

OCEs 3001 Coastal Environmental Monitoring

Course Description

Students will gain hands-on experience in field survey and sampling, laboratory studies including physical, chemical and biological analyses, experimental design, as well as data analyses and presentations. Course topics include coastal survey, water quality monitoring, marine sediment quality monitoring, etc.

Course Objectives

OCEs 3001 is a major required course for undergraduate students majoring in Environmental Science in the School of Science at the Hong Kong University of Science and Technology. The primary objectives of this course is to provide students with hands-on experiences in identifying possible sources of pollutants found in various coastal habitats and suggesting solutions of how to improve/ monitor environmental pollutants using advanced instrumentation and technology.

Intended Learning Outcomes (ILOs)

Students will gain essential background knowledge and skills for conducting field and lab works in coastal environmental monitoring. Upon completion of this course, students should be able to

1. Explain the scientific principles underlying the experimental procedures described in individual lab sessions
2. Collect, interpret, and critically analyse scientific data; and draw conclusions from lab studies
3. Practice the common techniques used in coastal environmental monitoring
4. Communicate pollution monitoring and measurement through oral presentation
5. Work independently and collaborate effectively in the teamwork
6. Abide by ethical principles in laboratory work and data interpretation

Course Format

One lab session & tutorial per week

Course Instructor

Dr Cindy Lam (envscindy@ust.hk)

Course Assessment

Individual Work

- 5 Lab Worksheets (30%; each 6%)
- 5 Online Quizzes (15%)
- Continuous Assessment (10%)
- Research Report (15%)

Group Work

- Experiential Lab (30%)
 - Proposal Writing (5%)
 - Group Presentation (20%)
 - Peer evaluation (5%)

Summary Table

Assessment Task	Contribution to Overall Course Grade (%)	Due Date
Lab 1 worksheet	6 %	22 Feb 2025
Lab 2 worksheet	6 %	1 Mar 2025
Lab 3 worksheet	6 %	15 Mar 2025
Lab 4 worksheet	6 %	29 Mar 2025
Lab 5 worksheet	6 %	12 Apr 2025
Quiz 1	3 %	19 Mar 2025
Quiz 2	3 %	19 Mar 2025
Quiz 3	3 %	9 Apr 2025
Quiz 4	3 %	9 Apr 2025
Quiz 5	3 %	9 Apr 2025
Group Project Proposal	5 %	29 Mar 2025
Group Presentation	20 %	7 May 2025
Individual Research Report	15 %	21 May 2025

Assessment marks for individual assessed tasks will be released within two weeks of the due date.

Lab Manual

Electronic lab manual with additional references will be available in Canvas.

Mapping of Course ILOs to Assessment Tasks

Assessed Task	Mapped ILOs	Explanation
Lab worksheets	ILO 1, ILO 2, ILO 3	This task assesses students' ability to explain scientific principles through collection, interpretation and analysis of scientific data (ILO 1, ILO 2) and practice the common techniques used in coastal environmental monitoring (ILO 3)
Quiz	ILO 1, ILO 2, ILO 3	This task assesses students' foundation understanding of scientific principles underlying experimental procedures (ILO 1, ILO 2), and evaluate the common techniques used in coastal environmental monitoring (ILO 3)
Group Project Proposal	ILO 1, ILO 2, ILO 3, ILO 5, ILO 6	This task assesses students' ability to understand and apply scientific

		principles to real-life decision solving the challenges in coastal areas (ILO 1, ILO 2), practice the common techniques (ILO 3) through collaboration with their group members (ILO 5) in the lab and in the field (ILO 6)
Group Project Presentation	ILO 1, ILO 3, ILO 4, ILO 5	This task assess students' ability to explain key concepts, principles and practices in coastal environmental monitoring (ILO 1, ILO 3), and learn different methods to present reliable data with their group members (ILO 4, ILO 5)
Peer Evaluation	ILO 4, ILO 5	This task assess students' ability to foster critical evaluation of group members' contributions to the project, aligning with ILO 4 and ILO 5, and promoting the development of evaluative and communicative skills
Individual Research Report	ILO 2, ILO 3, ILO 6	This task assess students' ability to explain key concepts principles and practices through data collection and experimental design in coastal environmental monitoring (ILO 2, ILO 3), and learn ethical principles in laboratory work and data interpretation

Final Grade Descriptors:

Grades	Short Description	Elaboration on Subject Grading Description
A	Excellent Performance	Students achieving this grade demonstrate a comprehensive understanding of the course materials and consistently perform at an exceptional level. They excel in both theoretical knowledge and practical applications, showing superior analytical skills, creativity in problem-solving, and a thorough understanding of coastal environmental monitoring techniques. Work is completed with precision and minimal errors, meeting or exceeding all requirements for individual and group assessments.
B	Good Performance	This grade reflects a solid understanding of course content and the ability to apply knowledge effectively in most situations. Students exhibit competence in field and laboratory tasks and contribute meaningfully to group projects. While their work meets the standards of the course, there may be minor

		errors or room for improvement in data analysis, interpretation, or presentation quality.
C	Satisfactory Performance	Students earning this grade meet the basic expectations of the course. They demonstrate an adequate understanding of key concepts and skills but may struggle with consistency or depth in analysis and application. Work quality varies, showing satisfactory completion of assignments with occasional errors or oversight in execution and interpretation.
D	Marginal Pass	This grade indicates minimal achievement of the course objectives. Students display limited understanding and application of coastal environmental monitoring techniques and may struggle to meet deadlines or collaborate effectively in group settings. Their work often contains significant errors, gaps in knowledge, or incomplete components.
F	Fail	Students receiving this grade fail to demonstrate the required understanding or skills to achieve the course objectives. They are unable to perform adequately in field, lab, or group activities, and their submitted work does not meet the minimum standards for quality, accuracy, or completeness.

