

YEAR 1 SEMESTER 1 (SEMESTER 1)

CODE	COURSE TITLE	THEORY	PRACTICAL	Credits
AFS 101	African Studies	1	0	1
COS 101	Communication Skills I	1	2	2
CLT 101	Computer Literacy I	1	2	2
MAT 101	Engineering Maths I	2	0	2
CVE 109	Civil Engineering Drawing I	1	2	2
CVE 103	Strength of Materials I	1	2	2
CVE 105	Fluid Mechanics	1	2	2
CVE 107	Mechanics of Machines	1	2	2
CVE 113	Engineering Technology	1	2	2
CVE 101	Civil Engineering Materials	3	0	3
		13	14	20

YEAR 1 SEMESTER 2 (SEMESTER 2)

CODE	COURSE TITLE	THEORY	PRACTICAL	Credits
AFS 102	African Studies	1	0	1
COS 102	Communication Skills II	1	2	2
CLT 102	Computer Literacy II	1	2	2
MAT 102	Engineering Maths II	2	0	2
CVE 104	Strength of Materials I	1	2	2
CVE 106	Fluid Mechanics	1	2	2
CVE 108	Principles of Land Surveying	1	4	3
CVE 110	Engineering Geology	2	2	3
CVE 102	Civil Engineering Construction	2	2	3
		12	16	20

YEAR 2 SEMESTER 1 (SEMESTER 3)

CODE	COURSE TITLE	THEORY	PRACTICAL	Credits
CVE 209	Civil Engineering Drawing II	1	4	3
CVE 205	Civil Engineering Const. II	2	2	3
CVE 201	Structural Analysis	2	2	3
CVE 203	Soil Mechanics	1	2	2
CVE 207	Engineering Surveying	2	2	3

CVE	211	Engineering Hydraulics	2	0	2
CVE	215	Computer Applications	1	2	2
CVE	213	Organizational Studies I	2	0	2
			13	14	20

YEAR 2 SEMESTER 2 (SEMESTER 4)

CODE		COURSE TITLE	THEORY	PRACTICAL	Credits
CVE	202	Structural Design I	2	2	3
CVE	206	Soil Engineering	2	2	3
CVE	208	Engineering Hydrology	2	2	3
CVE	214	Organizational Studies II	2	2	3
CVE	212	Environmental Quality Eng. I	2	0	2
CVE	204	Measurement of Civil Eng. Works	1	2	2
CVE	216	Research Methodology	2	0	2
CVE	210	Industrial Attachment I	0	8	2
			13	18	20

YEAR 3 SEMESTER 1 (SEMESTER 5)

COURSE		COURSE TITLE	THEORY	PRACTICAL	Credits
ETP	301	Entrepreneurship	2	0	2
CVE	301	Structural Design II	1	2	2
CVE	303	Highway Engineering	2	2	3
CVE	307	Environmental Quality Eng. II	2	2	3
CVE	305	Measurement of Civil engineering Works	3	0	3
CVE	309	Civil Engineering Maintenance	3	0	3
CVE	311	Project Phase I	0	2	1
			13	8	17

YEAR 3 SEMESTER 2 (SEMESTER 5)

CODE		COURSE TITLE	THEORY	PRACTICAL	Credits
CVE	302	Estimating of Civil Engineering Works	3	0	3
CVE	304	Construction Management Studies	3	0	3
CVE	306	Contract Administration and Law	2	0	2

CVE	308	Environmental Impact of Construction Activities	2	0	2
CVE	310	Industrial Attachment II	0	8	2
CVE	312	Project Final Phase	0	6	3
CVE	314	Construction Accounting	2	0	2
CVE	316	Transportation Engineering	2	0	2
			14	14	19

1. Course Description:

FIRST YEAR COURSES

AFS 102 AFRICAN STUDIES (1 – 2 – 2)

Objective: This course is structured to emphasis the students' awareness of the African environment and its development

Content:

- 0.0 Pre – historic Africa and the great civilization of Africa.
- 1.0 Traditional African Government, Social systems, and practices

Reading Material

COS 101 COMMUNICATION SKILLS I (1 – 2 – 2)

Objective: course is designed to offer the students the ability to use English correctly and effectively which is an essential skill all engineers must seek to master.

Content:

- 1.0 Use of English
 - 1.1 Syntax and grammar
 - 1.2 Spelling and Punctuation
 - 1.3 Vocabulary
 - 1.4 Sensitivity and discrimination
 - 1.5 Style
 - 1.6 Critical facilities
 - 1.7 Awareness of the recipient.
- 2.0 Meetings
 - 2.1 Introduction
 - 2.2 Different types of meetings
 - 2.3 The participants
 - 2.4 Written documentation
 - 2.5 Minutes

- 2.6 Terminology of meeting
- 3.0 Communication in Organisation
 - 3.1 Introduction
 - 3.2 Theory and process
 - 3.3 Using the process effectively
 - 3.4 The media of communication

Reading Material

1. Raman, M., and Sharma, S. (2012). *Technical Communication: Principles and Practice*.
2. R Ellis (1997) *Communication For Engineers*

COS 102 COMMUNICATION SKILLS II (1 – 2 – 2)

Objective: course is designed to offer the students the ability to use English correctly and effectively which is an essential skill all engineers must seek to master.

Content:

1.0 The Letter

- 1.1 Introduction
- 1.2 Format
- 1.3 Common categories of letter
- 1.4 Content style

2.0 Information

- 2.1 Introduction to Information Technology (IT)
- 2.2 Developments in information Technology
- 2.3 Information Technology Office applications

3.0 Memoranda and Reports

- 3.1 Introduction
- 3.2 The Memorandum
- 3.3 The Report

Reading Material

1. Raman, M., and Sharma, S. (2012). *Technical Communication: Principles and Practice*.
2. R Ellis (1997) *Communication for Engineers*

CLT 101 COMPUTER LITERACY I (1 – 2 – 2)

Objective: This course serves an introduction to the computer and its accessories. The objective is to encourage the students to appreciate the use of computers.

Content

1.0 Introduction to computers

- 1.1 Computer literacy
- 1.2 Who is the user
- 1.3 Data process

- 1.4 The computer
- 1.5 The computer system
- 1.6 Types of computers and their uses

2.0 The microcomputer and some input/output devices

- 2.1 Components of a microcomputer
- 2.2 The processing unit
- 2.3 Peripherals

3.0 Storage devices and the basic structure of a computer

- 3.1 Primary or main memory
- 3.2 Secondary or auxiliary memory
- 3.3 Direct access and sequential access schemes
- 3.4 The basic structure of a computer
- 3.5 The machine cycle
- 3.6 Data and program representation in a computer
- 3.7 Binary coding schemes
- 3.8 The computing cycle
- 3.9 Computer word

4.0 Software and operating systems

- 4.1 Hardware and software
- 4.2 Types of software
- 4.3 Capabilities of operating systems
- 4.4 Functions of operating systems
- 4.5 Types of operating systems

5.0 Data communications and networks

- 5.1 Data communication dc systems
- 5.2 Data transmission channels media and forms
- 5.3 Communications hardware
- 5.4 Communications software
- 5.5 Protocols
- 5.6 Networks
- 5.7 Local area networks (LAN)

6.0 Practical uses of data communications

- 6.1 Telephone-related communications services
- 6.2 Online information services
- 6.3 Electronic bulletin board systems
- 6.4 Telecommuting
- 6.5 The internet
- 6.6 Getting ready for internet access
- 6.7 Addresses
- 6.8 World wide web

7.0 Issues related to purchase ,maintenance and security of a computer

- 7.1 Software and hardware to buy
- 7.2 Maintaining a system
- 7.3 Health and safety

7.4 Security and viruses

Reading Material

Nasiriya, M. (2011). *Computer Literacy Basics*. Thomson Learning

Spilka Rachel *Digital Literacy for Technical Communication: 21st Century Theory and Practice*
Routledge

CLT 102 COMPUTER LITERACY II (1 – 2 – 2)

Objective: Students should
thoroughly understand the basic of windows
thoroughly understand word processing and spreadsheet techniques in there are of study
be familiar with applications of both word process and spreadsheet in field of study

Content

1.0 Introduction to windows

- 1.1 Parts of a window
- 1.2 Types of windows
- 1.3 The mouse and the key board
- 1.4 DOS commands in windows
- 1.5 Modifying a window

2.0 Introduction to windows 8.1

- 2.1 A look at windows 8 redesigned desktop
- 2.2 Dialogue boxes
- 2.3 Managing files and folders
- 2.4 Using the windows explorer to view your folders and files

3.0 Microsoft Word (Office 2013)

- 3.1 Basics of entering text
- 3.2 Keyboarding rules
- 3.3 Microsoft word and its windows interface
- 3.4 Menus and toolbars
- 3.5 The text area
- 3.6 Using the enter key
- 3.7 Non-printing characters
- 3.8 The file, save as... command
- 3.9 Closing a document
- 3.10 To open a document or file
- 3.11 Editing a file
- 3.12 Navigation features in word
- 3.13 Editing techniques
- 3.14 Formatting
- 3.15 Introduction tabs and tables
- 3.16 Modify page appearance
- 3.17 Margins
- 3.18 Page breaks

4.0 Microsoft Excel (Office 2013)

- 4.1 A look at excel windows
- 4.2 Creating a basic worksheet with range of data
- 4.3 Formatting
- 4.4 Editing and modifying techniques
- 4.5 Formatting techniques
- 4.6 Page breaks, margins, headers and footers and print titles
- 4.7 Charting

Reading Material

- 1. Eunice Cluck *Using Word for Windows* Mitchell McGraw Hill
- 2. Eunice Cluck *Using Excel for Windows* Mitchell McGraw Hill
- 3. Blanton and Aileen *Step by Step MS Office* Microsoft Press

MAT 101 ENGINEERING MATHEMATICS I (2 – 0 – 2)

At the end of the module, students should:

Objective:

- 1.0 Be familiar with hyperbolic functions and their application.
- 2.0 Understand applications of differential calculus.
- 3.0 Be familiar with the use of complex numbers.
- 4.0 Understand some of the uses of series

Content

1.0 Hyperbolic Functions:

- 1.1 Recognise hyperbolic notation.
- 1.2 Explain the relationship between hyperbolic functions and trigonometric functions.
- 1.3 Sketch the curves of typical hyperbolic functions
- 1.4 Solving problems involving hyperbolic functions
- 1.5 Identify the uses of hyperbolic functions and relate those uses to engineering applications.

