Mahidol University
International College

Course syllabus

Program of study: Natural Sciences
Mahidol University International College
Course code: ICGN 128
Course title: Climate emergency; biodiversity crisis; and humanity at risk
Number of credits: 2 (1-2-3). [Theory; Practice; Self-study]
Prerequisite(s): None
Type of course: General education

Instructor: Dr Wayne Phillips **Email**: wayne.phi@mahidol.edu

Course Description

Anthropogenic activities; biodiversity crisis; biodiversity loss; biological diversity; climate change; climate crisis; climate emergency; ecosystem functions; harmful and unsustainable practices; humanity at risk; mitigate and adapt; threats, impacts and consequences.

Course Goals

This course improves participants' awareness and understanding of the harmful and unsustainable anthropogenic activities that have resulted in the ongoing state of climate emergency and biodiversity crisis, placing humanity at severe risk. The course develops comprehension and appreciation of biological diversity and ecosystem function to better recognise their contribution to addressing the climate crisis and climate change. The course further allows learners to develop and demonstrate actions or potential actions that can mitigate and adapt to the impacts of climate change, and that can arrest further loss of biodiversity.

Course Learning Outcomes (CLOs)

By the end of the course, participants will be able to

1. Explain the principles of climate change, climate crisis, biodiversity, biodiversity crisis, and ecosystems functions and services.
2. Describe the threats to biodiversity and ecosystems.
3. Describe the impacts and consequences of climate emergency and biodiversity crisis on humanity.
4. Employ the principles of biodiversity and ecosystems functions to explore options to address and redress climate emergency and biodiversity crisis.
5. Work effectively in groups.
6. Use technology to enhance the learning experience.

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Course discussion content and field work schedule

Some teaching will be in the classroom but most teaching will take place in local ecosystems.

Course discussion content	Hours	Instructor
The Earth's climate; ecosystems	1	WNP
Principles of ecosystem services	1	WNP
Principles of biodiversity and mass extinctions	1	WNP
Threats and impacts to ecosystems and biodiversity	1	WNP
Principles of climate change.	1	WNP
Climate Crisis	1	WNP
Biodiversity Crisis	1	WNP
Consequences to humanity of biodiversity loss and the loss of ecosystem services	1	WNP
Biodiversity conservation and ecosystem protection	1	WNP
Climate change adaptation and mitigation	1	WNP
Actions and options	2	WNP
TOTAL	**12**	

Field work schedule – dates to be confirmed

Upstream Ecosystems – the forests, headwater streams, and biodiversity loss

As we investigate the critical ecosystems that support humanity but are challenged and threatened by disturbance and development we will take a "Ridge to Mangrove to Reef" approach. The first phase will be conducted in the Western Forest Complex, the main biodiversity conservation corridor in South East Asia. The Complex comprises 19 geographically diverse protected areas and we will visit some of the National Parks within the Complex to better recognise the challenges to these ecosystems.

Downstream Ecosystems – urban environments, mangrove forests, and biodiversity loss

This second phase will be conducted in the urban environment and mangrove forests where we will explore the influence the urban environment has on coastal water quality by visiting Lat Phrao canal where we will spend the day with Terracycle Thai Foundation. In tropical systems most rivers flow through mangrove forests which accumulate the sediments transported from the mountains and upstream ecosystems, filtering them before they flow to the sea and interfere with light penetration in coral reefs. For a better understanding of the importance of mangrove ecosystems we will investigate the coastal forests of Chumphon National Park.

Offshore Ecosystems – coral reefs, climate change, and biodiversity loss

The final phase will be conducted on Koh Tao that is globally famous for its clear waters, coral reefs, and biodiversity. We will investigate how upstream influences and local tourism negatively impact coral reef resilience in the face of global climate change. What steps are needed to protect these important ecosystems?

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Measurement of student achievement of CLOs

Course Learning Outcome		Measurement method	Weight (%)
1	Explain the principles of climate change, climate crisis, biodiversity, biodiversity crisis, and ecosystems functions and services	Daily journal	15
2	Describe the threats to biodiversity and ecosystems.	Daily journal	20
3	Describe the impacts and consequences of climate emergency and biodiversity crisis on humanity.	Daily journal	20
4	Employ the principles of biodiversity and ecosystems functions to explore options to address and redress climate emergency and biodiversity crisis.	Daily journal	20
5	Work effectively in groups.	Peer evaluation	20
6	Use technology to enhance the learning experience.	Daily journal	5

Daily journal 80%; Peer evaluation 20%

Evaluation of student achievement of CLOs

Student achievement will be evaluated according to the College and University standards.

Course Evaluation

Students can evaluate the course and instructor through normal College and University channels.

