

<b>Ecology and Conservation</b>	
<b>Course Code</b>	DIC 8001
<b>Credits</b>	Three (lectures: 3 hr per week)
<b>Organizers</b>	Chung-Chi Chen and Teng-Chiu Lin
<b>Lecturers</b>	Hwey-Lian Hsieh, Allen Chen, Tung-Yuan Ho, Sheng-Feng Shen, Benny Chan
<b>Time</b>	Monday 14:10-17:00
<b>Place</b>	1. S606, NTNU (first class, Gong-Guan Campus) 2. Room 204, TIGP Building, AS
<b>Prerequisites</b>	
<b>Description</b>	<p>This course aims to provide students with rigorous training related to ecology and conservation. The course will cover the following topics:</p> <ol style="list-style-type: none"> <li>1. Structure and function of community and ecosystem: Interactions between physical setting and biological components Driving forces of ecosystem</li> <li>2. Habitat requirement of non- human keystone species in ecosystem Identification and characterization of habitat required by species through its life history</li> <li>3. Key processes related to ecosystem structure and function Net primary production Biogeochemistry Ecosystem stability, resistance and resilience</li> <li>4. Conservation of ecosystem Global warming threat and human responses and adjustments Characterizing ecosystem or habitat that needs for maintenance, wise use, or restoration practices (case studies) in conserving ecosystems</li> <li>5. Ecological services and valuation of ecosystem: From structure, function, and services of ecosystem to human well-being</li> </ol> <p>Selected readings that represent major advancement in ecology and conservation and related to the above topics will be given to students for in depth discussion. Professor(s) will give brief lectures on the topics and lead the discussion for approximately one quarter of the semester and students will lead the discussion for the rest. Through the discussion each student is expected to develop research proposal as a term paper. Questions and solutions raised in the discussions are expected to make major contributions in ecology and conservation. Novel approaches and inter-disciplinary studies are highly encouraged.</p>
<b>Purpose</b>	<ol style="list-style-type: none"> <li>1. Lectures and assigned readings are designed to provide fundamental knowledge in ecology and conservation.</li> <li>2. Students will identify an area of interest and come up with a research proposal that aims to answer an outstanding question in that area.</li> </ol>

<b>Weeks taken/ Ecosystem</b>	<b>Content</b>	<b>Lecturer/ Reading Material</b>
<b>Week 1</b> Introduction	2/18 Overall briefing	<b>Hwey-Lian Hsieh</b>

<b>Week 2~ 3</b> Open ocean ecosystems	-Marine biogeochemistry -Acidification -Global change and Sustainable development	<b>Tung-Yuan Ho</b>
<b>Week 2</b> <b>2/25</b> Introduction of Marine Environment	Physical and chemical conditions in the open ocean	Reading materials: Chapter 1-11 Susan M. Libes, <i>Introduction to Marine Biogeochemistry, Second Edition</i> , Academic Press, 2009
<b>Week 3</b> <b>3/4</b> Global Environmental Changes in the Ocean	Ocean acidification and temperature increase in oceanic surface waters	
<b>Week 4~5</b> Forest ecosystems	Ecology and Conservation -Insects communities/ environment interactions -Global warming and Sustainable development	<b>Sheng-Feng Shen</b>
<b>Week 4</b> <b>3/11</b> Introduction of Forest ecosystem	Biodiversity of forest ecosystem.	Reading materials: Chapter 3-5, Lee Hannah (2011) <i>Climate Change Biology</i> . Academic Press.
<b>Week 5</b> <b>3/18</b> Impacts of Global Change on Forest ecosystem	Impacts of climate change and habitat alternation on the forest ecosystem.	
<b>Week 6~ 9</b> Wetland ecosystems (coasts, estuaries, freshwater systems)	Ecology and Conservation - Aquatic animals/environment interactions - Habitat restoration principles and practices - Functions of wetland ecosystem - Valuation and sustainability of ecosystem services - Management	<b>Hwey-Lian Hsieh</b>
<b>Week 6</b> <b>3/25</b>	Driving forces of aquatic ecosystem-Interactions between physical settings and biological components -Pelagic and benthic systems	Reading materials: 1. Odum HT, Odum EC 2006. <i>The prosperous way down</i> . Energy 31:21-32. And, this issue related literature.
<b>Week 7</b> <b>4/1</b>	Characterizing habitats that need for maintenance, wise use, or restoration practices in conserving ecosystems (I)- mangrove, shallow coasts and small island case studies	

<b>Week 8</b>	<b>4/8</b>	Characterizing habitats that need for maintenance, wise use, or restoration practices in conserving ecosystems (II)- mangrove, shallow coasts and small island case studies	
<b>Week 9</b>	<b>4/15</b>	Ecological services and valuation of ecosystem: From structure, function, and services of ecosystem to human well-being	
<b>Week 10</b>	<b>4/22</b>	Mid-term checking point for term paper and evaluation of performance	<b>Hwey-Lian Hsieh</b>
<b>Week11~17</b>		Ecology and Conservation -Functions of coral reefs and rocky shores -Management (e.g. Designation of marine protected area)	<b>Allen Chen</b>
<b>Week 11</b>	<b>4/29</b>	Natural and artificial rocky shores – a comparison (I)	<b>Benny Chan</b>
<b>Week 12</b>	<b>5/6</b>	Natural and artificial rocky shores – a comparison (II)	
<b>Week 13</b>	<b>5/13</b>	Coral reef ecology and conservation	<b>Allen Chen</b>
<b>Week 14</b>	<b>5/20</b>	Natural disturbances on coral reefs	
<b>Week 15</b>	<b>5/27</b>	Anthropogenic disturbances and historical degradation of coral reefs	
<b>Week 16</b>	<b>6/3</b>	Response mechanisms of coral reefs to climate change	
<b>Week 17</b>	<b>6/10</b>	Marine protected areas and conservation of coral reefs	
<b>Week 18</b>	<b>6/17</b>	Final term paper and evaluation of performance	<b>All teachers</b>