

# Water Quality Assessment and Management MKAK 1063

## COURSE PRESENTATION



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**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

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## 1.0 Introduction to course

This course is a mandatory course with 3 credits (4 ECTS), offered specifically to Master of Engineering (Environmental Management) students; and was developed by Faculty of Civil Engineering, Universiti Teknologi Malaysia.

This course is designed to expose students to current trends and various aspects of water quality assessment and management for river catchments, lakes, reservoirs, wetlands, and marine ecosystems. It tackles problems involving water pollution and its impacts on the environment and legislation. Water quality monitoring projects carried out by students will enable the application of proper sampling and monitoring methods.

At the end of the course, students will be able to assess water quality problems and plan mitigation and control measures for water pollution.

By the end of the course, students will success to:

1. Students will be able to apply appropriate water quality sampling and monitoring techniques for river, lakes and reservoir
2. Students will be able to analyze water quality monitoring data for planning of water pollution mitigating and control measures
3. Students will be able to communicate effectively on issues pertaining to water quality management
4. Students will be able to engage self-advancement through professional development on the awareness of current water quality related issues

## 2.0 Course Structure

### 2.1 Course Planning

|                  |   |
|------------------|---|
| Learning methods | <ul style="list-style-type: none"> <li>• Lecture</li> <li>• Video presentations/ Augmented Reality</li> <li>• Field work, Site visits, group work</li> <li>• Scenario Based Learning</li> <li>• Online learning (due to Covid-19 pandemic)</li> </ul> |
| Course outline   |   |
| Week 1           | Introduction; Chemical, physical and biological characteristics of aquatic system   |
| Week 2           | River Water Quality Monitoring<br>- Stations and frequency selection<br>- Monitoring of physical and chemical parameters<br>- 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<br>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<br>Constructed wetland system – FWS and SF  |
| Week 12          | Ecosystem Services and Biodiversity Conservation  |
| Week 13          | Coastal Water Management<br>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   |

## 2.0 Course Structure

### 2.2 Teaching Method

Details on Innovative T&L practices:

| No. | Type                   | Implementation   |
|-----|------------------------|--|
| 1.  | Active learning        | Conducted through in-class activities  |
| 2.  | Field Work             | Conducted at site to collect sample and conduct monitoring. Students are divided in groups of 3 or 4 depending on number of students |
| 3.  | Site Visit             | Conducted at site to study on natural wetlands   |
| 4.  | Project-based Learning | Conducted through group project. Students must present the findings in in the form of written report and oral presentation.          |

