

# MASTER OF ENGINEERING (CONSTRUCTION MANAGEMENT)

## PROGRAMME SPECIFICATIONS

<b>1. Programme Name</b>		Master of Engineering (Construction Management)	
<b>2. Final Award</b>		Master of Engineering (Construction Management)	
<b>3. Awarding Institution</b>		UTM	
<b>4. Teaching Institution</b>		UTM	
<b>5. Programme Code</b>		MKAM	
<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 (per semester)</b>		14 weeks	
<b>11. Study Duration (semester)</b>		<b>Full time</b>	
		Minimum	3
		Maximum	8
<b>12. Entry Requirement</b>	<ol style="list-style-type: none"> <li>1. Degree with cumulative grade average of 3.00, or equivalent from a recognized university</li> <li>2. An international student should satisfy the English language minimum requirement of TOEFL score of 550 or IELTS band 6.0, or equivalent. A local student must produce a satisfactory score from MUET.</li> <li>3. Accepted by the post-graduate selection committee of the faculty involved.</li> <li>4. At least one member from the faculty who has at least a Master degree in the field of study is qualified and willing to supervise the candidate.</li> <li>5. Pass the health, financial and other requirements as specified by the university.</li> </ol>		
<b>13. 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>14. Programme Learning Outcomes (PLO)</b>			
Code	Intended Learning Outcomes	Teaching and Learning Methods	Assessment
<b>(a) Technical Knowledge and Competencies</b>			
PLO1	<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	Lectures, seminars, projects, directed reading, tutorials independent study, active learning	Examinations, group and individual project reports, presentations, assignments, problem-based exercises

	engineering discipline.		
<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 competent in solving problems logically, analytically and creatively based on sound facts and ideas.	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

**(b) Generic Skills**

<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

**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%
<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		13%
	(a) Management/Law/Humanities/Ethics	6	
<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>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 ENGINEERING SUBJECTS OFFERED (COMPULSORY)		LEARNING OUTCOME					
Code	Course	PO1	PO2	PO3	PO4	PO5	PO6
Core Course							
MKAM 1013	Construction Project Management	√		√			√
MKAM 1023	Construction Site Management and Safety Control	√		√		√	
MKAM 1043	Construction Law and Contract	√		√			√
MKAM1053	Project Planning and Scheduling	√				√	
MKAM 1103	Financial Management	√		√	√		
MKAM 1133	Sustainability & Environmental Management in Construction	√		√			√
ELECTIVE ENGINEERING SUBJECTS OFFERED (CHOOSE 2 FROM MKAM & 2 FREE ELECTIVES)		LEARNING OUTCOME					
Code	Course	PO1	PO2	PO3	PO4	PO5	PO6
Elective Course							
MKAM 1033	Construction Technology	√		√		√	
MKAM 1073	Project Estimating	√		√		√	
MKAM 1083	Construction Management Information Sys.	√		√			√
MKAM 1123	Construction Plants Management	√		√			√
MKAE 1153	Advance Concrete Technology	√		√			√
MASTER'S PROJECT		LEARNING OUTCOME					
Code	Course	PO1	PO2	PO3	PO4	PO5	PO6
MKAM 1514	Masters Pre-Project	√	√	√	√	√	√
MKAM 1526	Masters Project	√	√	√	√	√	√
MASTER'S PROJECT		LEARNING OUTCOME					
Code	Course	PO1	PO2	PO3	PO4	PO5	PO6
UABA 0013	Principle Engineering Management	√	√	√	√		
UAPA 0013	Research Methodology	√	√	√	√		√

### 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
7. ISO 9001:2000 and ISO 17025 accreditations (the only one in the world for Civil Engineering)

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**19. Career Prospects and Career Path**

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Graduates of the programme can work as a Project Engineer, Construction Engineer or Civil Engineer

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**20. Facilities available**

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List of laboratories:

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

## CURRICULUM STRUCTURE

<b>University's General Elective Courses(Total : 6 credits)</b>		
UABA 0013	Principle of Engineering Management	3 credits
UAPA 0013	Research Methodology	3 credits
<b>Core Courses (Total : 18 credits)</b>		
MKAM 1013	Construction Project Management	3 credits
MKAM 1023	Construction Site Management and Safety	3 credits
MKAM 1043	Control	3 credits
MKAM 1053	Construction Law and Contract	3 credits
MKAM 1103	Project Planning and Scheduling	3 credits
MKAM 1133	Financial Management	3 credits
	Sustainability & Environmental Management in Construction	
<b>Elective Courses – Choose any two from the following list (Total : 6 credits)</b>		
MKAM 1033	Construction Technology	3 credits
MKAM 1073	Project Estimating	3 credits
MKAM 1083	IT for Civil Engineers	3 credits
MKAM 1123	Construction Plants Management	3 credits
MKAE 1153	Concrete Technology	3 credits
<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>		
MKAM 1514	Masters Project 1	4 credits
MKAM 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

#### **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.

### **MKAM 1023 - Construction Site Management and Safety Control**

The course is designed to educate the student on the construction site management and occupational safety and health (OSH) concept. The course is divided into two parts namely site management and safety control. First part will emphasize on site management particularly principles of site management, site performance, site reporting, monitoring and control, site layout, workers' welfare and site resources. The second part will focus on the accident theories, prevention and investigation, risk management, OSH Management, performance and culture, occupational health such as stress and ergonomics within construction projects. Upon completion, students should be able to apply the effective site management and practice the knowledge Occupational Safety & Health Management and Accident Prevention within construction projects.

