

# MASTER OF ENGINEERING (CIVIL)

## PROGRAMME SPECIFICATIONS

<b>1. Programme Name</b>	Masters of Engineering (Civil)		
<b>2. Final Award</b>	Masters of Engineering (Civil)		
<b>3. Awarding Institution</b>	UTM		
<b>4. Teaching Institution</b>	UTM		
<b>5. Programme Code</b>	MKAA		
<b>6. Professional or Statutory Body of Accreditation</b>	MQA		
<b>7. Language(s) of Instruction</b>	English		
<b>8. Mode of Study (Conventional, distance learning, etc)</b>	Conventional		
<b>9. Mode of operation (Franchise, self-govern, etc)</b>	Self-governing		
<b>10. Study Duration (Full Time/ Part Time )</b>	Full Time		
<b>11. Study Duration (semester)</b>	Full Time		
	Minimum	3	
	Maximum	8	
<b>12. Programme Educational Objectives (PEO)</b>			
<ol style="list-style-type: none"> <li>1. Mastery of competencies and integration of knowledge required in the engineering profession.</li> <li>2. An appreciation of the value of lifelong learning and possessing enthusiasm and strong commitment to continued acquisition of new knowledge and skills.</li> <li>3. Advanced leadership and team working skills that allow environmental engineers and professionals to become visionary and inspirational leaders.</li> <li>4. Highly developed oral and written communications skills that fit at all level, appropriate to the field of engineering.</li> <li>5. An appreciation of the ethics and integrity in management, leadership and good governance.</li> </ol>			
<b>13. Programme Learning Outcomes (PLO)</b>			
Code	Intended Learning Outcomes	Teaching and Learning Methods	Assessment
<b>(a) Technical Knowledge and Competencies</b>			
<b>PLO1</b>	<b>Advanced Knowledge</b> Graduates are able to incorporate in-depth relevant knowledge in professional practices for the benefits of both national and international communities. Graduates are able to apply their knowledge and skills in the planning, analysis, design and supervision of works related to the civil engineering discipline.	Lectures, seminars, projects, directed reading, tutorials independent study, active learning	Examinations, group and individual project reports, presentations, assignments, problem-based exercises
<b>PLO2</b>	<b>Research Skills</b> Graduates are able to formulate hypothesis, design and perform experiments/research scientifically to solve and explain observed phenomena.	Lectures, seminars, projects, directed reading, tutorials independent study, active learning	Examinations, presentations, assignments, problem-based exercises, project reports, design tasks, simulation exercises
<b>PLO3</b>	<b>Critical Thinking &amp; Problem Solving</b> Graduates are able to manage conducive working environment qualities problem solving and higher order thinking skills. Graduate are technically	Computer hands-on sessions, laboratory/field works, lectures, independent study, seminars, active learning, projects	Examinations, presentations, assignments, problem-based exercises, project reports, design tasks, simulation exercises

	competent in solving problems logically, analytically and creatively based on sound facts and ideas.		
<b>(b) Generic Skills</b>			
<b>PLO4</b>	<b>Ethics, Values and Professionalism</b> Graduates are able to balance professional and ethical responsibilities including contemporary issues and environmental awareness.	Pre-Projects and Masters Project, lectures, tutorials, group projects, independent study	Masters Project thesis, project reports, design tasks, examinations, presentations, assignments
<b>PLO5</b>	<b>Communication</b> Graduates are able to apply a wide range of relevant knowledge through effective oral and written communication. Graduate are able to communicate effectively across a range of contexts and audiences.	Lectures, tutorials, directed reading, simulation exercises, group project, independent study, problem-based learning, projects	Masters Project thesis, project reports, design tasks, examinations, presentations, assignments
<b>PLO6</b>	<b>Lifelong Learning</b> Graduates are able to adopt the latest relevant knowledge and cutting-edge technologies through life-long learning process.	Group projects, independent study, field trips	Oral presentations, project reports

#### 14. Classification of Subjects

No.	Classification	Credit Hours	Percentage
1.	University	6	13%
2.	Programme Core	28	61%
3.	Programme Electives	6	13%
4.	Free Electives	6	13%
<b>TOTAL</b>		<b>46</b>	<b>100%</b>

**For engineering programme please fill up the following classification. (Others please refer to the Statutory Body guidelines)**

