

MAKERERE



UNIVERSITY

**COLLEGE OF ENGINEERING, DESIGN, ART AND TECHNOLOGY
(CEDAT)**

SCHOOL OF THE BUILT ENVIRONMENT

**DEPARTMENT OF CONSTRUCTION ECONOMICS AND
MANAGEMENT**

**PROPOSED MASTER OF SCIENCE IN CONSTRUCTION MANAGEMENT (MSc.
CMG) DEGREE PROGRAMME**

DAY/ EVENING PROGRAMME

Proposed Starting Date: August 2011

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1 PREAMBLE

The construction industry in Uganda is one of the fastest growing sectors of the national economy. This industry has both direct and indirect impacts on other sectors of the economy. Losses incurred in the industry due to the absence and shortage of experts in construction management and related skills drain the national economy to the tune of over US \$ 500 million annually. This loss is extensive and unsustainable for the industry and country. This programme provides advanced knowledge and skills required for effective management of construction projects and construction resources. The program was initially offered as an option under the MSc Civil Engineering and MEng (Civil) Programmes. The courses offered under the programme are similar in content with those initially under the MSc Civil Engineering and MEng (Civil) Programmes but with different course codes, except for cross-cutting courses. Table 1 compares the two programmes.

The courses cover areas of organizational functions in construction, construction business planning and control, management of materials and other resources, and the key elements construction contracts administration. These courses equip construction professionals with the necessary knowledge to add value to the management of construction projects and processes.

2 THE PROGRAMME

2.1 Programme Title

The title of the programme shall be **Master of Science in Construction Management, abbreviated as MSc. (CMG).**

The programme will be housed in the College of Engineering Design Art and Technology, School of Built Environment, Department of Construction Economics and Management. The degree shall be awarded by Makerere University

Table 1: A comparison of MSc Civil (CM Option) and MSc Construction Management

MSc Civil Eng. (CM Option)	MEng Civil (CM Option)	MSc Construction Management
Semester 1	Semester 1	Semester I (Plan A and B)
Core Courses (Compulsory)	Core Courses (Compulsory)	Core Courses (Compulsory)
EMT7102 Advanced Mathematics	CIV7101 Advanced Mathematics	CIV7101: Advanced Mathematics
EMT7103 Computer Applications in Engineering	EMT7101: Computer Applications in Engineering	EMT7101: Computer Applications in Engineering
CIV7102 Environmental Studies		CIV7102: Environmental Studies
	TEC7101 Principles of Management	
CIV7201 Project Management and Control		CMG7100: Project Management and Control
	MEC7101 Maintenance Engineering	
CIV7104 Construction Economics		CMG7101: Construction Economics
Semester II	Semester II	Semester II
Core Courses	Core Courses	Core Courses
TEC7200: Research methods	TEC7201 Business Administration 1	UPD 7200: Research methods and Scientific Writing
Elective Courses (select four)	Elective Courses (select three)	
	CIV7201 Project Management and Control	
CIV7220 Advanced Construction Technology	CIV7202 Construction Technology	CMG7201: Advanced Construction Technology
CIV7221 Contracts Law and Management	CIV7203 Construction Law	CMG7201: Contracts Law and Management
CIV7224 Construction Business Management		CMG7203: Construction Business Management
CIV7219 Site Management and Practice		CMG7204: Site Management and Practice
CIV7222 Systems Engineering		
CIV7223 Strategic Management in Construction		
	Semester II (Recess Period)	
	Compulsory Courses	
	CIV7301 Business Administration II	
	CIV7302 Research Methods	
	Elective Course (select two)	
	CIV7303 Materials of Construction	
	CIV7304 Economics of Construction	
	CIV7305 Project Appraisal	
	CIV7306 Principles of Quantity Surveying	
	CIV7307 Principles of Construction Design	
	CIV7308 Advanced Materials for Construction	
Semester III & IV	Semester III & IV	Semester III & IV (Plan A) –(All Core)
CE7200 Research and Dissertation	TEC8101 Research and Dissertation	CMG 8101: Masters Research Seminar 1
		CMG 8201 : Masters Research Seminar 2
		CMG 8100: Masters Dissertation
		Total Credit Units
		Semester III (Plan B) – 4 Courses
		Core Courses (4 Compulsory)
		CMG8102: Systems Engineering
		CMG8103: Strategic Management in Construction
		CMG8104: Materials of Construction
		CMG8105: Principles of Construction Design
		Elective (Students select ONLY 1 course)
		CMG8106: Principles of Quantity Surveying
		CMG8107: Advanced Materials of Construction
		Total Credit Units
		Semester IV (Plan B) – All Core
		CMG8202: Masters Project Seminar
		CMG8200: Masters Project

2.2 Programme Objectives

The objectives of the programme can be summarized as follows:

- To enable graduate students undergo a programme of upgrading and updating their technical knowledge in a specialized field of Construction Management
- Introducing the graduate students to applied research relevant to the industrial needs on the construction industry.
- Produce graduates with qualification sufficient to meet the needs of staff development of local Universities and technical colleges.

2.3 Rationale/Justification

The lack of construction management professionals has been at the bottom of several unbecoming practices and occurrences in the construction industry such as: collapse of buildings, incomplete projects, cost escalations, poor construction process administration, lack of technical planning, poor construction controls, unethical procurement procedures, lack of proper supervision, poor production of work, lack of site progress reports, inadequate specifications, low quality work, and lack of technical information during the construction process. All these have had a devastating effect on the national economy and as well as the social fabric. The content of this programme exposes professionals to the skills that will enable them to professionally address these problems that are rampant in the construction industry.

The College of Engineering, Design, Art and Technology, and Makerere University strategic visions, missions and plans emphasize the need for production of highly qualified human resources in existing, continuing and emerging areas in order to contribute to national development. Having specialists in construction management is in conformity with the strategic direction of the University and the nation.

2.4 Target Group

The demand for Construction professionals is increasing in Uganda. Proper management of construction is required in all government departments, NGOs and the private sector. This programme targets people who need to do research at graduate level and those who wish to

advance their knowledge in construction management. The list includes: graduate civil engineers, architects, construction managers, quantity surveyors, land economists and physical Planners, defence (Armed) Forces-Engineers Brigade, Police and so on. The target is to have 30 students for each intake of the Masters Programme.

2.5 Graduate Profile

A graduate with a Master of Science in Construction Management will be appropriately qualified to contract administration and project management of small and large scale construction projects. The course also provides adequate knowledge for construction professionals in top positions of responsibility in engineering organisations and government institutions/departments that handle works of engineering nature.

2.6 Nature of Programme

The MSc. (CMG) programme will be run as a day/evening programme with privately sponsored students. The duration of the day/evening programme will be two years spanning through four semesters. The programme shall offer two options for students to select according to their preference. These choices are termed Plan A and Plan B in conformity with University regulations.

2.6.1 Plan A

Students under Plan A will be required to take two semesters of course work and two semesters of research leading to a dissertation in any area of Construction Management, such as project management, construction materials, construction costing, construction quality management, operations control, etc. To qualify for Plan A, a student will have developed an acceptable research proposal, by the second week of semester three. Students intending to later on undertake PhD studies or a career in research will be encouraged to go through this plan.

2.6.2 Plan B

Students under Plan B will be required to undertake three semesters of coursework and one semester of a project. The project may not necessarily be research-oriented but should be investigative and will hence involve data collection, data analysis and report writing. To qualify for Plan B a student shall have developed a project proposal, by the second week of the last

semester (semester four). Students intending to later on undertake PhD studies or a career in research may be required to do some remedial courses as deemed appropriate.

