Marine Coastal and Delta Sustainability for Southeast Asia

Learner's Manual

Marine and Coastal Environment

LOM 10103

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1.0 Introduction

This course is offered as a core subject to the MMO programme to expose students to the maritime environment. The knowledge imparted to students concerning the natural forces at sea such as current, wave, tide, wind and the geological aspects of marine and coastal environment will give them the understanding required in order to be involved in maritime operations and the management of maritime activities. Amongst others, the knowledge garnered will enable them to plan port activities, port expansion and scheduling ships passages.

Upon completion of this course students should be able to:

1. Explain the evolution of the ocean and ocean basin.
2. Describe the features of the coastal and marine provinces.
3. Examine the air-sea interaction and its effects on offshore activities.
4. Analyze the various elements in ocean circulation and waves including their effect on maritime operations.
5. Analyze the influence of tides and tidal stream on shipping and port activities and the coastal environment.

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2.0 Course Structure

2.1 Learning Schedule

Topic	Description
Topic 1	**MARINE AND COASTAL ENVIRONMENTS** 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
Topic 2	**THE OCEAN AND THE ATMOSPHERE** 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
Topic 3	**COASTAL ENVIRONMENT** 3.1 Coastal oceans 3.2 Coastal ecosystem 3.3 Rocky shores 3.4 Coastal issues
Topic 4	**SEAFLOOR FEATURES** 4.1 The land beneath the sea 4.2 Bimodal crust and isostasy 4.3 Provinces of the seafloor 4.4 Marine sediments
Topic 5	**OCEAN CHEMISTRY** 5.1 Water and its unique property 5.2 The dissolved elements of seawater 5.3 Sources and sinks 5.4 CO2 and the ocean

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Topic 6	**OCEAN PHYSICS** 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
Topic 7	**MARINE AND COASTAL** ATMOSPHERE 7.1 Weather and climate 7.2 The air-sea interface 7.3 Coriolis effect 7.4 Global atmospheric circulation 7.5 Physical structure of the world ocean 7.6 Temporal and spatial variability in the atmosphere system
Topic 8	**OCEAN CIRCULATION AND WAVES** 8.1 General patterns of surface circulation 8.2 General patterns of deep circulation 8.3 Global conveyor belt system 8.4 The wave theory 8.5 Wave generation by winds 8.6 Wave interactions with seafloor 8.7 Hogging and sagging
Topic 9	**TIDES AND THE COASTAL** ENVIRONMENT 9.1 Tides and tidal streams 9.2 Causes of tides 9.3 Dynamic model of tides 9.4 Sea level, tidal height and chartered depth 9.5 Tides, tidal streams and port activities

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2.0 Course Structure

2.2 Mode of Delivery

Course were thought online using Microsoft Teams application. Link to the webinar will be provided by teacher through email or e-learning platform.

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2.0 Course Structure

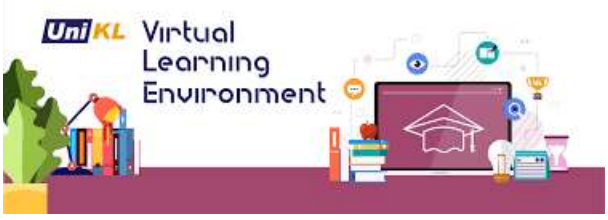
2.3 Teaching Strategy

Teaching and Learning

Teaching and learning will be via lecture, collaborative learning, and small group discussion with presentation. Students are required to do self-learning based on given topics for homework and assignment.

Assessment

Students will be assessed through written tests, final exam and group activity.



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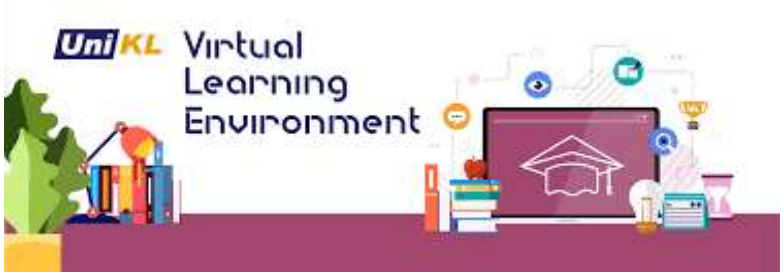
2.0 Course Structure

2.4 Learning Material



Lectures

Lecture Slides Chapter 1

Presentation slides for **Chapter 1: Marine and Coastal Environments** for our coming class for your reference.

Lecture Slides Chapter 2

Presentation slides for **Chapter 2: The Ocean and The Atmosphere** for our coming class for your reference.

Lecture Slides Chapter 3

Presentation slides for **Chapter 3: Coastal Environment** for our coming class for your reference.

Lecture Slides Chapter 4

Presentation slides for **Chapter 4: Seafloor Features** for your reference.

All learning materials such as lecture notes, videos and articles related to the learning topics will be made available online in e-Learning platform.

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2.0 Course Structure

2.3 Additional Learning Material (video/notes/articles)

Video Related to Course

- Hydrothermal Vents
- Solar Radiation - The Four Seasons
- Plimsoll Mark and International Load Line
- Halocline in Straits of Gibraltar (between Atlantic and Mediterranean Seas)
- Halocline near Surabaya and Madura, Indonesia

All additional materials such as lecture notes, videos and articles related to the learning topics will be made available online in e-Learning platform.

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2.0 Course Structure

2.4 Assessment

Type of Assessment	% Contribution
Written Test	30%
Assignment	30%
Final examination	40%
TOTAL	**100%**

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3.0 Course Structure

3.1 Course Reading List

No.	References
1.	Chamberlin, W. S. and Dickey, T. D. (2008), Exploring the World Ocean, McGraw Hill, New York
2.	Beer, Tom (1997), Environment Oceanography, Second Edition, CRC Press, Boca Ration, Florida
3.	Joseph, H. (2005), Introduction to Physical Geography and the Environment, Prentice Hall.
4.	Peter Nielsen (2009), Coastal and Estuarine Processes, Advanced series on Ocean Engineering – Vol. 29, World Scientific Publishing, Singapore.
5.	Zacharias, Mark (2014), Marine Policy, Routledge, New York.

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