adaptability and Transformability in Social– ecological Systems Brian Walker C. S. Holling, Stephen R. Carpenter, and Ann Kinzig Fisheries Research 147 (2013) 381– 393

Toxic effects of increased sediment nutrient and organic matter loading on the seagrass *Zostera noltii* by Laura L. Goversa, Aquatic Toxicology. 155 (2014) 253-260 by Jan H.F. De Brouwera,¹Wouter Suykerbuyka,^b Tjeerd J. Boumab, Leon P.M. Lamersc, Alfons J.P. Smoldersc, Marieke M. Van Katwijk

The functioning Marine Ecosystems . Philippe Gury, Lynne Shannon, and Yunne-Jai Shin . Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem 17 Reykjavik, Iceland, 1-4 October 2001.

The lunar cycle determines availability of coral-reef fishes at fish markets A. R. Bos and G. S. Gumanao. Journal of Fish Biology (2012) 81, 2074–2079 doi:10.1111/j.1095-8649.2012.03454.