

# MASTER OF ENGINEERING (TRANSPORTATION)

## PROGRAMME SPECIFICATIONS

<b>1. Programme Name</b>		<b>Masters of Engineering (Transportation)</b>	
2. Final Award		Masters of Engineering (Transportation )	
3. Awarding Institution		UTM	
4. Teaching Institution		UTM	
5. Programme Code		MKAQ	
6. Professional or Statutory Body of Accreditation		MQA	
7. Language(s) of Instruction		English	
8. Mode of Study (Conventional, distance learning, etc)		Conventional	
9. Mode of operation (Franchise, self-govern, etc)		Self-governing	
10. Study Duration		14 weeks	
11. Studey Duration (semester)		Full time	
Minimum		3	
Maximum		8	
12. Programme Educational Objectives (PEO)			
1	Mastery of competencies and integration of knowledge required in the profession.		
2	An appreciation of the value of lifelong learning and possessing enthusiasm and strong commitment to continued acquisition of new knowledge and skills.		
3	Advanced research skills that allow professionals to become competent in research.		
4	Highly developed oral and written communications skills that fit at all level, appropriate		
5	to the field of profession.		
	An appreciation of the ethics and integrity in management, leadership and good governance, and responsibility to their professions and community		
13. Programme Learning Outcomes (PLO)			
(a) Technical Knowledge and Competencies			
Code	Intended Learning Outcomes	Teaching and Learning Methods	Assessment
PLO 1	Advanced Knowledge: Graduate 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	Lectures, tutorials, seminars, laboratory works, directed reading, independent study, active learning, computer hands-on sessions.	Examinations, presentations, assignments, problem-based exercises, project reports, design tasks.

	knowledge and skills in the planning, analysis, design and supervision of works related to the civil engineering discipline		
PLO 2	Research Skills Graduate are able to formulate hypothesis, design and perform experiments/research scientifically to solve and explain observed phenomena.	Project supervision, lectures, tutorials, laboratory works, directed reading, simulation exercises, independent study, problem-based learning	Master project thesis, project reports, design tasks, examinations, problem-based assignments.
PLO 3	Critical Thinking and Problem Solving Graduate are able to manage conducive working environment qualities problem solving and higher order thinking skills. Graduate are technically competent in solving problems logically, analytically and creatively based on sound facts and ideas.	Project supervision, lectures, tutorials, laboratory works, directed reading, simulation exercises, independent study, problem-based learning	Master project thesis, project reports, design tasks, examinations, problem-based assignments.

#### 14. Programme Learning Outcomes

Code	Intended Learning Outcomes	Teaching and Learning Methods	Assessment
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#### (b) Generic Skills

PLO 4	Ethics, Values, Professionalism Graduate are able to balance professional and ethical responsibilities including contemporary issues	Assignments, masters' dissertation and presentation, and group projects, independent study.	Assignments, masters dissertation and presentation, and group projects.
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	and environmental awareness.		
PLO 5	Communication Graduate are able to apply a wide range of relevant knowledge through effective oral and written communications. Graduates are able to communicate effectively across a range of contexts and audiences.	Pre-projects and masters project, lectures, tutorials, group projects, computer-based exercises, independent study.	Laboratory reports, design projects, problem-based assignments.
PLO 6	Life Long Learning Graduate are able to adopt the latest relevant knowledge and cutting-edge technologies through life-long learning process.	Projects, independent study, tutorials, site visit, co-curriculum and social activities.	Oral presentations, written reports, group projects and design, co-curriculum and social activities.

#### 15. 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%
TOTAL		46	100%

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

A.	Engineering Subjects		87%
	Lecture/Project/Design studio	30	
	Masters Thesis Project	10	
	Total credit hours for Part A	40	
B.	Related Subjects		13%
	Management/Law/Humanities/Ethics	6	