2.0 Differential Calculus

- 2.1 Solving problems using the technique of successive differentiation.
- 2.2 Interpret Engineer problems, which involve the technique of successive differentiation in their solution.
- 2.3 Derive Leibnitz's theorem and relate it to the technique of successive differentiation.
- 2.4 Solve problems using the method of simple partial differentiation.
- 2.5 Identify the uses of partial differentiation, and relate those uses to Engineering applications.
- 2.6 Derive the reduction formula, and identify its practical uses.

- 2.7 Relate the reduction formula to the method of integration by parts.
- 2.8 Solve practical problems using the reduction formula and integration by parts.
- 2.9 Define gamma functions.
- 2.10 Use gamma functions in the solution of practical engineering problems.

3.0 Complex Numbers

- 3.1 Define the square root of a negative number
- 3.2 Define the square root of -1 as j^2 or i^2 .
- 3.3 State what is meant by the complex plane.
- 3.4 Recognise practical uses of complex numbers and the complex plane.
- 3.5 Solve practical problems involving complex numbers.

4.0 Uses of Series

- 3.19 Identify the expansions of Maclaurin and Taylor.
- 3.20 Solve problems using the expansions of 4.1.
- 3.21 Describe the principal uses of the series of 4.1, e.g. approximation, etc.
- 3.22 Use the series of 4.1 to make successive approximations.
- 3.23 Recognise the format of a Fourier series.
- 3.24 Describe the principal uses of a Fourier series.
- 3.25 Solve practical problems using a Fourier series.

Reading Material

1. Venkataraman M.K, Engineering Mathematics (Third Year-Part A), The National Publishing Company, Madras, 2001.
2. Bali N.P. and Manish Goyal, A Text Book of Engineering Mathematics, Lakshmi Publications, New Delhi, 2007.
3. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Eastern Ltd. 2005.

MAT 102 ENGINEERING MATHEMATICS II (2 – 0 – 2)

Objective: At the end of the module, students should:

- 1.0 Be familiar with the Laplace transform.
- 2.0 Understand the uses of second order differential equations with constant coefficients.
- 3.0 Know the applications of De Moivre's theorem.
- 4.0 Apply statistical concepts to engineering applications.
- 5.0 Be familiar with the theory of matrices.

1.0 Laplace Transform

- 1.1 Recognise the format of a Laplace transform.
- 1.2 Carry out Laplace transformations on mathematical functions.
- 1.3 Identify the engineering applications of the Laplace transform.
- 1.4 Use Laplace transforms in the solution of the applications of 1.3.

2.0 Differential Equations

- 2.1 Recognise second differential equations with constant coefficients.
- 2.2 Identify some of the applications of the equations of 2.1, e.g. equations of motion, fluid dynamics, structural analysis, etc.
- 2.3 Discriminate between particular integral and complimentary function.
- 2.4 Use the operator rule to determine the particular integral.
- 2.5 Solve problems related to the application of 2.2 by determining particular integrals and complementary functions.

3.0 De Moivre's Theorem

- 3.1 State De Moivre's theorem and describe its uses.
- 3.2 Use De Moivre's theorem in the solution of practical engineering problems.

4.0 Statistical Concepts

- 4.1 Give examples of outcomes, which are equally likely.
- 4.2 Distinguish between mutually exclusive events, combined events and union of events.
- 4.3 Give examples of the events of 4.2 e.g. throwing a specific number on consecutive rolls of dice, the probability of the same number on a subsequent roll of a dice, etc.
- 4.4 Calculate simple and conditional probability given appropriate data.
- 4.5 Infer conclusions from given statistical data
- 4.6 Explain the concept of confidence.
- 4.7 Calculate confidence levels for a single mean and single proportion.
- 4.8 Test a hypothesis for a single mean and single proportion.
- 4.9 Compare method of elementary sampling.
- 4.10 Estimate sampling errors.
- 4.11 Interpret the results of sampling.
- 4.12 Distinguish between a casual relationship and a hypothesis.
- 4.13 Distinguish between correlation and regression.
- 4.14 Calculate, using a case study approach.
 - (a) Product moment correlation coefficients;
 - (b) Rank correlation coefficients;
 - (c) Linear regression using the method of least squares.
- 4.15 Present in tabular form a summary of common statistics. E.g. height, weight, etc. of members of the class.
- 4.16 Plot the results of 4.15 as the normal curve.
- 4.17 Calculate deviations from the mean using the results of 4.15
- 4.18 Define quartile and standard deviation.
- 4.19 Label areas of the normal curve relative to standard deviations.
- 4.20 Distinguish between positive and negative skewness.

- 4.21 Determine coefficients of variation.
- 4.22 Identify other probability distributions e.g. Poisson distribution etc., and compare their use with that of the normal curve.
- 4.23 Use statistical and graphical methods to interpret quality control data.
- 4.24 Summarize the Gaussian Law.
- 4.25 Use the Gaussian Law to investigate the distribution of errors.

Reading Material

- 1. Venkataraman M.K, Engineering Mathematics (Third Year-Part A), The National Publishing Company, Madras, 2001.
- 2. Bali N.P. and Manish Goyal, A Text Book of Engineering Mathematics, Lakshmi Publications, NewDelhi, 2007.
- 3. Erwin Kreyszig, Advanced Engineering Mathematics, Wiley Eastern Ltd. 2005.

CVE 101 CIVIL ENGINEERING MATERIALS (3 – 0 – 3)

Objective: The aim of the course is to develop students awareness of properties of materials, constructional characteristics, classification and composition of materials used in Civil Engineering works.

The aim of the course is to develop students awareness of properties of materials, constructional characteristics, classification and composition of materials used in Civil Engineering works.

Content

1.0 General Properties

- 1.1 Strength and durability.
- 1.2 Thermal, moisture temperature movements.
- 1.3 Deterioration i.e. chemical, biological and mechanical factors.

2.0 Natural Resources Materials.

- 2.1 Timber
 - 2.1.1 Selection and Utilization.
 - 2.1.2 Constructional Characteristics.
 - 2.1.3 Mechanical properties
 - 2.1.4 /durability and preservation; treatment; seasoning.
 - 2.1.5 Stress grading.

- 2.1.6 Defects and deterioration
- 2.1.7 Timber products including plywood and laminated woods.

2.2 Stones

Classification and composition

2.3 Blocks and Bricks

Sandcrete, landcrete and clay bricks.

2.4 Sand and Gravels

Crushed aggregates 'all - in - aggregate', river and [itsand, coastal sand.

2.4.1 Mining of Materials for building operations.

2.4.2 Quarrying and mining of natural sand soil material

2.4.3 Impact of mining materials on vegetation and the atmospheric environment.

2.4.4 Disposal of building debris and producers of building materials from manufacturing factories and environmental pollution.

3.0 **Processed Materials**

3.1 Cement, Limes and Concrete

3.1.1 Classification and Composition

3.1.2 Manufacture of Cement and Limes.

3.1.3 Type and characteristics of cement

3.1.4 Lightweight and dense concretes

3.1.5 Sandcrete and concrete blocks.

3.2 **Manufacture and types i.e. Ferrous and non-ferrous metals**

3.2.1 Structural Characteristics of metals, structural steel; reinforcing steel (mild, high and yield).

3.2.2 Corrosion and protective coating of metals.

3.3 **Asbestos Products**

3.3.1 Asbestos Silica Cement.

3.3.2 Lime Products

3.4 **Bituminous Products**

3.4.1 Bitumen

3.4.2 Coal tar

3.4.3 Pitch

3.4.4 Asphalt

3.5 **Glass**

3.5.1 Characteristics and Strength properties

3.5.2 Types and Manufacture

3.5.3 Glass products i.e. Glass-fibre reinforcements, glass wool.

3.6 Plastics and Rubbers

3.6.1 Thermoplastics

3.6.2 Thermosetting plastics

Reading Material

1. Alan Everett. (1999). *Materials*.
2. Huntington, W.C., and Mickadeit, R.E. (1975). *Building construction: materials and types of construction*. John Wiley & Sons.
3. Varghese, P.C. (2005). *Materials*. Prentice Hall India.
4. Shetty, M.S. (2010). *Concrete Technology*. S. Chand and Company, New Delhi.

CVE 102 CIVIL ENGINEERING CONSTRUCTION I (2 – 2 – 3)

Objective:

The course aims at developing students' interest to appreciate the functioning of the various elements of a Building or Civil Engineering Structure and the practice of the art of construction.

Content

1.0 Introduction to principles and forms of building

2.0 Site Investigation and Soil Exploration

2.1 purposes

2.2 Methods of exploration, investigation procedure
Factors affecting choice of method

2.3 Sampling and Testing

2.4 Reporting

3.0 Substructure Construction

3.1 Functions and types of foundations

3.2 Characteristics, nature and composition of subsoil

3.3 De – watering

4.0 Super – structure

4.1 Functions requirements

4.2 Types of structural and non - structural walls

4.3 Stability of walls

4.4 Eccentricity, slenderness ratio

5.0 Retaining Walls

Types and functions

- 5.1 Causes of failure
- 5.2 Stability
- 5.3 Construction – Formwork
 - 5.3.1 Full height casting
 - 5.3.2 Climbing Formwork or life casting
 - 5.3.3 Casting Against Earth Face

6.0 Improved Techniques In Construction

- 5.4 Cross wall construction
- 5.5 Curtain walling

Field trips to projects sites by the students to familiarize themselves with the techniques in practice.

Reading Material

1. Allen, E., and Iano, J. (2011). *Fundamentals of Building Construction: Materials and Methods* (5 Ed.). John Wiley & Sons.
2. Huntington, W.C., and Mickadeit, R.E. (1975). *Building construction: materials and types of construction*. John Wiley & Sons.
3. Derek Osborne and Roger Greeno (2002) *Introduction to Building*

CVE 103 STRENGTH OF MATERIALS I (1 – 2 – 3)

Objective:

At the end of the module, students should be in position to understand the mechanics of deformable bodies with special emphasis on stress, strain and stress-strain relationship, and know the mechanical properties and characteristics of engineering materials.

Content

1.0 Stress

- 1.1 Normal and shear stresses, stress on an element.
- 1.2 Analysis of plane stresses, Mohr's circle of stresses.
- 1.3 Absolute maximum stress, shear stress, variation of stress through a body.

2.0 Strain

- 2.1 Deformations and displacements.
- 2.2 Analysis of plane strain.
- 2.3 Mohr's circle of plane strain.

3.0 Stress-strain Relationship

- 3.1 Stress-strain curve and Mathematical Modeling of stress-strain curves.

- 3.2 Poisson ratios effect, Generalized Hooke's Law, Relationship between E, G and R.

4.0 Mechanical properties and Characteristics of engineering materials

- 4.1 Classification of materials into Ductile, brittle, elastic, plastic, isotropic, anisotropic and orthotropic.
- 4.2 Elastic and plastic deformation.
- 4.3 Ultimate strength, rupture stress, yield point and yield strength, strain hardening, strain softening behaviour, creep, relaxation and fatigue behaviour.
- 6.0 The nature of solid materials subject to elastic and plastic action on the general peculiar behaviour at interface of composite materials walls.
- 7.0 Students should know typical properties of common engineering materials including density, plastic modulus, shear modulus, yield stress, Poisson ratio of bronze, cast iron, structural steel, concrete, timber, bricks and rocks,(sandcrete, and crete and burnt bricks)

Reading Material

1. Al Nageim, H. et al (2003). Structural Mechanics (6th Edition). Prentice-Hall. UK
2. Ryder, G. H. (1969). Strength of Materials (3rd Edition). MacMillan. London

CVE 104 STRENGTH OF MATERIALS II (1 – 2 – 2)

Objective: To introduce trainees to fundamental concepts of Load Analysis and relationship between loads and Factors important in Design Civil Engineering.

Content

1.0 Analysis of statistically determinate beams

- 1.4 Relationship between load, shear force and bending moment
- 1.5 Calculation of bending moments and shear forces.
- 1.6 Bending moment and shear force diagrams.

2.0 Theory of Pure Bending

- 2.4 Definition of pure bending
- 2.5 Types of stresses and strains resulting from pure bending.
- 2.6 Equation of bending stress.
- 2.7 Stress distribution in a section of a beam.
- 2.8 Section modulus and calculation of bending stress.

3.0 Shear Stress

- 3.3 Equation of shear stress in a beam

- 3.4 Shear stress distribution in a beam of rectangular cross-section.
- 3.5 Shear stress distribution in an I – section beam.
- 3.6 Solve examples of bending stress and shear stress, introduction to design principles of a section.

4.0 Torsion

- 4.4 Define torque and angle of twist
- 4.5 Expression of torsion shear for a solid circular shaft, a hollow circular shaft and a rectangular section in the elastic stages.
- 4.6 Torsion shear distribution for a solid shaft, a hollow shaft and a rectangular section in the elastic stages.
- 4.7 Calculation of torsion shear for a solid and a hollow shafts.

Reading Material

1. Al Nageim, H. et al (2003). Structural Mechanics (6th Edition). Prentice-Hall. UK
2. Ryder, G. H. (1969). Strength of Materials (3rd Edition). MacMillan. London

CVE 105 FLUID MECHANICS I (1– 2 – 2)

GENERAL OBJECTIVE

Objective: The end of the module, students should have been introduced basic applied Fluid Mechanics, which should include;

Content

1.0 The definitions and basic properties of fluid and liquids

- 1.1 Definition of (a) Fluids (b) Liquids
- 1.2 Ideal and Real Fluids
- 1.3 Basic properties of a fluid, e.g.
 - 1.3.1 Density, specific volume, specific weight, compressibility viscosity, surface tension and capillarity derive as expression of Newton Law of internal Friction i.e.

$$\tau = \frac{u dv}{dy}$$

2.0 Hydrostatics

- 2.1 Hydrostatic Pressure

- 2.1.1 Gauge pressure
- 2.1.2 Absolute Pressure

3.0 Properties of Hydrostatic Pressure and its measurement

4.0 (Law and the use of piezometer and manometer in measuring ‘pressure head’.

- (a) //define Pascal’s Law
- (b) Explain 2.2 (a) in relation to a fluid (at rest), specific potential Energy and potential Head.
- (c) Hydraulic Pressure.

5.0 Pressure forces on submerged bodies (solid surfaces, Graphical approach for finding hydrostatic forces on plane surfaces immersed in a fluid and pressure forces on curved surfaces.

Reading Material

1. Kumar, K. L. (2002). Engineering Fluid Mechanics. Eurasia Publishing House.
2. Bansal, R.K. (2010). Fluid Mechanics and Hydraulic Machines (Ninth Edition). Laxmi Publications.
3. Arore, K. R. (2005). Fluid Mechanics, Hydraulic and Hydraulic Machines. Standard Publishers and Distributors, New Delhi.
4. Rajput, R.K. (2005). Fluid Mechanics and Hydraulic Machines. S. Chand and Company Ltd.

CVE 106 FLUID MECHANICS II (1– 2 – 2)

Objective: Upon successful completion of the course, students should be in the position to understand hydrodynamics and causes of fluid flow. Students would know the basic terminology associated with fluid flow, and types of flow.

Content

1.0 Hydrodynamics

- 1.1 What is it?
- 1.2 What causes fluid flow?

2.0 Classification Of Flow

- 2.1 Steady uniform flow
- 2.2 Steady non-uniform flow
- 2.3 Uniform flow
- 2.4 Non-uniform flow
- 2.5 Explanation to the flow
 - 2.5.1 Fluid /element (Practice)
 - 2.5.2 Fluid Path
 - 2.5.3 Stream line and stream tube
 - 2.5.4 Filament

3.0 The Fundamental Equations Of Fluid Dynamics And Principles i.e..

- 3.1 Conservation Of Matter (Mass)
- 3.2 Conservation of energy
- 3.3 Conservation of momentum
- 4.0 The Continuity equation and condition for continuity of flow.
- 8.0 The Hydraulic Energy Equation of a filament and Bernoulli's Equation for (an idea fluid) filament.
- 9.0 Geometrical and Energy interpretation of Bernoulli's Equation,
- 10.0 Bernoulli's Equation for the flow of a real fluid and Head losses.
- 11.0 Types of flow (Lamina and Turbulent flow) lab work on 8.0, Reynolds Experiment and discharge through an orifice and Nozzles.
- 12.0 Explain Head losses leading to Darcy Weisbach Formula and Reynold's Number Minor head losses.
- 13.0 Application of the Darcy – Weisbach equation.

Reading Material

- 1. Kumar, K. L. (2002). Engineering Fluid Mechanics. Eurasia Publishing House.
- 2. Bansal, R.K. (2010). Fluid Mechanics and Hydraulic Machines (Ninth Edition). Laxmi Publications.
- 3. Arore, K. R. (2005). Fluid Mechanics, Hydraulic and Hydraulic Machines. Standard Publishers and Distributors, New Delhi.
- 4. Rajput, R.K. (2005). Fluid Mechanics and Hydraulic Machines. S. Chand and Company Ltd.

CVE 107 MECHANICS OF MACHINES (1– 2 – 2)

Objective At the end of the module, students should be familiar with the basic principles of statics, understand simple kinematic analysis and now free vibration theory.

At the end of the module, students should:

- 1.0 Be familiar with the basic principles of statics
- 2.0 Understand simple kinematic analysis.
- 3.0 Know free vibration theory.

Content

1.0 Static Principles

- 1.1 State Newton's law related to force and reaction.
- 1.2 Describe stable, unstable and neutral equilibrium
- 1.3 Resolve forces into vertical and horizontal components.
- 1.4 Construct, and solve problems involving:
 - (a) Triangle of forces.
 - (b) Parallelogram of forces
 - (c) Polygon of forces.
- 1.5 Determine the magnitude of forces in frameworks, graphically and

- experimentally.
- 1.6 Determine the center of gravity of a loaded beam, graphically and experimentally.
 - 1.7 Define work in terms of applied force and displacement.
 - 1.8 Define the joule.
 - 1.9 Name common forms of energy.
 - 1.10 Identify examples of the conversion of one form of energy into another form.
 - 1.11 Describe the relationship between energy and work done.
 - 1.12 Define efficiency in terms of energy input and output.
 - 1.13 Define power as a measure of the rate at which work is done.
 - 1.14 Name the relationship between the joule and the watt.
 - 1.15 State the principle of the conservation of energy.
 - 1.16 Solve problems involving energy. Work, power and the conservation of energy.

2.0 Kinetic Analysis

- 2.1 State Newton's laws of motion.
- 2.2 Use Newton's law to solve linear motion problems of rigid bodies.
- 2.3 Identify the radian as a unit of angular measurement.
- 2.4 Define angular velocity and acceleration.
- 2.5 State the relationship between linear and angular velocity and acceleration.
- 2.6 Define moment of inertia (or second moment of mass) about the center of gravity of a body.
- 2.7 Define radius of gyration.
- 2.8 Derive $T = I \alpha$ from $F = ma$.
- 2.9 Define centripetal acceleration.
- 2.10 Solve problems in regular motion using Newton's Laws.
- 2.11 State the principle of conservations and other rigid bodies.
- 2.12 Use the principles of conservation of momentum and energy to solve dynamic problems in mechanisms and other rigid bodies..
- 2.13 State the purpose of a flywheel.
- 2.14 Measure the moment of inertia of a flywheel, using experimental methods.
- 2.15 Construct crank effort and indicator diagrams, given details of torque variation.

3.0 Free Vibrations

- 3.1 Describe the basic equation for simple harmonic motion.
- 3.2 State the conditions for simple harmonic motion to occur, e.g. acceleration proportional to displacement and always directed towards the equilibrium position.
- 3.3 Define the terms frequency, amplitude and period.
- 3.4 Solve problems involving linear simple harmonic motion, e.g. spring, and loaded shaft. Etc.
- 3.5 Translate linear simple harmonic motion into torsional simple harmonic motion.
- 3.6 Solve problems involving torsional free vibrations.
- 3.7 Recognise advantages and disadvantages of free vibrations in engineering applications.
- 3.8 Measure frequency, amplitude and period of free vibrating systems.

Reading Material

1. Rajesekaran, S and Sankara Subramanian., G., Engineering Mechanics, Vikas Publishing House Private Ltd., 2002. Reference Books
2. Palanichamy, M.S. Nagan, S., Engineering Mechanics – Statics & Dynamics, Tata McGraw-Hill, 2001.
3. Beer, F.P and Johnson Jr. E.R, Vector Mechanics for Engineers, Vol. 1 Statics McGraw Hill International Edition, 1997.

CVE 108

PRINCIPLES OF LAND SURVEYING (1– 4 – 3)

Objective: At the end of this course, students are to be fully prepared to undertake simple site surveys involving the use of basic instrument in linear measurements, i.e. triangulation traversing, chaining and other modes of linear measurements.

Content

1.0 Linear Measurement In Surveying

- 1.1 Define Surveying and state divisions of surveying.
- 1.2 Instruments used in linear Surveying and Symbols of features.
- 1.3 Measurement of Horizontal Distances, by direct method (step chaining) by indirect methods.
- 1.4 Demonstrate the use of Abney levels on slopes and state sources of error likely to rise in linear measurement.
 - 1.4.1 Field Problems: Setting out right angles, obstacles to chaining and ranging.
- 1.5 State alternative methods of linear measurement.
- 1.6 Maintenance of equipment.
- 1.7 Detailing by chains surveying, perpendicular offsets and triangular offsets, booking procedure.
- 1.8 Carry out a detailed chain survey of an area, which contains a variety of natural and artificial features within the periment, and plot to scale.

1.9 Produce a final presentation drawing of a survey plot.

2.0 Compass Surveying

2.1 Define Bearings; Reference Directions true bearing, magnetic bearing grid bearing.

2.2 Description of compass, use of compass in traversing. Errors in compass observations, Local Attraction. Limitations of Compass, Advantages and Disadvantages of Surveying by Compass.

2.3 Compass Traverse of an area, Plotting and Graphical Adjustment

3.0 Leveling

3.1 Leveling terminology (i.e. Level line or surface, Horizontal plane, datum, reduced LEVEL, bench marks etc.)

3.2 Types of levels (i.e. automatic level, dumpy level, tilting level) and the leveling staff

3.3 Principles of leveling. Temporary Adjustments to the level, Field Procedure.

3.4 Booking and reduced level circulations (The rise and fall method and the height of collimation method)

3.5 Errors in leveling

3.6 Applications of leveling.

3.7 Contouring (Direct and Indirect Contouring), interpolating contours and obtaining sections from contours

3.8 Theodolites, their uses and essential features of theodolites.

3.9 Principles of angle measurement; setting up tripod, reading, booking and calculating of plotted areas using Simpson's rule, trapezoidal rule, square sheet and planimeter.

3.10 Measurement of Horizontal Angles, Temporary Adjustments to the Theodolites, Reading, Booking.

3.11 Theodolites traversing. Calculation of Coordinates

3.12 Measurement of areas, calculations of plotted areas by Simpson's Rule and by Trapezoidal rule, Square Sheet and Planimeter. Calculation of area from Coordinates

4.0 Introduction to technological advancement in surveying including photogrammetry/G.I.S.

5.0 Photo identification using stereoscope, remote sensing and geographical information systems (G.I.S.) visit to digital mapping firms for practical demonstration.

Reading Material

1. Duggal, S.K., Surveying Vol I & II, Tata McGraw Hill (2006)
2. Bhavikatti, S.S. Surveying & Levelling Volume I&II (2009)
3. Uren & Price, Surveying for Engineers.

Objective:

The aim of this course is to enable the student to acquire the basic drawing skills and the ability to interpret civil engineering drawings.

Content

- 1.0 Basic draughtsmanship skills
- 2.0 Representative techniques
- 3.0 Projections/
 - 3.1 Orthogonal
 - 3.2 Isometric
 - 3.3 Developments
- 4.0 Measured drawings
- 5.0 Working Drawing including location Drawings

Reading Material

- 1. H. A. Freebury Geometrical and Technical Drawing Book 1, 2, and 3
- 2. K. Morling Geometric and Engineering Drawing
- 3. Cecil Jensen ,Jay D Helsel & Dennis Short (2002)*Engineering Drawing and Design*

CVE 110 ENGINEERING GEOLOGY (2– 2 – 3)**Objective:**

At the end of course, students should be able to identify the rock types and hence select appropriate construction aggregates or stones materials for engineering purposes, control of erosion and geological processes and how it affects the environment, and Civil Engineering works.

Content**1.0 Introduction**

- 1.1 Definition Engineering Geology

2.0 THE EARTH

- 2.1 Dimension and Surface relief.
- 2.2 Define or explain Hydrosphere, Atmosphere, subsidence, uplifts, tides, the core, the mantle and the crust.

3.0 PETROLOGY

- 3.1 Definition of rock
- 3.2 Igneous rocks
- 3.3 Sedimentary rocks

3.4 Metamorphic rocks and causes of Metamorphism.

4.0 ROCK WEATHERING PROCESSES

4.1 Erosion and Transportation of Weathered products

4.2 Erosion control

5.0 GEOLOGICAL STRUCTURES

5.1 Folds and Foldings, syncline, fault and joints.

6.0 GROUND WATER GEOLOGY

6.1 Definition of the hydrological cycle infiltration, percolation, porosity and permeability.

6.2 Aquifer

6.2.1 Confined and unconfined aquifer

7.0 EARTH MOVEMENT

7.1 Landslide and types of landslide

7.2 Prevention and control of landslides

7.3 Causes of studies

8.0 SITE INVESTIGATION

8.1 Geological and geophysical exploration techniques.

8.2 Boring or borehole logging, discontinuity logging, geological maps and polluted site investigation.

8.3 Investigation Report.

9.0 CONSTRUCTION AGGREGATES/STONES

9.1 Crushed rocks/aggregates, aggregates reactions, road stone, building stones and properties.

LABORATORY WORK

Compaction, moisture content, particle distribution, Atterberg's limit, crush test, Aggregates abrasion tests, aggregate shape and absorption tests.

Reading Material

1. Bell, Fundamentals of Engineering Geology, Butterworth and Co., London, 1983.
2. Blyth, F.G.H. and De Freitas, M.H., A Geology for Engineers, Edward - Arnold publishers Ltd., 1998
3. Toby Waltham, Foundations of Engineering Geology, 3rd Ed., University Press

CVE 113 ENGINEERING TECHNOLOGY (1 – 2 – 2)

Objective: The object of this course is to introduce students to the basic physics and applications of diodes, transistors, and thyristors. It also serves as an introduction to the various types of

amplifiers, switching devices and power supplier and network theorem

Content

Intrinsic and extrinsic semiconductors, P. N. junction. Current/voltage characteristics junction capacitance, junction breakdown. Application of P. N. diode, rectifiers, configuration, MOS transistors, JFET

Amplifiers: Introduction of electronic amplifiers, biasing, stability, load line techniques for transistors amplifiers.

Power supply: Rectifiers, power supplies, voltage regulation, DC/DC (AC/DC) converters, Trysistors, Commutation.

DC circuits

Ohms Law parallel circuits Kirchhoff's Laws superposition theorem. Hevenin's theorem (or equivalent voltage generator) Norton's theorem or (equivalent current generator) reciprocity theorem Transformation of networks

Electromagnetism

Magnetic field, electromagnet electromagnetomotive induction electromechanical energy conversion

Magnetic circuits magneto motive forces(f) magnetic flux(θ)reluctance(s) magnetising force(h) magnetic flux density(b) permeability(μ) magnetizing (b-h) curve series connection magnetic circuits Kirchhoff's law of magnetic circuits

Inductance

Self inductance (1) mutual inductance

Reading Material

SECOND YEAR COURSES

CVE 201 STRUCTURAL ANALYSIS I (2- 2 - 2)

Objective:

At the end of the module, students should be able to determine deflections in beams and columns; understand plastic methods of design and analyse roof trusses.

Content

- 1.0 Solution of deflection in beams and columns;
- 1.1 Using partial differential equation.
- 1.2 Buckling of columns.
- 1.3 First Euler load and effective load factor.
- 1.4 Real column (cases 1 - 5);
- 1.5 Energy methods and its application

- 1.7 General energy method.
- 2.0 Design Stresses
 - 2.1 Strengths of real strut
 - 2.2 State of the stress at section
 - 2.3 Forms of strength curves.
- 3.0 Steel Design
 - 3.1 Ductility
 - 3.2 Plastic methods of structural design
 - 3.3 Elastic and plastic bending
 - 3.4 Evaluation of plastic moment.
 - 3.5 Simple cases of plastic collapse.
- 4.0 Simple cases of slope deflection method of determining end moments in beams and columns .
- 5.0 Moment Distribution method for determining end-moments of beams and columns and simple frames.
- 6.0 Framed Structures (Trusses)
 - 6.1 Perfect, imperfect and redundant pin-ended trusses.
 - 6.2 Graphical solution of truss-force diagrams
 - 6.3 Solution by method of sections
 - 6.4 Solution by method of joints/method of inspections

Reading Material

1. Al Nageim, H. et al (2003). Structural Mechanics (6th Edition). Prentice-Hall. UK
2. Kassimali, A. (1999). Structural Analysis (2nd Edition). Thomson Publishing. USA
3. Vaidyanathan, R. and Perumal, P. (2007). Comprehensive Structural Analysis (Volume 1 &2). Laxmi Publications. New Delhi

CVE202 STRUCTURAL DESIGN I (2 – 2 – 3)

Objective:

At the end of the module, students should be able to design simple structural elements in framed structures in reinforced concrete, steel and timber.

Content

- 1.0 Design of reinforced Concrete Elements
 - 1.1 Introduction, Constituents of reinforced concrete.
 - 1.2 Mixes/Proportioning
 - 1.3 Bending Theory including assumptions i.e.