Teaching Materials and Resources

Intergovernmental Panel on Climate Change 6th Assessment Synthesis Report

Working Group 1 – The physical science basis

Working Group 2 – Impacts, adaptation and vulnerability

Working Group 3 – Mitigation of climate change

World Meteorological Organization Greenhouse Gas Bulletin

IPCC - Special Report on Climate Change and Land

IPCC – Special Report on the Ocean and Cryosphere in a changing climate

Grading Rubric - Peer evaluation 20%

Meaning Grade GPA	Outstanding A 4.0	Competent B 3.0	Adequate C 2.0	Ineffective D 1.0	Failed F 0.0
Contribution to group goals **[25%]**	Team member consistently and actively worked towards goals, and willingly accepted and fulfilled individual role within the group	Team member worked towards goals, and accepted and fulfilled individual role within the group	Team member worked towards goals, and accepted and fulfilled individual role within the group but needed occasional prompting	Team member worked towards goals, and accepted individual role within the group but only when prompted	Team member put little effort towards goals and let others do the work
Contribution of knowledge **[20%]**	Team member consistently and actively contributed knowledge, opinions, and useful ideas without being prompted or reminded	Team member contributed knowledge, opinions, and ideas without being prompted or reminded	Team member sometimes contributed knowledge, opinions, and ideas but needed occasional prompting and reminding	Team member contributed knowledge, opinions, and ideas only when prompted	Team member did not contribute knowledge, opinions, or ideas.
Quality of contribution **[25%]**	Team member's contributions always exceeded our expectations	Team member's contributions frequently exceeded our expectations	The team member's contributions met our expectations	Team member's contributions sometimes failed to meet our expectations	Team member's contributions failed to meet our expectations
Responsibility **[10%]**	Team member exceeded our expectations on timely completion of tasks, follow up, and feedback	The team member was responsible and completed most tasks on time	The team member did not complete all tasks on time	The team member frequently failed to complete tasks on time	The team member failed to complete any tasks on time and needed frequent prompting
Cooperation **[10%]**	Team member consistently helped identify tasks and goals and encouraged others to contribute	Team member often helped identify tasks & goals and often encouraged others to contribute	Team member sometimes helped identify tasks & goals and sometimes encouraged others to contribute	Team member occasionally helped identify tasks & goals but needed encouragement to contribute	Team member did not help identify tasks and goals and let others do the work
Overall assessment of team member **[10%]**	I would actively try to work with this person again	I would be pleased to work with this person again	I would not mind working with this person again	I would be reluctant to work with this person again	I would refuse to work with this person again

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Grading Rubric – Daily journal 80%

Meaning Grade GPA	Outstanding A 4.0	Competent B 3.0	Adequate C 2.0	Ineffective D 1.0	Failed F 0.0
Factual knowledge **[15%]**	You use the correct terminology and you use relevant facts correctly.	You use the correct terminology and facts most of the time.	You sometimes use the incorrect terminology and your use of facts is sometimes irrelevant and/or wrong.	You often use incorrect terminology and you sometimes use irrelevant made-up "facts".	You show no sign of knowing the correct terminology or any relevant facts.
Conceptual knowledge **[15%]**	You address the major concepts and it is clear you understand how facts fit theory.	You know and address most of the relevant major concepts.	You address some of the major concepts but it is clear you do not fully understand them.	You address a major concept but get it wrong.	You show no sign of understanding the concepts discussed in class.
Procedural knowledge **[25%]**	It is clear you understand the procedures and you can discuss the pros and cons of different methods within the context of a study.	You have an acceptable level of practical knowledge about the procedures you used. You know other methods exist but do not elaborate or explain.	You have an adequate understanding of procedures you used but it is clear you do not know about other methods.	You have minimal understanding of the procedures you used and do not know about other methods.	You have little practical knowledge.
Content (facts) **[30%]**	You provide substantial, specific and illustrative examples that demonstrate a strong development of ideas.	You provide sufficiently developed examples with adequate elaboration and explanation of ideas.	You provide limited examples and could elaborate and explain more.	You provide examples that are superficial and/or minimal.	You provide incomplete or no examples. There is no development of ideas.
Organisation **[5%]**	You present information in effective order using effective transitions between ideas and concepts. You use an effective and interesting introduction and closure.	You present information in a logical order using appropriate transitions between ideas. You provide an interesting introduction and closure.	You present information in a predictable order and sometimes use appropriate transitions between ideas. You provide an adequate introduction and closure but miss some major points.	You present information in a predictable order but use few transitions between ideas. Your work is missing an introduction and/or closure.	You present information in a confusing and/or random way with no transitions between ideas. Your work is missing an introduction and closure.
Communication **[10%]**	You use interesting and precise vocabulary with a variety of complex sentences. Your writing is fluent and near error-free.	You use specific vocabulary and write with a variety of sentence structures. Your writing errors are minor and do not interfere with meaning.	You use appropriate vocabulary with some variety of sentence structure. Your writing errors can create some confusion but the overall meaning is still clear.	You use simple vocabulary in simple predictable sentences. Your writing errors affect meaning.	You rely heavily on simple sentence structures and disregard writing conventions such as spelling, punctuation and grammar.

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Notes: