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E-Learning presentation

MARINE ENVIRONMENT AND RENEWABLE ENERGY

Marine Coastal and Delta Sustainability for Southeast Asia (MARE)

OVERVIEW

MARE
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- Contain “Marine Environment and Renewable Energy” course material for Master of Science (Mechanical Engineering)
- Site URL: Course: MEMO2003-01 MARINE ENVIRONMENT AND RENEWABLE ENERGY (utm.my)
- Medium: English

- Modules:
  - Announcements
  - Overview
  - Lesson Plan
  - Course Materials
  - Lecture Notes
  - Additional Resources
  - Assignment

OVERVIEW (Disclaimer)

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MEMO2003-01 MARINE ENVIRONMENT AND RENEWABLE ENERGY

Dashboard > My courses > MEMO2003-01

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COURSE INTRODUCTION

Edit

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MARINE ENVIRONMENT AND RENEWABLE ENERGY

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WELCOME MESSAGE

Dear students, I would like to welcome you to Marine Environment and Renewable Energy Course. Please check the e-learning page frequently.

Best regards,

Dr. Arifah

COURSE SYNOPSIS

This course is designed to give students an understanding of the science of marine environment particularly waves and tides, and how this affects efforts to exploit energy from these resources. Students will first be introduced to fundamentals of oceanography and marine meteorology. 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. Student will then learn on marine environmental issues related to ship and offshore structure. This course also introduces the main forms of marine renewable energy particularly wind, wave and tidal, focusing on the technology and resource assessment associated with each.

COURSE OUTCOMES

CLO1	Apply the physics of oscillations and waves with applications to wind, waves, and tides
CLO2	Analyse the effects of marine environment on vessels and offshore structures
CLO3	Critically analyse problems of available marine energy converters and propose suitable device for selected region
CLO4	Appraise various aspects of investment in renewable energy development using appropriate techniques and Excel functions for finance

LESSON PLAN

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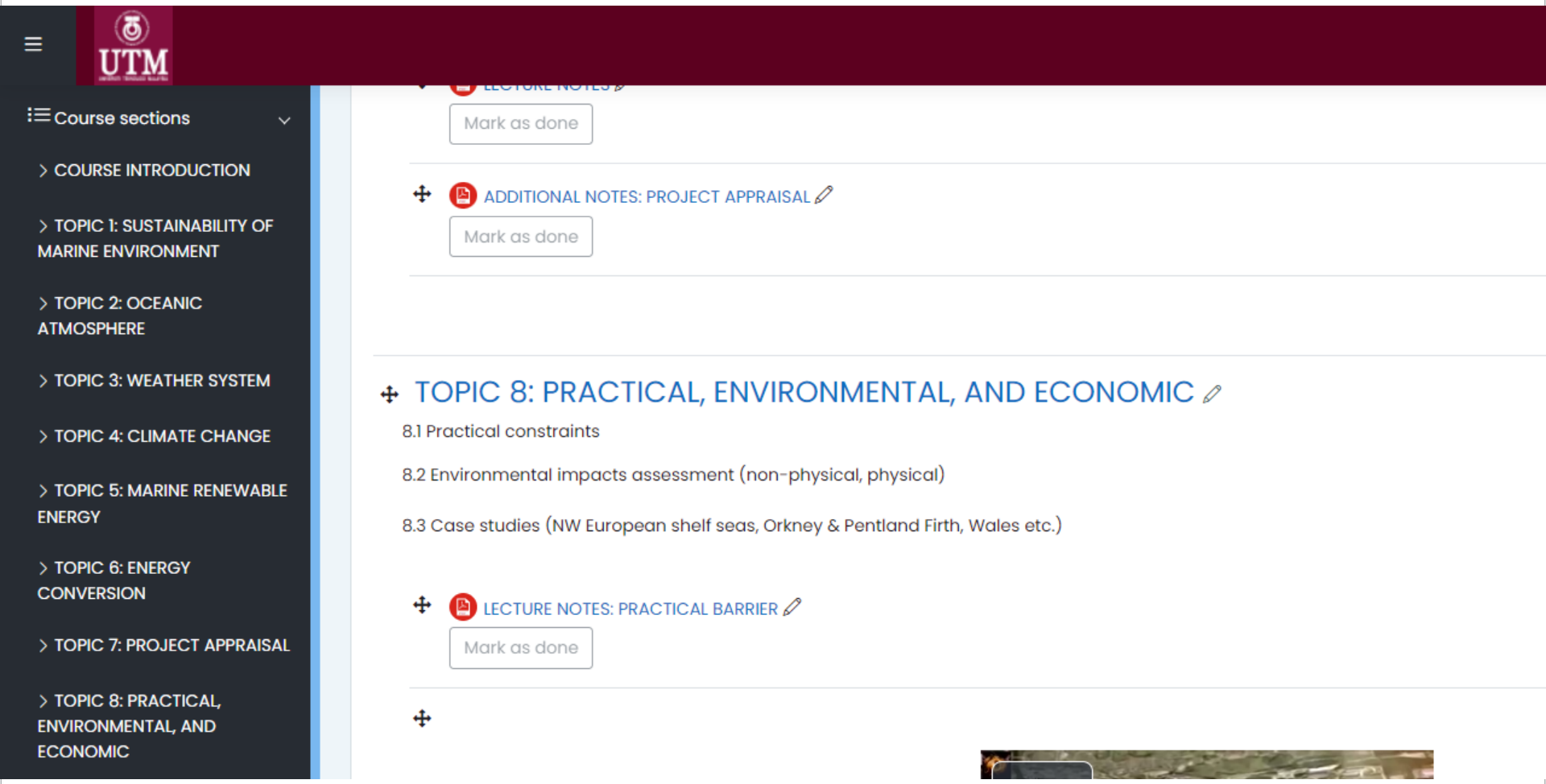