A.	Engineering Subjects		
	(a) Lecture/Project/Design studio	30	87%
	(b) Masters Thesis Project	10	
<b>Total credit hours for Part A</b>		<b>40</b>	
B.	Related Subjects		
	(a) Management/Law/Humanities/Ethics	6	13%
<b>Total credit hours for Part B</b>		<b>6</b>	
<b>Total Credit Hours for Parts A and B</b>		<b>46</b>	<b>100%</b>
<b>15. Total credit hours to graduate</b>		<b>46 credit hours</b>	

## 16. Programme structures and features, curriculum and award requirements

The course is offered on full-time mode and is based on a 2-Semester Academic Session with several subjects being delivered and assessed in each Semester. Assessment is based on final examination and coursework conducted throughout the semester.

### Award requirements:

To graduate, students should:

- Attain a total of no less than 46 credit hours with minimum CPA of 3.0.
- Complete and pass the Master Project.

## 17. Mapping of Programme Learning Outcomes to Subjects

CORE & ELECTIVE ENGINEERING SUBJECTS OFFERED		LEARNING OUTCOME					
Code	Course	PO1	PO2	PO3	PO4	PO5	PO6
Core Course							
MKAE 1013	Advanced Structural Analysis	√		√			
MKAE 1083	Advanced Reinforced Concrete Structures	√		√			
MKAM 1013	Construction Project Management	√		√			√
MKAG 1113	Advances Hydraulics	√		√			√
MKAJ 1033	Advanced Foundation Engineering	√		√		√	
MKAK 1003	Enviromental Management & Sustainability	√		√		√	
MKAA 1514	Master Project 1	√	√	√	√	√	√
MKAA 1526	Master Project 2	√	√	√	√	√	√
CORE & ELECTIVE ENGINEERING SUBJECTS OFFERED		LEARNING OUTCOME					
Code	Course	PO1	PO2	PO3	PO4	PO5	PO6
Elective Course							
MKAM 1033	Construction Technoloy	√	√				
MKAE 1213	Structural Fire Engineering	√		√			
MKAJ 1053	Advanced Software Application in Geotechnical Engineering	√		√		√	
MKAQ 1013	Highway and Infrastructure Design	√		√			
MKAQ 1043	Transport Planning	√			√		

## 18. Our Uniqueness

1. No. of graduates
2. Employability rate
3. Leaders in industry
4. Diversity of lecturers
5. Biggest Civil Engineering Faculty in the world
6. One of the biggest Civil Engineering lab/facilities in the region

## 19. Career Prospects and Career Path

Graduates of the programme can work as a Project Engineer, Construction Engineer, Hydraulic Engineer, Environmental Engineer, Highway and Transport Engineer or Geotechnical Engineer.

## 20. Facilities available

List of laboratories:

1. Structural Engineering Laboratory
2. Material Engineering Laboratory
3. Hydraulics and Hydrology Laboratory
4. Environmental Laboratory
5. Geotechnical Laboratry
6. Highway & Transportation Laboratory
7. Computer Laboratory
8. Fire Laboratory
9. CETU
10. ITUCE
11. Resource Centre
12. Surveying Unit

## CURRICULUM STRUCTURE

<b>University's General Elective Courses (Total : 6 credits)</b>		
UAPA 0013	Research Methodology	3 credits
UABA 0013	Principle Engineering Management	3 credits
<b>Core Courses (Total : 18 credits)</b>		
MKAE 1013	Advanced Structural Analysis	3 credits
MKAE 1083	Advanced Design of Reinforced Concrete	3 credits
MKAM 1013	Construction Project Management	3 credits
MKAG 1113	Advances Hydraulics	3 credits
MKAJ 1033	Advanced Foundation Engineering	3 credits
MKAK 1003	Environmental Management & Sustainability	3 credits
<b>Elective Courses – Choose any two from the following list (Total: 6 credits)</b>		
Choose any two (2) courses offered by Programmes as below which is not a core subjects in this program;		6 credits
<ol style="list-style-type: none"> <li>1. Master of Engineering Program (Structure) MKAE</li> <li>2. Master of Engineering Program (Hydraulic &amp; Hydrology) MKAG</li> <li>3. Master of Engineering Program (Geotechnic) MKAJ</li> <li>4. Master Engineering Program (Environmental) MKAK</li> <li>5. Master Engineering Program (Construction Management) MKAM</li> <li>6. Master Engineering Program (Transportation) MKAQ</li> </ol>		
<b>Free Elective Courses (Total : 6 credits)</b>		
Choose any two subjects offered by other programmes, faculties or from the above elective subjects.		6 credits
<b>Masters Project (Total : 10 credits)</b>		
MKAA 1514	Masters Project 1	4 credits
MKAA 1526	Masters Project 2	6 credits
<b>TOTAL CREDITS</b>		<b>46 credits</b>
<b>Duration of Study</b>		
Full Time	:	3 – 8 semester