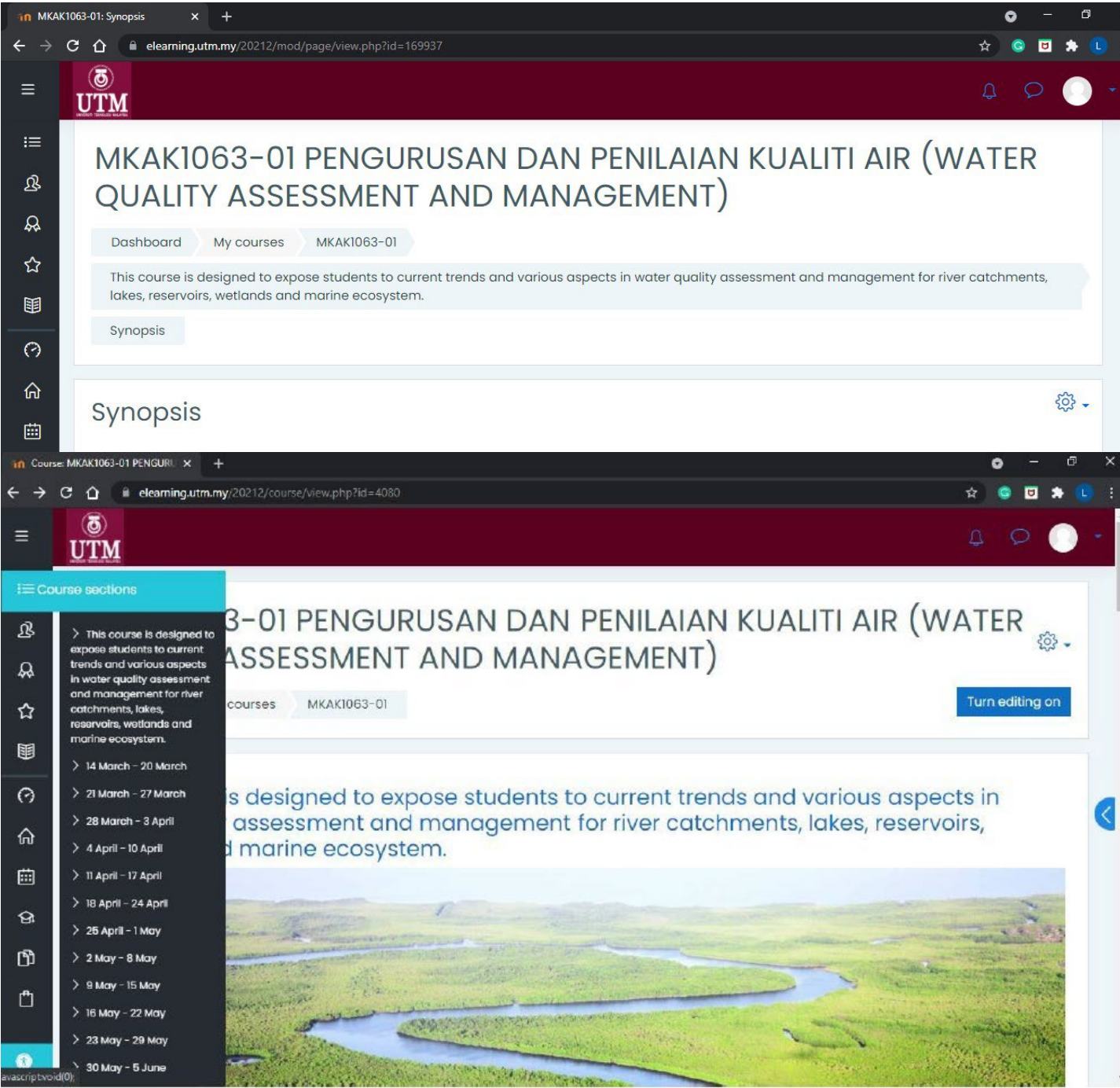
| Distribution of student Learning Time (SLT) Course content outline |     |   |   |      | Teaching and Learning Activities                              |  |        | TOTAL |
|--|-----|---|---|------|---|--|--------|-------|
|  |     |   |   |      |   |  |        | SLT   |
|  |     |   |   |      |   |  |        |       |
|  |     |   |   |      |   |  |        |       |
| Guided Learning (Face to Face)                                     |     |   |   |      | Guided Learning Non-Face to Face (Assessment and preparation) | Independent Learning Non-Face to face (Revision) |        |       |
| CLO  | L   | T | P | O    |   |  |        |       |
| CLO1   | 14h |   |   | 5.5h | 13h   | 15h  | 47.5h  |       |
| CLO2   | 14h |   |   | 5.5h | 7h  | 18.5h  | 45h    |       |
| CLO3   |     |   |   | 3h   | 6h  | 6h   | 15h    |       |
| CLO4   |     |   |   |      | 2h  | 8h   | 10h    |       |
| Total SLT  | 28h |   |   | 14h  | 28h   | 47.5h  | 117.5h |       |

| Continuous Assessment |                          | PLO to be assessed                         | Percentage  | Total SLT  |
|-----------------------|--------------------------|--|-------------|--|
| 1                     | Assignment               | Knowledge, Cognitive Skill, Personal Skill | 15          | Include in learning time for teaching activities |
| 2                     | Field Work               | Knowledge                                  | 15          |  |
| 3                     | Project and Presentation | Communication Skill                        | 30          |  |
| 4                     | Final Examination        | Knowledge, Cognitive Skill                 | 40          | 2.5h   |
| Total                 |                          |  |             |  |
|                       |                          |  | Grand Total | 120h   |



# 2.0 Course Structure

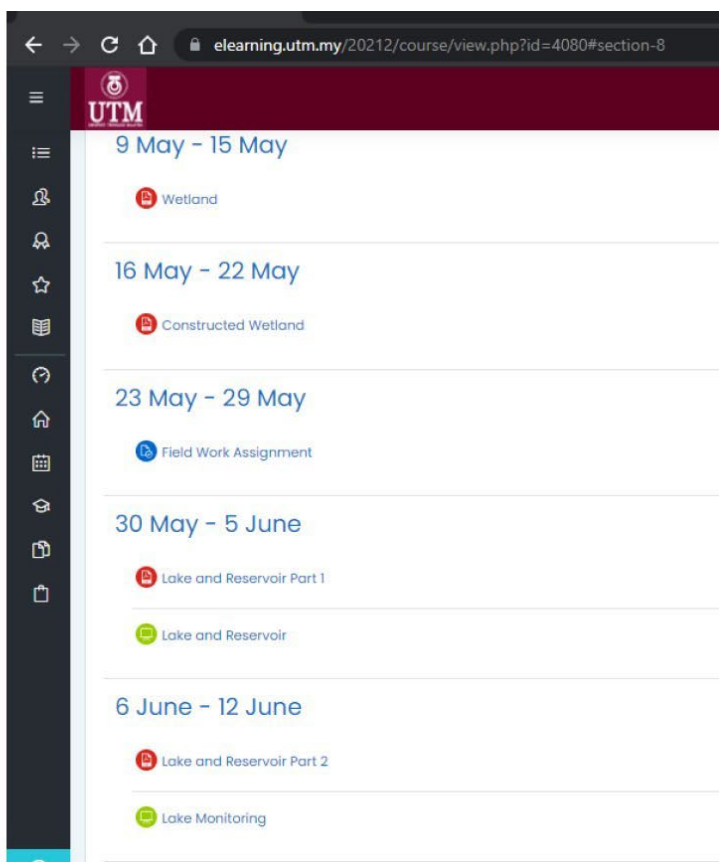
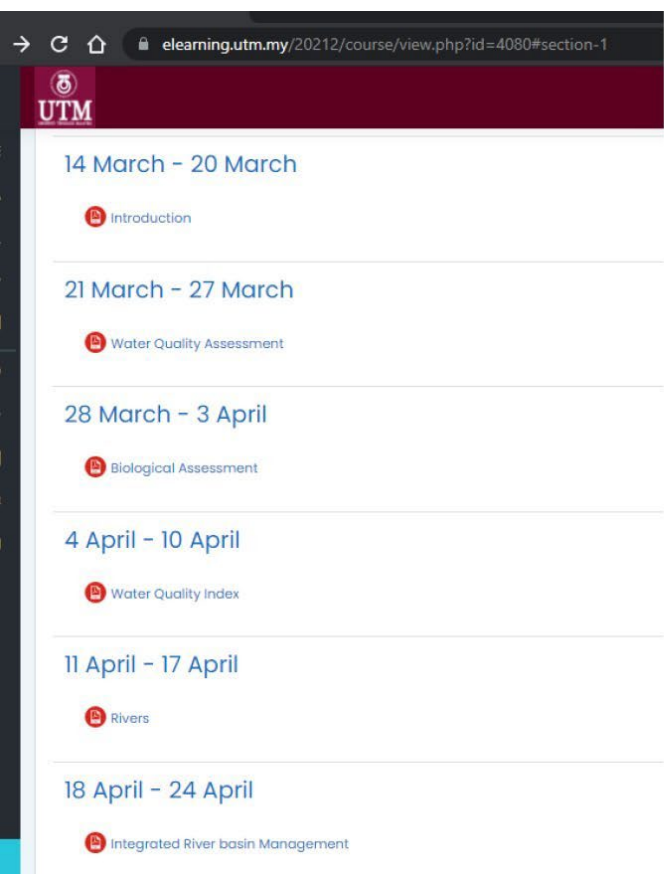
## 2.3 Learning Material



Lecture information will be uploaded in e-Learning Platform

# 2.0 Course Structure


## Learning Material




**Lecture Notes will be uploaded in  
e-Learning Platform**


# 2.0 Course Structure

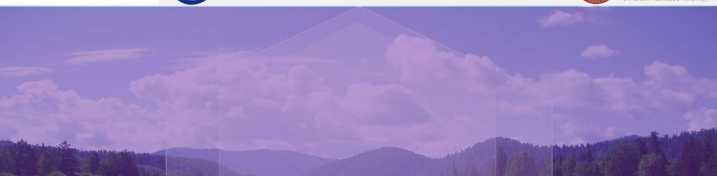
## 2.3 Learning Material



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CHAPTER: BIOLOGICAL ASSESSMENT


MEAK1063: Water Quality Assessment and Management


Master Eng. (Environmental Management)



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CONTENTS OF CHAPTER


01 INTRODUCTION


02 ADVANTAGES OF BIOLOGICAL ASSESSMENT


03 ELEMENTS OF BIOLOGICAL ASSESSMENT

04 TYPES OF BIOLOGICAL ASSESSMENT









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CHAPTER: BEACH AND SHORELINE


MEAK1063: Water Quality Assessment and Management


Master Eng. (Environmental Management)



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CONTENTS OF CHAPTER


01 INTRODUCTION


02 SAND MOVEMENT


03 SALINITY AND WATER QUALITY

04 EFFECT FROM HUMAN ACTIVITIES









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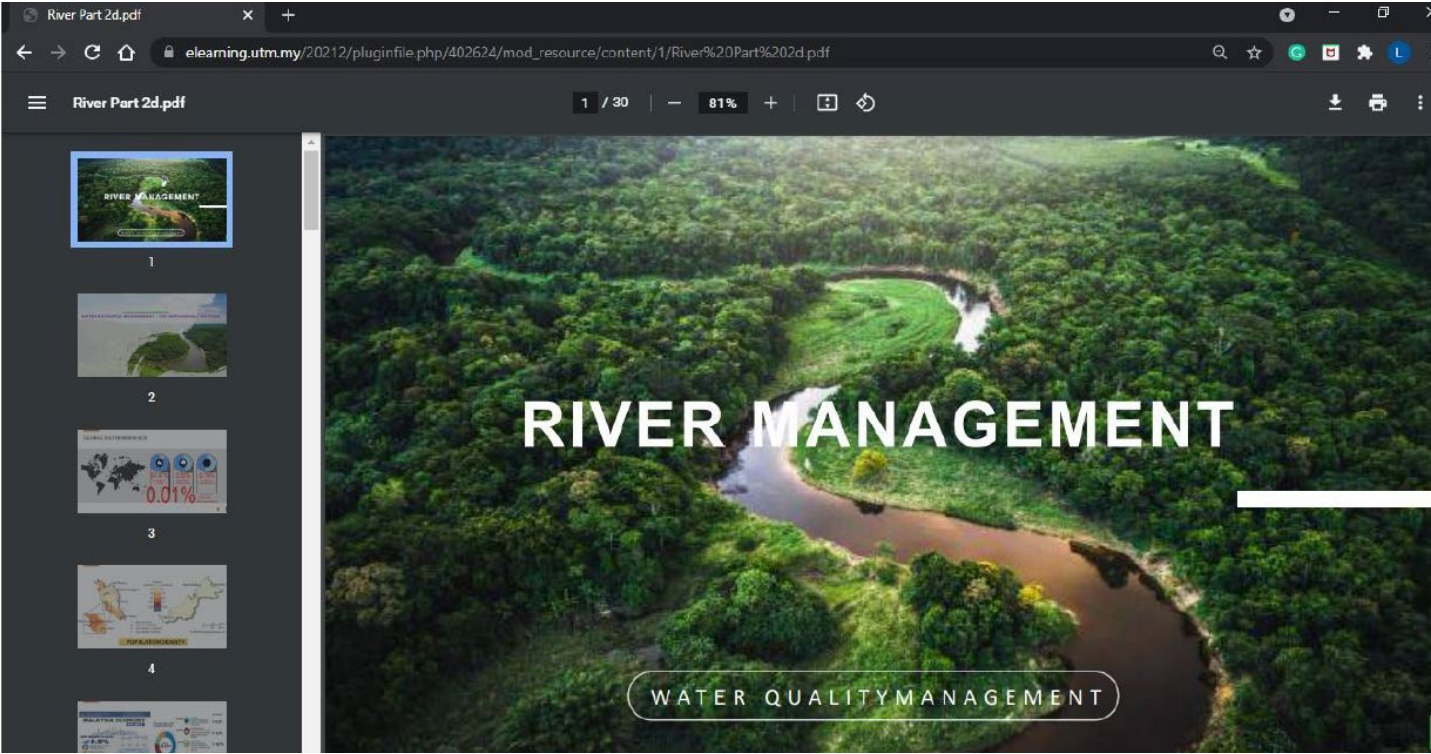
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Lecture Notes will be uploaded in e-Learning Platform



