SEE3003: CLIMATE CHANGE AND ADAPTATION STRATEGIES

Effective Term
Semester A 2024/25

Part I Course Overview

Course Title
Climate Change and Adaptation Strategies

Subject Code
SEE - School of Energy and Environment
Course Number
3003

Academic Unit
School of Energy and Environment (E2)

College/School
School of Energy and Environment (E2)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
PHY1201 General Physics I;
MA1200 Calculus and Basic Linear Algebra I or
MA1300 Enhanced Calculus and Linear Algebra I; AND
MA1201 Calculus and Basic Linear Algebra II or
MA1301 Enhanced Calculus and Linear Algebra II

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course aims to develop a fundamental appreciation and understanding of climate change and adaptations to climate change issues. Upon completion, students are expected to be able to present a balanced perspective on climate change and adaptations. The course will various meteorological and geological topics including, Earth's climate system, Weathering and soils, Groundwater and wetlands, Oceans and coastlines, Climate Change and greenhouse gas emission trends, Mitigation and adaptation to climate change.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explain the scale and process of climate system, climate change and greenhouse gas emission trends	20	x		x
2	Relate physical and chemical principles to the process of weathering and soils, groundwater and wetlands, oceans and coastlines, and greenhouse gas emission	30		x	x
3	Apply strategies to solve weathering and soils, groundwater and wetlands, oceans and coastlines problems, and greenhouse gas emission	35		x	x
4	Demonstrate critical thinking skills in global environmental change and societal adaption strategies	15	x	x	x

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture and Tutorial	In tutorials, students will form in small groups (2-4 students each group) to discuss and compare the climate change-relevant phenomena discussed in lecture and work with their peers to organize their understandings in the form of roadmaps.	1, 2, 3, 4	

2	Group Project	Group project requires students to form a small group of 3 – 5, and identify, analyse, and discuss their findings on solutions to a climate change-related issues in the form of a presentation.	2, 3, 4	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Homework Assignment There will be 6-8 assignments throughout the semester. Students will complete the assignments to demonstrate their ability to apply their knowledge in topics related to climate change and adaptation strategies.	1, 2, 3, 4	18	Approximately 6-8 problem sets
2	In-Class Tutorial Exercise Students will engage in tutorial activities to demonstrate their understandings on the topics related to climate change and adaptation strategies.	1, 2, 3, 4	2	Approximately 3-4 In-class tutorial exercises
3	Group Project Students will participate in groups to consolidate their learnings to identify, analyse, and discuss their findings on a climate-change issues and the appropriate adaptation solutions.	1, 2, 3, 4	20	1 group project
4	Midterm Quiz There will be 1 midterm quiz for instructor to assess students' learning progress on the concepts as outlined in "Lecture and Tutorial".	1, 2	20	1 midterm quiz

Continuous Assessment (%)

60

Examination (%)

40

Examination Duration (Hours)

2

Additional Information for ATs

Examination duration: 2 hrs
Percentage of continuous assessment, examination, etc.: 60% by continuous assessment, 40% by exam

To pass a course, a student must do ALL of the following:
1) obtain at least 30% of the total marks allocated towards continuous assessment (combination of assignments, pop quizzes, term paper, lab reports and/ or quiz, if applicable);
2) obtain at least 30% of the total marks allocated towards final examination (if applicable); and
3) meet the criteria listed in the section on Assessment Rubrics.