	Total credit hours for Part B	6					
Total Credit Hours for Parts A and B		46	100%				
16. Total credit hours to graduate		46 credit hours					
17. Programme structures and features, curriculum and award requirements							
<p>The course is offered on full-time mode and is based on a 3-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.</p> <p>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.</p>							
18. Mapping of Programme Learning Outcomes to Subjects							
CORE & ELECTIVE ENGINEERING COURSES OFFERED				LEARNING OUTCOME			
Code	Course	LO 1	LO 2	LO3	LO4	LO 5	LO6
Core Course							
MKAQ 1013	Highway and Infrastructure Design	√		√			
MKAQ 1023	Advanced Highway Engineering	√		√			
MKAQ 1043	Transport Planning	√			√		
MKAQ 1083	Traffic Management and Analysis	√		√			
MKAQ 1053	Pavement Design and Construction	√		√			
MKAQ 1063	Public Transport System	√				√	√
MKAQ 0013	Pre Master Project	√	√	√	√	√	√
MKAQ 0024	Master Project	√	√	√	√	√	√
MKAQ 1073	Airport Planning and Design	√					√
MKAQ 1033	Transport and Environmental Planning	√		√			
MKAQ 1093	Transport Safety	√					√
MKAQ 1103	Disaster Management	√					√
MKAQ 1113	Pavement Management System	√					√
MKAQ 1123	GIS for Civil Engineering	√		√		√	√
19. Career Prospects and Career Path							
<p>Graduates of the programme can work as a Project Engineer, Construction Engineer, Hydraulic Engineer, Environmental Engineer, Highway and Transport Engineer or Geotechnical Engineer.</p>							

20. Facilities available

**List of laboratories:**

**Structural Engineering Laboratory**

**Material Engineering Laboratory**

**Hydraulics and Hydrology Laboratory**

**Environmental Laboratory**

**Geotechnical Laboratory**

**Highway & Transportation Laboratory**

**Computer Laboratory**

**CETU**

**ITUCE**

**Resource Centre**

**Surveying Unit**

## CURRICULUM STRUCTURE

University's General Elective Courses(Total : 5 credits)		
UAPA 0013	Research Methodology	3 credits
UABA 0013	Principle Engineering Management	3 credits
Core Courses (Total : 18 credits)		
MKAQ 1013	Highway & Infrastructure Design	3 credits
MKAQ 1023	Advanced Road Material	3 credits
MKAQ 1043	Transport Planning	3 credits
MKAQ 1053	Pavement Design and Construction	3 credits
MKAQ 1063	Public Transport System	3 credits
MKAQ 1083	Traffic Management & Analysis	3 credits
Elective Courses – Choose any two from the following list (Total : 6 credits)		
MKAQ 1033	Transport and Environmental Planning	3 credits
MKAQ 1073	Airport Planning and Design	3 credits
MKAQ 1093	Transport Safety	3 credits
MKAQ 1103	Disaster Management	3 credits
MKAQ 1113	Pavement Management System	3 credits
MKAQ 1123	GIS For Civil Engineer	3 credits
Free Elective Courses (Total : 6 credits)		
Choose any two subjects offered by other programmes, by other, faculties, or from the above elective subjects		6 credits
Masters Project (Total : 7 credits)		
MKAQ 1514	Pre-Master Project	4 credits
MKAQ 1526	Master Project	6 credits
TOTAL CREDITS		46 credits
Duration of Study		
Full Time	:	3 – 6 semester

## **COURSE SYNOPSIS**

### **CORE COURSES**

#### **MKAQ 1013 - Highway & Infrastructure Design**

This course provides state of art knowledge on highway and infrastructure design. Understanding of the subject will help the students to design highways and related infrastructure facilities. Topics for the subject are highway surveys and location, geometric design of roads and highway facilities, road cross section design, intersection design, intersection control system, and roundabout design. At the end of the course, students are able to analyse and apply the related theories in order to design highway and infrastructure facilities.

#### **MKAQ 1023 - Advanced Road Material**

This is one of the core subjects that will enhance the knowledge of the students on advanced road materials. The course consists of the following topics i.e., properties and test of materials in road construction, analyze the laboratory testing (Marshall mixture design, Superpave mixture design, and concrete pavement mixture), recycled aggregate in road construction, waste materials in road construction, alternative binders for sustainable asphalt pavement and nanotechnology and its impact on road construction.

#### **MKAQ 1043 - Transport Planning**

This course is one of the core courses, which discusses transport models and four steps travel demand forecasting process, land-use demographic survey design and transport planning related data collection, Trips regression and category analysis, growth factor methods, trip distribution models, logit and probit models, route choice models, Appraisal of transportation projects. Economic evaluation and priority ranking techniques, alternative analysis, Citizen participation in transport planning. This course provides an exhaustive knowledge in traffic and transport planning.

#### **MKAQ 1053 - Pavement Design and Construction**

This is one of the core subjects that will develop the knowledge and experience of the students in pavement design construction. This course comprises the following topics: Factors influencing thickness design, methods of pavement design: AASHTO, Asphalt Institute, ATJ5/85 (2013), Rigid pavement design, Interlocking block design, surface dressing design, construction of various pavement types, earthworks, cut slopes, embankments, surface drainage, subsurface drainage, erosion control, slope protection, culverts.

