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Template syllabus of the new/revised courses

Course Name: MARINE ENVIRONMENT
Number of credits: 3 ECTS

Period: Fall/spring semester

Cooordinator	
Credits	3 ECTS
Lecturers	**Adi Maimun bin Abdul Malik, Prof, Dr.**
Level	Undergraduate
Host institution	Universiti Teknologi Malaysia
Course duration	1 semester=14 weeks (80 learning time)
New/revised	Revised

Summary

This subject gives an introduction to the subjects of marine meteorology and oceanography. It explains the fluid physical characteristics and movement on the earth surface. As such, the student will have a clear understanding of the weather that results from the interaction between the atmosphere and the sea surface. Following from this, the students will gain better appreciation on the interactions between the marine environment and marine vehicles/structures. As such, the important issue relating to marine safety, sustainability and environmental impact (Climate Change & Sea Level Rise) can be addressed.

Target student audiences

Open to all undergraduate students especially engineering and science courses.

Prerequisites

Required courses (or equivalents): none

Aims and objectives

The main course objective is to expose the students to the interactions between the marine environment and marine vehicles/structures. The course will highlight the knowledge of marine safety, sustainability and environmental impact (Climate Change & Sea Level Rise).

The Authentic Tasks are:

General learning outcomes:

By the end of the course, successful students will:

Knowledge	• Describe the Marine Meteorology and Oceanography phenomena and their characteristic
Comprehensive	•
Application	• Apply relevant knowledge to carry out/propose sustainable environmental projects
Analysis	• Analyze the relationships between the marine environment and marine vehicles/structures
Synthesis	•

Overview of sessions and teaching methods

The course will make most of interactive and self-reflective methods of teaching and learning and, where possible, avoid standing lectures and presentations.

Learning methods

- Lectures and active learning
- Video presentations
- Test, assignment and project
- Interviews, surveys, fieldtrip, group work, written articles/essay
- Project Based Learning
- Literature review

Course outline

WEEK 1	Origins of atmosphere and ocean basins Fluids: Atmosphere and water
WEEK 2	Hydrological Cycle: Water in the atmosphere. Energy source and heat distribution
WEEK 3	Vertical stability and temperature distribution
WEEK 4	Cloud, precipitation and visibility
WEEK 5	Pressure gradients and atmosphere
WEEK 6	Climatology General circulation of the atmosphere. Global distribution of pressure. Air and sea surface temperatures. Winds and precipitation over the oceans. Local circulations. Land and sea breezes.
WEEK 7	Weather Systems Air masses. Extra-tropical cyclones, anti-cyclones and associated weather. Fronts and their movements. Sequences of clouds and weathers at fronts. Intertropical convergence zones. Tropical revolving storms, assoc weather, winds and clouds.
WEEK 8	Mid-Semester Break
WEEK 9	Constituents of sea water Water masses
WEEK 10	Waves and tides
WEEK 11	Oceanic circulation
WEEK 12	Marine renewable energy devices
WEEK 13	Marine pollution
WEEK 14	Climate change and sea level rise
WEEK 15	Presentations of projects

Literature

References

1. Meteorology for Mariners, Met. O. 895, HMSO, 1983. London.
2. Marine Observer's Handbook, Met. O. 887, HMSO, 1987, London.
3. A Course in Elementary Meteorology, Met. O. 707, HMSO, London, 1962
4. Atmosphere and Ocean: Our Fluid Environments, J.G. Harvey, The Artemis Press, 1976
5. Geography Workbook 2 – The Weather, P.Harvey, K.R. Maxted, M.G. Webb Lewis Reprints, 1978
6. Mariner's Weather Handbook – First Edition, Steve & Linda Dashew, Beowulf Inc., 1999.
7. Ocean Circulation – 1st Edition, Joan Brown, Butterworth-Heinemann, 1st January 1989.

8. Marine Pollution Control: Legal and Managerial Frameworks, Iliana Christodoulou-Varotsi, Taylor & Francis, 24 Apr 2018.
9. Marine Pollution, Chris Frid and Bryony A. Caswell, Oxford, United Kingdom, Oxford University Press, 2017.

Online
http://elearning.utm.my

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities (30 hours)			
Lectures	Understanding theories, concepts, methodology and tools	Class participation	10
Moderated in-class discussions	Understanding various policy and management contexts and common problems in communication in Climatology And Weather Systems	Class participation and preparedness for discussions	5
In-class assignments, field assignment	Understanding various policy and management contexts and common problems in communication in in Climatology And Weather Systems	Class participation and preparedness for assignments	5
Reading and discussion of assigned papers for seminars and preparation for lectures	Familiarity with and ability to critically and creatively discuss key concepts, tools and methods as presented in the literature	Class participation, creative and active contribution to discussion	5
Group presentation	Ability to interpret data, to analyze audience, and to use the concepts of Marine Renewable Energy Devices and understand Marine Pollution control	Quality of group assignments and individual presentations	5
Independent work (50 hours)			
Group work: - Contribution to the group case-study projects - Contribution to the preparation and delivery of individual presentation - Contribution to the web-application	Ability to interpret data, to analyze audience, and to use the concepts, tools, and methods for communicating information to all participants Carry out/propose sustainable environmental projects. Using current information, tools and methods	Quality of group assignments and individual presentations	10
Course group assignment	Ability to conceptualize and frame an environmental governance problem, find	Quality of developed	10

	related literature and data, interpret data, use the concepts, tools and methods covered in the course, and draw policy/management relevant conclusions	problem solution and their presentation	
Self Study	Analyse the relationships between the marine environment and marine vehicles/structures Apply relevant knowledge to carry out/propose sustainable environmental projects.	Self study and reading of learning materials	30
Total			

Grading

The students' performance will be based on the following:

Assessment

- Progress assessment (80%):
  - Quiz (20%)
  - Homework (20%)
  - Test (40%)

- Project (20%):

- Group report (20%): The students will be divided into groups of 4-5 students and choose 1 topic among 6 topics including hydropower, biomass energy, waste to energy, solar energy, wind energy and energy efficiency and complete the group project report according to the specific requirements of each topic.
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Evaluation

90 – 100	A+	4.00	Excellent Pass
80 – 89	A	4.00	
75 – 79	A-	3.67	
70 – 74	B+	3.33	Good Pass
65 – 69	B	3.00	
60 – 64	B-	2.67	Pass
55 – 59	C+	2.33	Fail
50 – 54	C	2.00	
45 – 49	C-	1.67	
40 – 44	D+	1.33	
35 – 39	D	1.00	
30 – 34	D-	0.67	
00 – 29	E	0.00	