2.7 Admission Requirements

To qualify for admission, a candidate must fulfill the general Makerere University entry requirements for masters degree, and in addition the candidate must be a holder of either:

1. A postgraduate diploma in Construction Project Management or a closely related field from a recognized University/Institution; OR
2. A bachelor's degree or equivalent from a recognized university in the following disciplines Construction Management, Civil Engineering, Architecture, Quantity Surveying, Land Economics, and Physical Planning. For other disciplines, the Graduate Studies and Research Committee will decide whether Construction Management forms an integral part so as to determine whether candidates from such disciplines qualify to be admitted to the MSc (CMG) Programme.
 - (a) Applicants with first class degree in the above disciplines do not require any working experience.
 - (b) Applicants with second class degree in the above disciplines are required to have at least two years of working experience in a relevant field.
 - (c) Applicants with a third class degree in the above disciplines are required to have at least two years of working experience in a relevant field and also have proven academic growth, such as a Post Graduate Diploma in the above disciplines or evidence of presenting academic papers.

2.8 Upgrading Post Graduate Diploma to MSc (CMG)

When a student graduates with a Postgraduate Diploma in Construction Project Management (Lower Second Class, Upper Second Class or First Class), he/she can apply for the Master of Science in Construction Management to join second year . In such a scenario, the applicant is expected to either take on Plan A or Plan B. With Plan A, the applicant is expected to undertake research for one year which is equivalent to the second year (semesters III and IV) course load that is covered on the Master of Science in Construction Management. With Plan B, the student is expected to undertake the Semester III courses and a project in Semester IV as stipulated in the

Masters of Science in Construction Management programme. The upgrading of the Post Graduate Diploma to the MSc (CMG) described above must be supported by the relevant academic documents attained from the Post Graduate Diploma in Construction Management of Makerere University. This must be done for purposes of analyzing the relevant academic courses that must have been attempted as per the current curriculum. Any courses that were not attempted by the applicant as per the first and second semesters' course load of the current curriculum must be undertaken.

Students with a class of diploma lower than the second class lower, will not be allowed to upgrade to MSc (CMG) by joining the second year, but can be allowed to undertake the two years of the programme.

2.9 Programme Duration

The minimum duration of the Master of Science in Construction Management shall be two (2) years while the maximum shall be four (4) academic years.

2.10 Sequencing

The MSc (Construction Management) shall run on a semester system. In each semester, a number of courses will be conducted to broaden the knowledge of the students in the various sub-disciplines of Construction Management. The programme will begin with courses which will be compulsory for all students registered for the programme. In the third semester for Plan B, elective courses will be offered, in which students will be permitted to select courses that are relevant to their application areas of interest.

The overall sequence will be as follows:

Year 1

Semester 1:	5 Compulsory Courses
Semester 2:	5 Compulsory Courses

Year 2:

Plan A:	Semester 3 and 4:	Masters Seminars and Dissertation
Plan B:	Semester 3:	4 Compulsory Courses
		1 course elective course
	Semester 4:	Masters Seminar and Project

2.11 Tuition Fees

Tuition fees payable by the students will be based on whether a student is a Ugandan or a foreigner as determined by the University from time to time. The tuition for fees for Ugandans will be UGX3,787,500 while for others it will be UGX8,250,000 (at an exchange rate of US\$1=UGX2500) per academic year.

3 EXAMINATION REGULATIONS

3.1 Assessment of courses

- (i). Each taught course will be assessed on the basis of 100 total marks with proportions as follows:

Course work 40%

Written examination 60%

- (ii). Coursework consists of Progressive Assessment (Tests and Assignments) assessed at 40%.
- (iii). A minimum of two coursework assignments/tests are required per course.
- (iv). For Masters Seminars, written documents (proposals and Progress reports) and oral presentations will be marked. Under both Plan A and B seminars account for 37.5% of the overall project credits units.

3.2 Grading Courses

- (i). Each course is graded out of a maximum of 100 marks and assigned appropriate letter grades and grade point averages as follows:

Table 2: Grading of Marks

Mark%	Letter Grade	Grade point	Interpretation
90-100	A+	5.0	Exceptional
80-89	A	5.0	Excellent
75-79	B+	4.5	Very Good
70-74	B	4.0	Good
65-69	C+	3.5	Fairly Good
60-64	C	3.0	Pass

55-59	D+	2.5	Marginal pass
50-54	D	2.0	Clear Fail
45-49	E	1.5	Bad Fail
40-44	E-	1.0	Qualified Fail
Below 40	E	0	Qualified Fail

(ii). These additional letters will be used where appropriate

W - Withdrawn from course

I - Incomplete

AUD - Audited courses only.

(iii). The pass grade per course is 3.0 (i.e. a pass mark of 60%).

(iv). No credit is awarded for any course in which a student fails.

3.3 Weighting System

The weighting unit is based on a Credit Unit (CU). A Credit Unit is equivalent to fifteen (15) contact hours per semester. A contact hour is equal to one lecture hour, or two practical hours.

3.4 Progression

Progression through the course shall be assessed in three ways:

(i) **Normal Progress** occurs when a student passes all courses taken.

(ii) **Probation** is a warning stage and occurs if:-

a) A student fails a core/compulsory course or

b) A student obtains GPA or CGPA of less than 3.0

Probation is removed when either of the conditions (a) and (b) no longer holds.

(iii) **Discontinuation** occurs if one of the following conditions obtains:-

a) A student accumulated three consecutive probations on the same core/compulsory course

b) A student accumulated three consecutive probations based on CGPA

3.5 Retaking a Course

There shall be no supplementary in any course of the programme. However, a student may retake any course when it is offered again in order to:

a) Pass, if the student had failed it before.

b) Improve the grade, if the first pass grade was low.

A student who does not wish to repeat a failed elective course shall be allowed to take a substitute elective.

3.6 Calculation of the Cumulative Grade Point Average

The cumulative grade point average at a given time shall be obtained by;

$$CGPA = \frac{\sum_{i=1}^n (GP_i \times CU_i)}{\sum_{i=1}^n CU_i}$$

where GP_i is the Grade Point score of a particular course i ; CU_i is the number of Credit Units of course i ; and n is the number of courses so far done

3.7 Masters Dissertation

Students will be required to demonstrate their ability to independently formulate acceptable dissertation proposals, undertake research and be able to communicate and defend their findings. The dissertation shall conform to the standing guidelines and regulations of the University on higher degrees. In addition, the following shall also apply:

- a) A candidate shall not be allowed to formally start on research unless he/she has passed all the core courses.
- b) A candidate under Plan A shall submit a research proposal to the Graduate Studies and Research Committee of the School of the Built Environment at the beginning of Semester three of study.
- c) Candidates under plan A shall conduct research during the second year of study.
- d) A candidate shall be assigned a supervisor who is a specialist in the candidate's field of study to undertake supervision of the dissertation.
- e) Each candidate shall hand in three hard copies and one soft copy of the dissertation by the end of the second year.

3.8 Passing a Dissertation

To pass a dissertation, the candidate shall satisfy the examiners in both the written dissertation and viva voce. The examiners will include internal examiners, external examiners and the viva voce panel.

3.9 Revised Dissertation

A candidate who fails to satisfy examiners shall resubmit a revised dissertation in accordance with the standing University guidelines for the dissertation examinations three months after notification.

3.10 Master's Project

Students are required to demonstrate their ability to independently formulate a detailed Project Proposal, as well as develop and demonstrate their Project thoroughly.

- a) A candidate shall be allowed to formally start on the Project after the third semester.
- b) A candidate shall submit a Project Proposal to the College Graduate Studies and Research Committee during the third semester.
- c) The candidate shall execute the Project during the fourth semester.
- d) The candidate shall submit the Project Report by the end of the fourth semester.

3.10.1 Passing of a Project

To pass the Project, the candidate shall satisfy the examiners in a written report and viva voce independently.

3.10.2 Revised Project Report

A candidate, who fails to satisfy the examiners, shall re-submit a Revised Project Report in accordance with the standing University guidelines for the project examinations.

3.11 Graduation Requirements

The degree of MSc (CMG) shall be awarded to a candidate who fulfils both conditions below:-

- a) Accumulated CU of not less than 44 for Plan A and not less than 52 for Plan B Should have passed all core (compulsory) courses
- b) Passed the dissertation/project/field report.

4 GENERAL PROGRAMME STRUCTURE

4.1 PLAN A

Table 3: Programme Courses/Courses

Semester I (5 Courses)				
Core Courses (Compulsory)				
Semester I	LH	PH	CH	CU
CIV7101: Advanced Mathematics	45	0	45	3
EMT7101: Computer Applications in Engineering	45	30	45	3
CIV7102: Environmental Studies	45	0	45	3
CMG7100: Project Management and Control	45	0	45	3
CMG7101: Construction Economics	45	0	45	3
Total Credit Units				15
Semester II				
Core Courses				
UPD 7201: Research Methodology and Scientific Writing	30	30	45	3
CMG7200:Advanced Construction Technology	45	0	45	3
CMG7201: Contracts Law and Management	45	0	45	3
CMG7203: Construction Business Management	45	0	45	3
CMG7204: Site Management and Practice	45	30	45	3
Total Credit Units				15
Semester III & IV (All Core)				
CMG 8101: Masters Research Seminar 1	15	30	45	2
CMG 8201 : Masters Research Seminar 2	15	60	45	2
CMG 8100: Masters Dissertation	30	180	120	10
Total Credit Units				14

4.2 PLAN B

Table 4: Programme Courses/Courses

Semester I (5 Courses)				
Core Courses (Compulsory)				
Semester I	LH	PH	CH	CU
CIV7101: Advanced Mathematics	45	0	45	3
EMT7101: Computer Applications in Engineering	45	30	45	3
CIV7102: Environmental Studies	45	0	45	3
CMG7100: Project Management and Control	45	0	45	3
CMG7101: Construction Economics	45	0	45	3
Total Credit Units				15
Semester II				
Core Courses				
UPD 7201: Research Methodology and Scientific Writing	30	30	45	3
CMG7200: Advanced Construction Technology	45	0	45	3
CMG7201: Contracts Law and Management	45	0	45	3
CMG7203: Construction Business Management	45	0	45	3
CMG7204: Site Management and Practice	45	30	45	3
Total Credit Units				15
Semester III – 4 Courses				
Core Courses (4 Compulsory)				
CMG8102: Systems Engineering	45	0	45	3
CMG8103: Strategic Management in Construction	45	0	45	3
CMG8104: Materials of Construction	45	30	45	3
CMG8105: Principles of Construction Design	45	0	45	3
Elective (Students select ONLY 1 course)				
CMG8106: Principles of Quantity Surveying	45	0	45	3
CMG8107: Advanced Materials of Construction	45	0	45	3
Total Credit Units				15
Semester IV – All Core				
CMG8202: Masters Project Seminar	15	30	45	2
CMG8200: Masters Project	0	150	75	5
Total Credit Units				7

5 DETAILED CURRICULUM FOR THE COURSES

CIV 7101 Advanced Mathematics

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course covers definition of statistical concepts, measures of location, measures of dispersion, presentation and summarization of data, probability distributions, sampling, tolerance and quality control.

Objectives/Aim

- To enable the student understand and use advanced statistical and mathematical tools in the construction management process and research.

Course Outline

- Definition of elementary statistical concepts [5 CH]
- Measures of location [5 CH]
 - arithmetic mean,
 - median,
 - midpoint,
 - midrange.
- Measures of dispersion [5 CH]
 - range,
 - variance,
 - standard deviation,
 - coefficient of variation,
 - standard error
- Presentation and summarization of data [5 CH]
 - frequency,
 - histograms/bar charts
- Probability, [5 CH]
 - probability distributions,
 - normal (Gaussian) distributions,
 - exponential distributions,
 - gamma distributions,
 - beta distributions,
 - other distributions.
- Samples and populations [5 CH]
- Tolerance and quality control. Confidence limits [5 CH]
- The chi square distribution: Inference, comparison of means. [5 CH]

9. Method of least squares, regression, and correlation. [5 CH]

Learning Outcomes

The student will be able to:

- Understand and use advanced mathematics and statistical principles in research and management of construction processes and projects.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark, while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

1. Williams, A. S. (2006) *Statistics for Business and Economics*; West
2. Upton G. and Cook I (1996) *Understanding Statistics*, Oxford University Press
3. *Probability and Statistics*. Addison – Wesley Publishing Company, London.

EMT 7101 Computer Applications in Engineering

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	2	5	45	100	60	40	3

Course Description

The course covers relevant computer concepts, operating systems, software design and programming, and computer applications.

Objectives/Aim

- To enable the student understand and use Computer and Information Technology in the construction management projects and processes.

Course Outline

1. Advanced computer concepts [12CH]
 - 1.1. Representation of integers,
 - 1.2. Real values,
 - 1.3. Characters and instructions;
2. The operating system [12CH]
 - 2.1 Disk operating system
 - 2.2 Windows operating system
 - 2.3 Other operating systems
3. Software development [12CH]

- 4. Computer programming [12CH]
- 5. Computer applications for Construction Managers [12CH]

Learning Outcomes

The student will be able to:

- Understand and use Computer and Information Technology in the construction management process.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials, practical exercises and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and practical tests, and final written examination. The final examination carry 60% of the total mark, while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

1. Andrea diSessa (2000) *Changing Minds: Computers, Learning, and Literacy*; The MIT Press
2. Luehrmann A. and Peckham H. (1984) *Computer Literacy: A Hands-On Approach*, First Apple Edition, Macmillan/Mcgraw-Hill School

CIV 7102 Environmental Studies

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

This course covers environmental considerations in planning, design and management of projects and health issues in a work environment.

Objectives/Aim

- To equip the student with knowledge of environmental and health matters in construction.

Course Outline

1. Environmental Sustainability and Human Values [5 CH]
 - A. Human Use of Earth
 - B. Human Values and Environmental Problems
 - C. Environmental Justice
 - D. An Overall Plan for Sustainable Living

2. Risk Analysis and Environmental Hazards [5 CH]
 - A. A Perspective on Risks
 - B. Environmental Hazards

- C. Movement and Fate of Toxins
 - D. How We Determine the Health Effects of Pollutants
 - E. Precautionary Principle
3. Solid and Hazardous Waste: An Unrecognized Resource [5 CH]
 - A. Solid Waste
 - B. Reducing Solid Waste
 - C. Hazardous Waste
 - D. Managing Hazardous Waste
 4. Air and Air Pollution [5 CH]
 - A. The Atmosphere
 - B. Types and Sources of Air Pollution
 - C. Effects of Air Pollution
 - D. Controlling Air Pollutants
 - E. Indoor Air Pollution
 5. Freshwater Resources and Water Pollution [5 CH]
 - A. The Importance of Water
 - B. Water Resource Problems
 - C. Water Management
 - D. Water Pollution
 - E. Improving Water Quality
 6. Nonrenewable Energy Resources [5 CH]
 - A. Energy Consumption
 - B. Coal
 - C. Oil and Natural Gas
 - D. Nuclear Energy
 - E. Decommissioning Nuclear Power Plants
 7. Renewable Energy Resources [5 CH]
 - A. Direct Solar Energy
 - B. Indirect Solar Energy
 - C. Other Renewable Energy Sources
 - D. Energy Solutions: Conservation and Efficiency
 8. Health and Safety in a Work Place [5 CH]
 9. Environmental Impact Assessment [5 CH]

Learning Outcomes

The student will be able to:

- Understand environmental implications of construction processes and how their impacts can be mitigated.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials, practical exercises and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and practical tests, and final written examination. The final examination carry 60% of the total mark, while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

Robert Staib (2005) Environmental Management and Decision Making for Business; Palgrave Macmillan

Gary S. Thorpe (2011) Barron's AP Environmental Science

CMG 7100 Project Management and Control

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	2	3	45	100	60	40	3

Course Description

The course covers management principles, operations research, construction contracts, and planning, scheduling and controlling of construction projects.

Objectives/Aim

- To train the student in the application of modern management concepts, principles and tools in the management of construction projects.

Course Outline

1. Principals of management [9 CH]
 - 1.1. Organisation theory
 - 1.2. Evolution of management theory
 - 1.3. Scientific management theories
 - 1.4. The human relations approach
 - 1.5. System and contingency approaches
 - 1.6. Modern approaches to management

2. Construction Management Tools and Techniques [10 CH]
 - 2.1 Project Work Breakdown
 - 2.2 Work Scheduling
 - 2.3 Critical Path Method of Analysis
 - 2.4 Project Evaluation and Review Technique
 - 2.5 Precedence Network Analysis
 - 2.6 Manpower Scheduling
 - 2.7 Planning for Construction Materials
 - 2.8 Planning for Construction Equipment
 - 2.9 Construction Costs and Budgets

- 2.10 Statistical Approach
- 2.11 Computer Applications
- 3. Operational research [9 CH]
 - 3.1 linear programming,
 - 3.2 probability theory,
 - 3.3 research and development,
 - 3.4 decision and game theory,
 - 3.5 queuing theory.
- 4. Construction contracts: [9 CH]
 - 4.1 construction commissioning
 - 4.2 systems of agreement,
 - 4.3 the role of the engineer
 - 4.4 documentation,
 - 4.5 tendering & bidding,
 - 4.6 management contracts,
 - 4.7 target contracts.
 - 4.8 sub-contracts,
- 5. construction site organization, [8 CH]
 - 5.1 personnel,
 - 5.2 documentation and regulations,
 - 5.3 accounting,
 - 5.4 execution of works,
 - 5.5 risk management,
- 6. Project failure [5 CH]
- 7. Project phasing and scheduling. [5 CH]
- 8. Project monitoring and appraisal. [5 CH]

Learning Outcomes

At the end of the course, the student will be equipped with management concepts in the context of construction projects, and will be in position to apply appropriate project management tools in the management of the construction projects and processes.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

- Anbuvelan K. (2007). *Management Concepts for Civil Engineers*. Laxmi Publications, New Delhi
- Cole G. A. (2004). *Management Theory and Practice*. (6th Ed.) Book Power, London
- Chitkara K. K. (2004). *Construction Project Management. Planning, Scheduling and Controlling*. Tata McGraw-Hill Publishing Company Limited, New Delhi
- Freeman B. G. & Balkwill J. (2005). *Management in Engineering: Principles and Practice*. (2nd Ed.) Prentice Hall of India PVT, New Delhi
- Kwakye A. A. (1997). *Construction Project Administration in Practice*. Pearson Longman, Essex, UK.
- Piésold D. A. (1991). *Civil Engineering Practice, Engineering Success by Analysis of Failure*. McGraw-Hill Book Company, London.
- Sengupta B. & Guha H. (2004). *Construction Management and Planning*. Tata McGraw-Hill Publishing Company Limited, New Delhi.

CMG7101 Construction Economics

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course is geared at taking the student through estimating, economic resources, feasibility studies, cost benefit analysis; and supply and demand.

Objectives/Aims

- To enable the student understand estimation processes, inputs and outputs
- To help the student master the different ways of assessing the viability of construction projects
- To provide an understanding of supply and demand in the construction context

Course Outline

- 1. Estimating** [10 CH]
 - 1.1 The Process
 - 1.2 Inputs and Outputs of Estimating process
 - 1.3 Methods of estimating
 - 1.4 Cash flows
- 2. Economic resources: identification and allocation** [10 CH]
 - 2.1 Economic resources

- 2.2 Reducible and irreducible factors
 - 2.3 Priority analysis
 - 2.4 Interest
 - 2.5 Net Present Value, Equivalent Annual Cost, Payback Period, Profitability Index
- 3. Feasibility Studies [10CH]**
- 3.1 Need for feasibility studies
 - 3.2 Parties and processes in feasibility studies
 - 3.3 Feasibility study reports
- 4 Cost benefit analysis [5CH]**
- 4.1 Cost determination
 - 4.2 Benefits and disbenefits
 - 4.3 Cost benefit ratio analysis
- 5 Supply and demand [10 CH]**
- 5.1 Supply analysis
 - 5.2 Demand analysis
 - 5.3 Using demand and supply in construction
 - 5.4 Elasticity of demand and supply in construction
 - 5.5 Price Mechanism and allocation of resources
 - 5.6 The role of government in construction demand and supply

Learning Outcomes

The course will help the student to:

- Estimate for civil engineering projects
- Carry out economic assessment and choose projects
- Carry out feasibility studies and write reports
- Analyse the supply and demand in construction

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

- Shutt, R. C. (1989) Economics of the Construction Industry, 2nd ed. Longman.
- Harris, F. and McCaffer, R. (2001) Modern Construction Management, 5th ed., Blackwell Science.
- Brech, E. F. (1971) Construction Management in Principle and Practice, 1st ed., Longman.
- Thompson, P. A. (1981) Organisation and Economics of Construction, 2nd ed., McGrawHill.
- Sepulveda, J. A., Souder, W. E., and Gotfried, B. S. (1984) Engineering Economics, 1st ed., McGrawHill.

UPD 7201 Research Methodology and Scientific Writing

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	30	3	45	100	60	40	3

Course description:

The course provides the theoretical insight and practical skills required to plan, implement, analyse and report a scientific findings in the area of urban planning and design. The main parts of the course are scientific methods of projects including research methodology, and ethics both theoretical and practical. It also includes scientific writing, reviewing, and presentation of texts.

Objectives:

- The aim of the course is to give the students the theoretical and practical skills to conduct, analyze and present in written research tasks in the area of Plannin and design and to give insight and understanding of research methodology.

Learning outcomes:

Following this course a student should be able to:

- Explain and apply techniques for scientific writing and research methodology to prepare the writing of a scientific report.
- perform investigation using methods, explain and take position on the results as well as summarize related work
- Apply the knowledge in scientific writing and research methodology and use the knowledge to write a scientific report.

Delivery method:

The course is divided into three parts, where lectures and labs provide support for handling:

1. Research Methodology, which is motivating, and preparing as well as performing an
2. Evaluation, giving insights in evaluations for scientific research, and a
3. Scientific Report, reporting the outcome of the evaluation.

These three parts are examined by a project proposal (or project plan), a method description and a scientific report.

Assessment method:

This will be done through continuous assessment (including coursework and tests) and written examination at the end of the semester. Coursework and test will be assessed out of 40% and examinations, out of 60%.

Course content:

1. Introduction to Research Methodology and Scientific Writing 4 CH

2.	Introduction to Scientific Genres - Proposals and technical reports	2 CH
3.	Scientific knowledge	2 CH
4.	Hypothesis testing	2 CH
5.	Effective Writing Strategies, Paragraph structure, Cohesive devices, Information structure, and Conciseness	2 CH
6.	Working with Texts, Digital resources, Working with original sources, Referencing systems,	4 CH
7.	Reviewing and collaboration, Learning from model texts	2 CH
8.	Introduction to research and data collection methods: both qualitative and quantitative	2 CH
9.	Experiments	2 CH
10.	Quantitative methods	2 CH
11.	Proposals	2 CH
12.	Ethics, Plagiarism	2 CH
13.	Quantitative data collection methods, analyse, result	3 CH
14.	Seminar 1	2 CH
15.	Research articles 1: Introduction and Methods	4 CH
16.	Qualitative methods	2 CH
17.	Qualitative data collection methods	2 CH
18.	Research articles 2: Results, discussion, title and abstract.	2 CH
19.	Seminar 2	2 CH

Proposed staff: Dr. Allan Birabi, Dr. Ian Senkatuka

References:

- Wayne C. Booth, Gregory G. Colomb, and Joseph M. Williams, *The Craft of Research*, 2nd edition (Chicago Guides to Writing, Editing, and Publishing), University Of Chicago Press; 1 edition (March 2003), paperback: 336 pages, ISBN-10: 0226065685, ISBN-13: 978-0226065687
- Angelika H. Hofmann, *Scientific Writing and Communication: Papers, Proposals, and Presentations*, Oxford University Press, USA (December 16, 2009), Paperback: 704 pages, ISBN-10: 0195390059, ISBN-13: 978-0195390056

Peter Bock, *Getting It Right: R&D Methods for Science and Engineering*, Academic Press; 1 edition (September 13, 2001), 406 pages, ISBN-10: 0121088529, ISBN-13: 978-0121088521

CMG7200 Advanced Construction Technology

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

Construction involves different types and levels of technology that enable building structures of different magnitudes to be constructed. This course focuses on technologies, materials and methods employed in construction of building structures and other large building projects.

Objectives/Aims

- To impart knowledge on assembly and performance of building structures:
- To know the materials, false-works, components, plant and equipment required in construction of framed structures
- To appreciate service requirements and safety regulations in large building structures.

Course Outline

1. Construction technology concepts, [5 CH]
 - 1.1 Forms and design.
 - 1.2 Construction equipment.
 - 1.3 Building standards.
 - 1.4 Quality control.
2. Substructure construction [5 CH]
 - 2.1 Temporary support,
 - 2.2 Excavation,
 - 2.3 soil testing,
 - 2.4 foundations (shallow, deep, piles, retaining walls),
 - 2.5 underpinning.
3. Superstructure construction [5 CH]
 - 3.1 scaffolding,
 - 3.2 reinforced concrete, s
 - 3.3 teelwork, timber,
 - 3.4 prestressed concrete,
 - 3.5 steelwork,
 - 3.6 timber,
 - 3.7 composites,
 - 3.8 masonry,
 - 3.9 prefabs.
4. Horizontal and other structures [5 CH]
 - 4.1 hydraulic structures,
 - 4.2 bridges,
 - 4.3 off shore structures,
 - 4.4 pavements.
5. Secondary works [5 CH]
 - 5.1 finishing,
 - 5.2 doors and shutters,
 - 5.3 joinery and adhesives,
 - 5.4 access to sites,

5.5 building envelopes.

6. Functional services [5 CH]
6.1 drainage,
6.2 water supply,
6.3 electrical fittings.
7. Construction monitoring and appraisal. [5 CH]
8. Demolition, repair, renovation and maintenance. [5 CH]
9. Safety and health regulations. [5 CH]

Learning Outcomes

Understanding of construction techniques, materials, and methods for framed structures and large building construction projects.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials, site visits, and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination will carry 60% of the total mark, while continuous assessment will carry a total of 40%.

Reading/reference materials

Chudley R. 1973 & 1974. Construction Technology, Vols. 1 and 2. Longman, London.

Rangwala, S, C (1978), Building Construction 4th Edn, Charotar Book Stall. Anand Press, India.

Barry R., (1979), The Construction of Buildings Vols 3 and 4. Crosby Lockwood Staples, London.

Harris () Modern Construction Equipment and Methods

Seeley 1. (1980), Building Technology, Macmillan, London.

CMG7201 Contracts Law and Management

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course teaches the student Uganda and English legal systems, Contract law, law of tort, business law, construction contracts and labour law.

Objectives/Aims

- To teach the student law of contracts and tort
- To help the student analyse construction contracts

Course Outline

- 1. Introduction** [10 CH]
 - 1.1 Uganda and English legal systems
 - 1.2 passive, reactive and proactive characters.
- 2. Contract law** [10 CH]
 - 2.1 Exportability of judgements,
 - 2.2 jurisdiction on bases of domicile,
 - 2.3 submission and propagation
 - 2.4 international arbitration,
 - 2.5 torts and trusts,
 - 2.6 laizzare faire,
 - 2.7 contract documentation,
 - 2.8 negligence
 - 2.9 FIDIC/ICE Conditions of contract,
 - 2.10 liquidated damages,
 - 2.11 extensions of time,
 - 2.12 money claims, damages, restitution, abortive contracts, indemnity, and arbitration.
- 3. Business law** [10CH]
 - 3.1 Economic functions of companies,
 - 3.2 Types of companies, incorporation, limited liability; corporate
 - 3.3 Finance, raising capital; the stock exchange, insider dealing,
 - 3.4 Corporate directors, take-overs, floating charges, insolvency.
- 4 Construction contracts, procedures and dispute resolution** [5CH]
 - 4.1 Contract promotion,
 - 4.2 tendering procedures, (client, engineer and contractor)
 - 4.3 Tender/contract documents; bills of quantities and methods of measurement
 - 4.4 Design-build practice
- 5 Labour law** [10 CH]
 - 5.1 Forming contract of employment, employee's rights and obligations,
 - 5.2 Dismissal, unfair dismissal, wrongful dismissal and redundancy/retrenchment
 - 5.3 Industrial action and Trade Union policy Demand analysis

Learning Outcomes

The course will enable the student to:

- Use law principals in the construction context
- Draft documents with legal issues in mind

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

W. V. H. ROGERS, *Winfield & Jolowicz on Tort*, 16th Edition, London, Sweet & Maxwell, 2002/ 17th Edition, London, Sweet & Maxwell, 2006.

JOHN MURPHY, *Street on Torts*, 12th Edition, Oxford University Press, Oxford, 2006.

GRAHAM STEPHENSON, *Sourcebook on Torts*, 2nd Edition, Cavendish Publishing Ltd. 2000.

MARKESINIS B. S. & DEAKIN S.F., *Tort Law*, 4th Edition, Clarendon Press, Oxford, 1999.

JOHN G. FLEMMING, *The Law of Torts*, 9th Edition, 1998.

CLERK & LINDSELL On Torts, The Common Law Library No.3, 17th Edition, London, Sweet & Maxwell, 1995.

E. VEITCH, *East African cases on the Law of Tort*, London, Sweet & Maxwell, 1972.

HEYDON J. D., *Economic Torts*, London, Sweet & Maxwell, 1973.

PAGE KEETON & RORERT KEETON, *Tort Cases and Materials*, American Casebook Series, West Publishing Co.

MUNKMAN JOHN, *Employer's Liability at Common Law*, 7th Edition, Butterworth 1971.

CMG7202 Construction Business Management

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course is geared at taking the student through the management of construction business. It covers the business nature, production function, personnel function, marketing function, and finance function.

Objectives/Aim

- To enable the student understand the construction business management process.

Course Outline

1. Business: [9 CH]
 - 1.1. Nature and purpose of business,
 - 1.2. scope of business.
 - 1.3. Business ownership: sole proprietorship, partnership and company
 - 1.4. private and public sectors;
 - 1.5. cooperatives,
 - 1.6. multinationals,
 - 1.7. business combinations.

2. The production function [9 CH]
 - 2.1 meaning and factors of production,
 - 2.2 plant and location layout;
 - 2.3 production planning and control.

3. The personnel function; [9 CH]
 - 3.1 personnel selection,
 - 3.2 training,
 - 3.3 development and appraisal,
 - 3.4 employee remuneration;
 - 3.5 labour management relation.

4. Marketing function: [9 CH]
 - 4.1 product planning and development;
 - 4.2 pricing policies
 - 4.3 channels of distribution,

5. The finance function: [9 CH]
 - 5.1 the finance of a business
 - 5.2 capital structure,
 - 5.3 methods and sources of business finance;
 - 5.4 the business environment;
 - 5.5 financial markets

Learning Outcomes

The student will understand how to run construction businesses and their applicability.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

1. Allen L.A. (1977), *Management and Organization*. Mc Graw-Hill, London.
2. Fremout E.K. and Rosenzweig E.J. (1985), *Organization and Management A Systems and Contingency Approach*. Mac Graw-Hill, London.

CMG 7203 Site Management and Practice

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	2	3	45	100	60	40	3

Course Description

Nature of construction projects. Effective and productive construction, the effect of technology. Site layout. Site documentation. Safety and health issues on site.

Objectives/Aim

- To enable the student understand and apply the principles of site management and practice.

Course Outline

- Nature of construction projects. [12CH]
- Effective and productive construction, the effect of technology [12CH]
- Site layout [12CH]
- Site documentation [12CH]
- Safety and health issues on site [12CH]

Learning Outcomes

The student will be able to understand and use the principles of site management and practice.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

- Seeley, I.H. (1996). Building Economics; Fourth Edition. Macmillan Press Limited.

CMG 8101 Masters Research Seminar 1

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
1	2	3	30	100	100	0	2

Course Description

The seminar will aim at examining research relevance to society, contribution to the body of knowledge, procedures in the selection and evaluation of research projects, and techniques of data collection, handling, and analysis.

Objectives/Aim

- To provide an overview of research procedures, forms of evaluation, and various types of techniques used for research data collection.
- To provide a foundation and framework for the conceptualization of the research project
- To streamline the focus of the research process, discussions, and overall research work.

Learning Outcomes

The seminar will help the student to streamline the process of the research and share preliminary findings that can be reviewed to focus the research process.

Method of Teaching/Delivery

The course will be conducted through public presentations.

Assessment Method

The assessment will be by viva voce

Reading/ Reference Materials

Harris, R. A. (2005). *Using sources effectively: Strengthening your writing and avoiding plagiarism* (2nd ed.). Glendale, CA: Pyczak Publishing.

Mills, G. E. (2007). *Action research: A guide for the teacher researcher* (3rd ed.). Upper Saddle River, NJ: Merrill.

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington DC: Author.

Bogdan, R. C., & Biklen, S. K. (1992). *Qualitative research for education: An introduction to theory and methods*. Needham Heights, MA: Allyn & Bacon.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Glatthorn, A. A., & Joyner, R. L. (2005). *Writing the winning thesis or dissertation* (2nd ed.). Thousand Oaks, CA: Corwin Press.

Isaac, S., & Michael, W. B. (1995). *Handbook in research and evaluation for education and the behavioral sciences*. San Diego, CA: EdITS.

Madsen, D. (1992). *Successful dissertations and theses*. San Francisco: Jossey-Bass.

Roberts, C. M. (2004). *The dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation*. Thousand Oaks, CA: Corwin Press

CMG 8201 Masters Research Seminar 2

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
1	2	3	30	100	100	0	2

Course Description

The seminar will aim at examining research relevance to society, contribution to the body of knowledge, procedures in the selection and evaluation of research projects, and techniques of data collection, handling, and analysis.

Objectives/Aim

- To provide an overview of research procedures, forms of evaluation, and various types of techniques used for research data collection.
- To provide a foundation and framework for the conceptualization of the research project
- To streamline the focus of the research process, discussions, and overall research work.

Learning Outcomes

The seminar will help the student to streamline the process of the research and share preliminary findings that can be reviewed to focus the research process.

Method of Teaching/Delivery

The course will be conducted through public presentations.

Assessment Method

The assessment will be by viva voce

Reading/ Reference Materials

Harris, R. A. (2005). *Using sources effectively: Strengthening your writing and avoiding plagiarism* (2nd ed.). Glendale, CA: Pyczak Publishing.

Mills, G. E. (2007). *Action research: A guide for the teacher researcher* (3rd ed.). Upper Saddle River, NJ: Merrill.

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington DC: Author.

Bogdan, R. C., & Biklen, S. K. (1992). *Qualitative research for education: An introduction to theory and methods*. Needham Heights, MA: Allyn & Bacon.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Glatthorn, A. A., & Joyner, R. L. (2005). *Writing the winning thesis or dissertation* (2nd ed.). Thousand Oaks, CA: Corwin Press.

Isaac, S., & Michael, W. B. (1995). *Handbook in research and evaluation for education and the behavioral sciences*. San Diego, CA: EdITS.

Madsen, D. (1992). *Successful dissertations and theses*. San Francisco: Jossey-Bass.

Roberts, C. M. (2004). *The dissertation journey: A practical and comprehensive guide to planning, writing, and defending your dissertation*. Thousand Oaks, CA: Corwin Press

CMG 8100 Research & Dissertation

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	18	21	135	100	100	0	12

Course Description

The research project provides the student with experience in the planning and execution of a personal research project. Students design a research project with specified aims and objectives in an applied field of Construction Management. This incorporates a review of relevant literature, data capture, analysis and output of results, applying appropriate use of Construction Management technology. Results are communicated by oral and written means.

Objectives/Aim

This Course aims to develop student’s skills to develop research questions, design research projects, collect data from various sources, and present findings in a scientific way.

Course Outline

Each student will be required to plan an investigation and analyse, collate and present the findings in report form. This will involve the hypothesis inductive method of research, survey and interviewing techniques, questionnaire design etc. the project will be chosen in the context of the individual’s present or future employment intentions or areas of special interest. Various topics are expected to be covered by participants, including case studies, contract procedure, information technology, project management, estimating and cost control, structural failures, low cost construction, innovations in construction materials and technology, durability, vernacular materials, etc.

Learning Outcomes

The course will equip the student with

- Ability to carry out independent research

- Writing and disseminating research findings.

Method of Teaching/Delivery

The student interacts with two selected tutors on a regular basis to obtain guidance on the research. The student on his own to produce the work.

Assessment Method

The rules of assessment of research reports for Graduate students at Makerere University will apply. A student will prepare a research proposal in collaboration with a member of staff. The proposal will be presented and approved by the departmental research committee. The final report submitted and accepted will be marked according to the guidelines from the School of Graduate studies. A viva Voce is an integral component of the examination process.

Reading/ Reference Materials

Varied depending on the topic.

CMG 8102 Systems Engineering

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course is geared at taking the student through the principles of systems engineering of operations research. It covers Monte carlo simulation of financial and construction models, decision and utility theory, dynamic programming, queuing theory applications to construction management, stock control, planning and organization, resource leveling and smoothing, project cost-time algorithms, formulation and application of linear programming, Simplex method, transportation and assignment problems, bidding theory, risk analysis and project appraisal.

Objectives/Aim

- To enable the student understand the principles of operations research in management of construction projects and processes.

Course Outline

1. Monte carlo simulation of financial and construction models. [10CH]
2. Decision and utility theory. [10CH]
 - 2.1 Dynamic programming.
 - 2.2 Queuing theory applications to construction management.
3. Stock control technique selection [10CH]
4. Construction planning and organization, [10CH]

- 4.1 CPM/PERT,
 - 4.2 resource leveling and smoothing
5. Project cost-time algorithms. [10CH]
- 5.1 Formulation and application of linear programming
 - 5.2 Simplex method,
 - 5.3 transportation and assignment problems.
6. Bidding theory, risk analysis and project appraisal [10CH]

Learning Outcomes

The student will be able to:

- Understand and use the principles of operations research in the construction environment.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

1. Taylor, R(2008) Operations Management. Prentice Hall
2. Dennis and Dennis (2005) Management Science, Wiley, New York

CMG 8103 Strategic Management in Construction

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course is geared at taking the student through the principles of strategic management in construction. It covers the strategic management processes, tools and techniques, marketing and strategic alliances.

Objectives/Aim

- To enable the student understand the principles of strategic management in construction.

Course Outline

1. The strategic management process: [9 CH]
 - 1.1. SWOT analysis,
 - 1.2. Strategic choice,

- 1.3. Plan implementation.
2. Tools and techniques. [9 CH]
 - 2.1 Functional strategies and policies
 - 2.2 Annual operation plans
 - 2.3 Organization structure and roles
 - 2.4 Leadership and corporate culture
 3. The management of change and marketing. [9 CH]
 4. Strategic alliances – joint ventures and consortia. [9 CH]
 5. Business simulations of construction organizations. [9 CH]

Learning Outcomes

The student will be able to:

- Understand the nature of alliances in construction businesses.
- Understand the strategic management business process.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

1. Harris, F. and MacCaffer R. (2005) Modern Construction Management.
2. Pearce J. A. & Robinson R. B. (2005). *Strategic Management: Strategy Formulation and Implementation*. AITBS Publishers and Distributors, New Delhi

CMG 8104 Materials of Construction

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course is geared at taking the student through the materials of construction. There are different materials used in construction. These materials have different properties that influence their application. The materials also respond differently when subjected to different conditions. The course provides knowledge of all these aspects which is important for all construction professionals.

Objectives/Aim

- To enable the student understand the different materials of construction.

Course Outline

1. Properties of materials [10 CH]
 - 1.1 plasticity,
 - 1.2 elasticity,
 - 1.3 density,
 - 1.4 porosity,
 - 1.5 hardness.
 - 1.6 Optical, electrical, thermal and acoustic properties.
2. Manufacture of building materials: [10 CH]
 - 2.1 wood and wood products,
 - 2.2 bricks,
 - 2.3 fibre cement,
 - 2.4 ceramics,
 - 2.5 plastics,
 - 2.6 sealants and mastics,
 - 2.7 stones.
3. Concrete technology: [8 CH]
 - 3.1 cement,
 - 3.2 aggregates,
 - 3.3 water and admixtures,
 - 3.4 properties of fresh concrete;
4. Metals in buildings: [7 CH]
 - 4.1 structural ferrous alloys,
 - 4.2 corrosion and protection,
 - 4.3 welding,
 - 4.4 failure
5. Behavior of building materials and structures under fire exposure. [10 CH]

Learning Outcomes

The student will be able to:

- Understand the different materials of construction and their applicability.
- Understand the advantages and disadvantages of different materials of construction.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

1. Illston, J. Inwoodie, J.M. and Smith, A.A. *Concrete. Timber and Metals*. Pitman, London.

2. Neville, A.M. (1975), *Properties of Concrete*. Pitman, London
3. Everett, A. 1975. *Materials. Mitchell's Building Construction* B.T. Batsford Ltd, London and Sydney.
4. Schoner, W. Brunner, M.Y./Sway, A. (1987), *Building Materials. Separate Manuscripts: General Introduction, Steel, Mineral Binders, Concrete, Bricks and Blocks, Timber*, - Publications of Faculty of Engineering, University of Dar Es Salaam.
5. Jackson N. and Dhir, R. (2006) *Civil Engineering Materials*, Palgrave, London.

CMG 8104 Principles of Construction Design

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course is geared at taking the student through the principles of construction design.

Objectives/Aim

- To enable the student understand the different principles of construction design.

Course Outline

- | | |
|---|--------|
| 1. Surveying | [6 CH] |
| 2. Architectural concepts | [7 CH] |
| 3. Civil/structural engineering design concepts | [6 CH] |
| 4. Office drawing and detailing | [7 CH] |
| 5. Blue print interpretation | [6 CH] |
| 6. Design-build practice | [7 CH] |
| 7. Computer aided design | [6 CH] |

Learning Outcomes

The student will be able to:

- Understand the different concepts of construction design.
- Understand the advantages and disadvantages of different principals in construction design.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

- Smallwood, P. (2008) Construction Design Principles, Longman, New York.

CMG 8105 Principles of Quantity Surveying

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course is geared at taking the student through the principles of quantity surveying.

Objectives/Aim

- To enable the student understand the different principles of quantity surveying.

Course Outline

1. Standard method of measurement (SMM) [10 CH]
2. Bills of quantities and costing: [10 CH]
3. Excavation, concrete, brickwork, steel and ironwork pipelines [10 CH]
4. Specifications [8CH]
5. Schedule rates [7 CH]

Learning Outcomes

The student will be able to:

- Understand the different principles of quantity surveying.
- Understand the advantages and disadvantages of different principals in quantity surveying.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

1. Turner,D.F. (1983), *Quantity Surveying – Practice and Administration*. George Godwin, London.

2. Seeley, I. H. and Winfield, R. 1999. *Building Quantities Explained* 5th Edition. Macmillan, London
3. Wood, R.D. (1985), *Principles of Quantity Surveying* Estate Gazette, London.
4. Institute of Architects, Kenya (1970), *Standard Methods of Measurement of Building Works for East Africa*, (1st Edn.) Architectural Association of Kenya, Chapter of Quantity Surveyors, Nairobi.

CMG 8106 Advanced Materials of Construction

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
3	0	3	45	100	60	40	3

Course Description

The course is geared at taking the student through the advanced materials of construction.

Objectives/Aim

- To enable the student understand the different advanced materials of construction and their application.

Course Outline

- | | |
|-------------------------|--------|
| 1. Glass | [6 CH] |
| 2. Ceramics | [7 CH] |
| 3. Intermetallics | [6 CH] |
| 4. Composites | [7 CH] |
| 5. Polymers | [6 CH] |
| 6. Alloys | [7 CH] |
| 7. Plastics and rubbers | [6 CH] |

Learning Outcomes

The student will be able to:

- Understand the different advanced construction materials and their use.
- Understand the advantages and disadvantages of different technologies in construction.