# 2.0 Course Structure

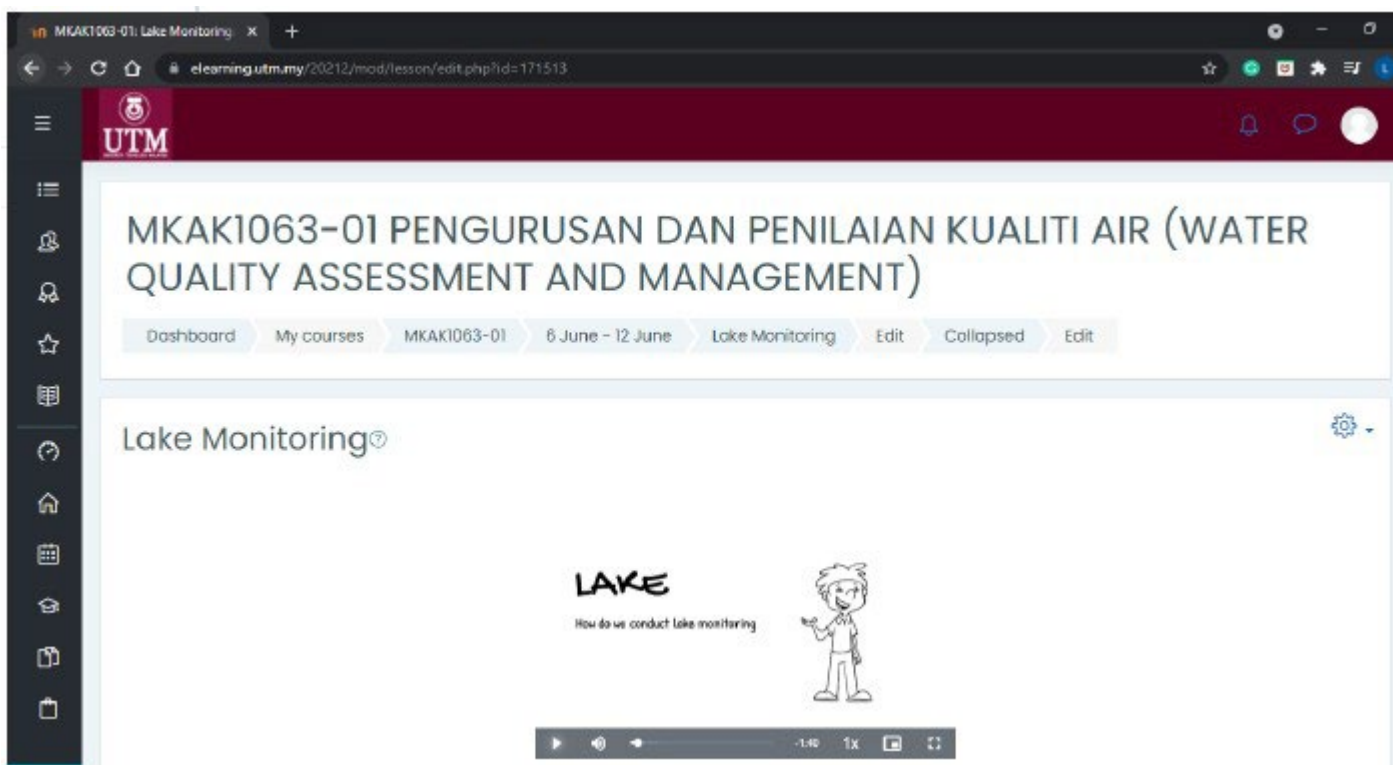
## 2.3 Learning Material



**Lecture Notes will be uploaded in  
e-Learning Platform**

## 2.0 Course Structure

## 2.3 Learning Material



**Lecture Notes will be uploaded in  
e-Learning Platform**

## 2.0 Course Structure

### 2.3 Learning Material

#### AUTHOR'S BIOGRAPHY

Dr. Shamila Azman has 21 years of experience in teaching at the Faculty of Civil Engineering, Universiti Teknologi Malaysia. She is involved in environmental management, especially in the field of water quality monitoring and treatment. As a researcher, Dr. Shamila has worked closely with the Ministry of Natural Resources, Environment, and Climate Change on the Malaysia Environmental Performance Index since 2010. She also volunteers for youth and community programmes, especially on issues relating to water management and river restoration activities.

AP Dr. Mohd Ismid Mohd Said is a marine biologist with more than 30 years of experience in water quality management. His work involves water quality management and bioassessment in freshwater and marine ecosystems. He is dedicated to studying rivers and their conservation and investigating various aspects such as pollution sources, restoration efforts, ecological monitoring, and sustainable management practises to ensure the health and sustainability of river ecosystems. To date, 20 postgraduate students have graduated under his supervision

## 2.0 Course Structure

### 4. Course Reference

Text book (if applicable)

1.Canter, L. W. 2018. River Water Quality Monitoring. Boca Raton: CRC Press

Main references

1.Chapman, D, 1998, Water Quality Assessments: A Guide to The Use of Biota, Sediments and Water in Environmental Monitoring, New York: Taylor and Francis

2.Ahuja, S., 2013. Monitoring Water Quality: Pollution Assessment, Analysis, and Remediation. Waltham: Elsevier.

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

## 3.0 Course Assessment

### 3.1 Assignment/ Project

| No | Learning Outcomes  | Assessment Activity   |
|----|--|---|
| 1  | Ability to analyze water quality monitoring data for planning of water pollution mitigating and control measures | Site Visit, Field Work Assignment   |