COURSE MATERIALS

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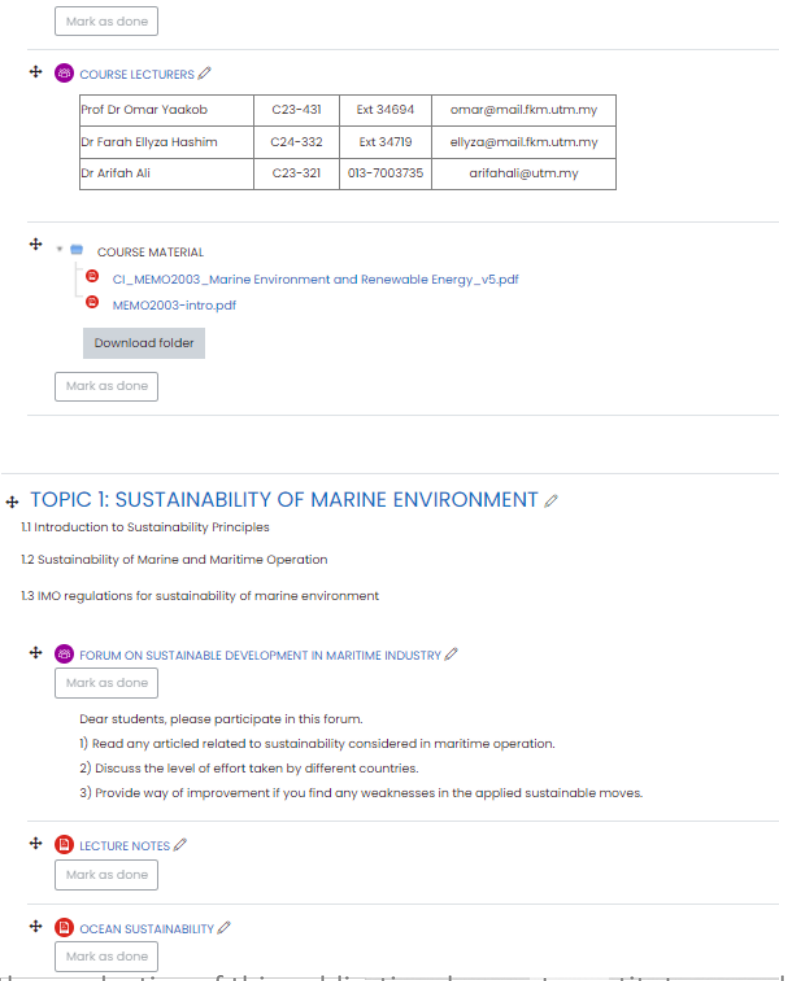

