MACHAKOS UNIVERSITY

University Examination 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (ELECTRICAL ENGINEERING)

BACHELOR OF SCIENCE (MECHANICAL ENGINEERING)

BACHELOR OF SCIENCE (CIVIL ENGINEERING)

ECU 401: PROJECT MANAGEMENT

DATE: 31/7/2019 **TIME: 11.00-1.00 PM**

INSTRUCTIONS: Answer questions **ONE** and any other **TWO** questions.

QUESTION ONE

a) Using the balance quadrant, discuss project management's knowledge areas (10 marks)

b) With the aid of a sketch, discuss the generic project life cycle (10 marks)

c) Differentiate between operations management and project management. Hence or otherwise list the key skills that a project manager should be equipped with. (10 marks)

QUESTION TWO

a) Every project, not just those in the construction industry, goes through a series of identifiable phases, wherein it is 'born', it matures, it carries through to old age and it 'expires'. By use of a graphical figure identify and discuss the six phases of the construction process. (15 marks)

b) In presenting the contractor's activities on the construction site the responsibilities involve three basic areas: monitoring and control, resource management and documentation and communication. List five most important aspects of monitoring and controlling the work. (5 marks)

QUESTION THREE

a) An owner is contemplating the design and construction of a high-rise apartment building in your region's capital city. Identify potential appropriate project delivery systems and construction contract options. Which might be preferred? Why? ***(to be answered by Civil Engineering students only)*** (20 marks)

b) A utility company is contemplating the design and construction of a high-voltage power transmission line in your region's capital city. Identify potential appropriate project delivery systems and construction contract options. Which might be preferred? Why***? (to be answered by Electrical and Electronic Engineering students only)*** (20 marks)

c) A manufacturing company is contemplating the design and construction of a new product processing line in its factory. Identify potential appropriate project delivery systems and construction contract options. Which might be preferred? Why? ***(to be answered by Mechanical Engineering students only)*** (20 marks)

QUESTION FOUR

The construction of a sidewalk project consists of the activities given below;

Activity	Duration (working days)	Immediate predecessor(s)	Value (US$)	Number of labourers
Move-in	2		500	3
Excavate	3	Move-in	1500	2
Grade surface	2	Excavate	800	2
Order and deliver forms	6		900	0
Order and deliver reinforcing	10		2200	0
Pre-fabricate forms	4	Order and deliver forms	2600	4
Install forms	3	Grade surface; prefab-ricate forms	2100	3
Place and compact base	2	Install forms	1100	2
Place reinforcing	1	Place and compact base; order and deliver reinforcing	600	2
Place concrete	1	Place reinforcing	4500	5
Strip forms	3	10 working days after completion of place concrete	1650	2
Cleanup and move-out	2	Strip forms	900	3

Note that there is a lag of 10 working days between the completion of 'place concrete' and the beginning of 'strip forms'.

a) Draw an activity-on-node schedule network diagram for this project.

b) Calculate the early and late start and finish time and the slack for each activity.

c) Identify the critical path. (20 marks)

QUESTION FIVE

a) List several potential risks that will be assumed by the sponsor of a build–own–operate–transfer project. Identify those risks on your list that would not fall upon a design–build organization if such a project were transferred to the owner upon completion of construction. (10 marks)

b) Distinguish between a time-and-materials contract and a cost-plus contract. (5 marks)

c) An owner and its design professional will pre-qualify general contractors for a remote marine docking facility in Lamu Port. What factors should be included in the prequalification criteria? (5 marks)