AFRICAN COLLEGE OF COMMERCE

P.O. BOX 301 KABALE – UGANDA

THE CURRICULUM FOR
THE DIPLOMA IN
WATER ENGINEERING (DWE)

THE STRUCTURE, REGULATIONS AND SYLLABUS

YEAR 2014

VISION

To be a leading Institution in Business, Technical and Vocational Training in Africa

MISSION

To establish a competence - based training that equips the learners with skills relevant to employment and economic growth

CORE VALUES

1. **Competence based training for Skilled and competent graduates;**

2. **Integrity based on honesty and ethics;**

3. **Hard work, dedication, and achievement of results.**

CONTACT US

PHYSICAL ADDRESS

Kekubo Cell

Kirigime Ward

Southern Division

Kabale Municipality

Kabale District

South Western Uganda

Uganda

POSTAL ADDRESS

Post Office Box 301, Kabale – Uganda

Phone	**Office**	**+256 200902667**
	Mobile	**+256 772484739**
		+256 712484746

WEB ADDRESS

Emails:	**acc@africancollege.ac.ug**
	principal@africancollege.ac.ug
	academic@africancollege.ac.ug
	bursar@africancollege.ac.ug
Website:	**www.africancollege.ac.ug**

THE HISTORY OF

AFRICAN COLLEGE OF COMMERCE (ACC)

African College of Commerce is an Educational Institution majoring in Business, Technical and Vocational training programmes. Below is the historical background of the institution.

1986: 14th April, Commissioned as a Business Education Institution.

1986: June, Registered and recognised by the Ministry of Education.

1990: Held the first Graduation Ceremony;

1992: Introduced Computer Science Courses;

1994: Granted Examinations Centre U62 by the Uganda National Examinations Board,

1998: Purchased land on which to construct the Main Campus

2003: Affiliated to Makerere University Business School (MUBS)

2004: Shifted from rented building in Kabale town centre to Kekubo cell a kilometre away in our own buildings in an area conducive for learning

2005: Received donation from the Federal Republic of Germany in form of buildings, computers, text books and Human Resource Development.

2006: Established ICT Centers in Kabale and Kanungu Districts with the assistance of the Uganda Communications Commission.

2007: Worn a BRONZE Medal from the Federation of Uganda Employers for being the third best employer in Uganda for the year 2006.

2008: Accredited by the National Council for Higher Education as a recognized Institution of Higher learning in Uganda:

2010: Re branding African College of Commerce. Introduced more Technical and Vocational programmes and short courses.

2011: April 16th 2011, Cerebrate Silver Jubilee **1986 to 2011**. Penetrated the Rwanda, Congo, Tanzania Burundi and Kenya

2012: Transformed into a fully fledged **Polytechnic.** Engaged all the training programmes into innovation and production units for products and services. Concretised the hands on training and competence based approach.

2014: Affiliating to Kyambogo University for diploma programmes and in particular the Diploma in Instructor and Technical Teacher Education DITTE, under Skilling Uganda Strategy.

TABLE OF CONTENTS

PART A: GENERAL REGULATIONS

PART B: DETAILED COURSE CONTENT

PART A: GENERAL REGULATIONS

1.0 LIST OF ACRONYMS

DWE	Diploma in Water Engineering
CGPA	Cumulative Grade Point Average
ATPs	Assessment Training Packages
CH	Contact Hours
CU	Credit Units
GP	Grade Point
GPA	Grade Point Average
HNDC	Higher National Diploma in Construction
IT	Industrial Training
LH	Lecture Hours
MoES	Ministry of Education and Sports
NCHE	National Council for Higher Education
NP	Normal Progress
PH	Practical Hours
PP	Probationary Progress
WOW	World of Work
ACC	African College of Commerce
ACCAB	African College of Commerce Academic Board
ACCEB	African College of Commerce Examinations Board

2.0 TITLE

The title of the Programme is **DIPLOMA IN WATER ENGINEERING (DWE))**

3.0 INTRODUCTION

The Diploma in Water Engineering is a two year academic programme aimed at providing students with building, construction and water installation skills that are required in the service sector.

3.1 Rationale

The housing sector is growing tremendously due to increase in population and economic development in East Africa. This has increased demand for water engineers to install supply and install water. This programme is intended to train and produce competent water engineers to serve the growing demand.

3.2 Target Group.

The target group is the Senior Six leavers and certificate holders in related fields.

4.0 OBJECTIVE OF THE PROGRAMME

The main objective of this course is to enable students gain knowledge and skills in water engineering work.

5.0 PROGRAMME OUTCOMES

The graduate of water engineering should competently apply skills and knowledge of engineering in interpreting plans, Bills of quantities operation plants and simple construction practices

6.0. JOB TITLES FOR DWE GRADUATES

- Water Engineer
- Inspector Of Works
- Supervisor Of Works
- Town Water Officer
- Site Foreman Or Pipe Line Foreman
- Contract Manager
- Contracts Manager
- Instructor Technical And Vocational Institutes

7.0 ORGANIZATIONS THAT EMPLOY DWE GRADUATES

- National Water and Sewerage Cooperation
- Hydro power Companies
- District local governments
- Central governments and its Parastatals like Hospitals
- Established contracting companies like Roko, RCC etc
- Engineering consultants
- International organizations like UN, UNICEF
- Non Government Organizations
- Self Initiated companies

8.0. NATURE OF COURSES

All the courses in this programme are compulsory.

9.0 ADMISSION REQUIREMENTS

The minimum entry requirement to the Diploma in Water Engineering are:

a) Uganda Certificate of Education (UCE) with at least 5 credits in Science subjects;

b) Uganda Advanced Certificate of Education (UACE) with 1 Principal pass and two subsidiaries in science subjects obtained at the same sitting or its equivalent;

c) Qualifications equivalent to Uganda Advanced Certificate of Education (UACE) as shall be determined by the National Council in consultation with the Uganda National Examinations Board;

d) A Certificate in engineering programmes obtained from a recognized institution of higher learning.

10.0 DURATION OF THE PROGRAMME

The minimum period to complete the Diploma in water engineering is two years and the maximum period is four years. Failure to complete the program in four/two years, the student shall be required to repeat the whole program i.e. forfeit the already passed program and start afresh.

11.0 MODE OF DELIVERY AND INSTRUCTIONAL STRATEGIES

Mode of delivery and instructional strategies will be by the following:

11.1 Lectures for theory
11.2 Practical work in form of Projects
11.3 Field work through industrial training and Study tours
11.4 Class discussions and group presentations
11.5 Demonstrations

12.0 STUDY MATERIALS AND INFRASTRUCTURE

12.1 Institutional Infrastructure

The institution will use the existing facilities on ACC Campus. The institution has sufficient infrastructure to facilitate the teaching and learning process e.g. furniture, lecture rooms, workshops, library, computer laboratories and a resource room.

12.2 Study Facilities

The Faculty of Engineering will use the existing study facilities on ACC Campus. The institution has sufficient study facilities to facilitate the teaching and learning process e.g. relevant materials and equipment to the programme, computers, handouts, textbooks and other materials from individual lecturers, journals and related publications, internet connectivity in the computer laboratories, library with wireless connection, audio visual materials, relevant software programme, source documents, archival records, government policy papers, Government Acts and Statutes, research and innovations by lecturers and students.

13.0 HUMAN RESOURCE

The Faculty of Engineering has well qualified and experienced teaching and technical staff managing the Certificate and Diploma Programmes. The academic and technical staff to support the Diploma in Water Engineering will be drawn from the programmes under the Faculty as listed on page 92 of this curriculum

14.0 PROGRAMME STRUCTURE

14.1 YEAR ONE SEMESTER ONE

CODE	NAME	LH	PH	CH	CU
DWE 1101	Building Construction I	30	60	60	4
DWE 1102	Engineering Mathematics I	40	40	60	4
DWE 1103	Surveying I	40	40	60	4
DWE 1104	Engineering Drawing	30	60	60	4
DWE 1105	Engineering Materials & Concrete Technology I	30	30	45	3
DWE 1106	Carpentry and Fabrication Work	30	60	60	4
DWE 1107	Computer Applications I	20	50	45	3
DWE 1108	Water Engineering Project I	10	130	75	5
	Total	**230**	**470**	**465**	**31**

14.2 YEAR ONE SEMESTER TWO

CODE	NAME	LH	PH	CH	CU
DWE 1201	Engineering Materials & Concrete Technology II	30	30	45	3
DWE 1202	Building Construction II	30	60	60	4
DWE 1203	Engineering Mathematics II	40	40	60	4
DWE 1204	Surveying II	40	40	60	4
DWE 1205	Communication Skills	40	40	60	4
DWE 1206	Computer Applications II	20	50	45	3
DWE 1207	Water Engineering Project II	10	130	75	5
DWE 1208	Fieldwork	10	130	75	5
	Total	**220**	**520**	**480**	**32**

14.3 YEAR TWO SEMESTER ONE

CODE	NAME	LH	PH	CH	CU
DWE 2101	Water Treatment	45	60	75	5
DWE 2102	Quantity Surveying & Specifications I	25	40	45	3
DWE 2103	Engineering Mathematics III	40	40	60	4
DWE 2104	Surveying III	40	40	60	4
DWE 2105	Statics & Structures I	30	30	45	3
DWE 2106	Engineering Software	20	50	45	3
DWE 2107	Hydrology, Water Supply and Irrigation	30	30	45	3
DWE 2108	Water Engineering Project III	10	130	75	5
	Total	**240**	**420**	**450**	**30**

14.4 YEAR TWO SEMESTER TWO

CODE	NAME	LH	PH	CH	CU
DWE 2201	Site Organisation & Management	30	30	45	3
DWE 2202	Entrepreneurship Skills	50	20	60	4
DWE 2203	Statics & Structures II	30	30	45	3
DWE 2204	Quantity Surveying & Specifications II	25	40	45	3
DWE 2205	Geology And Soils	30	30	45	3
DWE 2206	Sanitation And Drainage	30	90	75	5
DWE 2207	Fluid Mechanics And Hydraulics	30	30	45	3
DWE 2208	Water Engineering Project IV	10	130	75	5
	Total	**235**	**400**	**435**	**29**

15.0 PROGRAMME LOAD

To qualify for the award of a Diploma in Water Engineering, a candidate must obtain 122 credit units distributed as follows:

YEAR ONE	SEMESTER I	31
	SEMESTER II	32
YEAR TWO	SEMESTER I	30
	SEMESTER II	29
	TOTAL	**122**

16.0 CURRICULUM

The Curriculum for Diploma in Water Engineering will be prepared by the African College of Commerce Academic Board (ACCAB) and accredited by the National Council for Higher Education (NCHE)

17.0 EXAMINATION REGULATIONS

The examination rules and regulations for the Diploma in Water Engineering shall be set by the African College of Commerce Examinations Board (ACCAB)

18.0 ADMISSIONS TO THE PROGRAMME

18.1 Admission:

Admission into the programme shall close at the end of the third full week of each semester;

19.0 PROGRESSION

Progression of a student shall be classified as normal, Probational or Retaking or discontinuation.

19.1 Normal progression

Normal progression occurs when a student passes each course taken with a minimum grade point of 2.00

19.2 Probationary progress

This is a warning stage and it occurs when a student;

(i) Fails a course unit
(ii) Has GPA or CGPA of less than 2.00

19.3 Stay put

A student who fails more than a half of the total number of courses in a semester shall be required to stay on that semester until the failed courses are cleared. When the GPA of a student goes up in the following semester, the probation is removed.

19.4 Retaking

A student shall retake any course when it is next offered, to pass or to improve performance. A student shall retake in a course only two times.

19.5 Discontinuation

A student is discontinued when he or she has:

(i) Received three (3) consecutive probations in the same course unit.
(ii) Received a CGPA of less than 2.00 for three consecutive probations.
(iii) Failed to present him/her-self for final examinations without giving sufficient reasons.
(iv) Over stayed on the programme for a period of more than four years

20.0 FINAL EXAMINATION PAPER FORMAT

20.1 YEAR ONE SEMESTER ONE

PAPER NAME AND CODE	EXAMINATION FORMAT
DWE 1101 Building Construction I DWE 1102 Engineering Mathematics I DWE 1103 Surveying I DWE 1105 Engineering materials and Concrete Technology I DWE 1106 Carpentry and Fabrication Work	Each paper will consist of **seven** questions and the candidate will be required to answer **at least five**. All questions shall carry equal marks. The Students should be assessed on memory, understanding, application, analysis, synthesis and evaluation. The total duration of the examination will be three hours
DWE 1107 Computer Applications I	The paper will consist of three exercises and the candidate will be required to answer all. The total duration of the examination will be two hours.
DWE 1104 Engineering Drawing	Each paper will consist of two sections, A [Geometry and plane figures] and B [orthographic, auxiliary, sectioning and isometric]. Section A will consists of three questions and the candidates will answer any two questions, each carrying 20 marks. Section B consists of two questions and the candidate will be required to answer at least one question, each question in section B shall carry 60 marks. The total duration of the examination will be three hours
DWE 1108 Water Engineering Project I	The continuous assessment of the various projects in the semester will lead to the final examinations paper marks. The total duration of the assessment will be within 15 weeks of teaching African College of Commerce will invite an expert /examiner to assess the projects

20.2 YEAR ONE SEMESTER TWO

PAPER NAME AND CODE	EXAMINATION FORMAT
DWE 1201 Engineering Materials and Concrete Technology II DWE 1202 Building Construction II DWE 1203 Engineering Mathematics II DWE 1204 Surveying II DWE 1205Communication Skills	Each paper will consist of **seven** questions and the candidate will be required to answer **at least five**. All questions will carry equal marks. The Students should be assessed on memory, Understanding, application, analysis, synthesis and evaluation. The total duration of the examination will be three hours
DWE 1206 Computer applications I	The paper will consist of three exercises and the candidate will be required to answer all. The total duration of the examination will be two hours.
DWE 1207 Water Engineering Project II	The continuous assessment of the various projects in the semester will lead to the final examinations paper marks. The total duration of the assessment will be within 15 weeks of teaching African College of Commerce will invite an expert /examiner to assess the projects

20.3 YEAR TWO SEMESTER ONE

PAPER NAME AND CODE	EXAMINATION FORMAT
DWE 2101 Water Treatment DWE 2102 Quantity Surveying and Specifications I DWE 2103 Engineering Mathematics III DWE 2104 Surveying III DWE 2105 Statics & Structures **I** DWE 2107 Hydrology, Water supply and Irrigation.	Each paper will consist of **seven** questions and the candidate will be required to answer **at least five**. All questions will carry equal marks. The Students should be assessed on memory, understanding, application, analysis, synthesis and evaluation. The total duration of the examination will be three hours
DWE 2106 Engineering Software	Each paper will consist of one practical section. It will consist of two practical questions and a candidate will be required to answer any one questions. Section B will consist of three practical questions and a candidate will be required to answer any two questions. The total duration of the this practical examination will be five hours
DWE 2108 Water Engineering Project III	The continuous assessment of the various projects in the semester will lead to the final examinations paper marks. The total duration of the assessment shall be within 15 weeks of teaching. African College of Commerce shall invite an expert /examiner to assess the projects. The total duration of the examination shall be during 15 weeks of teaching.

20.4 YEAR TWO SEMESTER TWO

PAPER NAME AND CODE	EXAMINATION FORMAT
DWE 2201 Site Organization& Management DWE 2202 Entrepreneurship Skills DWE 2203 Statics and Structures II DWE 2205 Geology and Soils DWE 2206 Sanitation and Drainage DWE 2207Fluid Mechanics and Hydraulics	Each paper will consist of **eight** questions and the candidate will be required to answer **at least five**. All questions will carry equal marks. The Students should be assessed on memory, understanding, application, analysis, synthesis and evaluation. The total duration of the examination will be three hours
DWE 2204 Quantity Surveying & Specifications II	Each paper will consist of three sections A (theory) and B (taking off) and section C (Unit rates and BOQs). Section A will consist of two questions, Section B will consist of three questions, while Section C will consist of three questions. The candidate will be required to answer one question from A, any two questions from B and any one from C. All questions shall carry equal marks. The total duration of the this theory and practical examination will be three hours
DWE 2208 Water Engineering Project IV	The continuous assessment of the various projects in the semester will lead to the final examinations paper marks. The total duration of the assessment will be within 15 weeks of teaching African College of Commerce will invite an expert /examiner to assess the projects

21 .0 ASSESSMENTS AND GRADING

21.1 Theory Assessment

21.1.1	Continuous Course Work	
	21.1.1.1 Course work 1	10%
	21.1.1.2 Course work 2	10%
	21.1.1.3 Course work 3	10%
	Total	**30%**
21.1.2	End of Semester Examination	**70%**
	Total	**100%**

21.2 Project Work

21.2.1	Project Assessment 1	20%
21.2.2	Project Assessment 2	20%
21.2.3	Student's Personal Innovation	20%
21.2.4	Project Assessment 4	40%
	Total	**100%**

21.3 Field Work

21.3.1	Industrial Training	70%
21.3.1	Field Tours	30%
	Total	**100%**

21.4 Assessment Training Packages (ATPs)

Each student will be assigned an Assessment Training Package. This will record the student's academic progression. This will include assessment areas, grades obtained from course works, project work, field work and final examination.

21.5 Grading courses

Each course unit will be graded out of a maximum of one hundred (100) marks and assigned grade point as follows

MARKS (%)	GRADE POINTS
80-100	5.00
75-79	4.50
70-74	4.00
65-69	3.50
60-64	3.00
55-59	2.50
50-54	2.00
Below 50	0.00

The course pass mark is 50% which is Grade Point 2.0.
No credit unit will be awarded for any course in which a student fails.

21.6 Scaling

All the grades will be scaled down to 100%

22.0 AWARDS AND CLASSIFICATION

22.1 Awards

A successful candidate will be awarded the Diploma in Water Engineering of African College of Commerce (ACC)

22.2 Grade Point Average (GPA)

A grade point average is mark calculated to determine the final award. To arrive at a grade point average, the following steps are taken.

a. Multiply the Grade Point by the Credit Unit to get a Weighted Score of a Course;

b. Add together the weighted scores for all courses taken up to that time to get **total weighted score(TW);**

c. Add the Credit Units for each course to get the **Total Credit Units (TCUs);**

d. Divide the total weighed scores by the total number of credit units taken up to that time to get **grade point average (GPA). TWs/TCUs =GPA.**

The letter grades shall be used for Grade Point Averages (GPAs) as follows:

A	B+	B	C	D
5	4	3	2	1

22.3 Cumulative Grade Point Average (CGPA)

This is determined by dividing total accumulated weighted scores (TWs) by the total accumulated credit units (TCUs) up to a particular time.

22.4 Classification of Final Awards

CLASS	FINAL CGPA	LETTER GRADE
First Class	4.4 – 5.0	A
Second Class Upper Division	4.0 – 4.3	B+
Second Class Lower Division	3.0 – 3.9	B
Pass	2.0 – 2.9	C
Fail	1 - 1.9	D

PART B: DETAILED COURSE CONTENT

23.0 YEAR ONE SEMESTER ONE

23.1 BUILDING CONSTRUCTION I

COURSE CODE DWE 1101

CREDIT UNITS 4

CONTACT HOURS 60

COURSE DESCRIPTION
This Course introduces students to the basic knowledge and skills in water management systems.

LEARNING OUTCOMES
At the end of this course, students will acquire and apply the basic skills in water management.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to;
1. Define the building terms
2. Interpret building drawings & plans
3. List the building regulation as applied in construction industry
4. Identify a datum peg & a building line
5. Conduct site investigation, preparation and set out a building

COURSE CONTENT

CHAPTER ONE
1.0 **Introduction**
1.1 Introduction
1.2 Built Environment
1.5 Construction Documents
1.6 Construction Drawings
1.7 Planning Application
1.8 Construction Regulation
1.10 Safety Signs and Symbols
1.13 Construction standards (European and British Standards
1.16 Levels and Angles
1.17 Road Construction
1.18 Shoring

CHAPTER TWO
2.0 **Builders/site Plant**
2.1 General Consideration
2.2 Bull Dozer
2.3 Scrapers
2.4 Graders
2.5 Tractors Shovel
2.6 Excavators

2.7 Transport Vehicles
2.8 Hoists
2.10 Cranes

CHAPTER THREE
3.0 **Site and Temporary Works**
3.1 Site Investigation
3.2 Site Selection
3.4 Site works and setting out (preparation and organization)
3.4.1 Site access
3.4.2 Hoarding
3.5 Temporally services
3.6 Materials Storage (timber, bricks/blocks, cement, aggregates, re-enforcing bars, drainage pipes, man hall rings, scaffolding equipments, flammable liquids and compressed gasses
3.7 Construction plant – requirements for concrete mixing, bending of steel reinforcing, steel member fabrication, brick/block making and casting of concrete drainage pipes and manhole rings
3.9 Subsoil drainage
3.10 Clearing and excavation
3.10.1 Demolition
3.12 Excavation and Timbering
3.14 Surface water and ground water control – surface water drainage (site grading, drainage ditches), ground water dewatering (considerations, types – swamps and wall points)

CHAPTER FOUR
4.0 Substructure
4.1 Trenches and Basement Excavation
4.2 Foundations
4.3 Reinforced Concrete Foundation
4.4 Concrete
4.5 Retaining Walls
4.6 Basements

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES
1. Building construction hand book 4th edition by Roy Chudley and Greeno,
2. Construction Technology 6th edition by Roy Chudley,
3. Building construction by R. Barry,
4. Construction Technology 4th edition by Roy Chudley,

23.2 ENGINEERING MATHEMATICS I

COURSE CODE **DWE 1102**

CREDIT UNITS 4

CONTACT HOURS 60

COURSE DESCRIPTION

This course introduces students the foundation of Mathematics. It deals with laws and relevant equations which help in solving daily problems.

LEARNING OUTCOMES

By the end of the course, students will be able to apply engineering mathematics in solving daily construction problems.

OBJECTIVES OF THE COURSE

By the end of this course, students should be able to:

1. Calculate and change bases
2. Apply the laws of indices and logarithms
3. Solve mathematical problems involving roots and polynomials
4. Solve simultaneous and quadratic equations
5. Identify and calculate different types of matrices

COURSE CONTENT

CHAPTER ONE

1.0 **Indices and Logarithms**
1.1 Definitions
1.2 Laws of Indices
1.3 Fractional and Negative Indices
1.4 Multiplication and Division
1.5 Rationalization
1.6 Equations Involving Indices
1.7 Theory of Logarithm
1.8 Common Logarithm
1.9 Equation Involving In Logarithmic Functions
1.10 Logarithmic Graphs

CHAPTER TWO

2.0 Elements of mathematics
2.1 Set theory of relations and fractions
2.2 Number theory
2.3 Boolean algebra
2.4 Switching circuits and laws
2.5 Logic and compound statements
2.6 Truth tables
2.7 Combinations and permutations

CHAPTER THREE

3.0 Identification of roots
3.1 Polynomial equations
3.2 Depression of polynomial to lower degrees by long division
3.3 Polynomials with imaginary roots
3.4 Curve sketching for second & third order polynomials
3.5 Applied problems involving polynomials
3.6 Remainder theorem and its application in the solutions of polynomial equations

3.7 Linear Functions & approximations
3.8 Graphs of Functions

CHAPTER FOUR
4.0 SERIES
4.1 Sequences and Series
4.2 Sequences, Series
4.3 Arithmetic and Geometric Series
4.4 Methods of Summation of Finite Series
4.5 Convergence Principle of Series
4.6 Tests for Convergence and Divergence of Series
4.7 The Logarithm Series
4.8 Exponential Functions
4.9 Binomial series
4.10 Power Series
4.11 Uniform Convergences

CHAPTER FIVE
5.0 Equations
5.1 Definitions
5.2 Simultaneous
5.3 Quadratic Equations
5.4 The General Quadratic Equation by use of Completing the Square & factor method.
5.5 Partial Fractions

CHAPTER SIX
6.0 Matrices
6.1 Definitions
6.2 Matrix Algebra
6.3 Types of Matrices (Addition, Subtraction & Multiplication)
6.4 Determinants
6.5 Crammers rule for solving equations
6.6 Inverse matrices by row reduction method & ad joint method (Echelon Matrices)
6.7 Solution of matrix equations using inverse matrices
Eigen Values

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Engineering Mathematics 2nd Edition by K. A. Stroud
2. Advanced Modern Engineering Mathematics, Fourth Edition by Glyn James 203
3. An introduction to Mathematics for Engineers (Mechanics) by Stephen Lee

23.3 SURVEYING I

COURSE CODE **DWE 1103**

CREDIT UNITS **04**

CONTACT HOURS **60**

COURSE DESCRIPTION
This course introduces students the general principles of surveying and leveling and the use of surveying equipment.

LEARNING OUTCOMES
By the end of this course, students will be able to use field book in construction surveying and use appropriate surveying equipment in construction.

OBJECTIVES OF THE COURSE
By the end of this course the learner should be able to:
1. Define terms used in chain surveying
2. Acquire skills of using a field book
3. Appreciate the importance of leveling & surveying equipment

COURSE CONTENT

CHAPTER ONE
1.0 Introduction
1.2 Definition and technical terms used
1.3 Objectives of surveying
1.4 Types of surveying
1.5 Branches of surveying
1.6 Principle of surveying
1.7 Units of measurements- linear measures and angular measures
1.8 Map scales such as numerical scales
1.9 Requirements of scales
1.10 Micrometer, microscope
1.11 Measuring correct length with a wrong scale

CHAPTER TWO
2.0 Linear Measurement
2.1 Definition
2.2 Instruments for measuring distances - tapes, steel bands, surveyor's chains, metric chain and chain pine (arrows)
2.3 Instruments for making stations
2.4 Ranging a line mainly direct ranging, line ranging, indirect ranging
2.5 Chaining a line unfolding a chain, folding the chain
2.6 Methods of chaining
2.7 Errors in measurement due to incorrect chain length
2.8 Chaining on sloping grounds like direct method, indirect method, and comparison between direct and indirect method
2.9 Corrections for linear measurements

CHAPTER THREE
3.0 Chain Surveying
3.1 Introduction
3.2 Purpose of Land Surveying
3.5 Principle of Chain Surveying

3.6 Terms used in Chain Surveying
3.7 Selection and Measurement of Base Lines
3.8 Offsets- Perpendicular Offsets and Oblique Offsets
3.8.1 Measurement of Oblique Offsets
3.8.2 Taking Offsets
3.8.8 Reconnaissance
3.8.9 Locating Building Corners, Points and Intersection
3.8.10 Field Book Notes
3.10 Instruments for Setting out Right out Right Angles
3.14 Obstacles in Chaining
3.17 Plotting a Chain Survey

CHAPTER FIVE
5.0 Leveling
5.1 Introduction
5.2 Telescope and its parts
5.3 Focusing a telescope- internal and external
5.4 Tripod
5.5 Types of levels-(dumpy level, reversible level, tilting level, wyes level)
5.6 Advantages and disadvantages of different types of levels
5.7 Leveling staff- (solid, folding or hinged, target, telescope or sop with)
5.8 Relative merits of self reading staff and target staff
5.9 Terms used in leveling and their abbreviation
5.10 Principles of leveling
5.11 Adjustments of levels- temporary and permanent adjustments
5.12 Elimination of Parallax
5.14 Methods of Booking Levels-(Rise and fall, Height of Collimation)
5.14.1 Comparison of Collimation Method with Rise and Fall Method
5.15 Errors in Leveling & their corrections
5.16 Derivation of the Formula for Curvature Correction
5.17 Methods of leveling
5.19.2 Leveling across a River
5.19.3 Leveling in Steep Slopes

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Surveying for construction by William Irvine & Finlay Mac Lennan Fifth Edition
2. Surveying & leveling by R Agor
3. Surveying Seventh Edition Arthur Bannister, Stanley Raymond, Raymond Baker
4. Surveying with Construction Applications Seventh Edition by Barry F.Kavanagh

23.4 ENGINEERING DRAWING

COURSE CODE **DWE 1104**

CREDIT UNITS **04**

CONTACT HOURS **60**

COURSE DESCRIPTION
This course introduces students and emphasizes the need for drawing as well as interpretation of orthographic and isometric drawings in engineering task.

LEARNING OUTCOMES
Students will be able to transform ideas into 3D drawings.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to:
1. Identify different types of drawing instruments & their use.
2. Draw building plans to the required standards
3. Read and interpret building drawings
4. Create awareness of modern techniques used in engineering communications
6. Enable learners gain experience in transforming ideas into 3D drawings

COURSE CONTENT

CHAPTER ONE
1.0 Introduction to Technical Drawing
1.2 Setting of a Paper and paper sizes
1.3 Lettering
1.4 Lines
1.5 Dimensions and dimension styles
1.6 Reading and drawing to scale

CHAPTER TWO
2.0 Drawing Instruments and Drawing Boards
2.1 Simple Geometrical Construction
2.2 Plane Figures
2.3 Polygons
2.4 Principles of Tangent
2.5 Circle

CHAPTER THREE
3.0 Special Curves and loci
3.1 Ellipse
3.2 Parabola
3.4 Hyperbola

CHAPTER FOUR
4.0 Principles of Orthographic Projection
4.1 Drawing paper planning
4.2 1st and 3rd angle projection
4.3 Three view drawing of regular objects
4.4 Dimensioning of orthographic drawing

CHAPTER FIVE

5.0 Isometric and Oblique drawings

5.1 Principles

5.2 Objects with isometric and isometric line

5.3 Projections / Use & application

CHAPTER SIX

6.0 Production of Drawing/ Reading and Interpretation of Drawings.

6.1 Complete Building Drawings

6.2 Design Simple Structure

CHAPTER SEVEN

7.0 Engineering drawing, road sections, manholes, septic tanks, open channels

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.

There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Technical Drawing Advanced Level 1st Edition by Erick Isanga
2. Carpentry & Joinery by Peter Blett Level II
3. Architectural graphics by Francis D.K Ching
4. Basic engineering drawing by R.S.Rhodes and L.B Cook

23.5 ENGINEERING MATERIALS & CONCRETE TECHNOLOGY I

COURSE CODE **DWE 1105**

CREDIT UNITS **3**

CONTACT HOURS **45**

COURSE DESCRIPTION
This course introduces students the building materials, timber structure, management and application, clay products, cement, lime, workability, quality control techniques, aggregates and concrete mixes.

LEARNING OUTCOMES
By the end of the course, students should be able to identify the uses of various building materials, apply timber in construction, use clay products, cement, lime and other related materials in construction.

OBJECTIVES OF THE COURSE
By the end of this course the learner should be able to:
1. Identify different types of building materials and their uses
2. Classify building materials
3. List general properties of building materials
4. Determine appropriate storage for different types of building materials
5. Identify different types of concrete
6. List types of reinforcents
7. Appreciate the skill of hooking reinforcements
8. Identify different types of cement & their applications
9. Test for workability using compacting factor & slump tests

COURSE CONTENT

(A) ENGINEERING MATERIALS
CHAPTER ONE
1.0 Introduction to Building Materials
1.1 Origin & Classification
1.2 Natural Materials (Mineral/Organic)
1.3 Manufactured Materials (Mineral, Polymeric, Metallic, Wooden)
1.4 General properties of materials

CHAPTER TWO
2.0 Timber
2.1 Material Structure
2.2 Softwood and Hardwood
2.3 Conversion
2.4 Curing
2.5 Seasoning
2.6 Properties
2.7 Testing (Bs 375, Bs 4512, Bs 5820)
2.8 Diseases & Defects
2.9 Preservation

2.10 Products (Ply Wood, Block Board, Laminated Timber, Chip Board and Fibre Boards)

CHAPTER THREE

3.0 Clay Products (Clay Bricks, Hollow bricks, Roofing Tiles)

3.1 Introduction
3.2 Manufacture
3.3 Types
3.4 Uses
3.5 Properties
3.6 Testing (Bs 3921)
3.7 Behaviour (durability, weather resistance)
3.8 Sand Crete bricks
3.9 Manufacture
3.10 Uses
3.11 Properties

(B) CONCRETE TECHNOLOGY

CHAPTER FOUR

1.0 Cement

1.1 Definition, materials and manufacture of cement
1.2 Ordinary Portland cement
1.3 Setting time of cement
1.4 Hydration and hardening
1.5 Soundness and fineness testing of cement
1.6 Other types of cement and where they are used

CHAPTER FIVE

5.0 Lime
5.1 Definition, materials and manufacture of lime
5.2 Setting time of lime
5.3 types and classification of lime and where they are used
5.4 Slaking of lime
5.5 Store and site storage of cement

CHAPTER SIX

6.0 Introduction

6.1 Definition of Concrete
6.2 Characteristics
6.3 Types
6.4 Batching
6.5 Mixing
6.6 Placing and compaction
6.7 Curing
6.8 Properties of Concrete
6.9 Reasons for Reinforcement
6.10 Hooking of Reinforcement
6.11 Uses of Different Types (Plain, Reinforced, Pre-Stressed, Post- Stressed, Light Weight)

CHAPTER SEVEN

7.0 **Workability**

7.1 Factors affecting workability

7.2 Slump test
7.3 Compacting factor test

CHAPTER EIGHT
8.0 Quality control of concrete
8.1 Stages of quality control
8.2 Control of materials
8.3 Control of batch
8.4 Testing and checking

CHAPTER NINE
9.0 AGGREGATES
9.1 Aggregates
9.2 Types
9.3 Uses
9.4 Sampling and grading
9.5 Bulking of sand
9.6 testing of aggregates for soluble salts

CHAPTER TEN
10.0 Concrete Mixes
10.1 Water/Cement Ratios
10.2 Aggregate/Cement Ratio
10.3 Yield
10.3 Workability
10.4 Properties of Different Mixes (Volume, Weight, Strength)
10.4 Specifications

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Material Science by Sarendrah Sighn
2. Brick work by W.G Nash II
3. Construction Technology by Obande
4. Soil Mechanics by Smith
5. Building materials by Allan Everett
6. Dictionary for building by John Swit
7. Concrete Technology by Mardock

23.6 CARPENTRY AND FABRICATION WORK

COURSE CODE: **DWE 1106**

CREDIT UNITS: **04**

CONTACT HOURS: **60**

COURSE DESCRIPTION

This course introduces students to wood/timber work especially how to construct timber roofs, scaffolds, shoring, and the use of timber in formwork. It also explores the use of steel in construction work and the different methods of joinery.

LEARNING OUTCOMES

By the end of this course, students will be able to make furniture using timber.

OBJECTIVES OF THE COURSE

By the end of this course students should be able to**:**

1. Make furniture using timber, steel and other materials
2. Construct timber and steel roofs

COURSE CONTENT

CHAPTER ONE

1.0 Carpentry and Joinery Tools and Equipment:

1.1 Hand and electrical tools

1.2 Types of wood working machines, saws, surface and thicknesers, chain and chisel mortise, spindle modulus

1.3 Principles of operations and maintenance of each of the machine

1.4 Care, safety and other workshop regulations

CHAPTER TWO

1.0 Timber & Timber Joints

1.1 Timber: Selection, use, preparation for carcass and joinery work

1.2 Standard types of timber joints, halving, mortise and tenon, dovetail dowel joints, edge joint.

1.3 Use of nails, bolts, screws and adhesives for jointing timber

CHAPTER THREE

3.0 Timber Floors

3.1 Preparation of jointing to hollow floors, cutting, splicing, halving and fixing joints

3.2 Trimming to openings

CHAPTER FOUR

4.0 Roofs:

4.1 Definition. Function. Functional Requirements. Choice of Roof Structure;

4.2 Fabrication of Timber Trusses and Beams or purlins.

4.3 Preparation of Rafters struts and ties, wall plates, Cutting Bevels and Birds Mouth, Fixing to Plates and Ridge.

4.3 Types of Roof Structure: Flat Roof in timber. Flat roof coverings: Bitumen, asphalt, copper, lead, zinc and aluminum. Parapet walls.

4.4 Pitched Roofs: Roof shapes, single roofs, double roofs and triple roofs.

Openings in Timber Roofs.
4.5 Roof coverings and Methods of Fixing.
4.6 Roof lights. Roof ventilation and lightening protection.

CHAPTER FIVE
5.0 Frames and Shutters
5.1 Construction and fixing Windows and Door Frames.
5.2 Construction and hanging Doors and Windows.
5.3 Fixing of Architraves, skirting, picture rails, dado rails, cover mouldings

CHAPTER SIX
6.0 Construction of Timber Stairs
6.1 Construction of a simple flight of stairs including setting out strings, templates, jointing, and fixing treads and risers
6.2 Balustrades, newel posts and hand rails

CHAPTER SEVEN
7.0 Joining Metals and Plastics
7.1 Equipments used in a small Engineering Workshop: Welding Machine, lathe machine, drilling machine, bending machines, grindstone & soldering gun
7.2 Safety in the workshop and safety wear
7.3 Care and maintenance of tools and equipments
7.4 Metals: selection, use and preparation
7.5 Jointing process in metals and plastics (arc and gas welding)
7.6 Simple fitting, machining and shaping
7.7 Use of stocks and dies
7.8 Soldering, brazing and welding
7.9 Cutting, shaping and bending sheet metal

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES
1. Construction Technology, 4th edition, by: Roy Chudly and Greeno
3. Construction Technology by Obande
4. Carpentry and Joinery by David R. Bates

23.7 COMPUTER APPLICATIONS I

COURSE CODE **DWE 1107**

CREDIT UNITS **03**

CONTACT HOURS **45**

COURSE DESCRIPTION
The course introduces students to the computer applications of introduction to computers, micro soft word and Excel.

LEARNING OUTCOMES
At the end of this course, Students should l be able to:

1. Efficiently connect computers and their accessories
2. Produce documents using Microsoft word
3. Manipulate figures using spreadsheets,

OBJECTIVES
By the end of this course learners should be able to:

1. Identify the different Applications within an Office environment
2. Acquire skills in basic computer software applications and apply them in various business situations in order to facilitate the information management function.
3. Appreciate computer applications in business through hands on
4. Demonstrate the ability to use the common software applications of Microsoft Word, and Microsoft Excel
5. Produce business documents and data analysis and models applicable to business environment

COURSE CONTENT

CHAPTER ONE
1.1 Basic concepts and startup procedures
1.2 Introduction to practical computing
1.3 Connecting computer parts (CPU, Monitor, Mouse, Key board)
1.3 Windows Operating Systems Commands
1.4 Booting the computer
1.5 Using the mouse
1.6 Managing the user interface
1.7 Introduction to Windows programmes

CHAPER TWO
2.0 Word Processing (Document production with MS word)
2.1 Starting Ms Word
2.2 Creating documents
2.3 Looking at and using tool bars
2.4 Entering data
2.5 texts formatting
2.6 page formatting
2.7 Document formatting

2.8 Creating tables
2.9 Sorting and filtering data (plain text and tabulated text)
2.10 Graphics
2.11 printing
2.12 practice assignments

CHAPTER THREE
3.0 Spreadsheets (Microsoft Excel)
3.1 Starting Ms Excel
3.2 Excel tool bars
3.4 Managing workbooks and worksheets
3.5 Entering data and its formatting
3.6 Performing formulae, errors and their corrections
3.7 Calculating using functions
3.8 Sorting and filtering data
3.9 Using Graphs
3.10 Printing
3.11 Practice assignments

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Kathy Ivens and Thomas Barich(1997), How to use Microsoft Office' 97, Ziff-Davis press
2. Whitecomb A and Brown B, Key boarding and Document production, Stanley Thornes, **Chem.: emam**
3. E.S. Waburoko(200), An introduction to information technology, Department to Distance Learning, Edsoft Computer Institute
4. Teach yourself Microsoft Excel 97 in 24 Hours by Linda Jones and Reul L. Hernadez by S: MS
5. Hernandez cy SAW Publishing
6. Keneth C. and Laudon J.P: Essentials of Management Information Systems; 3rd Edition Prentice Hall, New Jersey, 1999
7. Elliot G. and Starkings:Business Information Technology, Theory and Practice; Addison Wesley, Longman, London and New York, 1998
8. Olive and Chapman; Data Processing and Information Technology, DP Publications
9. Christopher Barnatt (1996): Management Strategy; ND Information Technology; International Thomson Business Press.
10. Clifton H.D. and A.G. (1994); Business Information Systems; 5th Edition.

23.8 WATER ENGINEERING PROJECT I

COURSE CODE **DWE 1108**

CREDIT UNITS **05**

CONTACT HOURS **75**

PROJECT DESCRIPTION
This course introduces student's hands on training and practice of computer applications, building construction, engineering technology and communication.

LEARNING OBJECTIVES
By the end of the course, students will be able to perform basic construction work and interpret construction plans.

OBJECTIVES OF THE PROJECT
By the end of this course, the student should be able to;
1. Design, draw and interpret working drawings
2. Estimate and cost the works at hand
3. Construct new structures
4. Repair existing structures

CHAPTER 1:
1.0 SURVEYING AND LEVELING
1.1 Levels and Angles
1.2 Units of measurements- linear measures and angular measures
1.3 Chaining a line
1.4 Field Book and Field Notes

CHAPTER 2:
2.0 **TEMPORARY SITE WORKS**
2.1 Shoring
2.2 Hoarding

CHAPTER 3:
3.0 FOUNDATIONS
3.1 Pad, Raft, Pile and Strip foundations
3.2 Reinforced Concrete Foundation

CHAPTER 4:
4.0 MANUFACTURE OF BRICKS
4.1 Clay Brick
4.2 Hollow bricks
4.3 Interlocking bricks
4.4 Roofing Tiles
4.5 Sand Crete bricks

CHAPTER 5:
5.0 CONCRETING
5.0 Batching and Mixing

5.1 Placing and compaction
5.2 Curing
5.3 Concrete Reinforcement
5.4 Manufacture of concrete blocks, pavers and culverts

CHAPTER 6:
6.0 DRAWING AND DESIGN
6.1 Orthographic Projection
6.2 Isometric and Oblique drawings
6.3 Production of Building Drawing/Reading and Interpretation of Drawings
6.4 Design of simple structures

CHAPTER SEVEN:
7.0 Innovation: Student's self initiated project relevant to the programme.

MODE OF DELIVERY
This course will be taught through demonstrations, illustrations, site visits, guided discussion, practical work, report writing and presentations

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows:

Project Assessment 1	20%
Project Assessment 2	20%
Student's Personal Project	20%
Project Assessment 4	40%
Total	**100%**

The marks will be converted into Grade points.

24.0 YEAR ONE SEMESTER TWO

25.1 ENGINEERING MATERIALS AND CONCRETE TECHNOLOGY II

COURSE CODE **DWE 2105**

CREDIT UNITS **3**

CONTACT HOURS **45**

COURSE DESCRIPTION
This course equips learners with knowledge and skills in assessment of building materials suitable for construction especially metals and their treatment.

LEARNING OUTCOMES
By the end of this course, students will be able to use various types of building materials and concrete in construction and building.

OBJECTIVES OF THE COURSE
By the end of this course the students should be able to.
1. Identify different types of building materials and their uses
2. Classify building materials
3. List general properties of building materials
4. Determine appropriate storage for different types of building materials
5. Identify different types of metals
6. Appreciate importance of heat treatment in Building industry
7. Identify different types of concrete
8. Appreciate the importance of concrete compaction

COURSE CONTENT

CHAPTER ONE
1.0 Ferrous Metals
1.2 Types (Pig Iron, Cast Iron, Wrought Iron, Mild Steel, High Tensile Steel)
1.3 Manufacture
1.4 Properties
1.5 Uses in Construction
1.6 Protection (Corrosion, Fire, Electrolytic)
1.7 Durability

CHAPTER TWO
2.0 Non Ferrous Metals
2.1 Types Used In Construction (Copper, Zinc, Aluminum, Lead, Various Alloys)
2.2 Common Alloy Agents
2.3 Manufacture
2.4 Properties
2.5 Testing (Bs 18)
2.6 Heat Treatment

CHAPTER THREE
3.0 Plaster, Mortar & Gypsum Plaster Boards
3.1 Types of mortar, plaster

3.2 Properties of good mortar and plasters
3.3 Preparation of surfaces for plaster
3.4 Mixing ratios for plaster
3.5 Cold weather precautions
3.6 Admixtures applied on mortar and plasters and why
3.7 Application methods for plaster

CHAPTER FOUR
4.0 Plastics, bituminous material and Rubbers
4.1 Types of plastics, bituminous and rubber used in construction
4.2 Properties of plastics, bituminous and rubber used in construction
4.3 Testing bituminous material (British Standards)
4.4 constituents materials used in Plastics, bituminous material and Rubbers
4.5 Classification of plastics and bituminous materials
4.6 uses of plastics, bituminous and rubbers in engineering

CHAPTER FIVE
5.0 Paints
5.1 Constituents materials of paint
5.2 Types of paint, tools and equipment used for paint application
5.3 Uses of paint and surface preparation for paint
5.4 Properties of wet liquid and dry paint
5.5 paint defects and their prevention

CHAPTER SIX
6.0 Glass
6.1 Constituents of glass
6.2 Functions of glass
6.3 use of glass, glass cutting methods and techniques, tools and equipment used for cutting and fixing glass
6.4 Types and classification

CHAPTER SEVEN
7.1 Batching, Mixing and Transporting Concrete
7.2 Volume Method &Equipment
7.3 Weight Method & Equipment
7.4 Mixing platforms
7.5 Dry and wet mixing
7.6 Types (Including Both Hand Mixing & Machine Mixing)
7.7 Sizes of gauge boxes
7.8 Characteristics of aggregate when damp
7.9 Considerations taken care of during transportation of concrete
7.10 Methods of transporting concrete
7.11 Advantages & Disadvantages of each transportation method

CHAPTER EIGHT
8.0 Placing, Compacting, Protecting & Curing of Concrete
8.1 Hand & Machine Placement & Compaction
8.2 Use of Vibrators in Placement & Compaction
8.3 Reasons of protecting and curing
8.4 Methods of protecting and curing
8.5 Duration for curing of concrete
8.6 Special Provisions for Hot Weather Conditions
8.7 Bulking of aggregates and its tests

8.8 Slump test for workability of concrete

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Material Science by Surrendra Singh
2. Brick work by W.G Nash II
3. Construction Technology by Obande
4. Soil Mechanics by Smith
5. Building materials by Allan Everett
6. Dictionary for building by John Swit
7. Concrete Technology by Mardock

24.2 BUILDING CONSTRUCTION II

COURSE CODE DWE 1202

CREDIT UNITS 4

CONTACT HOURS 60

COURSE DESCRIPTION
This course continues the theory of construction. It explains brick work in detail and explores the superstructure.

LEARNING OUTCOMES
By the end of this course, students will demonstrate skills of construction management and especially brick work.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to;
1. Define terms related to building industry
2. Identify different types of bricks & their application
3. Appreciate the importance of bonding brick/ block work
4. State the difference between chimney flue & chimney stack

COURSE CONTENT

CHAPTER ONE
1.0 Superstructure
1.1 Brick Work
1.2 Block Work
1.3 Walls
1.4 Functional requirements of walls
1.5 Classification
1.6 Cavity Walls
1.7 Openings in Walls
1.8 Arches
1.9 Timber Framed Structures – domestic/residential and industrial/commercial
1.10 Multi storey buildings
1.11 Timber Properties and Grading
1.12 Timber Deterioration
1.13 Steel Framed structures – domestic/residential and industrial/commercial
1.14 Multi storey buildings

CHAPTER TWO
2.0 Floors
2.1 Solid Concrete Ground Floor Construction
2.2 Suspended Concrete Ground Floor Construction
2.3 Suspended Timber Floors
2.4 Timber upper floors
2.4.1 Single floor
2.4.2 Double floor
2.4.3 Triple floor
2.4 Raised Access Floors

2.5 Pre Cast Concrete Floors
2.6 Hollow Block and Waffle Floors
2.7 Lateral Restraint and Slenderness Factors

CHAPTER THREE
3.0 Fuel Combustion
3.1 Fire Places, Chimney and Flues
3.2 Boiler Flues
3.3 Design development and construction of energy saving cooking stoves

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Building construction hand book 4th edition by Roy Chudley,
2. Construction Technology 6th edition by Roy Chudley,
3. Building construction by R. Barry,
4. Construction Technology 4th edition by Roy Chudley,

24.3 ENGINEERING MATHEMATICS II

COURSE CODE DWE 1203

CREDIT UNITS 04

CONTACT HOURS 60

COURSE DESCRIPTION
This course continues to expound on the basics of pure mathematics-trigonometry, integral and differential calculus

LEARNING OUTCOMES
By the end of the course, students will be able to use engineering mathematics in construction.

OBJECTIVES OF THE COURSE
By the end of this course students should be able to:
1. Identify, calculate trigonometric ratios and determine the relationship between trigonometric and hyperbolic functions
2. Differentiate partial fractions, Integrate trigonometric functions and differential equations

COURSE CONTENT

CHAPTER ONE
1.0 Trigonometry
1.1 Identities and Trigonometric equations
1.2 Hyperbolic functions and their identities
1.3 Sine Rule, cosine rule and area of triangle
1.4 Compound angles, Double angles, half angles and their applications
1.5 Solution of trigonometric equations and its applications
1.6 Graphical addition to sine wave with a phase displacement
1.7 Relationship between trigonometric & hyperbolic functions
1.8 Factor formulae

CHAPTER TWO
2.0 Differentiation
2.1 Differentiation of standard functions from first principles
2.2 Fractional indices
2.3 Alternative notations for first & second derivatives
2.4 Derivatives of sine x & cosines x
2.5 Derivatives of other trigonometric functions
2.6 Differentiation of Algebraic, Exponential. Logarithmic & Hyperbolic functions
2.7 Applications of differentiation to rates of changes including curvatures Maxima & Minima
2.8 Approximate roots to equations
2.9 Development of products & quotients of functions
2.10 Chain rule
2.11 Partial Differentiation

CHAPTER THREE

3.0 Integration

3.1 Definition
3.2 Geometrical interpretation
3.3 Area under a curve
3.4 Definite & infinite integrals
3.5 Multiples Integrals
3.6 Integration by parts
3.7 Integration by resolving into partial fractions
3.8 First order differential equations
3.9 Integration of trigonometric functions
3.10 Integration by change of variables
3.11 Applications of Integration finding areas, volumes of revolution, length of arcs,
3.12 Centroids, and surface areas of solids of revolution moments of inertia
3.13 Pappu's theorems
3.14 Radius of gyration
3.15 Parallel axes theorem
3.16 Perpendicular axes theorem (Thin plates)
3.17 Second moment of area
3.18 Centers of pressure
3.19 Curves and curve sketching
3.20 Probability and Moment Generating Function
3.21 Random Variables
3.22 Variance

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Engineering Mathematics 4th Edition by K. A. Stroud
2. Advanced Modern Engineering Mathematics, Fourth Edition by Glyn James 203
3. An introduction to Mathematics for Engineers (Mechanics) by Stephen Lee

24.4 SURVEYING II

COURSE CODE DWE 1204

CREDIT UNITS 04

CONTACT HOURS 60

COURSE DESCRIPTION
This course continues the theory and practice of surveying and leveling and the use of sophisticated machinery especially theodolites.

LEARNING OUTCOMES
By the end of this course, students will be able to use field book in construction surveying and use appropriate surveying equipment in construction.

OBJECTIVES OF THE COURSE
By the ends of this course students should be able to:
1. Define terms used in surveying
2. Acquire skills of measuring & taking angles using surveying instruments
3. Appreciate the use of contours & their applications

COURSE CONTENT

CHAPTER ONE
1.0 Contouring
1.1 Definition and terms used
1.2 Relief Represented By Attitudes
1.2 Factors for Deciding Contour Interval
1.4 Characteristics of Contours
1.5 Contours of Natural Features
1.6 Methods of Contouring- Direct, Indirect, Interpolation
1.7 Comparison of Direct and Indirect Methods of Contouring
1.8 Use of Contoured Maps

CHAPTER TWO
2.0 Compass Surveying
2.1 Introduction
2.2 Magnetic Meridian
2.3 Magnetic Bearing
2.4 Grid Meridian
2.5 Grid Bearing
2.6 Whole Circle Bearing System
2.7 Quadrantal Bearing System
2.8 Fore and Back Bearing
2.9 Relation Between Fore and Back Bearing
2.10 Calculation of Included Angles from Bearing
2.11 Calculation of Bearing from Included Angles
2.12 Adjustment of Closing Error
2.13 Sources of Error in Compass Traversing

CHAPTER THREE

3.0 Theodolite Traversing

3.1 Introduction
3.2 Purpose of a theodolite traverse
3.3 General principle of theodolite Survey
3.4 Methods of theodolite traversing
3.5 Field work of theodolite traversing
3.6 Reconnaissance
3.7 Selection and marking of traverse pegs
3.8 Measurement of traverse angles
3.9 Measurement of angles for intersection points
3.10 Booking of field notes
3.11 Traverse computations
3.12 Conversation coordinates
3.13 Calculations of the closing error

CHAPTER FOUR

4.0 Traversing

4.1 Definition
4.2 Types of traverses (closed, open, loop)
4.4 Bearing (whole circle bearings, reduced bearing/quadrant bearing)
4.5 Traverse computations (right angled co ordinates, latitudes and departures, easting and northings, correcting angles, correcting easting and northings using Bowditch s method and transit rule, plotting using co ordinates, traverse tables)
4.6 Compass traversing; choice of stations, field procedure, local attraction and their treatment, plotting using whole circle bearing and lengths, adjustment of closure error using drawing methods

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Surveying for construction by williamIrvine& Finlay Mac Lennan Fifth Edition
2. Surveying & leveling by R Agor
3. Surveying Seventh Edition Arthur Bannister,Stanley Raymond, Raymond Baker
4. Surveying with Construction Applications Seventh Edition by Barry F.Kavanagh

24.5 COMMUNICATION SKILLS

COURSE CODE	**DWE 1205**
CREDIT UNITS	**4**
CONTACT HOURS	**60**

COURSE DESCRIPTION
This course introduces students to the basics of communication especially the desirable skills that help students in the world of work. Letter writing skills are also covered in detail.

LEARNING OUTCOMES
By the end of this course, students will be able to communicate effectively to teammates and the public.

OBJECTIVES OF THE COURSE
By the end of this course the student should be able to:
1. Demonstrate the ability to communicate efficiently and effectively
2. Deal with correspondences and other writings at a supervisory level
3. Understand the meaning of communication and how it relates to other management functions.
4. Use of both verbal and non-verbal communication
5. Acquire public presentation skills
6. Acquire writing skills of business letters, memos and minutes of a meeting.

COURSE CONTENT

CHAPTER ONE
1.0. Grammar and vocabulary
1.1. Parts of speech
1.2. Tenses
1.3. Simple and Compound Sentences
1.4. Punctuation
1.5. Direct and Indirect Speech
1.6. Prefixes and suffixes
1.7. Correction of grammatical errors

CHAPTER TWO
1.0 Comprehension
1.1 Summary writing
1.2 Written and oral deduction of summons from given prose passage
1.3 Diction
1.4 Answering questions about the passage

CHAPTER ONE
3.0 Introduction
3.1 Meaning of communication
3.2 The communication process and its elements
3.3 Importance of communication
3.4 Types of communication; oral, verbal and non-verbal etc.
3.5 Barriers to communication
3.6 Remedies to barriers of communication
3.7 Principles of business communication

CHAPTER TWO

4.0 Organizational communication
4.1 Introduction
4.2 Communication structures
4.3 Communication networks
4.4 Channels of communication
4.4.1 Downward channels
4.4.2 Upward channels
4.4.3 Horizontal communication
4.4.4 Grape vine communication
4.4.5 Diagonal communication

CHAPTER THREE
5.0 Written communication
5.1 Introduction
5.2 Advantages and disadvantages of written communication
5.3 Business letter writing; CV writing, Application letter writing, requisition writing, apology writing, memo writing, delegation letters, official circulars, recommendation letters and notices
5.3.1 Parts of the business letter, types/formats of letters

CHAPTER FOUR
6.0 Report writing
6.1 Definition of a report
6.2 Importance of reports
6.3 Types of reports
6.4 Limitations of reports in organizations and solutions

CHAPTER FIVE
7.0 Oral communication
7.1 Introduction
7.2 Advantages and disadvantages of oral communication
7.3 Listening
7.3.1 Meaning of listening
7.3.2 Listening process
7.3.3 Types of listening
7.3.4 Preparation for listening
7.3.5 Importance of listening
7.3.6 Listening skills
7.3.7 Barriers to effective listening
7.4 Public speaking
7.4.1 Types of public speaking
7.4.2 Preparation/principles
7.4.3 Stage flight
7.5 Negotiating
7.6 Telephones
7.6.1 How to use a telephone
7.6.2 Advantages and disadvantages of telephones

CHAPTER SIX
8.0 Non-verbal communication
8.1 Meaning of non verbal communication
8.2 Relationship between verbal and non verbal communication
8.3 Importance of non verbal communication
8.4 Divisions of non verbal communication
8.4.1 Social

8.4.2 Physical (gestures, facial, expression, eyes etc)
8.4.3 Environment; room design, Buildings etc
8.5 Problems of non verbal communication and their suggested solutions

CHAPTER SEVEN
9.0 **Meetings**
9.1 Meaning of meetings
9.2 Types of meetings
9.3 Preparation for meetings
9.4 Documents and terminologies used in meetings.
9.5 Notices, Agenda, minutes etc
9.6 Roles of different personnel
9.7 Advantages and disadvantages of meetings
9.8 Committees
9.9 Formation and types of committees
9.10 Advantages and disadvantages of committees
9.11 Handling committee business

CHAPTER EIGHT
10.0 Interviews
10.1 Definition of interviews
10.2.1 Parties involved in the interview
10.2.2 Roles of different parties involved in the interview
10.3 Methods or types of interviews

CHAPTER NINE
11.0 Practical participation
11.1 Use of aids in:-
11.1.1 Oral presentation
11.1.2 Meetings
11.1.3 Interviews and committee sittings

CHAPTER TEN
12.0 Advertising
12.1 Definition of advertising
12.2 How to design an advert
12.3 Modes of advertising (radio, newspapers, magazines, internet, signposts etc.)

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. G J.BWaswaBalumywa, Getting the message around
2. J.S. Chandan Management, concepts and strategies
3. Chester L. Wolford and Vanneman E. (1983) Business Communications Edward Arnold, London
4. Little P. (1996) Communication in business Pitman Publishing, London
5. Mable Komunda, Business Communication skills

24.6 COMPUTER APPLICATIONS II

COURSE CODE DWE 1206

CREDIT UNITS 03

CONTACT HOURS 45

COURSE DESCRIPTION
This course enables students to acquire basic knowledge and skills in MS Access, MS Power Point and Internet.

LEARNING OUTCOMES
At the end of this course, Students should l be able to:

1. Create databases using Microsoft Access.
2. Make presentations using Microsoft Power point
3. Use search engines to obtain academic and other information

OBJECTIVES
By the end of this course learners should be able to:

1. Identify the different Applications within an Office environment
2. Acquire skills in basic computer software applications and apply them in various business situations in order to facilitate the information management function.
3. Appreciate computer applications in business through hands on
4. Demonstrate the ability to use the common software applications of Microsoft Word, and Microsoft Excel
5. Produce business documents and data analysis and models applicable to business environment

COURSE CONTENT

CHAPTER ONE
1.0 Database Management (Microsoft Access)
1.1 Starting MS Access
1.2 Creating data bases
1.3 Crating data tables; Using design view, table wizard, by entering data
1.4 Creating relationships between tables
1.5 Creating forms; using form wizard
1.6 Creating queries; using design view, using query wizard
1.7 Sorting and filtering data
1.8 Formatting data in different objects
1.9 Generating reports using report wizard
1.10 printing
1.11 Practice assignments

CHAPTER TWO
2.0 Presentation management (Microsoft point)
2.1 Starting MS Power Point
2.2 Starting a slide presentation and selecting the slides of desire
2.3 Formatting slides in the slide sorter
2.4 Adding coloring to slides
2.5 Graphing in the slides

2.6 Formatting slide show for different slide designs, layouts and animation schemes
2.7 Viewing a slide show
2.8 Saving and printing the slide presentation
2.9 Practice assignments

CHAPTER THREE
3.0 Internet/Intranet
3.1 Internet definition
3.2 History of Internet
3.3 Uses of Internet
3.4 ISP (Internet Service Providers)
3.5 DNS (Domain Name Systems)
3.6 www (World Wide Web)
3.7 Internet Browsers and Search Engines; Google Chrome, Internet Explorer, Mozira Firefox, OPERA
3.8 URL(Uniform Resource Locator)
3.9 Web Portals
3.10 Navigator/Bookmarks/links
3.11 Uploading and Downloading
3.12 Webmail (Electronic Mails); Thunderbird, Outlook.
3.13 Working with news groups
3.14 Printing and Saving Documents
3.15 Social Networking Web: Facebook, Twiter, Google, Yahoo messenger (chart room),
3.16 http: (hypertext Transfer Protocal)
3.16 Creating a homepage
3.17 Internet Security; Virus Infection, Firewalls, Open source programmes (Thunderbird, Outlook Google Chrome, Internet Explorer, Mozira Firefox, OPERA)

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Kathy Ivens and Thomas Barich(1997), How to use Microsoft Office' 97, Ziff-Davis press
2. Whitecomb A and Brown B, Key boarding and Document production, Stanley Thornes, **Chem.: emam**
3. E.S. Waburoko(200), An introduction to information technology, Department to Distance Learning, Edsoft Computer Institute
4. Teach yourself Microsoft Excel 97 in 24 Hours by Linda Jones and Reul L. Hernadez by S: MS
5. Hernandez cy SAW Publishing
6. Keneth C. and Laudon J.P: Essentials of Management Information Systems; 3rd Edition Prentice Hall, New Jersey, 1999
7. Elliot G. and Starkings:Business Information Technology, Theory and Practice; Addison Wesley, Longman, London and New York, 1998
8. Olive and Chapman; Data Processing and Information Technology, DP Publications
9. Christopher Barnatt (1996): Management Strategy; ND Information Technology; International Thomson Business Press.
10. Clifton H.D. and A.G. (1994); Business Information Systems; 5th Edition.
11. Raymond McLeod J (1995): Management Information Systems; 6th Edition; Prentice Hall International Editions.

24.7 WATER ENGINEERING PROJECT II

COURSE CODE DWE 1207

CREDIT UNITS 05

CONTACT HOURS 75

PROJECT DESCRIPTION
This course expounds on the hands on training

OBJECTIVES OF THE PROJECT
By the end of this course, students should be able to;
1. Plan, design and make drawings for the project
2. Estimate and cost for materials
3. Construct underground water tanks and other sanitation facilities

PROJECT ACTIVITIES

CHAPTER 1: BRICK WORK/BLOCK WORK
1.1 Walling
1.2 Openings in Walls

CHAPTER 2: FLOORING
2.1 Solid and hollow
2.2 Suspended Concrete Ground Floor Construction
2.3 Timber Floors

CHAPTER 3: TIMBER WORK
3.1 Timber Conversion, Seasoning, Preservation
3.2 Use of nails, bolts, screws and adhesives for jointing timber
3.3 Construction of Timber Stairs

CHAPTER 4: ROOFS
4.1 Preparation of Rafters struts and ties, wall plates, Cutting Bevels and Birds Mouth, Fixing to Plates and Ridge.
4.2 Doors and windows, Frames and Shutters
4.3 Construction and fixing Windows and Door Frames. .
4.4 Fixing of Architraves, skirting, cover moldings

CHAPTER 5: JOINING METALS AND PLASTICS
5.1 Use of equipment; Welding Machine, Lathe machine, Drilling machine, Bending machines, grindstone & soldering gun
5.2 Jointing process in metals and plastics (arc and gas welding)
5.3 Simple fitting, machining and shaping
5.4 Use of stocks and dies
5.5 Soldering, brazing and welding
5.6 Cutting, shaping and bending sheet metal

CHAPTER 6: TAKING OFF TO GET THE QUANTITIES
6.1 Brick/Block Walling
6.2 Floors and Partitions
6.3 Taking off for the quantities of Pitched and Flat Roofs

CHAPTER 7: INNOVATION: Student's self initiated project relevant to the Programme

MODE OF DELIVERY

This project will be done through demonstrations, illustrations, site visits, guided discussion, practical work, report writing and presentations

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows:

Project Assessment 1	20%
Project Assessment 2	20%
Student's Personal Project	20%
Project Assessment 4	40%
Total	**100%**

The marks will be converted into Grade points.

24.8 FIELD WORK

COURSE CODE DWE 1208

CREDIT UNITS 05

CONTACT HOURS 75

COURSE DESCRIPTION
This course enables students to transform the knowledge and skills obtained in class into real practical job performance.

LEARNING OUTCOMES
By the end of this course the student will acquire the skills of working with others in a given organization and put into practice what was studied in class.

OBJECTIVES OF THE COURSE
By the end of the course students should be able to:
1. Familiarize themselves with workplace environment
2. Translate what was learnt in class into real life situation
3. Acquire more job competences.
4. Market themselves to prospective employers through demonstration of skills.

SYLLABUS CONTENT
1. Intern orientation to the workplace
2. Planning, identifying and scheduling of industrial training tasks and activities
3. Working under the guidance of the industrial training organization supervisor
4. Visitation by the training institution supervisor to share the experiences and challenges facing the intern.

MODE OF DELIVERY/PROCEDURE
The mode of delivery/procedure shall include; practice, demonstration and supervision.

ASSESSMENT OF THE COURSE
This course unit shall be assessed out of 100 marks as follows;

Industrial Training

1. Training institution supervisor	10%
2. Workplace supervisor's assessment	30%
3. Intern's report	30%
Subtotal	**70%**
Study Tours	**30%**
Total	**100%**

The marks will be converted to grade points.

25.0 YEAR TWO SEMESTER ONE

25.1 WATER TREATMENT

COURSE CODE DWE 2101

CREDIT UNITS 05

CONTACT HOURS 75

COURSE DESCRIPTION
This course covers the general treatment of water for domestic and public use.

LEARNING OUTCOMES
By the end of the course, students should be able to treat water and protect water sources from contamination.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to;

1) Treat water
2) Protect water sources from contamination and polluted environment

COURSE CONTENT

CHAPTER ONE
1.0 Water Quality:

1.1 Physical Aspects; Temperature, colour, turbidity, suspended solids, dissolved solids, taste and odour; their effects and testing
1.2 Chemical Aspects: acidity and alkalinity (pH), hardness, electrical conductivity,
chemical content, (iron, manganese, fluoride, chloride, nitrogen, phenols, phosphates, potassium, radioactive substances, silica, sodium, sulphates); their effects and testing
1.3 Biological Aspects;
1.4 Micro organisms (classification, identification, effects and testing)
1.5 Pathogenic organisms (types, effects and testing)
1.6 Uganda water quality guidelines, WHO and NEMA standards for drinking water supply, 1.7 Industrial, agricultural, / irrigation, livestock and recreational uses
1.8 Regulations. Water supply act and water works act
1.9 Consideration of the quality of different water sources: lakes, rivers, wells, protected strings, gravity flow sources, rainwater

CHAPTER TWO
2.0 General Water Treatments

2.1 Applied Environmental / water supply chemistry
2.2 Purpose of treatment
4.2 Steps in treatment
2.3.1 Storage and settlement (Purpose, settling rates, types of settlers & their construction.
2.3.2 Flocculation and coagulation (Purpose, types of coagulants, their advantages & disadvantages, types of flocculaters)

2.3.3 Aeration (Purpose, types of aerators, advantages & disadvantages) Filtration (purpose, cleaning /backwashing) Disinfection (Purpose, factors affecting disinfection of water, types of disinfectants)

CHAPTER THREE

3.0 Rural Water Supply and Treatment,

3.1 Typical methods of treatment

3.2 Construction and use of simple filters and chlorination units

CHAPTER FOUR

4.0 Treatment methods for urban water supplies

4.1 Initial preparation (screening, algal control, pre-chlorination)

4.2 Aeration

4.3 Sedimentation

4.4 Mixing and flocculation

4.5 Clarification with flocculation

4.6 Filtration, disinfection (Chlorination & fluoridation)

4.7 Water softening (lime, soda ash, ion exchange method)

4.8 Turbidity removal

4.9 Taste and odour control

4.10 Demineralization / desalination

4.11 Sludge Treatment and Disposal

CHAPTER FIVE

5.0 Treatment Plant Drawing Exercises

5.1 Protected springs

5.2 Gravity floor Scheme

5.3 Rainwater

5.4 Layout of treatment plant for Urban Water Supplies

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.

There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Water Supply Engineering by B.C. Punmia, Ashon Jain and Arun Jain

25.2 QUANTITY SURVEYING AND SPECIFICATIONS I

COURSE CODE **DWE 2102**

CREDIT UNITS **03**

CONTACT HOURS **45**

COURSE DESCRIPTION
This course introduces students the measurement of quantities and the estimation of cost of materials, and tendering.

OBJECTIVES OF THE COURSE
By the end of this course, the students should be able to,
1. List duties & responsibilities of each of the supervisory personnel on building project
2. Identify different methods of tendering
3. Appreciate the importance of bills of quantities
4. Differentiate between flat roofs & pitched roofs
5. Appreciate the importance of contract documents in building construction field

COURSE CONTENT

CHAPTER ONE
1.0 Introduction
1.1 Terms used

CHAPTER TWO
2.0 Parties Involved In Building Projects
2.1 Duties & responsibilities of supervisory personnel

CHAPTER THREE
3.0 Tendering
3.1 Methods of tendering
3.2 Advantages & disadvantages

CHAPTER FOUR
4.0 Contracts
4.1 Types of contracts
4.2 Termination of contracts
4.3 Contract documents

CHAPTER FIVE
5.0 Preliminaries

CHAPTER SIX
6.0 Taking off to get the quantities
6.1 Brick/Block Walling
6.1 Floors and Partitions

CHAPTER SEVEN
7.0 Taking off for the quantities of Pitched and Flat Roofs

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.

There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Building Quantities Explained Fifth Edition by Ivor H .Seeley & Roger Winfield

25.3 ENGINEERING MATHEMATICS III

COURSE CODE DWE 2103

CREDIT UNITS 04

CONTACT HOURS 60

COURSE DESCRIPTION
This course introduces students the applications of vectors, numerical methods, complex numbers, probability and statistics in solving engineering problems.

LEARNING OUTCOMES
By the end of the course students will be able to solve mathematical problems using vectors and apply vectors in engineering works.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to:
1. Solve mathematical problems using vectors and appreciate the importance of vectors in Engineering works
2. Explain and apply the rules of Trapezoidal, Simpson's and Prismoidal.
3. Solve complex numbers using Demoivere's Theorem, Exponential and Polar Representation.
4. Use probability and statistics in real day life

COURSE CONTENT

CHAPTER ONE
1.0 Vector algebra
1.1 Addition & subtraction of vectors
1.2 Linear combination of vectors
1.3 Linear independence & dependence of vectors
1.4 The representation of vector in the i,j,k form in a three dimensional space
1.5 Dot & cross products & application
1.6 Unit vectors
1.7 Mensuration (Volume of a cylinder, a sphere, a prism, a cone, pyramid & frustum)

CHAPTER TWO
2.0 **Numerical methods**
2.1 Trapezoidal rule
2.2 Simpson's rule
2.3 Prismoidal rule
2.4 Newton Raphson Method

CHAPTER THREE
3.0 Complex Numbers
3.1 Definition
3.2 Algebra of Complex Numbers
3.4 The argand Diagram
3.5 Polar Representation
3.6 Exponential Representation

3.7 Function of Complex Variable
3.8 Powers and Roots
3.9 Demoivere's Theorem
3.10 Exponential and Hyperbolic Functions

CHAPTER FOUR
4.0 Statistics
4.1 Definition
4.2 Variables
4.3 Frequency distribution
4.4 Class boundaries
4.5 Histogram
4.6 Standard deviation
4.7 Central tendency
4.8 Coding & decoding
4.9 Dispersion
4.10 Frequency curves
4.11 Normal distribution curves

CHAPTER FIVE
5.0 Probability
5.1 Definition of probability
5.2 Events (independent & dependent events)
5.3 Conditional probability & mutually exclusive events
5.4 Discrete and Continuous Distributions
5.5 Parameters
5.6 Probability Theory
5.7 Conditional Probability
5.8 Partitions
5.9 Total Probability
5.10 Mathematical Expectation

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES
1. Engineering Mathematics 2nd Edition by K. A. Stroud
2. Advanced Modern Engineering Mathematics, Fourth Edition by Glyn James 203
3. An introduction to Mathematics for Engineers (Mechanics) by Stephen Lee

25.4 SURVEYING III

COURSE CODE DWE 2104

CREDIT UNITS 04

CONTACT HOURS **60**

COURSE DESCRIPTION:
This course introduces students to the surveying and leveling by tackling the special applications of tachometry and earth measurements.

LEARNING OUTCOMES
By the end of this course, students will be able to calculate areas and volumes of different shapes.

OBJECTIVES OF THE COURSE
By the ends of this course, students should be able to:
1. Define terms used in Surveying
2. Derive formulae for calculating Areas & Volumes of different shapes
3. Appreciate the importance of curves & their applications

COURSE CONTENT

CHAPTER ONE
1.0 Tachometry
1.1 Definitions
1.2 Purpose
1.3 Instruments Used For Tachometric Surveying
1.4 Systems of Tachometric Measurements
1.5 Methods of Tachometry
1.6 Principle of Tachometry
1.7 Forms/types of Tachometry (stadia/fixed hair, Gross hairs, substance system, optical wedge & tangential)
1.8 Fixed hair tachometry (Derivation of formulae for horizontal & inclined Sights).
1.9 Booking & Reduction of data in standard field form (Ordinary level & theodolite)
1.10 Errors (types, causes and treatment)
1.11 Field exercise involving fixed hair tachometry with inclined sights to obtain contouring Data

CHAPTER TWO
2.0 Earth works
2.1 Introduction
2.2 Areas
2.2.1 Determination of Areas
2.2.2 Computation of Areas from Plans
2.2.3 Area between a Straight Line and Irregular Boundary
2.2.4 The Mid- Ordinate Boundary
2.2.5 The Average Ordinate Formula
2.2.6 The Trapezoidal Rule

2.2.7 Derivation of the Simpson's Formula
2.2.8 Comparison of Accuracies Achieved By Simpson's Rule and Trapezoidal Rule
2.2.9 Areas with a Planemeter
2.2.10 Amstar Planimeter
2.3 Volumes
2.3.1 Definition
2.3.2 Methods of Computation
2.3.3 Formula for Calculation of Areas of Cross Sections
2.3.4 Calculating Of Volumes
2.3.5 Primordial Formula
2.3.6 End Area (Or Trapezoidal) Formula
2.3.7 Pappu's Theorem
2.3.8 Measurements of Volume from Spot Levels
2.3.9 Simpson's Rule
2.3.10 Shrinkage constants

CHAPTER THREE
3.0 Curve Ranging
3.1 Simple curves
3.2 Introduction
3.3 Types of Curves
3.4 Elements of Curves
3.5 Geometrics of A Circle
3.6 Degree of Curves
3.7 Relationship between the Radius and Degree of Curves
3.8 Calculation of Varian Elements of Curves
3.9 Setting out A Simple Circular Curve
3.10 Rankin's Method of Tangential Deflection Angles
3.11 Two Theodolite Method
3.12 Difficulties in Ranging a Simple Curve
3.13 Both the Points of Commencement and Tangency Inaccessible
3.14 Couple Curve Can Be Set Out From the Point Of Commencement
3.15 An Obstacle Intervences on the Curve
3.16 Typical Field Problems in Setting out Simple Curves
3.17 Calculation of the Radius of a Curve Passing Through a Fixed Point

CHAPTER FOUR
4.0 Using the total station
4.1 Assembling and disassembling the total station
4.2 Using the GPRS smart phone for surveying

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Surveying for construction by William Irvine & Finlay Mac Lennan Fifth Edition
2. Surveying & leveling by R Agor
3. Surveying Seventh Edition Arthur Bannister,Stanley Raymond, Raymond Baker
4. Surveying with Construction Applications Seventh Edition by Barry F.Kavanagh

25.5 STATICS & STRUCTURES I

COURSE CODE **DWE 2105**

CREDIT UNITS 0**3**

CONTACT HOURS **45**

COURSE DESCRIPTION
This course introduces students to types of forces in beams and other framed structures. Resolving the forces either graphically or mathematically is given special attention.

LEARNING OUTCOMES
By the end of the course, students will use the knowledge and skills in statics and structures to solve forces in beams and framed structures.

OBJECTIVES OF THE COURSE
By the ends of this course, students should be able to:
1. Identify different types of forces & their applications in the engineering field.
2. Calculate forces of different polygons & beam reactions
3. Resolve forces in framed structures using Graphical, Section & Resolution method
4. Explain the use of structural steel & its behavior in engineering field

COURSE CONTENT

CHAPTER ONE
1.0 Introduction
1.1 Forces
1.2 The Structure of Forces
1.3 Mathematical Modules

CHAPTER TWO
2.0 Concurrent Coplanar Forces
2.1 Triangle of Forces
2.2 Parallelogram
2.3 Rectangular
2.4 Polygon of Forces

CHAPTER THREE
3.0 Non-Concurrent Coplanar Forces
3.1 The Link Polygon
3.2 Application of the Link Polygon

CHAPTER FOUR
4.0 Moments of Forces
4.1 Measurement of Moment
4.2 Conditions of Equilibrium
4.3 Resultant of Parallel Forces
4.4 Couples
4.5 Beam Reactions

CHAPTER FIVE
5.0 Framed Structures
5.1 Perfect, Imperfect and Redundant Pin-Joint Frames,
5.2 Graphical Solutions for Frames - Force Diagrams,
5.3 Calculation Methods for Frames

CHAPTER SIX
6.0 Stress, Strain and Elasticity
6.1 Stress
6.2 Strain
6.3 Elasticity
6.4 Behaviour of Steel in Tension Yield Point
6.5 Strength of Materials and Factor of Safety
6.6 Stresses in Composition Ratio

CHAPTER SEVEN
7.0 Shear Force and Bending Moment
7.1 Shear Force
7.2 Bending Moment
7.3 Shear Force and Bending Moment Diagrams

CHAPTER EIGHT
8.0 Simple Beam Design and Deflection
8.1 The General Theory of Bending
8.2 Elastic Section Modulus-Symmetrical Sections
8.3 Load factor method
8.4 Limit State Design
8.5 Factors Affecting Deflection
8.6 Derivation of Deflection Formulae
8.6 Span /Depth Ratios
8.7 Deflection of Reinforced Concrete Beams

CHAPTER NINE
9.0 Beams of Two Materials
9.1 Flitch Beams
9.2 Reinforced Concrete Beams
9.3 Reinforced Concrete Columns

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES
1. Structural mechanics by Whitle
2. Structural mechanics by R.Hulse and J. Cain
3. Structural mechanics by Morgan, Dukka and Williams 5th Edition

25.6 ENGINEERING SOFTWARE

COURSE CODE **DWE 2106**

CREDIT UNITS 03

CONTACT HOURS 45

COURSE DESCRIPTION
This course introduces students the design of building structures using the computer programmes of Auto and Arch CAD.

LEARNING OUTCOMES
By the end of the course, students will be able to use a computer for designing and drawing building structures and facilities.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to;
1. Use a computer for designing and drawing building structures and facilities
2. Use AUTOCAD and ArchiCAD in designing buildings, road sections and other facilities

CHAPTER ONE
1.0 File Management
1.1 Create new files, save a file, Open a file,
1.2 Export, Publish, Recover
1.3 Send, Publish

CHAPTER TWO
2.0 Drawing
2.1 Creation of layers
2.2 Line ray, construction line, multi line
2.3 Polyline, 3D polyline, polygon, Rectangle
2.4 Arch Circle Donut, Ellipse, Spline
2.5 Block, Point
2.6 Hatch, Boundary, Region, Cloud

CHAPTER THREE
3.0 Methods for Viewing Drawing
3.1 Regenerate
3.2 Redraw
3.3 Zoom
3.4 Pan
3.4 Hide, Shade and Render
3.5 Dimension

CHAPTER FOUR
4.0 Dimensioning
4.1 Linear, Aligned, Ordinate
4.2 Radius Diameter Angular
4.3 Baseline, Text, Dimension styles

CHAPTER FIVE

5.0 Modifying a Drawing

5.1 Match Properties, Object, Clip
5.2 Erase, Copy, Offset, Array
5.3 Move Rotate, Scale, Stretch, and Lengthen
5.4 Trim, Extend, Break, Chamfer, Fillet
5.5 3D Operation, Solid Edit,
5.6 Explode

CHAPTER SIX

6.0 Production of Architectural Drawing

6.1 Review of drawing layout: Title block, Notes, Paper sizes,
6.2 Considerations of site orientation, economy, aesthetics, facilities for disabled, fire safety,
6.3 Block plan, Site Plan, Ground plan
6.4 Sections and Elevations
6.5 Details
6.6 Plotting and printing drawing on plain sheets, tracing and ammonia paper

CHAPTER SEVEN

7.0 Facilities details

7.1 Production of Plumbing & drainage drawings details
7.2 Electrical wiring network to lights and circuits

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Narayan, K. Lalit (2008). *Computer Aided Design and Manufacturing*. New Delhi: Prentice Hall of India. p. 3. ISBN 812033342X.
2. Narayan, K. Lalit (2008). *Computer Aided Design and Manufacturing*. New Delhi: Prentice Hall of India. p. 4. ISBN 812033342X.
3. Madsen, David A. (2012). *Engineering Drawing & Design*. Clifton Park, NY: Delmar. p. 10. ISBN 1111309574.
4. Farin, Gerald; Hoschek, Josef and Kim, Myung-Soo (2002). *Handbook of computer aided geometric design [electronic resource]*. Elsevier. ISBN 978-0-444-51104-1.
5. Ross, Douglas T. (17 March 1961). Computer-Aided Design: A Statement of Objectives. MIT USAF 8436-TM-4.

25.7 HYDROLOGY, WATER SUPPLY AND IRRIGATION

COURSE CODE DWE 2107

CREDIT UNITS 3

CONTACT HOURS **45**

COURSE DESCRIPTION
This course introduces students the design of water schemes and the installation of water to communities.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to;
1. Design water schemes and install in communities
2. Pump water to the desired designation

COURSE CONTENT

CHAPTER ONE
1.0 Hydrology
1.1 Hydrological cycle:
1.2 Weather conditions: Humidity, temperature, radiation, wind and evaporation, transpiration
1.3 Rainfall types and formation, intensity, frequency, areal extent, intensity-duration Relationships, depth–area – time relationships by Thiessen method
1.4 Evaporation (Evapo-transpiration) methods of estimating evaporation, Thornthwaite's formula for evapo-transpiration
1.5 Runoff: flow rating curves, extension of rating curves (by Steven's and slope area methods), duration, catchment characteristics and their effects, stream gauging (velocity area method, flow measuring structures, dilution gauging) unit hydrograph, S-curve
1.6 Infiltration; methods of determining infiltration capacity
1.7 Flood consideration; storage equation, reservoir routing, routing in a river channel graphical routing method, flood formulae, frequency analysis.

CHAPTER TWO
2.0 Water Resources and Resources Development
2.1 Principle water uses; agricultural industrial, domestic, energy generation, recreational, commercial, transport, fishing
2.2 Water demand forecasting
2.3 Selection of supply source
2.3 Principal Water Uses,
2.4 Water Demand Forecasting.

