

# DETAILED COURSES DESCRIPTION

## LEVEL 1 COURSE

### **AFS 101 AFRICAN STUDIES (1 – 2 – 2)**

### **AFS 102 AFRICAN STUDIES (1 – 2 – 2)** **GENERAL OBJECTIVES**

This course is structured to emphasis the students' awareness of the African Environment and its development.

1. Pre – historic Africa and the great civilization of Africa.
2. Traditional African Government, Social systems, and practices
3. Urbanization and Social Changes.
4. Education, Social and Political Changes
5. Systems of Land Tenure in Africa
6. Natural Resources and Industrial Development of Africa

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

Content to be supplied by Liberal Studies Department

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

Content to supplied by Liberal Studies Department

### **CLT 101 COMPUTER LITERACY (1 – 2 – 2)**

This is an introductory course to computer programming in the BASIC language and introduction to Auto Card. On successful completion of the course, candidates should be able to write simple programmed in the BASIC language and would be equipped to use standard computer programmes. The course contents include:

The computer, the programme, the BASIC language. The problem solving process: batch processing time-sharing and storing the programme. Commands in time sharing/interaction in BASIC, editing and correction. Loops variable step, information, function and subroutines. Alphabetic information. Debugging.

Application; curve fitting/plotting, Roots of equations, critical path analysis, polynomials integration, numerical solution of differential equations (the finite solving techniques for the standard designed.

- 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
- 3.4 Summaries

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

Content of the course to be provided by the Computer Unit

## **MAT 101 MATHEMATICS I (2 - 0 - 2)**

### **GENERAL OBJECTIVES**

At the end of the module, students should:

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

### **PERFORMANCE OBJECTIVES**

#### **0.0 Recognise hyperbolic notation**

- 0.0 Recognise hyperbolic notation.
- 0.1 Explain the relationship between hyperbolic functions and trigonometrical functions.
- 0.2 Sketch the curves of typical hyperbolic functions.

- 0.3 Solve problems involving hyperbolic functions and relate those uses to engineering applications.

## **1.0 Differential Calculus**

- 1.0 Solve problems using the technique of successive differentiation.
- 1.1 Interpret engineering problems, which involve the technique of successive differentiation in the solution.
- 1.2 Derive Leibnitz's theorem and relate it to the technique of successive differentiation.
- 1.3 Solve problems using the method of simple partial differentiation.
- 1.4 Identify the uses of partial differentiation, and relate those uses to engineering application.
- 1.5 Derive the reduction formula, and identify its practical uses.
- 1.6 Relate the reduction formula to the method of integration by parts.
- 1.7 Solve practical problems using the reduction formula and integration by parts.
- 1.8 Define gamma functions in the solution of practical engineering problems

## **3.1 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 numbers and the complex plane.
- 3.4 Recognise practical uses of complex numbers.
- 3.5 Solve practical problems involving complex number.

## **2.0 USES OF SERIES**

- 4.1 Identify the expansions of Maclaurin and Taylor.
- 4.2 Solve problems using the expansion of 4.1.
- 4.3 Describe the principal uses of the series of 4.1 e.g. approximation, etc.
- 4.4 Use the series of 4.1 to make successive approximations.
- 4.5 Recognise the format of a Fourier series
- 4.6 Solve practical problems using a Fourier series.
- 4.7 Describe the principal uses of Fourier series

## **MAT 102 MATHEMATICS II (2 - 0 - 2)**

### **GENERAL OBJECTIVES**

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

## **PERFORMANCE OBJECTIVES**

### **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 solutions of the applications of 1.3

### **2.0 Differential Equations**

- 2.1 Recognise second order 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 complementary 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 probabilities 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 methods of elementary sampling.
- 4.10 Estimate sampling errors.
- 4.11 Interpret the results of sampling.
- 4.12 Distinguish between a casual relationship and hypothesis.
- 4.13 Distinguish between co-ordination and regression.
- 4.14 Calculate, using a case study approach;
  - a) Product moment correlation coefficients;

- b) Rank correlation coefficients;
- c) Linear regression using the methods of least squares

- 4.15 Present in tabular for 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 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 the Gaussian law to investigate the distribution of errors.

## **5.0 Matrices**

- 5.1 Distinguish between a matrix and a determinant and describe the basic construction of each.
- 5.2 Recognise the relationship between matrices and simultaneous equations.
- 5.3 Identify the notation of a matrix.
- 5.4 Define the unit matrix
- 5.5 Calculate the sum, difference and product of two matrices.
- 5.6 Obtain the inverse of a 4 x 4 matrix.
- 5.7 Identify the notation of a determinant.
- 5.8 Evaluate a 4 x 4 determinant by expansion about any row or column.
- 5.9 Describe the meaning of determinant = 0.
- 5.10 Solve simultaneous linear equations with two unknown, using matrices and determinants.
- 5.11 Define a set, and describe the basis of set theory.
- 5.12 Use set theory to solve problems involving combinations, etc.
- 5.13 Recognise the applications of matrices as an aid to solving engineering problems.

Technology, Solution of linear simultaneous Algebraic Equations, Minimization and Optimisation, Least squares method of fitting a curve to a set of data points, Menstruation and Trigonometry.

## **BUT 101: BUILDING SCIENCE I (2- 0 –2)**

- 1. Structure and Classification of Building Materials:**  
i.e. porous and non-porous, Relationship of porosity to physical properties; density, strength, absorption, surface texture, condensation, insulation.
- 2. Fluid Pressure**

Demonstration of static water pressures; direction, intensity, head of water, hydraulic gradient. Water supply problem: low and High pressures, Gas water gauges. Flow of water through pipes and channels.

### **3. Pumps and Siphonage Action**

The principle and functioning of lift, force and the diaphragm pumps, the contractors pump.

### **4. Acoustics and Noise Control**

Revision and development of the understanding of the basic concepts related to sound and its measurement. The nature and propagation of sound waves. Mean pressure, frequency, wavelength, amplitude, and velocity of sound. Pure tones and broadband sound. Sound powers, sound intensity and sound pressure.

Loudness, threshold levels, decibels, addition of sound levels. Sound pressure level and sound power level. Sound level meters and weighting scales. Calibration of sound level meters.

### **5. Room Acoustics**

Requirements for good room acoustics; absorption of sound. Absorption coefficient, types of absorbers, calculation of total absorption.

Reverberation:

Reverberation time. Actual and optimum reverberation time effect of hall volume and shape seating arrangements and reflection of sound on hearing selection of absorbent materials.

### **6. Acoustic Comfort**

Hearing sound:

Pitch audiometry

Hearing defects

Deafness caused by noise: temporary threshold shift, permanent threshold shift, and noise susceptibility equivalent continuous noise level.

## **BUT 102: BUILDING SCIENCE II (2- 0 –2)**

1. Chemistry of cements and Limes:

- Composition and Compound content of commonly used Portland cements, i.e. Functions of Tricalcium silicates and aluminates and iron compounds in setting and hardening of cement
- Calcinations of limestone's

2. Temperature Movement:

- Expansion and contraction of solids, liquids and gases
3. Heat Transmission:
    - Transfer of heat through materials, i.e. convection, conduction and radiation
  4. Elasticity, plasticity and deformation.
  5. Experimental analysis of mechanical properties of common building materials, i.e. compressive, tensile and shear stress tests on masonry materials, steel and wood.
  6. Disturbed and an undisturbed soil testing to determine bearing pressures and characteristic behaviour of soil, consolidation, compaction and settlement.

## **BUT 103: BUILDING MATERIALS (2- 0 –2)**

### **1. Properties generally:**

- Density and Specific Gravity, Strength and durability, thermal, moisture and temperature movements, Deterioration i.e. Chemical, biological and mechanical factors.

### **2. Natural Resource Materials**

- Timber: Selection and utilization, constructional characteristics, mechanical properties durability defects and deterioration, timber products including plywood and laminated woods.
- Stone: classification and composition.
- Blocks and Bricks: Adobe, Laundcrete and Clay bricks.
- Sand and gravel: Crushed aggregates and all in aggregates.

### **3. Processed Materials:**

- Cement and Limes: Classification and composition: Manufacture of cement and limes and types and characteristics.
- Concrete, constituents and production processes type and characteristics, lightweight and dense concretes, sandcrete and concrete blocks.
- Properties of concrete (fresh and hardened), chemistry of cement and its influence on strength development, methods of concrete production and quality

control, i.e. proportioning, batching, mixing, transporting, placing, compaction and curing techniques.

**4. Metal:**

- Manufacture and types i.e. ferrous and non - ferrous metals,

**5.** Structural characteristics of metal structural and mild steels, corrosion and protective coating of metals.

**6.** Asbestos products:

- Asbestos cement and asbestos – silica and lime products

**7.** Bituminous products:

- Bitumen coal tar pitch

**8.** Glass

- Characteristics and strength properties, types and manufacture. Glass products i.e. glass-fibre reinforcements, glass wood.

**9.** Plastics and rubbers:

- Thermoplastics and thermosetting plastics, characteristics and types.

**10.** Adhesives:

- Natural and synthetic, characteristics and types.

**11.** Mortars and mastics:

- Forms, types and composition

**BUT 104 LAND SURVEYING I (1 – 4 – 3)**

Content of the syllabus is not ready.

**BUT 106 STRENGTH OF MATERIALS II (1 – 2 – 2)**

1. Fundamental concepts of load Analysis and Relationship between Loads and Factors important in Design. Specific topics are to include: Pressures, Frictional Forces, Thermal Loads, Wind Loads, Repeated Loading, Dynamic Loads and their effects.
2. Loads causing axial, shearing, bending and tensional deformations, Statistical Analysis of Convention Shear-Force and Bending-Moment.
3. Diagrams for simple beam, Fibre stresses in bending, shear and torsion. Combined axial, shear, bending (strength theories) and their application in the proportioning of member sizes.

### **BUT 107: BUILDING DRAWING I (2- 0 –2)**

The aim of this course is to enable the student to acquire the basic graphic communication skills and the ability to interpret building plans and working drawings. The course content consists of the following outlines:-

- Introduction to basic graphic communication and draughtsmanship skills including plane descriptive and solid geometry
- Working drawings including location drawing i.e. plans, elevations and sections.
- Construction detailing, i.e. detailing of typical elements of the building fabric, free hand sketching, measured Drawings.
- Representative techniques and projects.
- Pictorial Drawing.

### **BUT 108 BUILDING DRAWING II (1 – 2 – 2)**

This course relates to further understanding and application of graphic skills in communication and also introduce the students to the general provisions of the National Building Code and its implementation during the period of construction.

Main outline of the course include:

1. Further work in representative techniques, i.e. sketch design and site development plans graphical representation of materials, service drawings e.g. electrical, and plumbing and drainage installations.
2. Further work on working drawings, i.e. development of foundation plans and details elevations and typical sections through the building elements.

3. Specifications and schedules of materials.
4. Component and assembly drawings: doors and windows schedules
5. Structural detailing including preparation of bending schedules.

### **BUT 109: CONSTRUCTION TECHNOLOGY I (2- 2 –3)**

The course aims at consolidating the basic principle of Construction Technology to which students have been introduced at the previous level. The emphasis on developing the students' ability to appreciate the functioning of the composite elements of a building and the practice of the art and science of construction. In – depth treatment of the will concentrate on the following outlines:

1. Introduction to principles and forms of building, functional requirements of buildings and the building elements, traditional building systems i.e. Adobe, Atakpame and Wattle and Dauls construction methods.
2. Substructure Construction: functions and types of foundations, characteristics, nature and composition of sub –s soils, I.e. soils classification, bearing pressures, effects of seasonal changes, movement and subsidence.
3. Site Investigations and soil exploration.
4. Ground floors, soil concretes, choice of materials for hard-core filling.
5. Timber hollow floors: constructional characteristics, moisture and dampness prevention, termite control and ventilation.
6. Floors below ground i.e. basement construction, tanking and use of moisture barriers in floor.
7. Timber Technology/Structural and constructional characteristics of timber

### **BUT 110 CONSTRUCTION TECHNOLOGY II (2 – 2 – 3)**

The course is structured to emphasize the principles of building to ensure a structurally safe construction. Specific topics include:

- **Superstructure:**

Functional requirements, types of structural and non – structural walls, Principles an application of the three basic structural concept in construction,

i.e. solid, skeleton and surface structural concepts. Stability of walls, effects of over stressing and crushing, eccentricity, overturning and rotation, slenderness ratios, buttressing and introduction of piers and columns in walls.

- **Retaining Walls:**

Gravity and cantilever retaining walls, basic design considerations and construction characteristics. Stability, i.e. resistance against sliding and overturning. Basement walls used as retaining walls in clay soils special precautions, Piling and underpinning.

- **Opening in walls systems:**

Adobe, wattle and daub and the Atakpame Construction Technology i.e. improved techniques, reinforced block work, Cross wall construction, in-filling panels and curtain walling.

## **BUT 112 CONSTRUCTION ACCOUNTING (2 – 0 – 2)**

The emphasis is on management accounting.

1. Basic accounting concepts including:
  - ❖ The financial organisation and direction of business;
  - ❖ Books of Accounts and accounting transactions;
  - ❖ Income statements and balance sheets;
  - ❖ Basic Classification and coding of accounts;
2. Functions of financial accounting systems:
  - ❖ Providing information designed by stockholders and creditors;
  - ❖ Providing information for management use;
  - ❖ Keeping of assets and liabilities, and
  - ❖ Developing information required by regulatory law

## **LEVEL 2 COURSES**

### **BUT 201 BUILDING SERVICES I (2 – 0 – 2)**

This course aims at achieving the following objectives;

- (a) Appreciation of the importance and functional needs of providing utility services in buildings.
- (b) Skills in the selection of appropriate materials for safe installation systems in building, and
- (c) The ability to provide adequate supervision in the layout and installation of services; appliances and fittings in buildings. The main outlines of the course include;

#### 1. Water Supply:

Sources of water, surface and underground supplies. Treatment, storage and distribution (truck and town's mains); distribution within buildings i.e. low and medium rise buildings. Requirements for industrial supplies. Hot water services central boiler and unit heaters.

#### 2. Sanitation:

- Sanitary appliances and fittings, internal plumbing materials. Layout and jointing.
- Drainage above ground and underground drainage systems – materials laying and testing, surface and roof drainage.
- Sewerage treatment and disposal systems: Public and private treatment plants, KVIP Latrines.
- Drainage Design: Flow rates and discharge unit values: Dry, wet and storm weather flows, Pipe sizing and determination of cross – section of channels and culverts, gradients, invert level and levels of sights rails.

### **BUT 202 BUILDING SERVICES II (2 – 0 – 2)**

Pre-requisite Course Number BUT 233

This course is an extension of the objectives

1. Refuse Disposal: Domestic and Industrial refuse handling.
2. Electricity and Elimination:
  - ❖ Source of power: hydropower and diesel generators.
  - ❖ Basic wiring systems and wiring for large scale installations: ring main and radial systems, consumer service units, cable rating and safety devices, e.g. Miniature circuit breakers.
  - ❖ Conduit systems
  - ❖ Daylight and artificial lighting: the lumen method of lighting design.
3. Mechanical services in building: ventilating plants; e.g. extract systems and Air-Conditioning.
4. Communication and Protection System: Telephone, systems requirements of systems, Miscellaneous, Cable systems, including group urial systems, binglar alarms, call systems, public address systems, (introduction to general issues). Fire detection and suppression, Manual and automatic alarms, fixed equipment for the first aid and fire brigade use, fixed automatic fire suppression systems using available extinguishing agents.

### **BUT 203 LAND SURVEYING II (1 – 4 – 3)**

The content of the syllabus is not ready.

### **BUT 204 RESEARCH METHOLODOLOGY (2 – 0 – 2)**

The aim of the research methodology course is to enable the students develop research skills and be able to write a technical report. The objectives of the course include:

- ❖ Distinguish between different types of research
- ❖ Define a research problem
- ❖ Differentiate between primary and secondary data
- ❖ Identify different instruments and methods of data collection
- ❖ Present and analyse data
- ❖ Identify the elements of a research report

- ❖ Prepare a research outline
- ❖ Apply the knowledge and skills acquired to write a proposal for the final project of the HND programme

### **BUT 205 STRENGTH OF MATERIALS III (1– 2 – 2)**

- a. Elastic behaviour of load – resisting flexural members,
- b. Bending of beams with symmetrical sections.
- c. Basic load – stress relationship for bending.
- d. Basic Geometric Relationship for deflection.
- e. Determination of deflection by  
Direction Integration and the  
Moment Area method.
- f. Elastic Buckling of columns.
- g. Empirical Column formulae
- h. Application to solution of problems in timber, steel and reinforced concrete members.

### **BUT 206 THEORY AND DESIGN OF STRUCTURES I (2 – 2 – 3)**

Design of simple structural elements in masonry timber materials and steel.

1. Retaining Walls: Design of gravity retaining walls, proportioning design checks, detailing.
2. Masonry Walls: Stresses, proportioning, design check detailing of block and brick walls.
1. Timber Elements: Design of truss, nailed and bolted joints, design of simple solid beams and built-up beams, proportioning, design checks, detailing.
2. Structural Steel Design: Girders, connections, beams, columns.

### **BUT 207 MEASUREMENT OF CONSTRUCTION WORKS I(2 – 0 – 2)**

The main aim of this syllabus is to provide candidates with an understanding of those elements of Quantity Surveying, which are normally undertaken by supervised technical surveyors. In order to achieve the aim, the candidate must acquire:

- (i) A knowledge and understanding of documentation commonly used in billing and production processes.
- (ii) An understanding of the processes involved in the preparation of such documentation.
- (iii) An ability to quantify the work.

The main outlines of the course include:

Introduction to the techniques employed in the measurement of building works, general principles and basic mensuration, setting and the sequence of dimensioning as applied to excavation and earthworks, concrete works and block in sub – structure works, ground floor slab construction; Abstracting and Billing.

## **BUT 208 MEASUREMENT OF CONSTRUCTION WORKS II (2-0- 2)**

1. Application of general principles and elements of pricing to developments of units rates for construction works in the following trade section:
  - ❖ Excavation and earthworks;
  - ❖ Concrete work and block work in sub –structure
  - ❖ Super structure floors; wall including openings and roofs, floor and wall finishes.
  - ❖ External works, plumbing and electrical works including fences and drainage.
2. Analysis of prices general knowledge of the operation of a builders business and site organisation, their bearing on the cost of buildings' work, collecting of information for rendering.
3. Projection pricing work built-up of contract/tender rates including preliminaries compilation and adjudication of tender by contractor.
4. Pricing of alternative bill formats, such as operational and locational bills

## **BUT 209 CONSTRUCTION TECHNOLOGY III (2 – 2 – 4)**

**TOPICS COVERED IN THIS COURSE INCLUDE:**

## 1. Framed Structures

- Steel and Concrete framed construction factors influencing selection of type of foundations for framed structures.
- Joints and Jointing: Stanchion to Stanchion, Beams to Stanchion and beam to beam, riveted, bolted and welded joints, methods of connecting stanchions of foundations.
- Concrete Element:  
Construction, contraction and expansion joints,  
Tolerance: In – situ reinforced concrete construction  
Typical construction detailing

## 2. Upper Floor: Design and construction

Characteristics: factors influencing selection of floor types:

- a) Timber joisted floors: Structural stability, typical construction details.
- b) In – situ reinforced concrete slabs: slabs beam and slab floors; Ribbed and waffle floor systems, one – way and two – way slab construction: economic span, loading, and permissible deflections.
- Openings in floors precautionary measures – introduction to trimming beams.
- Incorporation of service pipes.
- Staircases: Monolithic stairs, continuous and geometrical stair construction.

## 3. Dry floor system: Hollow block and plank floor systems. Precast floor component assembly and joining.

## BUT 211 CONSTRUCTION ESTIMATING I (2-0- 2)

1. **AIM:** The aim of this syllabus is to identify the knowledge required for estimating and tendering. It should encourage candidates' fort the responsibility of identifying the needs and organizing the pre-contract stages of building.
2. The course outline includes:
3. Introduction to fundamentals of construction estimating and tendering. Emphasis will be placed on elements of pricing in terms of factors affecting:

- i. Labour cost: e.g. rates of pay, allowance, insurances, norms etc.
- ii. Materials costs: e.g. supply, distribution, insurances, norms etc.
- iii. Plant costs; e.g. builders plant cost, charges and economic usage.
- iv. Preliminaries and general items, e.g. site establishment, running and dismantling

## **BUT 212 BUILDING MAINTENANCE (2-0- 2)**

### **AIM**

1. The aim of this syllabus is to identify the depth and breadth of the knowledge to be examined with regard to the maintenance and repair of buildings. The topics are to be considered in the context of current and best practice.

Finally it encourages the candidate to be able to analyse, interpret and comment upon matters affecting the maintenance and repair of building.

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### **SYLLABUS CONTENT**

2. The course is to cover maintenance of building structures intended for human habitation but may be extended to cover other types of structures, Specific topics are to include:
  - ❖ Nature and importance of building maintenance, liability for defects relationship of capital to maintenance problems and running cost: economics of maintenance.
3. Building maintenance problems and their solution: over site and substructure works, grassed areas, drains and fencing, building settlement. Defects in walls and structural; frames, damp penetration and condensation. Timber defects, floor, staircases, roofs, vibration. Built-infurniure and joinery, corrosing of metal, render work, work and floor tiling, painting, glazing and honour glass.
4. Plumbing works, Electrical installation, Refuse collection and flood damage
5. Alterations and Improvements: dilapidation, proof of evidence and technical reports, Specification of maintenance works, Planning, Execution and Supervision of Maintenance works and Maintenance data management

## **BUT 213 SITE ORGANISATION & PROCEDURES (1 – 4 - 3)**

The main aim of this syllabus is to provide the student with a working knowledge to develop the ability to play an effective leadership role in the management of a construction site. It also promotes the development of full awareness of the causes of construction accidents and methods of avoiding them.

Finally, it is directed to achieving maximum economy at the site.

The subject should be studied through a system approach in order to emphasize the variation in size and shape of sites together with the peculiar problems each poses.

The syllabus should also be studied within the context of:

Taking into account the position of the main building which if fixed on the plot and the storage position(s) of the main materials being in the hands of the contractor and his team.

Identification positions of stationary plants should be equally considered.

The student should have knowledge in some depth the materials should be kept clear of the space where the building is to be constructed and also that on a restricted site, this is sometimes difficult.

## **1. SITE MANAGEMENT**

- Site Organisation and management, management of plant, materials and human resources, job description and assignment of tasks, quality control of construction processes, leadership role and cultivation of team spirit.
- Record keeping of day works and stores requisitions, issues and checks.

## **2. CONSTRUCTION SAFETY**

- Safety of structures: possible causes of failure of structures and the prevention, protection of the works against damage.
- Method of reducing accidents, safe means of access and safe places of work, safety education and control.
- Temporary works and methods of erection; fire prevention, first aid general provisions against health hazards; cost of accidents, direct and indirect cost, payment of compensation.

## **3. MATERIALS**

Cement, lime, sand, stones, paint, tiles, bricks and block, drains pipes and accessories, electrical conduits, reinforcing rods, timber, roofing sheets, glasses, door and window frames, soil delivery and removal.

#### **4. PLANNING**

Planning the site layout, general consideration condition of site, nature of site and peculiar problems; administration and construction areas.

#### **5. POSITIONS**

Position of building, strategies positions of materials, provision of storage places, closed and open shed facilities, materials, stationary plants, concrete as a special case, alternative production and conveyance arrangements on site, techniques for removal of spoils.

#### **6. PROBLEMS**

Defects of poor storage and handling, candles of poor storage and handling economic cost comparison, cost awareness, measures to achieve cost, effective handling and storage results and pilfering on site.

### **BUT 214 INDUSTRIAL ATTACHMENT I (0 – 2 - 1)**

The purpose to 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 formal report of about six pages, which will be submitted, to the Department for assessment. The course evaluation will be based on the assessment of the report of the student and the assessment provided by the industry of attachment.

## **BUT 217 ENVIRONMENTAL IMPACT OF CONSTRUCTION ACTIVITIES (2-0- 2)**

### **AIM**

1. The aim of this syllabus is to provide the student with a knowledge capable of assisting him to develop a full awareness of environmental degradation caused by some construction activities and methods/measures that should be instituted to address the problem.
2. Building and Landaus; mining of materials for building operations; quarrying and wining of natural sand and soil materials and the impact on vegetation and atmospheric problem.
3. Building debris and its disposal.
4. Disposal of waste and foul matter within buildings; contamination of watr bodies and vegetation resulting from waste and sewerage disposal.
5. Impact on plant and fish life.
6. Disposal of by – products of building materials manufacturing factories, atmospheric pollution

## **LEVEL 3 COURSES**

## **BUT 301            BUILDING LAW I (2-0- 2)**

### **AIM:**

The main aim of this syllabus is to provide the student with an outline knowledge of the legal system and a basic knowledge of the law of contract and the law relating to health safety and welfare.

### **1.    AN INTRODUCTION TO THE LEGAL SYSTEM**

Introduction to Constructional law, analysis of system, Ghanaian system of parliament.