- 1.3.1 Plain section remain plane after bending
- 1.3.2 Both concrete and steel obey Hooke's Law etc.
- 1.4 Determination of neutral axis of beam section and design of beams
- 2.0 Limit State Design i.e. ultimate and serviceability
 - 2.1 Partial factor of safety
 - 2.2 The stress blocks and derivation of equation i.e.
- M = $F_{st} Z = F_{CC} Z$ where $Z =$ lever arm
 - 2.3 Design of T and L beams
 - 2.4 Shear Design and bond including local and anchorage bonds
 - 2.5 Laps in reinforcement
 - 2.6 Design of Reinforcement Concrete Slabs
- 3.0 Column Design
- 4.0 Design of Footings i.e. pad footings
- 5.0 Design of gravity retaining walls, design checks and detailing.

Reading Material

1. Bhatt, P. et al (2006). Reinforced Concrete (3rd Edition). Taylor & Francis. London
2. Reynolds, C. E. et al (2008). Reinforced Concrete Designer's Handbook (11th Edition). Taylor & Francis. London
3. W H Mosley and J H Bungey *Reinforced Concrete Design*

CVE 203 SOIL MECHANICS I (1- 2 - 2)

Objective: Understand the properties of soils as a civil engineering construction material, and the fundamental principles of laboratory and in-situ testing methods.

Content

Definition of soil and soil mechanics Importance of soil in civil engineering. Soil formation,- physical weathering and chemical weathering. Factors affecting soil formation..The soil equation. Types of soil. Soil and soil-mass constituents 3-phase diagram, Basic definitions-water content, specific gravity, void ratio, porosity, degree of saturation, air void etc. Index properties of soil and their determination., common soil mechanics problems in Civil Engineering. Grain size analysis.. Consistency and sensitivity of Clay, Atterberg Limits, Index.Activity. Classification of coarse and fine grained .Soil classification systems: Cassagrande system. Unified Soil Classification System, AASHTO system, BS classification system., Clay mineralogy: Soil structure; single grained, honeycombed, flocculent, and dispersed, structure. Clay structure; basic structure, mineral structures, structures of Illite, Montmorillonite and kaolinite and their characteristics. Adsorbed, soil water capillary and freewater, effect of water on soils. Definition and objectives of compaction .concept of O.M.C. and zero Air Voids Line. Standard and Modified proctor Test. Factors affecting compaction Effect of compaction on soil properties. Field compaction methods.Compaction equipment. Field compaction control.

Reading Material

1. Craig R F, "*Soil Mechanics*", Chapman and Hall(ELBS) ,2004

2. Sahsh K Gulati and Manoj Datta *Geotechnical Engineering* Tata McGraw Hill 2005
New Delhi
3. Renato Lancellotta *Geotechnical Engineering* (2nd Ed.) Taylor and Francis New York
2009

CVE 204 MEASUREMENT OF CIVIL ENG. WORKS I (1– 2 – 2)

Objective: At the end of the course, students should understand the general principles and basic measurement of building and Civil Engineering works including taking-off abstracting and billing

Content

Introduction to the techniques employed in the measurement of building works. General principles and basic mensuration, setting out and the sequence of dimensioning as applied to excavation and earthworks, concrete works and block in substructure works, ground floor slab construction .abstracting and billing

Reading Material

1. H Seeley and E Winfred *Building Quantities Explained* 5th Edition
2. Christopher J Willis and J Andrew Mills *Elements of Quantity Surveying* (11th Edition
3. Civil Engineering Standard Method of Measurement (CESSM 3) 3rd Edition.
4. Martin Brook *Estimating and Tendering for Construction Works* 3rd Edition.

CVE 205 CIVIL ENGINEERING CONSTRUCTIONS (2– 2 – 3)

Objective:

The course is designed to enable students to understand construction in timber, and reinforced concrete framed structures.

Content

- 1.0 Timber Technology
 - Structural and construction characteristics in timber
- 2.0 Concrete technology
 - 2.1.0 Characteristics of concrete
 - 2.1.1 Consistency
 - 2.1.2 Workability
 - 2.1.3 Compactibility and Workability
 - 2.1.4 Factors affecting workability
- 3.0 basic Principles o reinforced concrete construction
 - 3.1 Ratio of steel to concrete
 - 3.2 Types of reinforcing steel
 - 3.3 Longitudinal and distributing steel

- 3.4 Compression, reinforcements bending stress
- 3.6 Concrete covers
- 4.0 Formwork for concrete structure
 - Materials design and construction considerations
- 5.0 Framed Structure and Concrete Elements
 - 5.1 Factors affecting the selection of type of foundations for framed structures
 - 5.2 Steel structures
 - 5.2.1 Joints and jointing
 - 5.2.2 Methods of connecting stanchions to foundations
 - 5.3 Concrete elements
 - In-situ monolithic reinforced concrete construction-typical construction detailing
- 6.0 Suspended upper floors
 - 6.1 Construction characteristics and factors influencing the selection of floor types
 - 6.2 Design criteria
 - 6.3 Precast concrete floor units
- 7.0 Roof structures
 - 7.1 Types of roof structures
 - 7.2 Materials for roof structures
- 8.0 Components and finishes
 - 8.1 Doors and windows
 - 8.2 Types of doors and windows
 - 8.3 Materials for doors and windows
 - 8.4 Ironmongery and glazing
 - 8.5 Finishes
 - 8.6 Painting and decoration
 - 8.6.1 Panelling
 - 8.6.2 Terrazzo and tiles etc.

Reading Material

1. C M H Barritt (1985) *Advanced Building Construction Vol 2 2nd Edition*
2. R Chudley (1994) *Construction Technology Vol 3*

3. S Emmitt and C A Gorse (2005) *Introduction to Constructions Of Buildings*

CVE 206 SOIL ENGINEERING (2– 2 – 3)

GENERAL OBJECTIVE:

Objective:

The course is designed to enable students to apply their judgment in all cases to analyse field conditions pertaining to soil mechanics previously learnt in CVE 152

Content

- 1.0 Permeability
 - 1.1 Darcy's Law, Discharge velocity and seepage velocity
 - 1.2 Method for the determination of co-efficient of permeability of soils
 - 1.3 Constant and falling head permeability test.
 - 1.4 Determination of K from horizontal capillarity – permeability test.
 - 1.5 Equation for K for an unconfined and confined Aquifer
 - 1.6 Effects of void ratio, effect of grain size, stratification temperature and permeability.

- 2.0 Shear Strength
 - 2.1 Basic concept of shear resistance and shearing strength
 - 2.2 The coulomb's equation, method(s) of determining shear strength parameters.
 - 2.2.1 The triaxial compression tests and triaxial (confined) test
 - 2.2.2 Stress condition in soil during triaxial compression test
 - 2.2.3 Mohrs diagram for triaxial compression test of failure.

Laboratory tests on soil may be on:

- (1) Undisturbed samples; or
 - (2) Remoulded samples; shearing strength test on clay test on soils for:
(undrained or quick tests)
- (i) Consolidated quick tests
 - (ii) Slow or drained tests.

Compressibility and Consolidation

- 3.1 Introduction, principle and definition
- 3.2 Consolidation test
- 3.3 One-dimensional consolidation theory
- 3.4 Pressure-void ratio curves for sand and clay
- 3.5 Determination of pre-consolidated pressure
- 3.6 Determination of the coefficient of consolidation
- 3.7 Compression ratios
- 3.8 Secondary compression
- 3.9 Rate of settlement due to consolidation

Laboratory work to be arranged by Lecturer

Reading Material

1. Craig R F, “*Soil Mechanics*”, Chapman and Hall(ELBS) ,2004
2. Sahsh K Gulati and Manoj Datta *Geotechnical Engineering* Tata McGraw Hill 2005
New Delhi
3. Renato Lancellotta *Geotechnical Engineering* (2nd Ed.) Taylor and Francis New York

CVE 207 ENGINEERING SURVEYING (2– 2 – 3)

Objective:

At the end of the course, students should be able to set out simple building and civil engineering structures including column bases, road curves including circular and transitional curves; evaluate the cost of earth works involved in civil engineering works i.e. to road works.

Content

1.0 Definition of Engineering survey, procedure for carrying out engineering survey, construction of points, field measurement of angles and distances.

- 1.1 Setting out and aims of setting out; steps or stages in setting out, methods of setting out including horizontal and vertical control, setting out a building to ground-floor level and transfer of control, and ground-floor slab setting out column positions.

2.0 Curves

- 2.1 Types, terminology of circular and designation of curves.
- 2.2 Design of circular curves, setting out of circular curves, transition curves, radial force and design speed, super-elevation.
- 2.3 Use and length of transition curves.
- 2.4 Setting out a composite curve by traditional methods, setting out by co-ordinates.
- 2.5 Calculation of cross-sectional areas.
- 2.6 Calculation of volumes and cost of earthwork – Mass Haul Diagrams.

Reading Material

W Schofield and M Breach (2006) *Engineering Surveying 6th Edition*
Arora K P(2000) *Surveying Volume III*
Punmia B C (1999) *Surveying Vols. I and II*

GENERAL OBJECTIVE:**Objective:**

Students should understand elements in the hydrological cycle, fundamentals of groundwater hydrology and hydraulics, interpretation and application of hydrological data.

Content

- 1.0 Hydrological cycle
 - 1.2 Hydrology as applied in Engineering
 - 1.3 Weather and climate and humidity
 - 1.4 Temperature, radiation and wind

- 2.0 Precipitation
 - 2.0.1 Types and forms of precipitation other than rain
 - 2.0.2 Measurement of precipitation
 - 2.0.3 Extraction and interpretation of data

- 3.0 Evaporation and transpiration
 - 3.0.1 Methods of estimating evaporation
 - 3.0.2 Evaporation from land surfaces using Penman's E value.
 - 3.0.3 Thornthwait's formulae for evapotranspiration.
 - 3.0.4 Direct measurement of evaporation by pans.

- 4.0 Infiltration capacity of soil;
 - 4.0.1 Factors influencing infiltration capacity.
 - 4.0.2 Methods of determining infiltration capacity

- 5.0 Groundwater occurrence
 - 5.0.1 Factors of influence
 - 5.0.2 Groundwater flow
 - 5.0.3 The absorption of groundwater
 - 5.0.4 The yield of wells
 - 5.0.5 Test pumping analysis

- 6.0 Surface runoff
 - 6.1 Components of a natural hydrograph
 - 6.2 The contribution of base flow to stream discharge
 - 6.3 Separation of base flow and runoff
 - 6.4 Evaluation of base flow
 - 6.5 The unit hydrograph
 - 6.6 Unit hydrographic of various durations
 - 6.7 Derivation of the unit hydrograph
 - 6.8 Unit hydrograph as a percentage distribution
 - 6.9 Instantaneous unit hydrographic.
Synthetic unit hydrograph

Reading Material

1. Raghunath, H. M. (2006). *Hydrology: Principles, Analysis and Design*. New Age Publications.
2. Chow, V.T. (1964). *Hand book of Applied Hydrology*. Mc-Graw Hill.
3. Varshney, R. S. (1986). *Engineering Hydrology* (3rd edn.). Nem Chand & Bros.
4. Das, M. M., Saikia, M. D. (2008). *Hydrology*. Prentice Hall, New Delhi.