CHAPTER THREE
3.0 Surface Water and Groundwater Supply:
3.1 Natural surface water bodies; lakes, rivers, streams, ponds and priorities for their selection
3.2 Manmade ponds, stream catchments, irrigation ditches
3.3 Reservoirs and dams

3.4 Springs, Types (protected & unprotected, Gravity/ horizontal, and artesian / vertical springs), construction of spring boxes, and seep collection system
3.4 Wells; construction of shallow wells, installation of pumps, deep bore hole wells drilling and construction

CHAPTER FOUR
4.0 Rain water harvesting
4.1 Rain water collection (design and construction of roof catchment and ground catch system)
4.2 Design of first flush diversion and tank cleaning system
4.3 Protection of collected waster from mosquitoes breeding and from contamination

CHAPTER FIVE
5.0 Transportation and Distribution
5.1 Transportation Systems; Open channels, pipelines, tunnels; operating problems (water hammer, leakages, waste detection)
5.2 Distribution Systems for Rural Supply; simple gravity flow scheme, protected springs,
5.3 Distribution Systems for Urban Supply; system configuration, and requirement, systemlayout, distribution reservoirs, pumps, pipelines and valves

CHAPTER FIVE
6.0 Irrigation
6.1 Land Classification
6.2 Crop irrigation requirements
6.3 Soil water relationship
6.4 Movement of soil moisture
6.5 Water quality methods and structures
6.6 Methods of irrigation, Drip, Sprinkler

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES
1. Water Supply Engineering by BC. Punmia and Ashok Jain

25.8 WATER ENGINEERING PROJECT III

COURSE CODE **DWE 2108**

CREDIT UNITS **05**

CONTACT HOURS **75**

PROJECT DESCRIPTION
This course expresses the hands on training of all the areas covered in the courses studied.

PROJECT OUT PUTS
By the end of these practical exercises, students should be able to perform jobs related to water engineering work.

OBJECTIVES OF THE COURSE
By the end of this course the students should be able to;
1) Plumb a complete domestic house
2) Estimate and cost for materials
3) Install rain water harvesting facilities

COURSE CONTENT

CHAPTER 1: INSTALLING ELECTRICITY
1.0 Detecting and measuring electric current
1.1 Electricity Supply in a Building
1.2 Wiring
1.3 Earthing

CHAPTER 2: WATER SUPPLY IN A BUILDING
2.0 Cold water supply; Connection and laying of service pipes
2.1 Hot water supply
2.2. Supply of water in multi-stored buildings.

CHAPTER 3: DRAINAGE AND SANITATION OUT OF A BUILDING
3.0 Installation of above/below ground Drainage.

CHAPTER 5: JOINTING MILD STEEL FITTINGS
5.0 Bending and Joining copper tube
5.1 Bronze welding
5.2 Assembling taps, cocks, valves
5.3 Soft soldering
5.4 Connecting P and S traps to wastes, jointing cast iron, plastic, cement and pitch fibre soil pipes
5.5 Fixing WC cisterns sinks and wash basins
5.6 Sheet metal roof work

CHAPTER 6: **IMPORTANT SITE DOCUMENTS**
6.0 Reports
6.1 Instructions book
6.2 Progress reports

6.3 Reporting and Departure time books and wage sheets
6.4 Materials Log book
6.5 Notifications to and site inspection by authorities
6.6 Accidents and sickness report or records book
6.7 Weather report book
6.8 Pre-tender planning personnel involved , objectives

CHAPTER 7: SOIL ANALYSIS
7.0 Particle Size Distribution & Sieve Test
7.1 Laboratory Permeability Tests (Constant Head, Falling Head)
7.2 Field Permeability Tests (Well Pumping Tests, Variable Head Bore Hole Test)
7.3 Laboratory Tests (Direct Shear, Unconfined Compression, Unconsolidated-Untrained Triaxial Compression)
7.4 Soil Sampling

CHAPTER 8: INNOVATION: Student's self initiated project relevant to the Programme

MODE OF DELIVERY
This mode of delivery will be taught through demonstrations, illustrations, site visits, guided discussion, practical work, report writing and presentations

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows:

Project Assessment 1	20%
Project Assessment 2	20%
Student's Personal Project	20%
Project Assessment 4	40%
Total	**100%**

The marks will be converted into Grade points.

26.0 YEAR TWO SEMESTER TWO

26.1 SITE ORGANISATION AND MANAGEMENT

COURSE CODE **DWE 2201**

CREDIT UNITS **03**

CONTACT HOURS **45**

COURSE DESCRIPTION
This course introduces students the management of sites. It also involves making of budgets and all forms of administration on site.

LEARNING OUTCOME
By the end of the course, students will be able to manage construction sites.

OBJECTIVES OF THE COURSE
By the end of this course students should be able to;
1. Lobby for projects
2. Budget and cost for projects
3. Manage and administer projects

CHAPTER ONE
1.0 Management Principles
1.1 Organization structure within a construction company and on a site
1.2 Delegation of responsibility and accountability
1.3 Pre-tender planning personnel involved, objectives
1.4 Parties concerned with a project, their functions and interrelationship; Client,
1.5 Contractor's team (Site Agent or Manager, Site Engineer, General Foreman, Foreman) Architect, Structural Engineer, Civil Engineer, Electrical Engineer & Services Engineer, Quantity survey, Clerk of Works, Roads Inspector, Local Government Building Inspector,

CHAPTER TWO
2.0 HIV and AIDS
2.1 How HIV or AIDS is spread.
2.2 How to prevent the spread of HIV or AIDS.
2.3 Care for HIV or AIDS patients.
2.3 Effects of HIV or AIDS on the construction industry.

CHAPTER THREE
3.0 Preliminary Site Works
3.1 Site layout
3.2 Sitting temporary buildings
3.3 Storage and material compounds, Access roads and hoarding
3.4 Site Protection and security
3.5 Temporary services; Water, gas, electricity, telephone, generators, toilets, drainage, kitchen and dinning

CHAPTER FOUR
4.0 Safety Health and Welfare

4.1 Regulations and safe working conditions on site concerning access, excavations, scaffolding
4.2 Safe working conditions, maintenance and inspection of mechanical plant, hoists, cranes, portable tools and electrical equipment
4.3 Provision for food and drinks, washing, Toilet Facilities
4.4 Provision for a Nurse and or first aid
4.5 Safety wear, building netting and falls
4.6 Transport and Temporary housing for labour for example storage, changing or dressing rooms
4.7 Health and safety education, Notices, warning signage
4.8 Noise and pollution control
4.9 Responsibility to third party and insurance schemes
4.10 Building Regulations, statutory requirements and fees
4.11 Employment legislation, Labour laws and construction regulations,
4.12 Timely payments and incentive schemes

CHAPTER FIVE

5.0 Important site documents.

5.1 Reports to head office
5.2 Instructions book
5.3 Day- works and Variations
5.4 Progress reports
5.5 Reporting and Departure time books and wage sheets
5.6 Materials Log book
5.7 Notifications to and site inspection by authorities
5.8 Accidents and sickness report or records book
5.9 Weather report book

CHAPTER SIX

6.0 Management of materials

6.1 Scaffolding; types and erection, consideration of distribution of materials and hoisting materials
6.2 Preparation of schedules, forecasting material requirements
6.3 Processing, ordering, checking, storage, protection, transport, loading and handling of materials

CHAPTER SEVEN

7.0 Labour Management and Site Control

7.1 Assessing and forecasting labour requirements throughout the project
7.2 Availability of labour and requirements
7.3 Incentives; Financial incentives, non financial incentives,
7.4 Measuring and recording labour in relation to work output
7.5 Forecasting, overall programme, short term programme,
7.6 Crash Programme: Objectives, use and effect
7.7 Progress Records and feed back of information
7.8 Site visit to pipe laying sites, water works and sewerage site

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.

There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Dr. B. C. Punmia Arun Kumar Jain (1988), Waste Water Engineering
2. Truman Nelson (1960), The Surveyor

26.2 ENTREPRENEURSHIP SKILLS

COURSE CODE DWE 2202

CREDIT UNITS 40

CONTACT HOURS 60

COURSE DESCRIPTION
This course includes the basics of entrepreneurship skills- the concepts and principles of running business

LEARNING OUTCOMES
By the end of the course, will be able to initiate and run their own business project.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to:
1. Understand the concepts and principles of entrepreneurship
2. Acquire knowledge of the best practices, successes, failures, opportunities and constraints in the field of entrepreneurship.
3. To identify an idea and develop a viable concept.
4. Appreciate the importance of entrepreneurship in the development of business organizations.
5. Acquire skills and knowledge for starting and running business organization in local environment.

COURSE CONTENT

CHAPTER ONE
Introduction
1.0 Definitions of entrepreneurship and an entrepreneur
1.1 The concept of entrepreneurship
1.2 The entrepreneur and the entrepreneurial characteristics
1.3 Entrepreneurial success

CHAPTER TWO
2.0 Entrepreneurial process
2.1 Definition of **Entrepreneurial process**
2.2 Identifying an opportunity (ideas, invention and innovation)
2.3 Evaluation of an opportunity (feasibility study)
2.4 Developing a business plan
2.5 Determining and marshaling resources
2.6 Management of the resulting enterprise

CHAPTER THREE
3.0 Environmental analysis
3.1 Characteristics of the environment in which entrepreneurs operate
3.2 Introduction to environmental analysis
3.3 Internal environmental analysis
3.4 External environmental analysis
3.5 Challenges in industry analysis
3.6 Barriers to entrepreneurship

3.7 Solution to barriers to entrepreneurship

CHAPTER FOUR
4.0 Entrepreneurship
4.1 Definition and importance of entrepreneurship
4.2 How to develop an organization that supports entrepreneurship

CHAPTER FIVE
5.0 Entrepreneurial venture
5.1 Characteristics of entrepreneurial venture
5.2 How to develop an entrepreneurial venture

CHAPTER SIX
6.0 Creativity and innovation
6.1 Purposeful innovation
6.2 Sources of innovation opportunities
6.3 The bright idea
6.4 Principles of innovation

CHAPTER SEVEN
7.0 Starting a business
7.1 Feasibility study
7.2 Business plan
7.3 Sources of capital for a business
7.4 Implementation follow-up
7.5 Control of business project

CHAPTER EIGHT
8.0 Concept development
8.1 Practically developing an enterprise

MODE OF DELIVERY
The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES
1. Innovation and entrepreneurship by Ducker F Peter.
2. Entrepreneurial development by Gupta, C.B and Sirinirasan, N.P Sultan Chand and sons Publishers
3. Entrepreneurship, an integrated approach by Charles Orrangor and Philip M. Mubiru

26.3 STATICS AND STRUCTURES II

COURSE CODE DWE 2203

CREDIT UNITS 3

CONTACT HOURS 45

COURSE DESCRIPTION:
This course continues the resolution of forces in beams and frameworks. Design of suitable beams is given special attention

LEARNING OBJECTIVES
By the end of this course, students should be able to design suitable columns, beams and slabs for building structures.

OBJECTIVES OF THE COURSE
By the ends of this course, students should be able to:
1. Design suitable Columns, Beams and Slabs for building structures
2. Demonstrate the understanding of connections
3. Appreciate the importance of retaining walls

COURSE CONTENT

CHAPTER ONE
1.1 Axially Loaded Columns
1.2 Design Factors
1.3 Reinforced Concrete Columns

CHAPTER TWO
2.0 Connections
2.1 Riveting and Bolting
2.2 High Strength Friction Grip Bolts
2.3 Welding and forging

CHAPTER THREE
3.0 Gravity Retaining Walls
3.1 Horizontal Forces
3.2 Wind Pressure
3.3 Liquid Pressure
3.4 Soil Pressure
3.5 Modes of Failure
3.6 Over Sliding
3.7 Over Turning
3.8 Overstressing

CHAPTER FOUR
4.0 Addition of Direct and Bending Stress
4.1 Definitions
4.2 Calculations of direct and bending stress

CHAPTER FIVE

5.0 Properties of Section

5.1 Cross -section area
5.2 The Centre of Gravity or Centroid
5.3 Moment of Inertia (I)
5.4 Section modulus (Z)
5.5 Radius of Gyration

CHAPTER SIX

6.0 Simple Beam Design

6.1 The General Theory of Bending
6.2 Elastic Section Modulus-Symmetrical Sections
6.3 Load factor method
6.4 Limit State Design

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Structural Mechanics by Morgan and Dukka
2. Structural mechanics by Whitle
3. Structural mechanics by R.Hulse and J. Cain
4. Structural mechanics by Morgan, Dukkan and Williams 5th Edition

26.4 QUANTITY SURVEYING & SPECIFICATIONS II

COURSE CODE **DWE 2204**

CREDIT UNITS **3**

CONTACT HOURS **45**

COURSE DESCRIPTION
This course continues the measurement of quantities especially of special constructions and services.

LEARNING OUTCOMES
By the end of the course, students will be able to measure and survey constructions sites.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to,
1. Define terms used
2. Quantify different types of structures
3. Apply the current standard methods of measurement

COURSE CONTENT

CHAPTER ONE
1.0 Internal Finishes
1.1 Plastering
1.2 Ceilings
1.3 Floors

CHAPTER TWO
2.0 Windows

CHAPTER THREE
3.0 Doors

CHAPTER FOUR
4.0 Stair Cases and Fitting

CHAPTER FIVE
5.0 Water Heating and Waste Services

CHAPTER SIX
6.0 Electrical Services

CHAPTER SEVEN
7.0 Drainage Works

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Building Quantities Explained Fifth Edition by Ivor H .Seeley & Roger Winfield

26.5 GEOLOGY AND SOILS

COURSE CODE: **DWE 2205**

CREDIT UNITS **3**

CONTACT HOURS **45**

COURSE DESCRIPTION

This course introduces students the earth structure and the formation of rocks. It covers elementary mineralogy and the general weathering

OBJECTIVES OF THE COURSE

By the end of this course, students should be able to,

1) Analyse various soil strata, their formations and constituents
2) Determine the ground water purification systems
3) Ground water flow patterns within different types of underground rock

COURSE CONTENT

CHAPTER ONE

1.0 Introduction to Geology.

1.1 The surface of the earth,
1.2 The interior of the earth,
1.3 Continental drift,
1.4 Plate tectonic,
1.5 Earth age and origin

CHAPTER TWO

2.0 Structural Geology

2.1 General introduction, attitude and beds,
2.2 Folds: (antiform, anticline, synform and syncline), and engineering considerations involved when dealing with folded rocks, fold geometry,
23. Faults: definition, (normal, reverse, thrust, wrench), recognition of faulting in the field, causes, effects and engineering considerations involved when dealing with the faulted rocks,
2.4 Joints: definition, nature and attitude, classifications, types, in different rocks and engineering considerations involved when dealing with the jointed rocks, and unconformities

CHAPTER THREE

3.0 Elementary Mineralogy.

3.1 Introduction: General to rocks and minerals,
3.2 Elements and compounds and their definitions,
3.3 Classification of minerals, their uses and physical, chemical and, microscopic optical properties of minerals, identifying feature (colour, streak, cleavage, fracture, hardness, luster, crystal habit, specific gravity, transparency, tenacity)
3.4 Rock forming minerals and their importance, clay and non – silicate minerals
3.5 Influence of geological history,

3.6 Importance of drainage and behavior of rock and soil and failures of rocks.

CHAPTER FOUR

4.0 Origin and classification and properties of rocks

4.1 Major rock groups (igneous, sedimentary, metamorphic) formation, composition, Rock classification exercise

4.2 Engineering Properties of rocks: Index properties (rebound number, unconfined compressive strength, and swelling coefficient), raw materials for aggregates for roads and concrete, rock as a fill material.

CHAPTER FIVE

5.0 Weathering and Denudation.

5.1 Types of weathering (chemical, mechanical and biological) and processes

5.2 Erosive mechanisms (rivers, seas, wind, ice, and running water) deposition and geological work associated with them.

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.

There will be the final examination in the last two weeks of the semester.

26.6 SANITATION AND DRAINAGE

COURSE CODE **DWE 2206**

CREDIT UNITS **5**

CONTACT HOURS **75**

COURSE DESCRIPTION:
This course covers all the issues related drainage for rural and urban populations, water treatment and solid waste management

LEARNING OUTCOMES
By the end of this course, students will be able to design the public and domestic excreta systems.

OBJECTIVES OF THE COURSE
By the end of this course, students should be able to:
1) Design the public and domestic excreta systems
2) Construct public and domestic excreta systems
3) Educate the public on the good health practices

COURSE CONTENT

CHAPTER ONE
1.0 Health Issues and Microbiology:
1.1 Public Health Concerns,
1.2 Sanitation related Illnesses and diseases; such as cholera, typhoid fever, dysentery, infant diarrheas, hookworm, ascariasis, bilharziasis, transmission of disease and prevention methods
1.3 Micro-organisms Present in Water Including Classification and Effects: Microbes, Plants and Animals. Protozoa, Algae. Bacteria, fungi.

CHAPTER TWO

2.0 Rural/ Urban Sanitation and Drainage:
2.1 Excreta Disposal Methods, Design Considerations, Construction, Operation and Maintenance, of pit latrines, Ecosan toilets, VIP latrines, bucket latrines, water seal latrines, Cesspool, septic tank, soak pits, leaching fields,
2.2 Household Sanitation, wash water sumps, soak pit, soakage trench)
2.3 Solid Waste Management (Generation, sorting, collection, transportation, disposal, recycling, composting)
2.4 Types of Sewage/Drainage Systems separate, combined or partial
2.5 Storm Drainage Systems: hydrological consideration, design flow, procedures for estimating runoff, storm water inlets, pipes and materials, system layout.

CHAPTER THREE
3.0 Waste water Collection
3.1 Building connections,
3.2 Collecting and intercepting sewers,
3.3 Pipes and materials,
3.4 System layout,

3.5 Sewer maintenance,
3.6 Protection of sewerage system against flood waters, Inverted siphons,
3.7 Wastewater pumping stations location of treatment plants

CHAPTER FOUR

4.0 Waste Water Quality Characteristics and treatment:
4.1 Dissolved oxygen,
4.2 Biochemical oxygen demand,
4.3 Relative stability,
4.4 Chemical oxygen demand
4.5 Chlorine demand,
4.6 Grease, & volatile acids,
4.7 Suspended solids,
4.8 Micro organisms,
4.9 Typical domestic waste characteristics
4.10 Reasons for treatment,
4.11 Biological and physical treatment,
4.12 Waste water quality standards
4.13 Conventional treatment plant methods: including screening, grit removal, sedimentation,
4.14 Sludge disposal
4.15 Design, Construction, operation and maintenance of stabilization ponds, and septic tanks

CHAPTER FIVE

5.0 Solid waste Management

5.1 Generation, Sorting and separation
5.2 Collection and transportation,
5.3 Treatment,
5.4 Recycling and disposal
5.5 Treatment of leachates,

CHAPTER SIX

6.0 Treatment of industrial wastes

6.1 Characteristics of industrial wastes and their effects on water bodies
6.2 Characteristics of agricultural wastes and their effect on water bodies
6.3 Dilution purification
6.4 Pretreatment of industrial wastes

CHAPTER SEVEN

7.0 Special Problems:
7.1 Low-Lying Water / Logged Areas, (wetlands) destruction and pollution
7.2 Poor Urban Areas; slums and their sanitation problems
7.3 Pollution by polythene bags, plastic bottles and their control
7.4 Sanitation and water supply on islands

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Dr. B. C. Runmia (1988), Waste Water Engineering

26.7 FLUID MECHANICS AND HYDRAULICS

COURSE CODE **DCE 2207**

CREDIT UNITS **03**

CONTACT HOURS **45**

COURSE DESCRIPTION:
This course introduces students the movement of fluids in pipes; the statics and dynamics of fluids and the discharge from tanks

OBJECTIVES OF THE COURSE
By the end of this course students should be able to,
1) Apply fluid dynamics and statics principles in determining the quantities of liquids flowing in a pipe at given velocities.

COURSE CONTENT

CHAPTER ONE
1.0 Introduction and Fluid Properties
1.1 Definitions of Hydraulics, Hydrostatics and Hydrodynamics Units
1.2 Distinction between Liquid and gas
1.3 Distinction between solid and fluid
1.4 Density
1.4 Specific Volume & specific gravity
1.5 Viscosity
1.6 Surface tension and capillarity
1.7 Compressibility and bulk modulus
1.8 Vapour pressure

CHAPTER TWO
2.0 Fluid Statics and dynamics
2.1 Hydrostatic Pressure
2.2 Theory of manometers and pressure measurement.
2.3 Static pressure force moments on immersed bodies & confining boundaries.
2.4 Archimedes principle and floatation.
2.5 Continuity equation, fluid energy, Bernoulli's energy conservation equation, total (impact) energy and hydraulic grade lines
2.6 Imensional analysis and similitude

CHAPTER THREE
3.0 Flows in Pipes
3.1 Laminar and turbulent flow
3.2 Reynolds's number, uniform and steady flow
3.3 Friction losses (from Darcy, Manning, Hazen –Williams and Chezy Formula)
3.4 Shock losses (From sudden enlargement, sudden contraction and orifices) Other losses (from valves & bends)
3.4 Head additions / extractions
3.5 Design of pipelines in series, parallel branched and looped
3.6 Flow measurement devices (orifices, venturimeter, pitot tube)

CHAPTER FOUR

4.0 Impulse/momentum principal of fluids

4.1 Impulse/momentum principle of fluid flow for forces exerted on flat plates, curved vanes, pipe bends and pipe reducers

CHAPTER FIVE

5.0 Discharges from Tanks

5.1 Orifice types, orifice coefficients (discharge, contraction, velocity)
5.2 Discharge into free space
5.3 Discharge into pipes

CHAPTER SIX

6.0 Open Channel flow

6.1 Formulae (wetted perimeter, Hydraulic radius, Chezy formula, Manning Formula)
6.2 Uniform flow, steady flow, critical flow (including specific energy and critical depth)
6.3 Most efficient cross section
6.4 Hydraulic jump
6.5 Flow measurement devices (notches, weirs, Par shall flume)

CHAPTER SEVEN

7.1 Loss of head, (Bernoulli's theorem)
7.2 Pipe friction,
7.3 Impact of jet
7.4 Orifice and notch flow
7.5 Open channel flow

MODE OF DELIVERY

The mode of delivery will include: lecture, hands-on, demonstration, group discussions and presentation.

ASSESSMENT OF THE COURSE

This course unit will be assessed out of 100 marks as follows;

Course work by continuous assessment	30%
Final examination	70%
Total	**100%**

The marks will be converted into Grade points.
There will be the final examination in the last two weeks of the semester.

REFERENCES

1. Batchelor, George K. (1967), *An Introduction to Fluid Dynamics*, Cambridge University Press,
2. Falkovich, Gregory (2011), *Fluid Mechanics (A short course for physicists)*, Cambridge University Press,
3. Kundu, Pijush K.; Cohen, Ira M. (2008), *Fluid Mechanics* (4th revised ed.), Academic Press,
4. Currie, I. G. (1974), *Fundamental Mechanics of Fluids*, McGraw-Hill, Inc.,
5. Massey, B.; Ward-Smith, J. (2005), *Mechanics of Fluids* (8th ed.), Taylor & Francis, ISBN 978-0-415-36206-1
6. White, Frank M. (2003), *Fluid Mechanics*, McGraw–Hill,

26.8 WATER ENGINEERING PROJECT IV

COURSE CODE **DWE 2208**

CREDIT UNITS **5**

CONTACT HOURS **75**

PROJECT DESCRIPTION
This course emphasizes hands on training in the various courses studied this semester.

PROJECT OUTPUTS
By the end of this course, the learner shall be able to design and draw overhead and underground irrigation pipes, install overhead and underground irrigation pipes and supply water by pumping.

OBJECTIVES OF THE PROJECT
By the end of this course, students should be able to,
1) Design and draw over head and underground irrigation pipes
2. Install over head and underground irrigation pipes and supplies the water by pumping
3. Construct the water catchment ponds for irrigation

COURSE CONTENT

CHAPTER 1: JOINTING MILD STEEL FITTINGS
1.0 Bending and Joining copper tube
1.1 Bronze welding
1.2 Stripping and assembling taps, cocks, valves
1.3 Soft soldering
1.4 Connecting P and S traps to wastes, jointing cast iron, plastic, cement and pitch fibre soil pipes
1.5 Fixing WC cisterns sinks and wash basins
1.6 Sheet metal roof work

CHAPTER 2: **IMPORTANT SITE DOCUMENTS**
2.1 Reports
2.2 Instructions book
2.3 Progress reports
2.4 Reporting and Departure time books and wage sheets
2.5 Materials Log book
2.6 Notifications to and site inspection by authorities
2.7 Accidents and sickness report or records book
2.8 Weather report book
2.9 Pre-tender planning personnel involved , objectives

CHAPTER 3: ROCKS
3.0 Classification of minerals
3.1 Rock forming minerals
3.2 Use of raw materials for aggregates for roads and concrete; rock as a fill material

3.3 Trial pits, percussion boring, mechanical augers, wash boring, rotary drilling
3.4 Sampling
3.5 Reports: boring, drilling and site investigation reports, / logs

CHAPTER 4: DRAINAGE AND SANITATION
4.0 Testing Micro-organisms Present in Water
4.1 Construction of VIP latrines, bucket latrines, septic tank, soak pits
4.2 Building connections
4.3 Collecting and intercepting sewers
4.4 Drawing a System layout

CHAPTER 5: FLOW OF LIQUIDS
5.0 Design of pipelines in series, parallel branched and looped, measurement devices

CHAPTER 6:
INNOVATION Student's self initiated project related to the programme

MODE OF DELIVERY
This course will be taught through demonstrations, illustrations, site visits, guided discussion, practical work, report writing and presentations

ASSESSMENT OF THE COURSE
This course unit will be assessed out of 100 marks as follows:

Project Assessment 1	20%
Project Assessment 2	20%
Student's Personal Project	20%
Project Assessment 4	40%
Total	**100%**

The marks will be converted into Grade points.

27.0 LIST OF LECTURERS AND TECHNICAL STAFF IN THE FACULTY OF ENGINEERING AND TECHNOLOGY

S/N	NAME	QUALIFICATIONS	EXPERIENCE
1	Akankwasa Phionah	B. VOC. STUD. IN TECH. EDUC (KYU)	3 Years
2	Byamukama Denis	B.VOC. STUD. IN TECH. EDUC (KYU)	3 Years
3	Ingabire Charity	B. VOC. STUD. IN TECH. EDUC (KYU)	3 Years
4	Mwanja Grace Charles	B.Sc Engineering (MUK)	28 Years
5	Kinconco Keneth Muhumuza	ODEE (UNEB), Bsc. Educ. KYU	8 Years
6	Twine Usito Bakesigaki	B. Tech. Teacher Educ. (Mech), KYU	3 Years
7	Nyanzi baker	ODEE (UBTEB) (UTC)	2 Years
8	Twinomujuni Naume	DWE, UNEB (UTC)	3 Years
9	Mugerwa Ashirafu	ODME, UBTEB (UTC)	2 Years
10	Muhumuza Merable	ODCE, UNEB (UTC)	3 Years
11	Niwagaba Edwin	ODIP CERAMICS (UNEB)	2 Years
12	Nabasa Philip	CRAFT I & II, CERT. IN PLUMB (UNEB), DWE	4 Years
13	Mbabazi Alex	ODEE (UNEB) CRAFT I & II ELECT INST (UNEB)	9 Years
14	Tugume Vicent	Craft I & II Carpent & Joinery UNEB, CTTE KYU, DCE Kabale Univ	13 Years
15	Arinda Sam	DME UNEB, HDEE City Guilds of London Institutes	4 Years
16	Niwamanya Paison	ODME (UNEB)	2 Years
17	Narinda Ivan	B. Voc Studies in Tech Educ KYU	2 Years
18	Akampurira Keneth	HDME, ODME (UNEB), B. Sc in Computer Science MUK	17 Years
19	Ashaba Nickolas	ODWE (UNEB)	3 Years
20	Wanjori Paul	B. Sc Electrical Engineering (MUK)	3 Years