### **2.    THE LAW OF CONTRACT**

Requirements for a valid contract; intention to create legal relations; offer and acceptance including tenders for building work; consideration formalities required to make certain types of contract enforceable.

Capacity to contract of corporations and partnerships.

An outline of factors, which render a contract void or voidable mistake; misrepresentation; illegality, with particular reference to contracts in restraint of trade and breach of building legislation.

The terms of a contract: express and implied terms; conditions, warranties and limitations of liability clauses.

Discharge of a contract: agreement; performance; frustration; breach.

Remedies for breach of contract: damages with particular reference to claims under building contracts; specific performance; rescission; quantum meruit.

### **3.    AN INTRODUCTION TO THE LAW RELATING TO HEALTH, SAFETY AND WELFARE**

An outline of the main provision of the health and safety at work etc. Act 1974 Responsibilities of employers, managers and employees under the Act.

Enforcement procedure under the Act: prosecution and administrative orders. Regulations under the Act specifically relating to the construction industry.

### **4.    Legal history of Ghana, Ghanaian court system, legal profession and its service. The elements and sources of law, Ghanaian statute law and customary law.**

Judiciary processes; principles of equity, legal and equitable interest in land law of real and personal property, acquisition and transfer of rights – Real Estate, Ghanaian Land tenure and law.

## **BUT 302            BUILDING LAW II (2-0- 2)**

### **1.    THE CONTRACT OF EMPLOYMENT**

Distinguish between a contract for service and a contract for services. Terms of a contract of employment; express, implied and incorporated terms; variation of terms, written statement as to terms.

Outline of the effect of legislation on the contract of employment.

### **2.    TORIS RELEVANT TO THE CONSTRUCTION INDUSTRY**

Nature of tortious liability intention motive; negligence; strict liability, Vivacious liability; distinction between an employee and an independent contractor and liability of an employer for their torts.

Negligence; duty of care and it's extend; breach of the duty and burden of proofs remoteness of damage.

Trespass to land; nature and definition; definition; defences; remedies.

Nuisance: Public and private nuisance; standard of liability; who can sue and be sued; defences.

The rule in Rylands Fletcher nature of user and escape; defences, Fire liability for the cause and spread of fire, Breach of statutory duty.

Outline of the general defences to an action in tort: consent; contributory negligence; necessity; limitation of actions.

Remedies: damages and measure of damages; types of injunction and specific restitution; limits of self-help.

### **3.    THE LAW RELATING TO HIGHWAYS RELVANT TO BUILDING OPERATIONS**

Definition of a highway and a street; procedure and rules for the adoption of a highway by a local authority.

Building and improvement lines.

Procedure to apply to close a highway; statutory offences under the highways legislation; and torts arising from the obstruction of highways and streets;

## **BUT 303            BUILDING MANAGEMENT (2-0- 2)**

1. Business Enterprise
2. Acquisition of work
3. Resources
4. Finance
5. Administration
6. Managers Role
7. Decision Making
8. Corporate Planning and Strategy
9. Organisation
10. Motivation
11. Information and Communication

## **BUT 305            THEORY OF STRUCTURE II – REINFORCE CONCRETE DESIGN (2-0- 2)**

Design and detailing of reinforced concrete components of framed building using the Elastic theory and ultimate strength.

Methods:

- One-way and Two-way Slabs,
- Simply supported and continuous slabs
- Simply supported and continuous Beams.
- Staircases,
- Columns and Column Bases.

### **BUT 306 HUMAN RELATIONS IN THE CONSTRUCTION INDUSTRY (2-0- 2)**

The main aim of the syllabus is to emphasize the acquisition, maintenance, development and utilization of human resources include the following:

1. Fundamentals of organizational behaviour: i.e. working with people and basis for human motivational factors; the Organisation itself and the environment in which it exists.
2. Moral development and use.
3. Developing a sound behavioural climate (industrial psychology).
4. Leadership and its development, leadership role effective supervision and development of participation.

### **BUT 307 MEASUREMENT OF CONSTRUCTION WORKS IV (2- 0- 2)**

1. Ground investigation and geometrical processes.
2. Measurement of Earthworks including excavation and filling.
3. Measurement of piles in concrete, timber and steel sheet piling.
4. Introduction of measurement of tunnel and tracks.