CVE 209 CIVIL ENGINEERING DRAWING (1– 4 – 3)

Objective: The aim of this course is to enable the student to acquire the basic drawing skills and the ability to interpret civil engineering drawings.

Content

- 1.0 Further work in representative techniques.
 - 1.1 Sketch design and development of site plans.
 - 1.2 Service drawing e.g. electrical, plumbing and plant installations
- 2.0 Further Work on working drawings
 - 2.1 Development of foundation plans and details.
 - 2.2 Elevation and typical sections through the building.
 - 2.3 Elements; components and assembly drawing, door and window. Schedules.
- 3.0 Structural detailing including preparation of bending schedules
- 4.0 Specifications and schedules of materials

Reading Material

1. Geometrical and Technical Drawing Book 1, 2, and 3 By H. A. Freebury
2. Geometric and Engineering Drawing By K. Morling
3. Civil Engineering Drawing By D. N. Ghose
4. Building Geometry and Drawing By Frank Hilton
5. Graphic Communication by Jack Whitehead

CVE 210 INDUSTRIAL ATTACHMENT I (0– 8 – 3)

Objective:

The purpose of the industrial attachment is to provide opportunity to the students to be familiar with the occupational; environment of the construction industry. The duration will normally be not less than eight weeks and the attachment shall be completed before the commencement of the third semester of the programme. The student is expected to collect information to develop knowledge and skills for construction. The students are expected to document their experiences by keeping records of attendance and activities.

At the end of the attachment period each student will write a technical report which will be submitted, to the Department for assessment. The course evaluation will be based on the assessment provided by the industry of attachment.

CVE 211**ENGINEERING HYDRAULICS (2– 0– 2)**

Objective: At the end of the course, students should be able to select appropriate machines for a particular job, interpret characteristics curves of turbine pumps, install pumps, and carry out simple hydraulic designs.

Content

- 1.0 Dimensional analysis and the Buckingham ‘Theory’
- 2.0 Fluid machines and their classification
 - 2.1 Pump turbines
- 3.0 Performance data or continuous flow pump and efficiency of pump
 - 3.1 Equation of pumps and rotodynamic machines.
- 4.0 Similarity and differences of hydraulic roto-machines
- 5.0 Installation of pumps; cavitation and permissible suction head.
- 7.0 Flow in open channels hydraulic best channel section and economic most effective section.
- 8.0 Investigation of flow profile, and hydraulic jump, types and its equation.
- 9.0 Introduction to flow in pipes (pressurized flow)

Laboratory work to be arranged by lecturer

Reading Material

1. Arore, K. R. (2005). *Fluid Mechanics, Hydraulics and Hydraulic Machines*. Standard Publishers and Distributors, New Delhi.
2. Rajput, R.K. (2005). *Fluid Mechanics and Hydraulic Machines*. S. Chand and Company Ltd.
3. Modi, P. N., and Seth, S. M. (2001). *Hydraulics and Fluid Mechanics* Standard Book House.

CVE 212**ENVIRONMENTAL QUALITY ENGINEERING (2– 0– 2)****Objective:**

At the end of the course, students should be able to appreciate the need to treat water before

distribution, the process of water treatment and the treatment facilities.

Content

1.0 WATER QUALITY PARAMETERS

- 1.1 Physical: Suspended Solids, Turbidity, Colour, Taste and Odour, Temperature
- 1.2 Chemical: Chemistry of Solution, Total Dissolved Solids, Alkalinity, and Hardness.
- 1.3 Biological: Pathogens, Pathogen indications
- 1.4 Water Quality Standards.

2.0 TREATMENT PROCESS

- 2.01 Screening
- 2.02 Physical biological and chemical processes of water treatment including aeration.
- 2.03 Setting
- 2.04 Coagulation and flocculation
- 2.05 Sedimentation
- 2.06 Filtration: Rapid Sand and Slow Sand
- 2.07 Chlorination

3.0 TREATMENT PLANT

- 3.01 Layout of treatment and description of facilities
- 3.02 Operation and maintenance and economic aspects.

4.0 APPLICATION OF WATER TREATMENT TO GROUND – WATER, SURFACE – WATER:

Reading Material

1. Duggal, K. N. (2002). *Elements of Environmental Engineering*. S. Chand & Company Ltd., New Delhi.
2. Nemerow, N. L., Agardy, F. J., Sullivan, P., and Salvato, J. A. (Eds) (2003). *Environmental Engineering: Water, Wastewater, Soil and Groundwater Treatment and Remediation* (6th edn.). John Wiley & Sons, Inc., New Jersey.
3. Liu, D. H.F., and Liptak, B. G. (1999). *Environmental Engineers Handbook*. Chapman & Hall/CRC Press Inc.

CVE 213 SITE ORGANISATIONAL STUDIES I (2-0-2)

Objective:

The Objective is for the student to be able to play an effective role in the management of a construction site.

Content

1.0 Site management

- 1.1 Site organisation and management.
- 1.2 Management of plant, materials and human resource, job description and assignment of task.
- 1.3 Fundamentals of organizational behaviour.

- 1.4 Leadership and motivation.
- 1.5 Morale development and use, maintenance incentive supervision.
- 1.6 Leadership role and cultivation of team spirit; effective supervision.
- 2.0 Records Keeping and Report Writing
 - 2.1 Records keeping of day works and stores requisition issues and check.
 - 2.2 Method of collecting technical information with supervised practice within the organisation.
 - 2.3 Graphic and written presentation of resumes, memoranda, abstracts, progress reports and other technical reports of various types likely to be used by technical personnel in Institution and Industry.
 - 2.4 Specification, writing and preparation of site instruction including variation orders.

Reading Material

1. G Forster, *Construction Site Studies-Production Administration and Personnel* 1989
2. R Gupta (1994) *Construction Planning and Technology*
3. RE Levitt and N M Samuelson (1993) *Construction Safety Management 2nd Edition*

CVE 214 SITE ORGANISATIONAL STUDIES (2– 2 – 3)

Objective:

This course should be treated as part of the overall planning of site layout. The main objective is directed to achieving the best site layout and minimizing accidents occurrence on site. Site varies in size and shape and each has its own peculiar problems.

Content

- 1.0 Materials
 - 1.1 Cement, lime, sand, stones, paint, tiles, bricks and block, drain pipes and accessories, electricity conduits, reinforcing rods, timber roofing sheets, glasses
- 2.0 Planning
 - 2.1 Planning the site layout, general consideration conditions of site, nature of site, peculiar problems.
- 3.0 Positions: Positions of building, strategic positions of planning access ways accessibility to storage places, closed and open shed facilities, materials requiring different storage arrangements. Covering of materials, stationary plants, concrete as a special case, alternative production and conveyance arrangement on site, technique for removal of spoils.
- 4.0 Problems
 - 4.1 Defects of poor storage and handling, causes of poor storage and handling, economic cost comparison, cost awareness, measures to achieve cost effective handling and storage results, pilfering on site.
- 5.0 Safety And Site Security
 - 5.1 Safety of structures, possible causes of failure of structures and the

- prevention/protection of the work against damage.
- 5.2 Methods of reducing accidents, safe means of access and safe places for work safety education and controls.
- 5.3 Temporary works and methods of erection
- 5.4 First aid and general provisions against health hazards
- 5.5 Cost of accidents, direct and indirect cost, payment of compensation.

Reading Material

1. G Forster (1989) *Construction Site Studies-Production Administration and Personnel*
2. R Gupta (1994) *Construction Planning and Technology*
3. RE Levitt and N M Samuelson (1993) *Construction Safety Management 2nd Edition*

CVE 215 COMPUTER APPLICATION (1– 2– 2)

Objective: To appreciate the use of computer in solving civil engineering problems and the use of computers in areas such as drafting etc.

Content

- 1.0 Introduction to the FORTRAN (Computer)
 - 1.1 Programming Language with emphasis on proper understanding of programming theory
 - 1.2 Application and organisation of simple data processing methods.
 - 1.3 Fortran Constants
 - 1.4 Variables
 - 1.5 Operations
 - 1.6 Expressions
 - 1.7 Functions
 - 1.8 Statement and Statement Format
 - 1.9 Programming the Computers:
 - 1.9.1 Simple INPUT/OUTPUT Statements.
 - 1.9.2 Arithmetic Statements.
 - 1.9.3 Transfer of Control: The PAUSE, STOP and END Statements.
 - 1.9.4 Handling programme Decks.
 - 1.9.5 Debugging the source programme.
 - 1.9.6 Subscripted variables.
- 2.0 Functions Sub-Programmes
 - 2.1 Subroutine sub programmes.
 - 2.2 Efficient programming in Forum.
 - 2.3 Application

- 2.4 Calculation of Compound interest.
- 2.5 Tax Depreciation.
- 2.6 Linear Regression
- 2.7 Curve plotting
- 2.8 Roots of equations
- 2.9 Critical paths analysis
- 2.10 Polynomials
- 2.11 Numerical integration
- 2.12 Numerical differentiation as may be applied to the solution of Civil Engineering problems.
- 3.0 Introduction to AutoCAD
 - 3.2 Architectural and Engineering drawings.
 - 3.3 Computer Aided Design (CAD) etc.