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COURSE LECTURERS

Prof Dr Omar Yaakob	C23-431	Ext 34694	omar@mail.fkm.utm.my
Dr Farah Ellyza Hashim	C24-332	Ext 34719	ellyza@mail.fkm.utm.my
Dr Arifah Ali	C23-321	013-7003735	arifahali@utm.my

COURSE MATERIAL

CI_MEMO2003_Marine Environment and Renewable Energy_v5.pdf

MEMO2003-intro.pdf

Download folder

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TOPIC 1: SUSTAINABILITY OF MARINE ENVIRONMENT

1.1 Introduction to Sustainability Principles

1.2 Sustainability of Marine and Maritime Operation

1.3 IMO regulations for sustainability of marine environment

FORUM ON SUSTAINABLE DEVELOPMENT IN MARITIME INDUSTRY

Mark as done

Dear students, please participate in this forum.

1) Read any articled related to sustainability considered in maritime operation.

2) Discuss the level of effort taken by different countries.

3) Provide way of improvement if you find any weaknesses in the applied sustainable moves.

LECTURE NOTES

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OCEAN SUSTAINABILITY

Mark as done

COURSE MATERIALS

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TOPIC 2: OCEANIC ATMOSPHERE

2.1 Origins of the Atmosphere and Ocean Basins

2.2 Atmospheric Measurement

2.3 Atmospheric pressure and wind

2.4 Waves and tides

2.5 Oceanic Circulation

LECTURE NOTES

Mark as done

Dear students,

Kindly download the lecture notes here and watch the related videos for each lesson.

LESSON 1

Mark as done

Watch the following video to learn about atmosphere and water.

LESSON 2

Mark as done

please watch the video to learn about relationship between atmospheric pressure and wind.

SHORT ESSAY

Mark as done

PREPARE ONE SHORT ESSAY WITHIN 250 WORDS.

COURSE MATERIALS

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TOPIC 3: WEATHER SYSTEM

3.1 Climatology Weather System

3.2 Air Masses

3.3 Depression at Polar Point

3.4 Warm Front and Cold Front

3.5 Cyclones

3.6 Navigation within Cyclone

LECTURE NOTES

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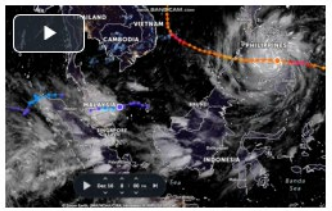
TROPICAL DEPRESSION



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CYCLONE AND ANTICYCLONE EXPERIMENT

Mark as done

ASSIGNMENT 1

Mark as done

1. EXPLAIN THE DIFFERENCE BETWEEN WARM FRONT AND COLD FRONT.
2. EXPLAIN THE DIFFERENCE BETWEEN CYCLONES AND COLD ANTI-CYCLONES.

COURSE MATERIALS

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TOPIC 4: CLIMATE CHANGE

4.1 Climate change modelling

4.2 Influence of climate change on ocean processes

4.3 General Climatology of the Oceans

4.4 MARPOL Effort on Managing Climate Change

LECTURE NOTES

Mark as done

IMO ACTION ON CLIMATE CHANGE

Mark as done

ATMOSPHERIC CIRCULATION AND OCEAN ECOSYSTEM

Mark as done

TOPIC 5: MARINE RENEWABLE ENERGY

5.1 Introduction to Ocean Renewable Energy

5.2 Context of marine energy (global/UK context, intermittency, energy roadmaps)

5.3 Key energy concepts (kinetic energy, potential energy, wave energy, tidal energy, power)

LECTURE NOTES

Mark as done

ASSIGNMENT 2

Mark as done

MAKE A COMPARISON BETWEEN 3 TYPES OF RENEWABLE ENERGY SOURCES.

