

## **Annexe A: New/Revised Course Content in OBTL+ Format**

### **Course Overview**

The sections shown on this interface are based on the templates [UG OBTL+](#) or [PG OBTL+](#)

If you are revising/duplicating an existing course and do not see the pre-filled contents you expect in the subsequent sections e.g. Course Aims, Intended Learning Outcomes etc. please refer to [Data Transformation Status](#) for more information.

Expected Implementation in Academic Year	AY2025/26
Semester/Trimester/Others (specify approx. Start/End date)	Semester 1
Course Author * Faculty proposing/revising the course	Asst Prof Euan James Forsyth Mutch
Course Author Email	euan.mutch@ntu.edu.sg
Course Title	Environmental Earth Systems Science
Course Code	ES5005
Academic Units	3
Contact Hours	39
Research Experience Components	Not Applicable

## Course Requisites (if applicable)

Pre-requisites	N/A
Co-requisites	N/A
Pre-requisite to	N/A
Mutually exclusive to	N/A
Replacement course to	N/A
Remarks (if any)	

## Course Aims

This course is designed to be a comprehensive introduction to the Earth and its systems, including the atmosphere, biosphere, hydrosphere, and solid Earth. The course will focus on the linkages and feedbacks between these systems, and the role of humans in the Earth system.

## Course's Intended Learning Outcomes (ILOs)

Upon the successful completion of this course, you (student) would be able to:

ILO 1	Define the major processes that govern the atmosphere, hydrosphere, solid Earth, and biosphere.
ILO 2	Build linkages and draw feedbacks between these systems.
ILO 3	Discern and critically evaluate media information about the Earth system.
ILO 4	Communicate intelligently about major topics that relate to the Earth based on solid evidence (data) and embedded in current world affairs.

## Course Content

This course provides a holistic overview of our planet and its interconnected systems: from the formation of the solar system and Earth's deep interior all the way up to the hydrosphere and atmosphere. The course will include, but is not limited to:

1. The Earth System
2. Energy, Space, and Time
3. The Geosphere – Tectonics
4. Natural Hazards
5. The Hydrologic Cycle
6. The Ocean
7. The Atmosphere, Wind, and Weather
8. The Climate System
9. Evolution, Ecosystems and Populations
10. Natural Resources

Anthropogenic Change

## Reading and References (if applicable)

Skinner, B.J., and Murck, B.W. (2023). 3rd Edition. *The Blue Planet: an Introduction to Earth System Science*, Wiley.

Kump, L. R., Kasting, J. F., & Crane, R. G. (2022). *The earth system* 4th edition. New York: Prentice Hall.

Marshak, S. (2022). *Earth: portrait of a planet: 7th international student edition*. WW Norton & Company.

Grotzinger, J. P., Jordan, T. H., Press, F., & Siever, R. (2020). *Understanding earth* 8th edition (p. 650). New York: WH Freeman.

## Planned Schedule

Week or Session	Topics or Themes	ILO	Readings	Delivery Mode	Activities
1	The Earth System	1, 2, 3, 4	Ch. 1	In-person	Lecture
2	Energy, Space, and Time	1, 2, 3, 4	Ch. 2, 3 & 4,	In-person	Lecture
3	The Geosphere - Tectonics	1, 2, 3, 4	Ch. 5, & 7	In-person	Lecture
4	The Geosphere - Hazards	1, 2, 3, 4	Ch 6	In-person	Lecture
5	The Hydrologic Cycle	1, 2, 3, 4	Ch 8	In-person	Lecture
6	The Ocean	1, 2, 3, 4	Ch 9, 10	In-person	Lecture
7	CA 1	1, 2, 3, 4	Ch 1 - 10	In-person	
8	The atmosphere, wind and weather	1, 2, 3, 4	Ch 11, 12	In-person	Lecture
9	The climate system	1, 2, 3, 4	Ch 13	In-person	Lecture
10	Evolution, Ecosystems and Populations	1, 2, 3, 4	Ch 14, 15, 16	In-person	Lecture
11	Resources	1, 2, 3, 4	Ch 17 & 18	In-person	Lecture
12	Anthropogenic Change	1, 2, 3, 4	Ch 19	In-person	Lecture
13	CA 2	1, 2, 3, 4	Ch 11 -19	In-person	