Assessment Rubrics (AR)

Assessment Task

1. Homework Assignment

Criterion

Ability to explain in detail and with accuracy method

Excellent (A+, A, A-)

Excellent analysis and problem-solving skills to demonstrate in-depth understanding of climate change and adaptation strategies

Good (B+, B, B-)

Good analysis and problem-solving skills to demonstrate in-depth understanding of climate change and adaptation strategies

Fair (C+, C, C-)

Moderate analysis and problem-solving skills to demonstrate in-depth understanding of climate change and adaptation strategies

Marginal (D)

Basic analysis and problem-solving skills to demonstrate in-depth understanding of climate change and adaptation strategies

Failure (F)

Poor analysis and problem-solving skills to demonstrate in-depth understanding of climate change and adaptation strategies

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Assessment Task

2. Group Project

Criterion

Capacity for self-directed learning to study the principles of climate change and climate adaptation

Excellent (A+, A, A-)

Demonstrate excellent self-directed learning capacity to study the principles of climate change and climate adaptation

Good (B+, B, B-)

Demonstrate good self-directed learning capacity to study the principles of climate change and climate adaptation

Fair (C+, C, C-)

Demonstrate moderate self-directed learning capacity to study the principles of climate change and climate adaptation

Marginal (D)
Demonstrate basic self-directed learning capacity to study the principles of climate change and climate adaptation

Failure (F)
Demonstrate poor self-directed learning capacity to study the principles of climate change and climate adaptation

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Assessment Task
3. Midterm Quiz

Criterion
Ability to explain the key concepts as outlined in "Lecture and Tutorial"

Excellent (A+, A, A-)
Demonstrate excellent ability to explain the key concepts as outlined in "Lecture and Tutorial"

Good (B+, B, B-)
Demonstrate good ability to explain the key concepts as outlined in "Lecture and Tutorial"

Fair (C+, C, C-)
Demonstrate moderate ability to explain the key concepts as outlined in "Lecture and Tutorial"

Marginal (D)
Demonstrate basic ability to explain the key concepts as outlined in "Lecture and Tutorial"

Failure (F)
Demonstrate poor ability to explain the key concepts as outlined in "Lecture and Tutorial"

Assessment Task
4. Examination

Criterion
Ability to explain key concepts, such as physical and chemical principles to the process of soil erosion and conservation, sea level rise

Excellent (A+, A, A-)
Demonstrate excellent ability to explain key concepts, such as physical and chemical principles to the process of soil erosion and conservation, sea level rise

Good (B+, B, B-)
Demonstrate significant ability to explain key concepts, such as physical and chemical principles to the process of soil erosion and conservation, sea level rise

Fair (C+, C, C-)
Demonstrate moderate ability to explain key concepts, such as physical and chemical principles to the process of soil erosion and conservation, sea level rise

Marginal (D)
Demonstrate basic ability to explain key concepts, such as physical and chemical principles to the process of soil erosion and conservation, sea level rise

Failure (F)

Demonstrate poor ability to explain key concepts, such as physical and chemical principles to the process of soil erosion and conservation, sea level rise

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Part III Other Information

Keyword Syllabus

- Earth's climate system
  Global air pollution, Global climate region, Extreme climate environment
- Weathering and soils
  Physical weathering, Chemical weathering, Biological weathering and decay, Erosion by water and wind, Effects of land use practise on Erosion, Soil erosion and conservation.
- Groundwater and wetlands
  Aquifer, Natural groundwater budget, Groundwater quality, Characteristics of wetlands
- Oceans and coastlines
  The dynamics of oceans and coastlines, Wave active and coastal processes, Sea level rise, Erosion Prevention strategies, Erosion adjustment strategies
- Climate Change and greenhouse gas emission trends
  Ozone and the stratosphere, CFCs and Ozone depletion, Greenhouse gases and global change, The global carbon cycle, Reducing greenhouse gas emission
- Mitigation and adaptations to climate change
  Adaptations of species to global warming, The relationship between adaptation and disaster reduction, Strategies for reducing the impact of global warming, Urban heat island, Renewable energy, Sector-specific adaptive responses

Reading List

Compulsory Readings

	Title
1	Nil

Additional Readings

	Title
1	McConnell, Steer, Knight, Owens, The Good Earth: Introduction to Earth Science, 5th Edition, 2021. McGrawHill. ISBN13: 9781260364125 (e-Book or hardcopy is acceptable)