COURSE MATERIALS

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TOPIC 6: ENERGY CONVERSION

6.1 Wave energy conversion

6.2 Marine current conversion

SIMULATION PROJECT

Mark as done

Hello students,

The task of the project is to conduct a short project which involve:

1) evaluating one marine renewable energy device based on CFD simulation (You need to use Server in Marine Technology Center, UTM as the simulation require powerful PC)

2) analysing the viability of the device with consideration of cost and environment

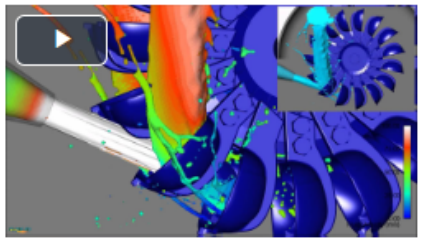
This is the link to submit the video PRESENTATION of project.

The aims of project is to assess student in

1. Appraise various aspects of investment in renewable energy development using appropriate techniques and Excel functions for finance

2. Demonstrate ability on project investment evaluation and design analysis ethically based on available standard guidelines

EXAMPLE OF CFD SIMULATION



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LECTURE NOTES

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COURSE MATERIALS

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TOPIC 7: PROJECT APPRAISAL

7.1 Economic Viability and Financial appraisal

7.2 Project Risk and Uncertainty

7.3 Marine Renewable Energy: Project Viability and Resource Availability

LECTURE NOTES

Mark as done

ADDITIONAL NOTES: PROJECT APPRAISAL

Mark as done

TOPIC 8: PRACTICAL, ENVIRONMENTAL, AND ECONOMIC

8.1 Practical constraints

8.2 Environmental impacts assessment (non-physical, physical)

8.3 Case studies (NW European shelf seas, Orkney & Pentland Firth, Wales etc.)

LECTURE NOTES: PRACTICAL BARRIER

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CASE STUDY: ARTICLE 1

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NOTES ATTACHMENT

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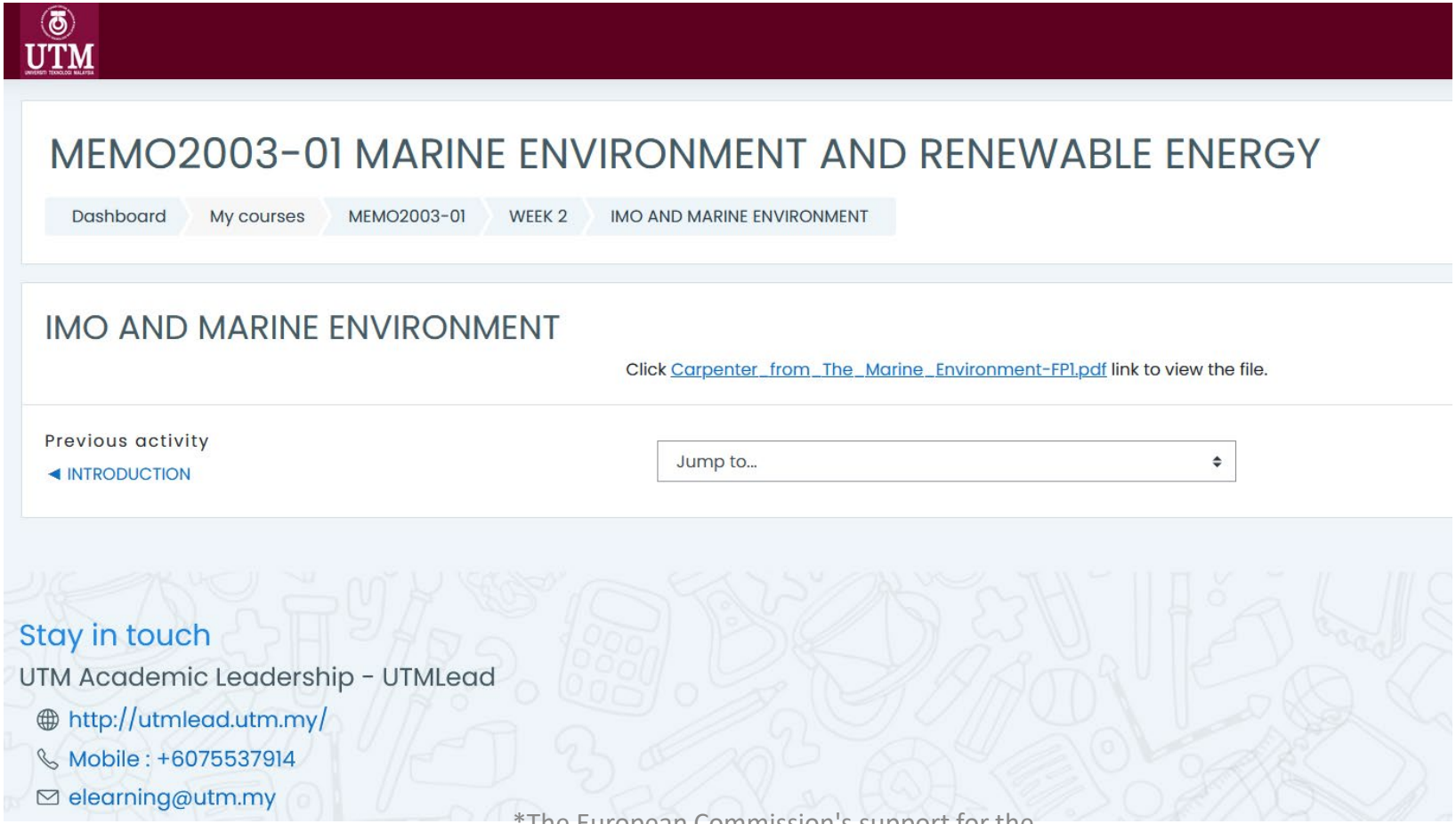

