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Course Name: FUNDAMENTALS OF CLIMATE CHANGE AND NATURAL DISASTERS

The target audience: Master students in Climate Change & Delta Management

Number of credits: 3 ECTS

Type of the course: Required courses

New/ updated course:

The percentage of updated course: 20%

Key competences of updated course/new course: Adaptation Models in Agriculture and Aqualculture in the Mekong River Delta

Course developers: (name, organization): Le Anh Tuan, Can Tho University, Vietnam

Briefly course contents:

- Chapter 1: Basics on Climate Sciences
- Chapter 2: Natural Disasters Phenomena
- Chapter 3: Climate Change and Sea Level Rise
- Chapter 4: Impacts of Climate Change and Sea Level Rise
- Chapter 5: Response to Climate Change and Sea Level Rise
- Chapter 6: Management of Natural Disaster Risks

Teaching methodologies: Interactive and self-reflective methods of teaching and learning.

Form of control:

- Progress assessment (10%)
- Group report (30%):
- Final examination (60%)

Teaching and learning materials (TLM)

Chapter 1. Basics on Climate Sciences	
Learning objectives	Equip climate science background, climate system concepts and related weather elements
Learning outcomes	Knowledge and Skills to identify climatic phenomena and to explain on the basis of science
Student deliverables	Questions & Answers and Plenary Discussion
Topic materials	<p>[1] Nguyen Duc Ngu (2008). Climate Change. Science and Technics Publishing House, Hanoi</p> <p>[2] Joel B. Smith, Richard J.T. Klein and Saleemul Huq (2003). Climate change, adaptive capacity and development, Imperial College Press, London</p> <ul style="list-style-type: none"> • Video: https://www.youtube.com/watch?v=N3EgcUNdIl8
Outline	<p>1.1. Definitions</p> <p>1.2. Earth Climate System</p>



	1.3. Major Meteorological Factors 1.4. Greenhouse effect 1.5. Weather Observation and Forecasting
Chapter 2. Natural Disaster Phenomena	
Learning objectives	Understand general concepts of natural disasters on earth and feature some common disaster images.
Learning outcomes	Knowledge and Skills to identify global disaster phenomena and explain the causes - characteristics of a common type of natural disaster in Vietnam
Student deliverables	Questions & Answers and Plenary Discussion
Topic materials	[3] Thomas E. Downing, Alexander J. Olsthoorn, Richard S.J. Tol (1999). Climate, change and risk. Taylor & Francis e-Library, London and New York. <ul style="list-style-type: none"> • Video: https://www.youtube.com/watch?v=oRiLLd2hX0E
Outline	2.1. Overview of Disaster 2.2. Thunderstorms, Tropical Depressions, Storms 2.3. Floods and Droughts 2.4. Landslides and subsidence
Chapter 3. Climate Change and Sea Level Rise	
Learning objectives	Climate Change Awareness, Global Climate Change Evidence, Climate Change and Sea Level Rise scenarios, emphasis on Viet Nam and Mekong Delta
Learning outcomes	Knowledge and Skills to Identify Global Climate Change and Sea Level Rise and Climate Change and Sea Level Rise in Vietnam & Mekong Delta.
Student deliverables	Questions & Answers and Plenary Discussion
Topic materials	1] Nguyen Duc Ngu (2008). Climate Change. Science and Technics Publishing House, Hanoi [2] Joel B. Smith, Richard J.T. Klein and Saleemul Huq (2003). Climate change, adaptive capacity and development, Imperial College Press, London [3] Thomas E. Downing, Alexander J. Olsthoorn, Richard S.J. Tol (1999). Climate, change and risk. Taylor & Francis e-Library, London and New York. <ul style="list-style-type: none"> • Video: https://www.youtube.com/watch?v=G4H1N_yXBIA
Outline	3.1. Fundamental Concept 3.2. Evidence of climate change and sea level rise 3.3. Scenario on climate change and sea level rise 3.4. Climate Change in Vietnam and the Mekong Delta 3.5. Current Studies
Chapter 4. Impacts of Climate Change and Sea Level Rise	
Learning objectives	Understand the effects of climate change and rising water in different key sectors and industries.
Learning outcomes	Knowledge and Skills to Identify Impacts of Climate Change and Sea Level Rise globally, Vietnam & Mekong Delta.
Student deliverables	Questions & Answers and Plenary Discussion in Class