#### **MKAQ 1063 - Public Transport System**

This course is one of the compulsory subjects, which provides background knowledge on mass transport modes, infrastructure and operational aspects. These include public transport scheduling and operation design, service planning and its data collection techniques. Transit demand forecasting is focused to model transit traffic flows. Transit lines and networks address level of service, investment, network operating efficiency, etc. This subject will expose the students to the public transport vehicle characteristics, the planning process of public transport, facilities location analysis and layout design, transit system planning and mode selection, highway design and traffic management for buses. The use of intelligent systems in urban mass transport modes and passengers, are elaborated. The economics of fares

structure and economic evaluation of public transport plans are discussed. Transit agency organizational and financing models are critically examined with case studies

### **MKAQ 1083 - Traffic Management and Analysis**

This course discusses urban traffic and transportation management strategies. It addresses the basic traffic and transportation data collections, analysis and the fundamental theory of traffic flow, capacity assessment of transportation facilities and the Transportation systems management (TSM) planning processes and strategies. TSM includes Advanced Traffic Management (ATM), Urban Traffic Control System (UTCS), Intelligent Transport and Traffic System (ITS) and Highway Information System.

## **ELECTIVE COURSES**

### **MKAQ 1033 - Transport & Environmental Planning**

This is one of the electives courses which will expose students to the fundamental aspects of environmental planning of transportation system.

Major topics include identification of environmental disturbances, traffic noise, techniques of estimation, design standard, air pollution, social impacts, transportation of hazardous and toxic material, transport and sustainability, and environmental evaluation and management.

### **MKAQ 1073 - Airport Planning and Design**

Legislation and organization of airway industry. Airport planning and size. Airport capacity, type, size and shape of the airport. Expected air traffic volume and control system. Runway traffic management.

### **MKAQ 1093 - Transport Safety**

This course provides state of art knowledge on road and transport safety. Understanding of the subject will help students to identify road and transport safety related interventions and preventive measures. Topics for the subject are fundamental concepts in transport safety, human factors in transportation, vehicle attributes that affect safety, traffic control devices, traffic safety measures, safety data review and assessment, safe road design concept, highway safety – data and analysis, traffic calming and other measures, pedestrian safety and road safety audit. At the end of the course, students are able to evaluate road safety engineering design and installations.

### **MKAQ 1103 - Disaster Management**

This is one of the elective subjects that will expand the knowledge of the students in disaster management and their understanding about impacts from disasters, to produce engineers that can provide holistic engineering, design and management solutions in their roles. The course consists of the following topics: Types and causes of disaster formation, Processes and mechanisms of disaster management, Traditional and contemporary approaches of disaster management cycles, Assessment of disasters using vulnerabilities and risk assessment, needs of special organisation structures that support disaster management. Effects of disasters on natural and built-up environment. Logistical and transportation needs during disasters, road safety auditing for anticipated disasters, sustainable construction and development efforts after disasters



### **MKAQ 1113 - Pavement Management System**

Students will learn two major things at the end of the course. Evaluation of various steps of pavement management system and Effective selection of the methods needed for managing pavement.

Students will also acquire a comprehensive knowledge of problems associated with pavement and how to maintain the roads effectively. They will get knowledge about “Arahan Teknik Jalan, Malaysia” and also latest technologies used by developed countries.

The course consists of the following topics: Overall picture of world highways as well as Malaysian roads, Network level and project level pavement management system, evaluation of different pavement layers and other infrastructure works, such as drainage etc.

They will also acquire functional and structural failures of pavement and corresponding rehabilitation works required including life cycle cost analysis.

They will gain knowledge about the source of finance for the most important public asset of roads for their construction and maintenance.

In Malaysia, they will get the knowledge of different organizations involved in pavement such as IKRAM, PLUS Bhd, Propel Bhd, HCM etc. From these evaluations and rehabilitations, they will get a widespread knowledge to manage the roads practically.

### **MKAQ 1123 - GIS for Civil Engineers**

This course is an elective course specially designs for post-graduate civil engineering students who always have to manipulate huge amount of spatial data. This course introduces the concept and advanced application of the Geographic Information System (GIS) theories especially in civil engineering fields. This course will emphasize on the overview and the application of GIS in civil engineering, GIS data structure, data manipulation and GIS implementation, information presentation of GIS, GIS case study in civil engineering, GIS prototype project, and future technology of spatial data storage. At the end of the course, students will be able to plan, analyse, and modeling the information for develop advanced GIS application related to civil engineering problems.