ADDITIONAL RESOURCES

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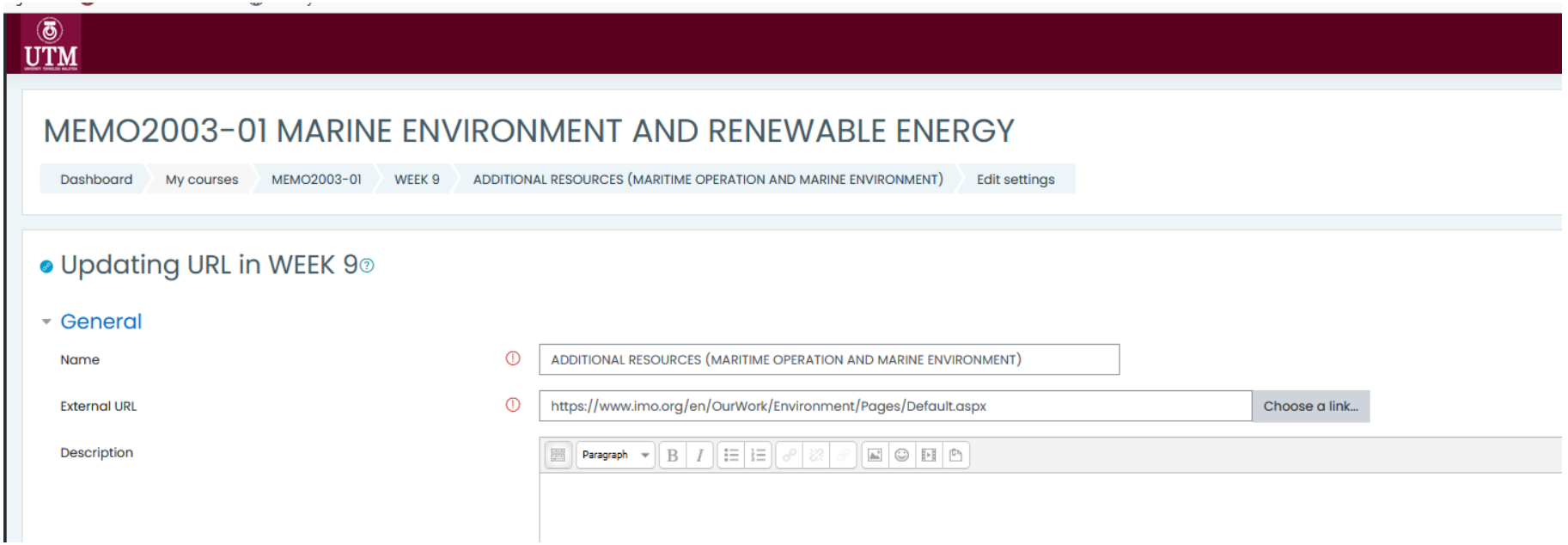