Topic materials	<p>Lesson</p> <p>[4] Lê Quang Tri, Le Anh Tuan, Nguyen Hieu Trung, Đàng Kieu Nhan, Van Pham Dang Tri, Nguyen Thanh Binh, Dao Trong Tu, Lam Thi Thu Suu, Ngụy Thi Khanh, Dinh Diep Anh Tuan (2015): Managing the Risks from Climate Extremes at the Local Level Viet Nam Publishing House of Natural Resources, Environment and Cartography, HaNoi, Vietnam, pp. 189-226, ISBN 978-604-904-623-0.</p> <ul style="list-style-type: none"> • Video: https://www.youtube.com/watch?v=lhkgmKXOM1A
Outline	<p>4.1. Concept</p> <p>4.2. Climate change impacts - Sea level rise to the ecosystem</p> <p>4.3. Climate Change Impacts - Sea level rise to humans</p> <p>4.4. Climate Change Impacts - Sea level rise in production</p> <p>4.5. Climate Change Impacts - Sea level rise in infrastructure</p> <p>4.6. Follow-up studies</p>
Chapter 5. Responding to Climate Change	
Learning objectives	Introduction of effective mitigation measures to mitigate and adapt to climate change and sea level rise, examples in Vietnam and the Mekong Delta.
Learning outcomes	Knowledge and Skills to find effective solutions to mitigate and adapt to climate change and sea level rise, examples in Vietnam and the Mekong Delta.
Student deliverables	Questions & Answers and Plenary Discussion in Class
Topic materials	<p>[5] TTK & SEA START RC, 2009. Water and Climate Change in the Lower Mekong Basin: Diagnosis & recommendations for adaptation. Chulalongkorn University, Water & Development Publications, Helsinki University of Technology, Espoo, Finland</p> <ul style="list-style-type: none"> • Video: https://www.youtube.com/watch?v=FO46sPwm4xk&t=67s
Outline	<p>5.1. Concepts</p> <p>5.2. Climate Change Mitigation and Adaptation</p> <p>5.3. The approach</p> <p>5.4. Some Experience</p>
Chapter 6. Management of Natural Disaster Risks	
Learning objectives	Knowledge of natural disaster management at the government and community level, following 3 sections before, during and after a disaster.
Learning outcomes	Knowledge and skills to implement effective disaster management solutions and obstacles under Vietnamese conditions.
Student deliverables	Exercise: Questions & Answers and Plenary Discussion in Class
Topic materials	<p>Lesson</p> <p>[4] Lê Quang Tri, Le Anh Tuan, Nguyen Hieu Trung, Đàng Kieu Nhan, Van Pham Dang Tri, Nguyen Thanh Binh, Dao Trong Tu, Lam Thi Thu Suu, Ngụy Thi Khanh, Dinh Diep Anh Tuan (2015): Managing the Risks from Climate Extremes at the Local Level. Viet Nam Publishing House of Natural Resources, Environment and Cartography, HaNoi, Vietnam, pp. 189-226, ISBN 978-604-904-623-0.</p> <ul style="list-style-type: none"> • Video: https://www.youtube.com/watch?v=7YmHvh99kUQ



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Outline	6.1. Concept 6.2. Human and Economic Risks from Natural Disasters 6.3. Natural Disaster Risk Management 6.4. Some Disaster Prevention Experiences
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E-learning

Online materials to support teaching the course. <https://wrd.ctu.edu.vn/projects/mare-project.html>

Teachers: Le Anh Tuan