### **BUT 308 CONTRACT ADMINISTRATION (2- 0- 2)**

Tendering procedure and contractor and selection: Ghana government's condition of contract for building works. Taking of site, interim valuations and certificates. Site instructions and variation orders, Periodic work measurement and valuation, Day works; nominated sub-contractors and completion; final account and contract procedures.

### **BUT 309 CONSTRUCTION TECHNOLOGY V (2-2- 3)**

The objective of this course structure is to expose the student to recent developments in rationalizing the construction process by introduction of mechanization into the construction and related element of Civil Engineering construction. The typical areas of the course include the following:

## **1. Industrialize Building Systems:**

- Economic Considerations
- Rationalize traditional building techniques.
- Modular co – ordination, standardization of components and tolerances.
- Prefabrication, recasting, erecting and jointing of elements and components.
- Mechanization in construction; plant selection and utilization considering relationship between operations of plant and of men; plants classification, i.e. excavating, hoisting, transporting and plants and plant ownership.

## **2. Elements of Civil Engineering Construction:**

- Road Construction

Materials and techniques; tropical; red soils asphalt and bitumen mixing plant; sub – base drainage; culverts and bridges – materials and construction.

## **BUT 310 MARKETING CONSTRUCTION PRODUCTS (2 - 0 - 2)**

The main aim of this syllabus is to develop in the student, a comprehensive understanding of the marketing techniques used in the built environments' products.

Topics should be considered in the context of current and best professional practice.

Detailed Course outline includes:

Nature and practice of making of construction products; Commercial; housing and industrial buildings, study of marketing strategy and factors such as consumer behaviour. Policies and techniques and their application to the selling problems of a construction enterprises.

## **BUT 311 PROJECT PLANNING AND CONTROL (3 - 0- 3)**

## **AIM**

The main aim of this syllabus is to introduce the student to the elements of construction planning and site organization to facilities/satisfactory organization and flow of the various building operations during the course of construction.

Finally, it is to provide the students the opportunity to develop the skills of site management and controls in the administration of a construction project. The course structure includes the following outlines:

1. Planning consideration taking into account site conditions, access, nature of job, and plant management.
2. Elements of production planning and control, i.e. overall planning and progress recording, long term programming.
3. Preparation of Construction programmes:  
  
Daily and week planning and process control; monthly programmers, weekly programmes; progress report and work adjustment; network analysis and the master programmes charts.
4. Constructional analysis: - Method, Resources information and sequences studies in relation to work planning and control.
5. Scheduling of resources: Men, Materials, Machines and Money.
6. Progressive preplanning and impact of construction progress;
7. Specification of operation/activities on site; comprise of estimated and actual output.
8. The use of work-study techniques appropriate to building production.

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.

### **BUT 313 PROJECT WORK I (0 – 6 - 3)**

Task assignment candidates to involve application of research methodology in solving practical problems.

### **BUT 314 PROJECT WORK II (INDIVIDUAL PROBLEMS)(0-6- 3)**

Task assignment to candidates to involve application of acquired knowledge to practical problem identification. Collection and analysis of data and deduction or recommendations for their solution.

Project topic must relate as much as possible to the construction industry.

### **BUT 315 COMPUTER APPLICATION (1 – 2 - 2)**

The main aim of this syllabus is to introduce candidates in computer programming in the BASU language and Auto Card systems.

To develop the ability to operate a micro – computer or on-line terminal

To introduce the uses of computers in the construction industry. The course contents include:

The Computer; the Programme; the BASIC language.

The problem solving process: batch processing, time-sharing and storing the Programme.

Commands in time-sharing, Interaction in BASIC, Editing and correcting, Loops variable step, double loops negative step. Lists and tabular information. Function and sub routines. Alphabetic Information Debugging

Application: curve fitting/potting, Roots of equations, Critical Path Analysis, Polynomials, Integration, numerical solution of differential equations (finite

## **BUT 317 TECHNICAL REPORT WRITING (2 – 0 - 2)**

1. Method of collecting technical information: with supervised practice in the organisation, graphic and written presentation of resumes, memoranda, abstract, progress reports and other technical report of various types likely to be used by technical personnel in institutions and industry.
2. Composition writing including developing, writing and presentation of Research information and reports.
3. Specification writing and preparation of site instruction including variation orders.