

**Course Name:** Marine and Coastal Environment - LOM 10103

**Number of Credits:** 3 credits (5 ECTS)

**Period:** January/July Semester

Coordinator	Ts. Amayrol Zakaria
Credits	3 (5 ECTS)
Lecturers	1. Assoc. Prof. Ts. Dr. Mohd Yuzri Bin Mohd Yusop 2. Associate Professor Ts. Dr. Aminuddin Md Arof 3. Norazlina Abdul Nasir
Level	Master
Host institution	Universiti Kuala Lumpur – Malaysian Institute of Marine Engineering Technology (UniKL-MIMET)
Course duration	17 weeks
New/revised	Revised

### Summary

This 3-credit (4 ECTS) course is offered as a core subject to the Master in Maritime Operations (MMO) programme to expose students to the marine environment. The marine environment encompasses a vast array of unique ecosystems, extending from coastal regions to deep oceans. This course will impart knowledge to students on the evolution of the ocean and ocean basins, its coastal and marine provinces geological features, the effects of air-sea interaction, the fundamental physical and chemical aspects of the ocean as well as its circulation, wave and tide. This course will also investigate the resulting threats to its sustainability with increasing human activities.

### Target student audiences

Master students majoring in marine sciences, marine biology and maritime studies.  
 Year 1, Semester 1

### Prerequisites

None.

### Aims and objectives

There is increasing concern on marine resources sustainability as we rely more and more on its goods and services to support a growing population. This is only possible with a full appreciation and awareness of marine biodiversity, ecosystem function and the potential consequences of intensified human activities. This course introduces students to general marine ecosystem contexts from coastal to deep sea environments. The adverse effects of sea temperature rise, ocean acidification, pollution, eutrophication, coral bleaching and overexploitation of marine resources are also investigated.

### The Authentic Tasks are:

#### General learning outcomes:

By the end of the course, successful students:

- |               |  |
|---------------|--|
| Knowledge     | - will be able to explain the evolution of the ocean and ocean basin and demonstrate good comprehension on features of coastal and marine provinces.   |
| Comprehensive | - will be able to demonstrate increased awareness of air-sea interaction, elements of ocean circulation, waves, tides and tidal stream and their effects on human activities.  |
| Application   | - will demonstrate the ability to apply fundamental methods of literature review, data analysis, and interpretation in the preparation and presentation of case study of a given topic on pollution and the effects of human activities on marine ecosystem. |

- Analysis - will demonstrate the ability to evaluate, integrate, and apply appropriate information from various sources to create cohesive case study on topics relating to marine ecosystem.
- Synthesis - will be able to identify environmental problems and evaluate problem-solving strategies.

### Overview of sessions and teaching methods

Teaching and learning will be via interactive virtual classes through the use of online platform designed to support the implementation of an innovative interactive learning approach. The online platform (UniKL VLE and MS-TEAMS) will also serve as a virtual space for students to interact with each other. Collaborative learning, and group discussions will also be done online. Students are required to do self-learning based on given topics in preparation for continuous and final assessments. Students will be assessed through written tests, individual and group assignments, and final examination.

<b>Learning methods</b>	<ul style="list-style-type: none"> <li>- Online lectures and presentations</li> <li>- Moderated in-class discussions</li> <li>- Group work</li> <li>- Case study</li> <li>- Literature review</li> </ul>	
<b>Course outline</b>	Week 1-4	<b>1. MARINE AND COASTAL ENVIRONMENTS</b> 1.1. The oceans 1.2. Similarities and differences between marine and terrestrial environments. 1.3. Characteristics of the marine environment 1.4. Marine biology  <b>2. THE OCEAN AND THE ATMOSPHERE</b> 2.1. Global Climates 2.2. The air-sea interface 2.3. Coriolis Effect 2.4. Global atmospheric circulation 2.5. Physical structure of the world ocean
	Week 5-7	<b>3. COASTAL ENVIRONMENT</b> 3.1. Coastal oceans 3.2. Coastal ecosystem 3.3. Rocky shores 3.4. Coastal issues  <b>4. SEAFLOOR FEATURES</b> 4.1. The land beneath the sea 4.2. Bimodal crust and isostasy 4.3. Provinces of the seafloor 4.4. Marine sediments
	Week 8-10	<b>5. OCEAN CHEMISTRY</b> 5.1. Water and its unique property 5.2. The dissolved elements of seawater 5.3. Sources and sinks 5.4. CO <sup>2</sup> and the ocean  <b>6. OCEAN PHYSICS</b> 6.1. An ocean of energy 6.2. Physical properties of sea water

		6.3. Solar radiation 6.4. Human-caused warming of the ocean 6.5. Plimsoll mark and the load lines
	Week 11-13	<b>7. OCEAN CIRCULATION AND WAVES</b> 7.1. General patterns of surface circulation 7.2. General patterns of deep circulation 7.3. Global conveyor belt system 7.4. The wave theory 7.5. Wave generation by winds 7.6. Wave interactions with seafloor 7.7. Hogging and sagging of ships
	Week 14-16	<b>8. TIDES AND THE COASTAL ENVIRONMENT</b> 8.1. Tides and tidal streams 8.2. Causes of tides 8.3. Dynamic model of tides 8.4. Sea level, tidal height and chartered depth 8.5. Tides, tidal streams and port activities
	Week 17	<b>REVISION FOR FINAL EXAMINATION</b>

## Literature

### Compulsory

1. Rafferty, J.P. (2011), Ocean and Oceanography, Britannica, New York.
2. Chamberlin, W. S. and Dickey, T. D. (2008), Exploring the World Ocean, McGraw Hill, New York.