## **COURSE SYNOPSIS**

### **CORE COURSES**

#### **MKAE 1013 - Advanced Structural Analysis**

This is a core course in the Structural Engineering Program that exposes the students to matrix methods for advanced structural analysis and solving many structural problems. The types of structures involved are beams, trusses and frames. Three dimensional structures are also included. This course also includes the application of matrix method for nonlinear geometric or second order elastic analysis and critical load prediction of structures. The applications of matrix methods for nonlinear material analysis of frame structures are also included in this course.

#### **MKAM 1013 - Construction Project Management**

This course review contemporary issues in construction project management process. At outset it appraises issues related to construction industry background and industry practices as well as the past, present and future performance measurement. The practice of using traditional construction work process is will be evaluated in comprehensive manner and problems associated with such practice will be identified. Various contemporary management philosophies and tools from other industry will be reviewed with regard to their potential application and benefits to the construction industry. New concept of working by using the concept collaborative working environment supported by ICT tools will be analysed as a strategy to reengineer the construction industry.

#### **MKAE 1083 - Advanced Reinforced Concrete Design**

This course is intended to provide extra knowledge on the aspect of design of reinforced concrete structural elements. As a continuation to the Reinforced Concrete Design 1 and 2, the topics discussed are analysis and design of ribbed, waffle and flat slabs, water retaining structures, shear walls, corbel and nibs. Furthermore, students will be exposed to the methods of deflection calculation, design of elements for torsion and design of raft foundations.

#### **MKAG 1113 - Advanced Hydraulics**

This course is designed to introduce advanced concepts of fluid mechanics in relation to viscous flows. It covers laminar flows, transition to turbulence and turbulent flows and will be taught with civil engineering applications in mind. The students should understand the topics of open channel flow, friction and sediment transport from the fundamental point of view. In this course, unsteady flow in open channels and pipes - topics of specific interest to civil engineers – will also be covered.

#### **MKAJ 1033 - Advanced Foundation Engineering**

This subject is one of the core subjects offered by the Department of Geotechnics and Transportation, which will highlight the application of soil

mechanics to foundation design in practice. Lectures will be emphasized on foundation design in Civil Engineering projects. Foundation design must be based on parameters evaluated from Site Investigation programme and make use of the soil parameters which requires the knowledge of geology and soil mechanics principles. Various types of foundation and their criteria for selection will be presented which is interpreted from site investigation related for shallow foundation, pile, raft foundation, drilled shaft, cofferdam and underpinning. Group piles, laterally loaded and uplift piles will be covered in the course. Settlement and bearing capacity considerations will be employed to select and design the appropriate foundation scheme for structures. At the end of the course the student will be able to understand and apply the principles of foundation design in terms of technical feasibility, economic viability, articulate and justify technical analyses through oral, written and graphical means. The student will also be able to appreciate the constantly evolving nature of civil engineering design and practice.

### **MKAK 1003 - Environmental Management and Sustainability**

This course is designed to expose students to various aspects in environmental management and the concept of sustainability. Topics discussed include the principles of sustainable development, understanding the environmental sensitive areas particularly the natural water bodies, catchment management, development of coastal and inland areas. Current issues related to environmental problems especially on climate change and water supply are the main aspects to be addressed. Some methods and concepts of sustainable approaches are introduced in order to promote and achieve sustainable development goals. At the end of the course, the students should be able to understand the concept of environmental sustainability. The course enables the students to understand, plan and incorporate the concept of sustainability in environmental management.

### **ELECTIVE COURSES**

Choose any two subjects offered by other programmes, faculties or from the above elective subjects.