

The Hong Kong University of Science and Technology

UG Course Syllabus

Essential Oceanography

OCES3204

No. of Credits: 3

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Office Hours: Tuesday and Thursday, 10:30 – 11:50

Course Description

This course invites students to explore the oceans through an interdisciplinary lens, integrating concepts from biology, chemistry, physics, and geology. Students will investigate oceanic processes, marine ecosystems, and the chemical composition of seawater while considering the interconnectedness of these fields. The curriculum includes topics such as ocean circulation, nutrient dynamics, marine biodiversity, and the impact of climate change on ocean health. Students will gain a comprehensive understanding of human impacts on marine environments and global systems. The course emphasizes critical, equipping students to address complex oceanographic challenges. By bridging multiple disciplines, this course prepares students for careers in marine science, environmental policy, and sustainability.

Intended Learning Outcomes (ILOs)

By the end of this course, students should be able to:

1. Describe the fundamental physical, chemical, and biological processes that govern ocean systems.
2. Explain the interactions between the ocean and other Earth system components (atmosphere, lithosphere, biosphere).
3. Analyze the spatial and temporal variability of oceanographic phenomena (e.g. currents, temperature, salinity).
4. Evaluate the impacts of natural processes and human activities on marine ecosystems and resources.
5. Apply oceanographic principles and data to address real-world problems related to climate change, coastal management, or resource sustainability.
6. Communicate oceanographic concepts and research findings in written and oral formats.

Assessment and Grading

This course will be assessed using criterion-referencing and grades will not be assigned using a curve. Detailed rubrics for each assignment are provided below, outlining the criteria used for evaluation.

Assessments:

Assessment Task	Contribution to Overall Course grade (%)	Due date
Reading and term paper (or presentation)	30%	Refer to the class schedule
Final exam	65%	Refer to the exam timetable
In-class participation	5%	N/A

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Reading and term paper (or presentation)	ILO1, ILO2, ILO3, ILO4	This task assesses students' ability to explain and apply oceanographic concepts (ILO 1), evaluate their implications (ILO 2), analyze their spatial and temporal variations (ILO 3), and ecological and geochemical implication (ILO 4).
Final exam	ILO1, ILO2, ILO3, ILO4, ILO5, ILO6	The examination assesses students' ability to critically evaluate oceanographic phenomena (ILO 3) and analyze its driving force (ILO 4), demonstrating higher-order thinking skills of analysis and evaluation. The examination will cover all ILOs
In-class participation	ILO3, ILO4, ILO5, ILO6	The presentation and reflection assess students' ability to critically evaluate oceanographic data (ILO 3) and apply oceanographic principles to practical problems, such as global climate changes (ILO 4, 5), demonstrating higher-order thinking skills of analysis and evaluation (ILO6).

Grading Rubrics**Final Grade Descriptors:**

Grades	Short Description	Elaboration on subject grading description
A	Excellent Performance	Demonstrates a comprehensive grasp of subject matter, expertise in problem-solving, and significant creativity in thinking. Exhibits

		a high capacity for scholarship and collaboration, going beyond core requirements to achieve learning goals.
B	Good Performance	Shows good knowledge and understanding of the main subject matter, competence in problem-solving, and the ability to analyze and evaluate issues. Displays high motivation to learn and the ability to work effectively with others.
C	Satisfactory Performance	Possesses adequate knowledge of core subject matter, competence in dealing with familiar problems, and some capacity for analysis and critical thinking. Shows persistence and effort to achieve broadly defined learning goals.
D	Marginal Pass	Has threshold knowledge of core subject matter, potential to achieve key professional skills, and the ability to make basic judgments. Benefits from the course and has the potential to develop in the discipline.
F	Fail	Demonstrates insufficient understanding of the subject matter and lacks the necessary problem-solving skills. Shows limited ability to think critically or analytically and exhibits minimal effort towards achieving learning goals. Does not meet the threshold requirements for professional practice or development in the discipline.

Course AI Policy

Need to report the use of AI when working on the writing report for the assessments.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission. Feedback on assignments will include strengths and areas for improvement. Students who have further questions about the feedback, including marks, should consult the instructor within five working days after the feedback is received.

Resubmission Policy

Unless with unavoidable circumstances, resubmission is not permitted.

Required Texts and Materials

Oceanography: An Invitation to Marine Science 10th Edition by Tom Garrison [Oceanography: An Invitation to Marine Science \(MindTap Course List\): Garrison, Tom S., Ellis, Robert: 9780357452752: Amazon.com: Books](#)

Biological Oceanography, 2nd Edition (Charles B. Miller, Patricia A. Wheeler) [Biological Oceanography, 2nd Edition | Wiley](#)

The link for the videos of Blue-Planet II:

<https://video.alexanderstreet.com/channel/blue-planet-ii>

HKUST has purchased these videos and you have free access to these videos. Please spend a few hrs to watch (they are not only educative but also wonderful). We may use one or two episodes in class. These videos will help you understand our oceans.

Academic Integrity

Students are expected to adhere to the university's academic integrity policy. Students are expected to uphold HKUST's Academic Honor Code and to maintain the highest standards of academic integrity. The University has zero tolerance of academic misconduct. Please refer to [Academic Integrity | HKUST – Academic Registry](#) for the University's definition of plagiarism and ways to avoid cheating and plagiarism.