Reading Material

CVE 216: RESEARCH METHODOLOGY (2, 0, 2)

Objective: To students to acquire knowledge to write research proposals, conduct research and write research reports

Content:

Mechanics of Research Methodology: Types of research, Significance of research, Research framework, Case study method, Experimental method, Sources of data, Data collection using questionnaire, Interviewing, and experimentation; Research formulation: Components, selection and formulation of a research problem, Objectives of formulation, and Criteria of a good research problem; Research hypothesis: Criterion for hypothesis construction, Nature of hypothesis, Need for having a working hypothesis, Characteristics and Types of hypothesis, Procedure for hypothesis testing; Sampling Methods: Introduction to various sampling methods and their applications. Data Analysis- Sources of data, Collection of data, Measurement and scaling technique, and Different techniques of Data analysis; Thesis Writing: Writing reports styles of referencing, , Copyrights, Avoiding plagiarism.

Reading Material

1. Kumar R (2005) *Research Methodology: A Step-by- Step Guide for Beginners*
2. Kothare, C R (2008) *Research Methodology Methods and Techniques*
3. Marczyk G R, Dematteo D& Festinger D (2004) *Essential of Research Design and Methodology*

THIRD YEAR COURSES

ETP 301 ENTREPRENEURSHIP I (2-0-2)

Objective:

It is expected that at the end of the course students should acquire knowledge in planning a small

scale industry, selection of viable business opportunity, business plan, recruiting the right personnel and implementing the project.

Content

- 0.0 Introduction to Entrepreneurship, Characteristics and trait of Entre.
- 1.0 Generating business ideas.
- 2.0 Planning a small-scale industry.
- 3.0 Selection of viable business opportunity.
- 4.0 The pre-feasibility studies.
- 5.0 Technological appraisal.
- 6.0 Ensure your market (a) market survey: (b) research.
- 7.0 Cost of project and means of financing
- 6 Profitability analysis
- 7 Sources of finance.
- 8 Presenting your case for t term loan
- 9 Business plan – detailed project report.
- 10 Appendix business plan guide.
- 11 Selecting right infrastructure
- 12 Buying machinery
- 13 Sources of technology
- 14 Recruiting the right personnel
- 15 Implementing the project.

Reading Material

1. Bill Bolton John Thomson (2004) *Entrepreneurs-Talents, Temperaments, Techniques 2nd Ed*
2. Walter S Good (1999) *Building A Dream-A Comprehensive Guide to Starting a Business of Your Own*
3. Rajeev Roy (2008) *Entrepreneurship*

CVE 301 STRUCTURAL DESIGN II (1 – 2 – 2)

Objective: The Course is designed for the students' basic understanding of design of steel and timber sections.

Content

- 1.0 Elastic Buckling of Steel
 - 1.1 Strut (Definition)
 - 1.2 Derivation of equations formulas
 - 1.3 Modes if buckling.
 - 1.4 Critical loads for Built-in columns (Euler's theorem)

- 2.0 Structural Connections
 - 2.1 Bolted and riveted joints and welded joints
 - 2.2 Modes of failure of simple bolted and riveted joints including efficiency of connections.
 - 2.2.1 Rivet system subjected to bending moment in its own plane and in plane perpendicular to its own.

- 2.2.2 Problem Solving.
 - 2.3 Welding Connection including types of weld's i.e. Butt and fillet
 - 2.3.1 Welded connection under bending action and derivation of formula.
 - 2.3.2 Welded connection under Torsion.
 - 3.0 Design of Tension and compression members including angles and tees.
 - 3.1 Examples including brief explanation of relevant tables in BS 449 (for structural steel design).
 - 3.2 Protection from fire and corrosion.
 - 4.0 Timber Construction
 - 4.1 Stresses in timber and methods of grading.
 - 4.2 Strength reducing effect.
 - 4.3 Working stresses for some Ghanaian Timber Species.
 - 4.4 Joints in timber (ref. CP 112) including extracts from table 27 of CP 112.
 - 4.4.1 Brief explanation and reference to relevant clauses in CP 112 i.e. duration of load, spacing of bolts etc.
 - 4.4.2 Examples of bolted joints and design approach i.e. References/Calculations/Results.
- Further Examples:
- 4.4.3 Design of tension members and splices;
 - 4.4.4 Connections i.e. toothed paste connector or splicing (brief explanation of moisture content, modification factors for decay and exposure.
 - 4.4.5 Design of compression members.

Reading Material

1. Punmia B C (2001) *Comprehensive Design of Steel Structures*
2. Mark A Bradford, David Nethercot, Nick Trahair *Behaviour and Design of Steel Structures to BS 5950*
3. Abdy Kermani(1999)*Structural Timber Design*

CVE 302 ESTIMATING OF CIVIL ENGINEERING WORKS (3 – 0 – 3)

Objective:

At the end of the Course, Students should be able to understand the fundamentals of construction estimating and tendering.

Emphasis will be placed in elements of pricing.

Content

- 1.0 Pricing in terms of factors affecting
 - 1.1.1 Labour cost
 - 1.1.2 Allowance

- 1.1.3 Insurance, norms etc.
- 1.1.4 Material cost
- 1.1.5 Supply
- 1.1.6 Distribution
- 1.1.7 Marketing
- 1.1.8 Handling
- 1.1.9 Waste in use and pilferage

1.2 Plant costs

- 1.2.1 Builders' plant costs
- 1.2.2 Charges and economic usage

1.3 Preliminaries and General Items
Site establishment, mining and dismantling

2.0 Application of general principles and elements of pricing to the development of unit rates for construction works.

- 2.1 Excavation and earthworks.
- 2.2 Concrete work and block in sub – structure
- 2.3 Super-structure: floors, wall including opening and roofs, floor and wall finishes.
- 2.4 External works: plumbing and electrical work including fenced wall and drainage.

3.0 Estimation for road projects

Reading Material

- 1. F Kelly and Bucham (1995) *Estimating for Builders and Quantity Surveyors*
- 2. M Brook (2008) *Estimating and Tendering for Construction Work 4th Edition*

CVE 303 HIGHWAY ENGINEERING (2 - 2 – 2)

Objective: This course aims at introducing students to the 'hard' side of highways, i.e. their physical location, construction and maintenance as well as the materials used in their construction.

Content

1.0 Soil survey and sub grade evaluation.

- 1.1 Object and scope
- 1.2 Factors to be considered in making decisions.
- 1.3 Soil survey procedure

- 2.0 Highway location and selection
 - 2.1 Primary controls that affect our roads.
 - 2.2 Factors affecting route location and design
- 3.0 Elements of flexible pavement
 - 3.1 Structural elements of a flexible pavement and their functions
 - 3.2 Materials on pavements
 - 3.3 Design factors
 - 3.4 Soil engineering for highways
- 4.0 Bituminous Surfacing (general considerations)
 - 4.1 Bituminous materials
 - 4.2 Specifications for laying, compaction etc.
 - 4.3 Faults in manufacture, laying and compaction
 - 4.4 Surface Treatment
- 5.0 Road Maintenance including road management
 - 5.1 Road improvement plan for paved road.

Part A General Repair

- 5.1.1 Defects
- 5.1.2 Maintenance

Part B Surface Dressing

- 5.1.3 Defects
- 5.1.4 Maintenance methods
- 5.2 Road Maintenance Plan for Unpaved roads.
 - 5.2.1 Defects
 - 5.2.2 Maintenance Method

- 5.3 Road Management
 - 5.3.1 Definition
 - 5.3.2 Categories and examples of road management works
 - 5.3.3 Management functions
 - 5.3.4 Management cycle.

Reading Material

1. P H Wright and K K Dixon (2004) *Highway Engineering*
2. N. Garber, L. Hoel (2009) *Traffic and Highway Engineering*.
3. D Croney And P Croney (1998) *The Design and Performance of Road Pavements*

CVE 304 CONSTRUCTION MANAGEMENT STUDIES (3 – 0 – 3)

Objective:

This course is to provide students the opportunity to develop the skills of site management and control in the administration of a construction project.

Content

- 1.0 Network analysis and the master programme charts.
OS
- 2.0 Planning Consideration
 - 2.1.1 Site conditions; access
 - 2.1.2 Nature of job
 - 2.1.3 Plant requirement
- 3.0 Daily and weekly planning and progress control
- 4.0 Site layout
 - 4.1 Administrative area
 - 4.2 Construction areas
- 5.0 Elements of production planning and control
 - 5.1 Overall planning and progress recording
 - 5.2 Long – term programming
- 6.0 Construction analysis
 - 6.1 Method
 - 6.2 Resources information and sequence studies in relation to work planning and control.
- 7.0 Scheduling of resources

- 7.1 Men
- 7.2 Materials
- 7.3 Machines
- 7.4 Money
- 8.0 Progress replanning and impact of construction progress
- 9.0 Further work on
 - 9.1 Monthly programme
 - 9.2 Weekly programme
 - 9.3 Progress report and work adjustments
- 10.0 Estimated and actual labour output.

Reading Material

1. R Cooke and P Williams (1998) *Construction Planning Programming and Control 2nd Edition*
2. S W Numally 2010 *Construction Methods and Management*
3. F Harris and R McCaffer (2001) *Modern Construction Management 5th Edition*

CVE 305 MEASUREMENT OF CIVIL ENG. WORKS II (2 – 2 – 3)

Objective: to introduce students to general principles and basic measurement of building and civil engineering works including taking –off, abstracting and billing

- 1.0 Setting-out and sequence of dimensioning as applied to;
 - 1.1 Roof construction
 - 1.2 Opening in walls and floor finishes
- 2.0 Abstracting and billing.
- 3.0 Setting – out and sequence of dimensioning as applied to:
 - 3.1 External; works
 - 3.2 Plumbing works
 - 3.3 Fence wall and drainage.
- 4.0 Abstracting and billing

Reading Material

1. J H Seeley and E Winfred *Building Quantities Explained 5th Edition*
2. Christopher J Willis and J Andrew Mills *Elements of Quantity Surveying (11th Edition*
3. Civil Engineering Standard Method of Measurement (CESSM 3) 3rd Edition.
4. Standard Method of Measurement of Building Works, 7th. Edition

CVE 306 CONTRACT ADMINISTRATION AND LAW (2– 0 – 2)

Objective:

At the end of the course students are expected to understand contracts, valuation of certificates including variations and legalities of contracts.

Content

- 1.0 Tendering procedure and contractor selection.
- 2.0 Ghana Government's conditions of contract for building works.