### **MKAM 1043 - Construction Law and Contract**

This course introduces students to Malaysia laws, which will focus on the sources, and branches of law in Malaysia. The course will emphasize on private laws related to construction practice, law of contract and construction contract administration. Construction contracts and the laws underpinning them will be subjected to detailed consideration and analysis, in tandem with a comparative analysis of the approach adopted by a wide range of standard form contracts. Other topics covered include avoidance, management and resolution of construction claims and disputes. Students will be exposed to various court cases related to construction contract administration. Students will also apply the knowledge of the Malaysian legal framework and legal requirements in contract administration to resolve legal issues in construction project. More importantly, the students will be able to use their knowledge to promote ethical and better image of the construction industry.

### **MKAM 1053 - Project Planning and Scheduling**

This course provides knowledge on contemporary practice in project planning and scheduling process in managing construction project. Major software for project planning and scheduling will be used. Student will be taught to develop project schedule and WBS then use advance technique to monitor and track project performance against baseline schedule. The concept and

application of Earn Value Management system will be taught and the student will be able to appraise project performance from time to time and recognised major delay and budget control.

### **MKAM 1103 - Financial Management**

The course focuses on the theory and practice of financial decision making and financial management within organizations. Students are introduced to some of the challenging issues facing managers in today's global financial landscape. The combination of quantitative and qualitative management tools presented in the course offer the essentials knowledge for the successful financial management. Its subject matter includes a review of the economic logic of financial decisions, drawing on the theories of finance, economic principles and behavioral and organizational aspects. The topics covered are capital budgeting, analysing business performance, managing working capital, investment decision making. At the end of the course, students should possess a sound knowledge of the financial management and are able to apply it in their practice.

### **MKAM 1133 - Sustainability & Environmental Management in Construction**

The developments of building and infrastructure have inherent links with the environment. Land, materials, water, energy are all consumed during the construction operation of buildings and infrastructure. The constructed facilities then become part of the new environment we have to live with. The process also generates greenhouse emissions which cause damage (e.g. global warming) to our environment. This subject offers an inter-disciplinary elective designed to promote collaboration and enhance understanding of the global challenge of sustainable development that related to construction industry. The course will emphasise on sustainability and environmental management within construction related issues as promoted by Agenda 21. The subject will cover aspects of embodied energy (renewable & non renewable), energy efficiency in building, construction waste, construction noise, water pollution, biodiversity and various sustainability control and prevention method for construction. Thus, environmental regulations & legislation; environmental Impact Assessment (EIA) and Environmental Management System (EMS) will be incorporated into the subject. At the end of the course, students are expected to able to understand the principles of sustainable development and apply knowledge to plan, design and construct using sustainable concepts and methods.

## **ELECTIVE COURSES**

### **MKAM 1033 - Construction Technology**

This is an elective subject emphasizing an integration of several areas related to construction. These include non-destructive tests for concrete structures, ground (site) investigation, excavation works in rocks and soils, tunnel construction, slope excavation, instrumentation and monitoring for large structures, bridge construction, and element and erection of steel and precast

structures. The course content is tailored to enable students to understand, evaluate, and apply essential theories and principles for construction purposes. At the end of the course, students should acquire the fundamental knowledge in constructing typical major structures.

### **MKAM 1073 - Project Estimating**

The course is designed to educate the student on the estimating, including the understanding of bidding, factors that affect estimates, and the understanding of cost proposal including the engineering economic is being develop with the focus on the cost benefits for the overall production rates on site is highlighted. The course is divided into two parts namely the recognition on the types of procurement and issues that cost estimates and the understanding on the principles of cost estimation. First part will emphasize on the scenario and issues involve in factors that affecting the estimates including the cost management and cash flow. The second part will focus on engineering economics, depreciation cost and the technology forecasting. Upon completion, students should be able to apply the cost proposal according to the estimation within construction projects

### **MKAM 1083 - IT for Civil Engineers**

Instructional lecture and problem based learning through the students group project 1 and 2. Students are also requiring to do an individual project to measure his/her skills in writing and analysis of data. In problem based learning, students are guided through the real-life problem that requires to be assembled into real data for database design. In project 2, students are being guided to form a database information system using Microsoft access. Engineers required IT content such as Business System of project and Product Based, Information Security, Knowledge Management and Knowledge Management Infrastructure are the main content of the lecture. The lecture is supplemented with the real data mapping and development of real database information system.

### **MKAM 1123 - Construction Plants Management**

This course introduces the techniques of applying engineering fundamentals and analyses to the planning, selection and utilisation of construction equipment. In general, the right selection, efficient utilization and cost-effectiveness of major construction operations have significant impacts on the overall cost and duration of construction activities. This course uses concepts from various engineering disciplines such as Engineering Economics, Geotechnical, Mechanical, Structural and Environmental Engineering, among others. At the end of this course, the students should be able to apply engineering fundamentals and analyses to the planning, selection and utilisation of construction equipment. This includes a thorough understanding on the total construction process and how construction equipment should be selected and used to produce the intended quality in the most cost-effective manner.



### **MKAE 1153 – Advance Concrete Technology**

This course is designed for students to gain knowledge on advanced concrete technology in Civil Engineering. It will emphasize of materials properties and various mix proportions of concrete, different types of supplementary cementing materials, special concretes including high performance concrete, high strength concrete, lightweight concrete, flowable concrete, self-consolidating concrete, and polymer concrete, concrete deformations, durability aspects of concrete, causes of concrete deterioration and repair techniques, and developments in current concrete technology. At the end of the course students should be able to describe, identify, and discuss the properties and behaviour of different types of concrete materials together with the selection and applications of the materials in practice. In addition, students should also understand the current trend in concrete technology