ASSIGNMENT

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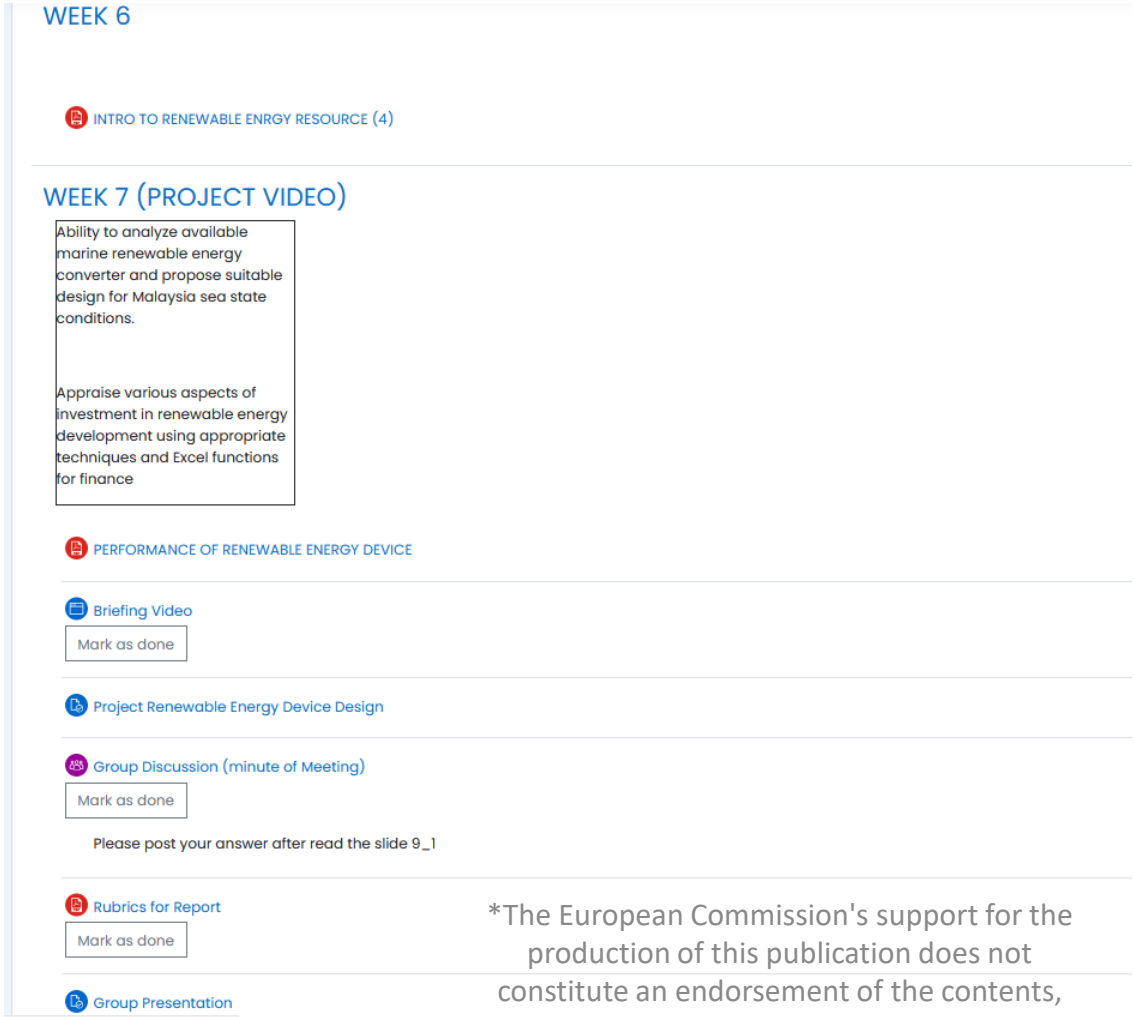

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