

Template syllabus of the new/revised courses

Course Name: Water Quality Assessment and Management

Number of credits (UTM): 3

Period: Fall/spring semester (All Semester)

Coordinator	DR SHAMILA AZMAN
Credits	3 credits (4 ECTS)
Lecturers	DR SHAMILA AZMAN AP DR MOHD ISMID MOHD SAID
Level	POST GRADUATE/ MASTER
Host institution	UNIVERSITI TEKNOLOGI MALAYSIA
Course duration	14 weeks=120 hours student learning time
New/revised	Revised

Summary

This course is designed to expose students to current trends and various aspects in water quality assessment and management for river catchments, lakes, reservoirs and wetlands. It tackles problems involving water pollution and its impacts on the environment and legislation. Water quality monitoring projects carried out by students will enable application of proper sampling and monitoring methods. At the end of the course students will then be able to assess water quality problems and plan mitigation and control measures for water pollution.

Target student audiences

Master or PhD students majoring in Master in Engineering (Environmental Management) and other civil engineering or master program in UTM

Prerequisites

Required courses (or equivalents): Not applicable

Aims and objectives

The main course objective is to enable students to assess water quality problems and plan mitigation and control measures for water pollution.

The Authentic Tasks are:

General learning outcomes:

By the end of the course, successful students will be:

- | | |
|---------------|---|
| Knowledge | <ul style="list-style-type: none"> • Able to demonstrate awareness of current water quality related issues with ability to adapt in changing situations. |
| Comprehensive | <ul style="list-style-type: none"> • Able to communicate effectively on issues pertaining to water quality management |
| Application | <ul style="list-style-type: none"> • Able to evaluate and analyze data obtained from water quality monitoring and plan mitigating and control measures for water pollution |
| Analysis | <ul style="list-style-type: none"> • Able to evaluate and analyze data obtained from water quality monitoring and plan mitigating and control measures for water pollution |
| Synthesis | <ul style="list-style-type: none"> • - |



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**
- Lecture
 - Video presentations/ Augmented Reality
 - Field work, Site visits, group work
 - Scenario Based Learning
 - Online learning (due to Covid-19 pandemic)

Course outline

Week 1	Introduction; Chemical, physical and biological characteristics of aquatic system
Week 2	River Water Quality Monitoring - Stations and frequency selection - Monitoring of physical and chemical parameters - Bio-assessment of rivers
Week 3	Bio indicators and criteria
Week 4	Assessment, remediation, planning and management and post audit/ monitoring strategies
Week 5	Integrated river basin management
Week 6	Formation of lakes; Lake ecosystem, Lake Morphometry, Thermal Stratification
Week 7	Physical & chemical properties of lake and reservoir Eutrophication, Prevention & Control
Week 8	MID SEMESTER BREAK
Week 9	Lake and reservoir monitoring
Week 10	Wetland: Types and function; Role of wetland in water quality management
Week 11	Wetland biogeochemistry: Treatment process mechanism for nutrient and heavy metal Constructed wetland system – FWS and SF
Week 12	Ecosystem Services and Biodiversity Conservation
Week 13	Coastal Water Management coastal water quality issues; impacts from watershed development, and coastal management techniques
Week 14	Marine Biological Resources, Ecosystem Based Management and Aquaculture Management
Week 15	Monitoring Estuarine and Marine Water Quality
Week 16-19	REVISION WEEK AND FINAL EXAMINATION

Literature

Compulsory

Wetzel, R.G., 2001. Limnology: Lake and River Ecosystems. Third Edition. San Deigo: Academic Press, 2001

Recommended:

1. Canter, L. W. 2018. River Water Quality Monitoring. Boca Raton: CRC Press
2. Chapman, D, 1998, Water Quality Assessments: A Guide to The Use of Biota, Sediments and Water in Environmental Monitoring, New York: Taylor and Francis
3. Ahuja, S., 2013. Monitoring Water Quality: Pollution Assessment, Analysis, and Remediation. Waltham: Elsevier.

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities (45 hours)			
Lectures	Understanding theories, concepts, methodology and tools	Class participation	28
Moderated in-class discussions	Understanding various policy and management contexts and common problems in communication in environmental governance	Class participation and preparedness for discussions	4
In-class assignments, field assignment	Understanding various policy and management contexts and common problems in communication in environmental governance	Class participation and preparedness for assignments	3
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, tools, and methods for communicating the EDP	Quality of group assignments and individual presentations	5
Independent work (75 hours)			
Group work: <ul style="list-style-type: none"> - 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 Plan and develop a energy development plan (EDP), be aware of information visualization tools and methods	Quality of group assignments and individual presentations	32
Course group assignment	Ability to conceptualize and frame an environmental governance problem, find related literature and data, interpret data, use the concepts, tools and methods	Quality of developed EDP and their presentation	30



	covered in the course, and draw policy/management relevant conclusions		
Group presentation	Ability to interpret data, to analyze audience, and to use the concepts, tools, and methods for communicating the EDP	Quality of group assignments and individual presentations	10
Final Examination	-Apply appropriate water quality sampling and monitoring techniques for river, lakes and reservoir Bloom Taxonomy C3 - Analyze water quality monitoring data for planning of water pollution mitigating and control measures Bloom Taxonomy C4	Individual	3
Total			120

Grading

The students' performance will be based on the following:

Assessment

- Progress assessment (60%):
 - Field work assignment (15%): Students need to work in groups to complete an assignment based on water quality measurement conducted on site.
 - Individual Assignment/ Presentation (10%)
 - Group Project (35%): The students will be divided into groups of 3-4 students and choose 1 topic and work on a video presentation on topics regarding water.
- Final assessment (40%):
 - Final examination (40%)

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	