- 3.0 Taking of site; interim valuation and certificates
- 4.0 Site instructions and variations
- 5.0 Periodic work measurement and valuation
- 6.0 Day works, nominated sub-contractors and supplies.
- 7.0 Accounts fluctuations.
- 8.0 Extension of contract period
- 9.0 Liquidated damages; practical completion, final account
- 5.0 Types of contract
- 6.0 Tort and negligence
- 7.0 Claim

Reading Material

1. J Adriaanse *Construction Contract Law-The Essentials* 2005
2. J Murdoch and W Hughes *Construction Contracts-Law And Management* 2008
3. K Manson (1993) *Law for the Civil Engineer-An Introduction*

CVE 307 ENVIRONMENTAL QUALITY ENGINEERING (2– 2 – 3)

Objective: At the end of the course, students should understand and appreciate the environmental effects of disposing untreated sewage and improper management of solid waste.

Content

1.0 SEWAGE TREATMENT

- 1.1 Definition of basic elements including sewer, sewage, sewerage and sullage.
- 1.2 Sewer, network and appurtenances including manhole
- 1.3 Physical unit preparations including screen, grit chamber and primary sedimentation tanks.
- 1.4 Biological unit processes or biological treatment
- 1.5 Secondary sedimentation tanks and disinfections, chemical unit processes

2.0 LOW COST SANITATION SYSTEMS AND SOLID WASTE MANGEMENT

- 2.1.0 Human excreta disposal
 - 2.1.1 Classification of latrines
 - 2.1.1.1 Water dependent on site and off-site systems.
 - 2.1.1.2 Water independent on-site and off-site systems
 - 2.2.0 Septic tank construction, components and problems.
- 2.2.1 Disposal of wastes and foul water from within building.
 - 2.3.0 Disposal systems
 - 2.3.1 Absorption trench
 - 2.3.2 Seepage pits
 - 2.3.3 Contamination of water bodies and vegetation resulting from wastes and sewage disposal.
 - 2.3.4 Diseases and disease causing vectors.
- 2.4.0 Solid waste definition and characteristics

- 2.4.1 Solid waste/refuse classification
- 2.4.2 Storage and Collection
- 2.4.3 Haulage or transportation
- 2.5.0 Treatment and disposal including
 - 2.5.1 Choice of disposal method
 - 2.5.2 Sanitation landfill
 - 2.5.3 Composting Incineration

Reading Material

1. Duggal, K. N. (2002). *Elements of Environmental Engineering*. S. Chand & Company Ltd., New Delhi.
2. Nemerow, N. L., Agardy, F. J., Sullivan, P., and Salvato, J. A. (Eds) (2003). *Environmental Engineering: Water, Wastewater, Soil and Groundwater Treatment and Remediation* (6th edn.). John Wiley & Sons, Inc., New Jersey.
4. Liu, D. H.F., and Liptak, B. G. (1999). *Environmental Engineers Handbook*. Chapman & Hall/CRC Press Inc.
5. Corbitt, R. A. (2004). *Standard Handbook of Environmental Engineering* (2nd Edn.). McGraw-Hill Company.

CVE 308 TRANSPORTATION ENGINEERING (3– 0 – 3)

Objective:

Understand issues related to transportation

Content

1.0 TRANSPORTATION PLANNING

- 1.1 Introduction
- 1.2 The transportation system
- 1.3 Types of transportation services
- 1.4 Land use and transportation
- 1.5 Travel demand forecasting
 - 1.5.1 Trip generation & trip distribution
 - 1.5.2 Category analysis model
 - 1.5.3 Calibration of the gravity model
 - 1.5.4 Model choice (model split)
 - 1.5.5 Network assignment
- 2.0 Traffic Control
 - 2.1 Introduction
 - 2.2 Traffic Control devices
 - 2.3 Traffic Signs, Placement of signs, pavement Markings & Traffic Calming
 - 2.4 Traffic Control at Intersections
- 3.0 Fundamentals of Traffic Signal Design
 - 3.1 Introduction
 - 3.2 Signal Warrants
 - 3.3 Traffic – signal – related Terminology
 - 3.4 Signal Sequence and Movement
 - 3.5 Types of Signal, Basic Signal design considerations, and Design of pre-timed and

- traffic actuated signals.
 - 3.6 Capacity and level of service at signalized intersection.
 - 3.7 The Planning Applications Method
- 4.0 Transportation System Management
 - 4.1 Introduction
 - 4.2 Management process manning
 - 4.3 Application of Transport System Management to travel demands Management.
 - 4.3.1 Traffic demand management schemes
- 5.0 Fundamentals of Streets Lighting
 - 5.1 Introduction
 - 5.2 Parameters affecting visual performance
 - 5.3 Driver visual information need
 - 5.4 Light sources
 - 5.5 Luminaries and placement of luminaries (single sided, staggered, opposite, span + wire & twin central)
- 6.0 Transportation Safety
 - 6.1 Introduction
 - 6.2 Highway accident categories
 - 6.3 Causes of accidents
 - 6.4 Safety responsibility
 - 6.5 Highway safety improvement procedures and road safety means
 - 6.6 Analysis of accident data for identifying hazardous locations
 - 6.7 Accident patterns and counter measures.

Reading Material

1. N. Garber, L. Hoel(2009), *Traffic and Highway Engineering. 4th Edition*, Cengage Learning.
2. C. S. Papacostas and P. D. Prevedourus.(2000)*Transportation Engineering and Planning. 3rd Edition*, Prentice Hall.

CVE 309 CIVIL ENGINEERING MAINTENANCE (3 – 0 – 3)

Objective: This course is designed to enable students to make correct diagnosis of defects, and implementation of the corrective remedial measures, all based on sound technical knowledge.

Content

- 1.0 Structure of building maintenance
 - 1.0.1 Objective; purpose
 - 1.0.2 Basic components

- 2.0 Concept of Building Maintenance
 - 2.1 Maintenance programmed
 - 2.2 Regular inspections and report
 - 2.3 Procedure for maintenance work
 - 2.4 Maintenance/repair Log Book
 - 2.5 Items regularly recorded in a Log book
- 3.0 Execution of maintenance work
 - 3.1 Choice between direct ad contract labour
- 4.0 Building Maintenance problems and their solutions
 - 4.1 Dry and Wet Rot
 - 4.1.1 Prevention
 - 4.1.2 Treatment of Dry and Wet rot
 - 4.2 Treatment for Rising Damp
 - 4.2.1 Chemical injection system
 - 4.2.2 Physical damp-proof course
 - 4.3 Superficial Faults
 - 4.3.1 Plaster, faults
 - 4.3.2 Paint-common faults
- 5.0 Structural Survey of an existing dwelling.
 - 5.1 Preliminary
 - 5.2 Equipment
 - 5.3 Order of Survey
 - 5.3.1 Roof
 - 5.3.2 Walls
 - 5.3.3 Drainage
 - 5.3.4 External works
 - 5.3.5 Floors
 - 5.3.6 Stairs
 - 5.3.7 Interior finishes
 - 5.3.8 Services
- 6.0 The demolition of buildings
 - 6.1 Types of demolition
 - 6.2 Preliminary activity and survey
 - 6.3 Statutory requirements
 - 6.4 Safety precautions
- 7.0 Dampness – Rising damp
 - 7.1 General background
 - 7.2 Building Regulation Requirements
 - 7.2.1 Walls
 - 7.2.2 Roofs
 - 7.2.3 Floors
 - 7.2.4 External joinery
- 8.0 Condensation
 - 8.1 Nature of condensation
 - 8.2 Causes of condensation
 - 8.3 Diagnosis of condensation

- 8.4 Remedial measure
- 9.0 Basic statutory Requirements
Construction of buildings in warm climates

Reading Material

1. R Lee C Lockwood (1976) *Building Maintenance Management*
2. National Building Agency (1983) *Common Building Defects-Diagnosis and Remedy*
3. E Mills (1994) *Building Maintenance and Preservation –A Guide to Design and Management 2nd Edition*

CVE 310 INDUSTRIAL ATTACHMENT (0-8 – 2)

Objective: To expose students to the world of work

Content

The second industrial attachment is to encourage the students to strengthen experiences, knowledge and skills in the construction industry. It is expected that the student will take initiative to explore new and more challenging experiences than those gained during the first attachment.

The students will keep proper records and the assessment will be similar to the assessment carried out for the first attachment. The duration of this attachment will depend, to some extent on the duration of the first attachment such that the aggregate of the two industrial attachment shall not be less than 20 weeks.

CVE 311 PROJECT (0 – 2– 1)

Objective:

Content Topic to be given should be designed by the various lecturers in the department but the project assignment to candidates must involve applications of acquired knowledge to practical problem identification, collection, analysis of data deduction of recommendations for their solutions; project topics must relate to construction, planning and control.

Reading Material

CVE 312 PROJECT (0 – 6– 3)

GENERAL OBJECTIVE:

Objective:

Content Topic to be given should be designed by the various lectures in the department but the project assignment to candidates must involve applications of acquired knowledge to practical problem identification, collection, analysis of data deduction of recommendations for their solutions; project topics must relate to construction, planning and control

Reading Material

CVE 314 CONSTRUCTION ACCOUNTING (2 – 0 – 2)

Objective: This course is an introduction to basic accounting principles. Emphasis is on management accounting

Content:

- 1.0 Basic Accounting Concepts.
 - 1.1 Function organisation and direction of business
 - 1.2 Books of accounts and accounting transactions.
 - 1.3 Income statements and balance sheet.
 - 1.4 Basic classification and coding of accounts
- 2.0 Functions of financial accounting systems
 - 2.1 Providing information desired by stockholders and creditors
 - 2.2 Providing information for management use.
 - 2.3 Keeping of assets and liabilities
 - 2.4 Determining tax liabilities.
 - 2.5 Developing information required by regulatory law
- 3.0 Elements of cost accounting
 - 3.1 Methods in cost accounting
 - 3.2 Job – order costing
 - 3.3 Indirect costs
 - 3.4 Indirect manufacturing expenses
 - 3.5 Direct costing

3.6 Quality cost

3.7 Joints cost

Reading Material

1. Frank Wood and Sangster (1999) *Business Accounting I*
2. Penne Ainsworth and Dan Deins (2002) *Introduction to Accounting: An Integrated Approach 3rd Ed*
3. Meg Pollard, Sherry K Mills Walter T Harrison 3*Principles Of Accounting* 2007