WP2.1: SUMMARY OF COURSES DEVELOPMENT

1. Marine Environment
- Bachelor of Engineering (Naval Architecture and Offshore Engineering)
2. Environment and Renewable Energy
- Master of Science (Mechanical Engineering)
3. Environmental Management and Sustainability
- Master of Engineering (Civil, Environmental Management, Environmental Engineering)
4. Water Quality Management
- Master of Engineering (Environmental Management)

No	Subject Name	Date of Approval	Approved by	Accreditation Status
1.	Marine Environment	Approval by UTM Senate on August 2019	UTM Senate	Approved
2.	Environment and Renewable Energy	Senate Meeting 24th February 2021	UTM Senate	On going
3.	Environmental Management and Sustainability	. Estimate on November 2021	UTM Senate	On going
4.	Water Quality Assessment & Management	. Estimate on November 2021	UTM Senate	On going

Courses	Marine Environment	Environment and Renewable Energy	Environmental Management and Sustainability	Water Quality Assessment & Management
Course Status	Revised subject	New subject	Revised subject	Revised subject
The title of the academic program involved	Bachelor of Engineering (Naval Architecture and Offshore Engineering)	Master of Science (Mechanical Engineering)	Master of Engineering (Civil, Environmental Management, Environmental Engineering)	Master of Engineering (Environmental Management)
Number of credits	2	3	3	3
Course Content	1.Origins at atmosphere and ocean basins Fluid: Atmosphere and water 2. Hydrological cycle: water in the atmosphere. Energy source and heat distribution 3. Vertical stability and temperature distribution 4. Cloud, precipitation and visibility 5. Pressure gradients and atmosphere 6. Climatology	1.Origin of the Atmosphere and Ocean Basins Fluids: Atmospheric pressure and water 2. Atmospheric pressure and wind 3. Waves and tides 4. Oceanic circulation 5. Climatology Weather system 6.Weather observations Weather forecasting 7. Climate change modelling	1. Environmental sustainability 2. Environmental health issue and problem 3. classification of natural environmental system 4. Environmentally sustainable approach: Sustainability development goal 5. Water security 6.Water footprint 7. Life cycle analysis 8. carbon footprint; carbon credit and payment for environmental services	1. Introduction: Chemical, physical and biological characteristics of aquatic system 2. River water quality monitoring 3. Bio indicators and criteria 4. Assessment, remediation, planning and management and post audit/monitoring strategies 5. Integrated River basin management 6. Formation of lakes Physical and chemical properties of lake and reservoir

	7. Weather system 8. Constituents of sea water Water masses 9. Waves and tides 10. oceanic circulation 11. Marine renewable energy devices 12. Marine pollution 13. Climate change and sea level rise	Influence of climate change on ocean processes Environmental issues related to ship and offshore structure 8. Context of marine energy Key energy concept 9. Wave energy conversion Wind energy conversion 10. Marine current conversion 11 Development appraisal 12. Practical, environmental and economic aspects of marine renewable energy 13. Case study	9. Green building	Eutrophication, prevention and control 7. Lake and reservoir monitoring 8. Wetland: Types and function; Roles of wetland in water quality management 9. Wetland biogeochemistry 10. Ecosystem services and biodiversity conversion 11. Coastal Water management Coastal water quality issues 12. Marine biological resources, ecosystem-based management and aquaculture management 13. Monitoring estuarine and marine water quality
Date of accreditation	22nd January 2020	24th February 2021		
Final Accreditation body	Board Of Engineers Malaysia	Malaysian Qualifications Agency (MQA)	Malaysian Qualifications Agency (MQA)	Malaysian Qualifications Agency (MQA)
Estimated starting date	Estimated to be offered on Session 1 2021/2022 October2021	Estimated to be offered on Semester 2 2021/2022 February 2022	October 2021	October 2021
Number of students accepted in the first year	20	Estimated 5	13	4
Number of students to be accepted in the second year	Estimated 26	Estimated 5	Estimated 20	Estimated 8
Teaching staff	1. Prof. Dr Adi Maimun	1. Prof Dr Omar Yaakob	1. Dr Mohd barruddin	1. Dr Shamila Azman

		2. Dr Farah Ellyza Hashim 3. Dr Arifah Ali	2. Prof Dr Khalida Muda 3. Dr Norelyza Hussein 4. Dr Shamila Azman	2. Ap Dr Mohd Ismid Mohd Said
Teaching methods	Lectures (face to face, online learning, video lecture, discussion/active learning, group work	Lectures (face to face, online learning, video lecture, discussion/active learning, group work	Lectures (face to face, online learning, video lecture, 2discussion/active learning, group work	Lectures (face to face, online learning, video lecture, discussion/active learning, group work
Learning methods	Learning method: Lectures and active learning, video presentation, interviews, survey, fieldtrip, groupwork, literature review, Project based learning	Propose learning method: Active learning conducted through in class-activities, Case study learning, individual/team assignment, literature review, presentation video	Learning method: Case study, individual/team assignment, presentation video, site visits, group work, online learning	Learning method: Lecture, video presentation/ augmented reality, field work, site visit, group work, scenario based learning, online learning
Evaluation methods	Online final exam and test, progress assignment	Online final exam and test, progress assignment	Online final exam and test, progress assignment	Online final exam and test, progress assignment
Any innovation?	Online interactive learning and assessment	Online interactive learning and assessment	Online interactive learning and assessment	Online interactive learning and assessment