| 2  | Ability to communicate effectively on issues pertaining to water quality management                              | Course group assignment and presentation<br>-Discussion issues pertaining to water quality management |
| 3  | Ability to apply appropriate water quality sampling and monitoring techniques for river, lakes and reservoir     | Field Work Assignment   |

- Universiti Teknologi Malaysia (UTM) is committed to academic integrity. Plagiarism, collusion, and cheating are strictly prohibited.
- Student is expected to submit work and present as your own without copy text or material from other sources.
- PLAGARISM DETECTION SOFTWARE (Turnitin) will be used to test the similarity from online sources.



# 3.0 Course Assessment

## 3.1 Assignment/ Project

Assignment on environmental quality issues in Malaysia

MKAK1063-01 PENGURUSAN DAN PENILAIAN KUALITI AIR (WATER QUALITY ASSESSMENT AND MANAGEMENT)

Dashboard

My courses

MKAK1063-01

23 May - 29 May

Field Work Assignment

Field Work Assignment

Opened: Wednesday, 16 June 2021, 12:00 AM

Due: Friday, 16 July 2021, 12:00 AM

Appendix 1.docx

Appendix 3.pdf

Assignment field.pdf

BWQI worksheet 1.xlsx

DO SAT.xls

WQI.xlsx

16 June 2021, 7:20 AM

16 June 2021, 7:20 AM

16 June 2021, 7:20 AM

16 June 2021, 7:20 AM

16 June 2021, 7:20 AM

16 June 2021, 7:20 AM

Grading summary

Assignment detail information will be uploaded in e-Learning Platform

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## 3.0 Course Assessment

### 3.2 Test / Final Exam Regulation

- Final examination contributed to 40% of the course mark.
- Student should write your examination answer entirely on your own without unacknowledged input from the others.
- Distributing, receiving, possessing any information in electronic, printed or any other form or cooperated with any other person when completing the examination is **STRICTLY** prohibited.

# 1. Course Evaluation

## 2. Questionnaire for Students

### COURSE EVALUATION

## **MKAK1063** **Water Quality Assessment and** **Management**

*Google Form:*

<https://forms.gle/CYoka8euej24N2RC7>