## Learning and Teaching Approach

Approach	How does this approach support you in achieving the learning outcomes?
Lecture	Lectures will pass on the theoretical knowledge required to understand the different components of the Environmental Earth system and the related scientific methods. They closely follow a book that is accessible online from the NTU library. In parallel, students will be asked to participate in class quizzes and discussions and submit group projects to demonstrate their understanding of the topics covered during lectures.
Active Learning	The course adopts an active learning approach by encouraging students to respond to clicker questions in class.
Project based learning	The course adopts a project based learning approach where students are involved in groups to investigate different aspects of the Earth System, and are expected to work in interdisciplinary teams to develop their group project

# Assessment Structure

Assessment Components (includes both continuous and summative assessment)

No.	Component	ILO	Related PLO or Accreditation	Weightage	Team/Individual	Rubrics	Level of Understanding
1	Continuous Assessment (CA): Test/Quiz(Continuous Assessment 1: MCQ and semi-structured questions)	1, 2, 3, 4		30	Individual	Analytic	Extended Abstract
2	Continuous Assessment (CA): Test/Quiz(Continuous Assessment 2: MCQ and semi-structured questions)	1,2,3,4		30	Individual	Analytic	Extended Abstract
3	Continuous Assessment (CA): Test/Quiz(Online Quizzes)	1,2,3,4		10	Individual	Analytic	Multistructural
4	Continuous Assessment (CA): Project(Group Projects)	1,2,3,4		30	Team	Holistic	Extended Abstract

## Description of Assessment Components (if applicable)

Continuous Assessments (CA) 1 & 2: Each CA consists of 50 multiple-choice questions and test your knowledge on the content from the lectures, and your ability to interpret and analyze environmental data. Each CA contributes to 30% of your grade.

Online Quizzes: Each lecture will have a short online quiz that tests your knowledge on the previous week's material. These quizzes will be administered online on NTU Learn. Each quiz accounts for 1% of your grade.

Group Projects (videos): You will be randomly assigned to a group which consists of students who come from different disciplines. This multi-disciplinary group setting imitates what you would face in real-world situations when your colleagues or team members may not be from the same background as you. This should encourage you to improve your communication skills and to have a chance to understand what a different discipline can offer in terms of Earth Systems Science. Together as a group, you will develop group videos related to a topic on Earth Systems. Each video will account for 15 % of your grade.

## Formative Feedback

You will receive formative feedback through written responses to your videos and verbal feedback through in-class discussion and review on your CA1 and quizzes.

## NTU Graduate Attributes/Competency Mapping

This course intends to develop the following graduate attributes and competencies (maximum 5 most relevant)

Attributes/Competency	Level
Care for Environment	Advanced
Collaboration	Advanced
Curiosity	Advanced
Global Perspective	Advanced
Critical Thinking	Advanced

# Course Policy

## Policy (Academic Integrity)

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values. As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

## Policy (General)

You are expected to complete all assigned readings, activities, assignments, attend all classes punctually and complete all scheduled assignments by due dates. You are expected to take responsibility to follow up with assignments and course related announcements. You are expected to participate in all project critiques, class discussions and activities.

## Policy (Absenteeism)

Absence from class will affect your overall course grade. It is important for you to attend the lectures even though they have been recorded on video. Absenteeism during Continuous Assessments is NOT ALLOWED without a valid medical certificate. This medical certificate has to be submitted to your school to be verified, before it reaches our school's undergraduate administration.

## Policy (Others, if applicable)

### Diversity and inclusion policy

Integrating a diverse set of experiences is important for a more comprehensive understanding of science.

It is our goal to create an inclusive and collaborative learning environment that supports a diversity of perspectives and learning experiences, and that honours your identities; including ethnicity, gender, socioeconomic status, sexual orientation, religion or ability.

To help accomplish this:

If you are neuroatypical or neurodiverse, have dyslexia or ADHD (for example), or have a social anxiety disorder or social phobia;

If you feel like your performance in the class is being impacted by your experiences outside of class;

If something was said in class (by anyone, including the instructor) that made you feel uncomfortable;

Please speak to your teaching team, our school pastoral officer Christina Tee Siew Khiaw or a peer or senior (either in-person or via email) about how we can help facilitate your learning experience.

As a participant in course discussions, you should also strive to honour the diversity of your classmates. You can do this by: using preferred pronouns and names; being respectful of others opinions and actively making sure all voices are being heard; and refraining from the use of derogatory or demeaning speech or actions.

All members of the class are expected to adhere to the NTU anti-harassment policy. if you witness something that goes against this or have any other concerns, please speak to your instructors or a faculty member.

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Last Updated By: Natasha Bhatia (Dr)