Communication and Feedback

Assessment marks for individual assessed tasks will be communicated via Canvas within two weeks of submission.

Course AI Policy

The use of Generative AI is not applicable to this course as all lab worksheets, quizzes, and individual research reports.

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.

Course Schedule

Week	Date	Topic	Format	Follow-up lab
1	5 Feb	Course Introduction & Lab Safety	Lecture	/
2	12 Feb	Lab 1: Physical Parameters Measurement in Water Samples	Lab	17 Feb
3	19 Feb	Lab 2: Total Coliform and <i>E.coli</i> Detection	Lab	20 Feb
4	26 Feb	Lab 3: Microplastics Detection	Lab	/
5	5 Mar	Lab 3 (cont'): Microplastics Quantification Using Raman Spectroscopy	Lab	/
6	12 Mar	Lab 4: Neutral Red Assay	Lab	/
7	19 Mar	Lab 4 (cont'): Trace Metal Analysis Experimental Design and Proposal Writing Quiz 1 & 2	Lab + Quiz	/
8	26 Mar	Lab 5: Determination of Total Petroleum Hydrocarbons + Toxicity Assays of Oil-Water Samples Using Brine Shrimp <i>Artemia salina</i>	Lab	27 Mar
9	2 Apr	<i>Midterm Break</i>		
9	9 Apr	Data Analysis of Lab 5 Submission of Group Project Proposal Quiz 3, 4 & 5	Lecture + Quiz	/
10	16 Apr	Experiential Lab (1)	Lab	/
11	23 Apr	Experiential Lab (2)	Lab	/
12	30 Apr	Data Wrap-Up Session Preparation of Group Project Presentation	Lecture	/
13	7 May	Group Project Presentation Submission of Group Project Report	Presentation	/

Rubrics for Group Presentation

Criteria	Excellent Marks = 10	Good Marks = 8	Satisfactory Marks = 6	Marginal Pass Marks = 4	Fail Marks = 0
Subject knowledge					
Quality (e.g. use of varied sources, evaluated and validated sources, accurate information)	Information is accurate; resources are legitimate; resources are varied and appropriate	Information is mostly accurate with only a few minor errors; one resource may be questionable; resources good but not varied enough	Information is acceptably accurate; more than one resource may be questionable; no variation in resource	Information is mostly unreliable and/or inaccurate; most of the resources are not valid	PLAGIARISM OR ABSENT FROM PRESENTATION
Explanation on specific terms	Well and clear explanation on specific terms with good examples	Good explanation on specific terms with a few minor errors in the examples	Fair explanation on specific terms without showing the examples	No explanation on specific terms nor showing the examples	
Organization					
Effective slides (e.g. coherent, logical progression, well organized include ‘main points, not details’, ‘tell a story’)	Slides clearly aid the speaker in telling a coherent story	For most of the slides are helpful in telling the story with minor problems	Slides are acceptably helpful in telling the story with a few glaring problems	Slides mostly interfere with the story	PLAGIARISM OR ABSENT FROM PRESENTATION

Criteria	Excellent Marks = 10	Good Marks = 8	Satisfactory Marks = 6	Marginal Pass Marks = 4	Fail Marks = 0
Communication					
Clarity (e.g. explains ideas well, integrates with slides, clear introduction and conclusion, obvious transition, demonstrate knowledge with key points)	Presentation is coherent with clear introduction, transition, language usage, and conclusion; speaker demonstrate intimate knowledge of the subject	Presentation is coherent for the most part, but missing some elements	Presentation is acceptably coherent, but missing a few important elements	Presentation lacks coherence	PLAGIARISM OR ABSENT FROM PRESENTATION
Style (e.g. speaks in sentence, fluent delivery, well paced, maintains eye contact, good time management, clearly practiced)	Presentation is polished, speaker uses sentences, fluent in delivery, maintains an effective pace and eye contact, excellent in time management	Presentation is polished for the most parts, but missing some elements	Presentation is acceptably polished but missing a few important elements	Presentation is hardly polished	

Criteria	Excellent Marks = 10	Good Marks = 8	Satisfactory Marks = 6	Marginal Pass Marks = 4	Fail Marks = 0
Team work					
Participation in the presentation (e.g. 4 min/ person)	Students are clearly defined the job allocation in the presentation	Most of the students are not clearly defined the job allocation in the presentation	Students only mention a few points of job allocation in the presentation	Students do not define the job allocation in the presentation	PLAGIARISM OR ABSENT FROM PRESENTATION
Problem solving skills (e.g. respond to questions in Q&A session)	Students respond well to questions with good examples or explanation	Students respond well to questions with examples or explanation in minor errors	Students respond to questions with limited examples or explanation	Students respond to questions with inaccurate examples or explanation	