Method of Teaching/Delivery

The course will be conducted through lectures, tutorials and assignments. Basic lecture materials provided by the Lecturer will be supplemented by individual reading effort by students.

Assessment Method

Continuous assessment through assignments and tests, and final written examination. The final examination carry 60% of the total mark., while continuous assessment will carry a total of 40%.

Reading/ Reference Materials

- Jackson N. and Dhir, R. (2006) Civil Engineering Materials, Palgrave, London.
- Illston, J. Inwoodie, J.M. and Smith, A.A. *Concrete. Timber and Metals*. Pitman, London.
- Neville, A.M. (1975), *Properties of Concrete*. Pitman, London
- Everett, A. 1975. *Materials. Mitchell's Building Construction* B.T. Batsford Ltd, London and Sydney.
- Schoner, W. Brunner, M.Y./Sway, A. (1987), *Building Materials. Separate Manuscripts: General Introduction, Steel, Mineral Binders, Concrete, Bricks and Blocks, Timber*, - Publications of Faculty of Engineering, University of Dar Es Salaam.

CMG 8202 Masters Project/Field Report for Plan B Seminar

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
2	2	4	30	100	100	0	4

Course Description

Presentation of project analysis and field reports of relevance to society, contribution to the body of knowledge, procedures in the selection. and evaluation of projects both in design and construction.

Objectives/Aim

- To make the student make technical presentations in a logical way.
- To help the student obtain the technical knowledge on various construction projects.

Learning Outcomes

The seminar will help the student to streamline the process of the project analysis and field studies to come up good technical reports and be able to present them to an audience.

Method of Teaching/Delivery

The course will be conducted through public presentations.

Assessment Method

The assessment will be by assessing the written report and the oral presentation.

Reading/ Reference Materials

Harris, R. A. (2005). Using sources effectively: Strengthening your writing and avoiding plagiarism (2nd ed.). Glendale, CA: Pycszak Publishing.

Mills, G. E. (2007). *Action research: A guide for the teacher researcher* (3rd ed.). Upper Saddle River, NJ: Merrill.

American Psychological Association. (2001). *Publication manual of the American Psychological Association* (5th ed.). Washington DC: Author.

Bogdan, R. C., & Biklen, S. K. (1992). *Qualitative research for education: An introduction to theory and methods*. Needham Heights, MA: Allyn & Bacon.

Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage.

Isaac, S., & Michael, W. B. (1995). *Handbook in research and evaluation for education and the behavioral sciences*. San Diego, CA: EdITS.

CMG 8200 Project/Field Report

Hours Per Week			Hours per Semester	Weighted Total Mark	Weighted Exam Mark	Weighted Continuous Assessment	Credit Units
LH	PH	TH	CH	WTM	WEM	WCM	CU
0	20	20	60	100	100	0	6

Course Description

Each student will be required to submit a report on a supervised short project/field attachment/industrial training carried out.

Objectives/Aim

This Course aims to develop student's skills to develop study issues in management of construction projects, collect data from various sources, analyse and the present findings in a logical way.

Course Outline

Various topics are expected to be covered by participants, including designs, construction procedures, case studies, contract procedure, information technology, project management, estimating and cost control, structural failures, low cost construction, innovations in construction materials and technology, durability, vernacular materials, etc.

Learning Outcomes

The student will be able to:

- Analyse issues pertaining to construction management projects
- Write good logical reports on construction management

Method of Teaching/Delivery

The student interacts with two selected tutors on a regular basis to obtain guidance on the project/field report. The student will carry out the search on his own.

Assessment Method

The rules of assessment of project/field reports for Graduate students at Makerere University will apply. A student will prepare a research proposal in collaboration with a member of staff. The proposal will be presented and approved by the departmental research committee. The final report submitted and accepted will be marked according to the guidelines from the School of Graduate studies. will be required to submit a report on a supervised short project/field attachment/industrial training carried out and external examination shall be mandatory.

Reading/ Reference Materials

Varied depending on the topic.

APPENDICES

APPENDIX 1: MEMBERS OF STAFF AVAILABLE AT CEDAT

No.	NAMES	S	HIGHEST	POST	STUTUS	SPECIALISATION	Current Teaching Load (CU)	Proposed Teaching Load (CU)	Total load (CU)
1	KERALI Anthony Geoffrey	M	PhD	Associate Professor	Full Time	Construction	8	4	12
2	TINDIWENSI Dan	M	PhD	Senior Lecturer	Full Time	Construction Management	8	4	12
3	MWAKALI A. Jackson	M	PhD	Professor	Full Time	Research Methods and Structures	8	4	12
4	TAMALE Kiggundu Amin	M	PhD	Lecturer	Full Time	Research Methods	10	3	13
5	SSEMOGERERE Kenneth	M	PhD	Lecturer	Full Time	Architecture & Project Management	10	3	13
6	SENKATUKA Ian	M	PhD	Lecturer	Full Time	Architecture & Project Management	8	4	12
7	OKIDI-LATING, Peter	M	PhD	Lecturer	Full Time	Mathematics and Computer application	8	4	12
8	ALINAITWE Henry Mwanaki	M	PhD	Associate Professor	Full Time	Construction Management & Structures	8	4	12
9	BAGAMPADDE Umaru	M	PhD	Senior Lecture	Full Time	Highways and engineering materials	8	3	11
10	KULABAKO Robinah	F	PhD	Lecturer	Full Time	Environmental Engineering	8	3	11
11	NATURINDA Dans	M	MSc (On PhD)	Assist. Lecturer	Full Time	Construction Management	10	4	14
12	ADUBANGO Eunice.	F	MSc (On PhD)	Assist. Lecturer	Full Time	Project Management	10	4	14
13	KAKITAHU John	M	MSc (On	Assist.	Full Time	Construction	10	4	14

			PhD)	Lecturer		Management			
14	MWESIGE Godfrey	M	MSc (On PhD)	Assist. Lecturer	Full Time	Highways and Transportation	10	4	14
15	EKYALIMPA Ronald	M	MSc (On PhD)	Assist. Lecturer	Full Time	Construction Management	10	4	14

APPENDIX 2: EQUIPMENT AND FACILITIES

The following are available:

N	DESCRIPTION	UNITS	QTY
1	Staff Offices	m ²	300
2	Staff Meeting Room	m ²	50
3	Student Lecture Rooms	m ²	3,000
4	Laboratory (Materials Testing)	m ²	180
5	Computer Laboratory (30no. + Internet)	m ²	100
6	Text Books	no.	285
7	Library	m ²	100
8	Conference Hall	m ²	200
9	Transport Facilities	no.	2

APPENDIX 3: EXPECTED LOCAL ANNUAL INCOME AND EXPENDITURE

A. INCOME				
Item Description	Quantity	Quantity Description	Unit Cost	Amount
Tuition Fees	30	Students	3,787,500	113,625,000
Total Income				113,625,000
B. Expenditure				
Item Description		Amount		
University Council (39%)		44,313,750		
Teaching Expenses (40%)		45,450,000		
Administrative Expenses (4%)		4,545,000		
Office Expenses (2%)		2,272,500		
Laboratory Materials (2%)		2,272,500		
Library Materials (2%)		2,272,500		
Utilities/Furniture (1%)		1,136,250		
College Levy (3%)		3,408,750		
Staff Development (3%)		3,408,750		
Computer Laboratory (1%)		1,136,250		
Visiting Professors Expenses (3%)		3,408,750		
Total (100%)		113,625,000		