### Recommended

1. Zacharias, Mark (2014), Marine Policy, Routledge, New York.
2. Peter Nielsen (2009), Coastal and Estuarine Processes, Advanced series on Ocean Engineering – Vol. 29, World Scientific Publishing, Singapore.
3. Joseph, H. (2005), Introduction to Physical Geography and the Environment, Prentice Hall.
4. Beer, Tom (1997), Environment Oceanography, Second Edition, CRC Press, Boca Ration, Florida

## Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
<b>In-class activities (54 hours)</b>			
Lectures	Explain the evolution of the ocean and ocean basin and demonstrate good comprehension on geological, physical and chemical features of coastal and marine provinces.	Class participation.	34
Moderated in-class discussions	Identify environmental problems and evaluate problem-solving strategies.	Class participation and	10

		preparedness for discussions.	
In-class assessments	Demonstrate increased awareness of air-sea interaction, elements of ocean circulation, waves, tides and tidal stream and their effects on human activities.	Written tests.	2
Individual assignments	Demonstrate the ability to evaluate, integrate, and apply appropriate information from various sources to create cohesive case study on topics relating to marine ecosystem.	Individual assignments.	4
Group assignment	Demonstrate the ability to apply fundamental methods of literature review, data analysis, and interpretation in the preparation and presentation of case study of a given topic on pollution and the effects of human activities on marine ecosystem.	Group assignment and presentation.	4
<b>Independent work (66 hours)</b>			
Lectures	Explain the evolution of the ocean and ocean basin and demonstrate good comprehension on geological, physical and chemical features of coastal and marine provinces.	Class participation.	18
Moderated in-class discussions	Identify environmental problems and evaluate problem-solving strategies.	Class participation and preparedness for discussions.	4
In-class assessments	Demonstrate increased awareness of air-sea interaction, elements of ocean circulation, waves, tides and tidal stream and their effects on human activities.	Written tests.	8
Individual assignments	Demonstrate the ability to evaluate, integrate, and apply appropriate information from various sources to create cohesive case study on topics relating to marine ecosystem.	Individual assignments.	10
Group assignment	Demonstrate the ability to apply fundamental methods of literature review, data analysis, and interpretation in the preparation and presentation of case study of a given topic on pollution and the effects of human activities on marine ecosystem.	Group assignment and presentation.	20
Final Examination	Explain the evolution of the ocean and ocean basin and demonstrate good comprehension on geological, physical and chemical features of coastal and marine provinces.	Final Examination	6
<b>TOTAL</b>			<b>120</b>

### Grading

The students' performance will be based on the following:

<b>Assessment</b>	<ul style="list-style-type: none"> <li>- <u>Continuous assessment (60%):</u> <ul style="list-style-type: none"> <li>- Written Tests (30%): students have to undertake written tests covering topics covered throughout the semester.</li> <li>- Individual Assignments (15%): students have to complete the exercise for each topic.</li> <li>- Group Assignment (15%): The students will be divided into groups of 4-5 students and each group will choose a topic that includes sea temperature rise, ocean acidification, pollution, eutrophication, coral bleaching and overexploitation of marine resources. Students need to produce and present their group assignment case study according to specific requirements. Peer Assessment will constitute 10% of the group assignment.</li> </ul> </li> <li>- <u>Final assessment (40%):</u> <ul style="list-style-type: none"> <li>- Final examination (40%)</li> </ul> </li> </ul>																																	
<b>Evaluation</b>	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Mark</th> <th style="padding: 5px;">Grade</th> <th style="padding: 5px;">Point Value</th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">80-100</td><td style="padding: 5px;">A</td><td style="padding: 5px;">4.00</td></tr> <tr><td style="padding: 5px;">75-79</td><td style="padding: 5px;">A-</td><td style="padding: 5px;">3.67</td></tr> <tr><td style="padding: 5px;">70-74</td><td style="padding: 5px;">B+</td><td style="padding: 5px;">3.33</td></tr> <tr><td style="padding: 5px;">65-69</td><td style="padding: 5px;">B</td><td style="padding: 5px;">3.00</td></tr> <tr><td style="padding: 5px;">60-64</td><td style="padding: 5px;">B-</td><td style="padding: 5px;">2.67</td></tr> <tr><td style="padding: 5px;">55-59</td><td style="padding: 5px;">C+</td><td style="padding: 5px;">2.33</td></tr> <tr><td style="padding: 5px;">50-54</td><td style="padding: 5px;">C</td><td style="padding: 5px;">2.00</td></tr> <tr><td style="padding: 5px;">45-49</td><td style="padding: 5px;">C-</td><td style="padding: 5px;">1.67</td></tr> <tr><td style="padding: 5px;">40-44</td><td style="padding: 5px;">D</td><td style="padding: 5px;">1.00</td></tr> <tr><td style="padding: 5px;">0-39</td><td style="padding: 5px;">F</td><td style="padding: 5px;">0.00</td></tr> </tbody> </table>	Mark	Grade	Point Value	80-100	A	4.00	75-79	A-	3.67	70-74	B+	3.33	65-69	B	3.00	60-64	B-	2.67	55-59	C+	2.33	50-54	C	2.00	45-49	C-	1.67	40-44	D	1.00	0-39	F	0.00
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