**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**30% ADDITION TO THE CCMAS COURSESTRUCTURE/SUMMARY**

**100 Level**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course Code** | **Title** | **Units** | **Status** | **LH** | **PH** |
| BUK-BUD 116 | Introduction to Building Quantities | 2 | C | 30 |  |
| BUK-BUD 123 | Building and Architectural Science | 2 | C | 30 |  |
| BUK-BUD 124 | Nature of Environmental Sciences | 2 | C | 30 |  |
| BUK-BUD 125 | Computer Appreciation for Builders | 3 | C | 30 | 45 |
|  | **Total** | **9** |  |  |  |

**200 Level**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course Code** | **Title** | **Units** | **Status** | **LH** | **PH** |
| BUK-BUD 231 | Basic Surveying in Construction | 2 | C | 30 |  |
| BUK-BUD 242 | Mechanics of Construction Materials | 2 | C | 30 |  |
| BUK-BUD 243 | Principles of Valuation for Builders | 2 | C | 30 |  |
| BUK-BUD 244 | Soil Mechanics and Foundation Design I | 3 | C | 30 | 45 |
|  | **Total** | **9** |  |  |  |

**300 Level**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course Code** | **Title** | **Units** | **Status** | **LH** | **PH** |
| BUK-BUD 311 | Analysis of Indeterminate Structures | 2 | C | 30 |  |
| BUK-BUD 313 | Science of Building Materials | 2 | C | 30 |  |
| BUK-BUD 323 | Thermodynamics of Buildings in the Tropics | 2 | C | 30 |  |
| BUK-BUD 324 | Soil Mechanics and Foundation Design II | 2 | C | 30 |  |
|  | **Total** | **8** |  |  |  |

**400 Level**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course Code** | **Title** | **Units** | **Status** | **LH** | **PH** |
| BUK-BUD 414 | Research Methods in the Built Environment | 2 | C | 30 |  |
| BUK-BUD 415 | Building Contract Laws and Alternative Dispute Resolution | 2 | C | 30 |  |
| BUK-BUD 416 | Health and Safety Management in Construction | 2 | C | 30 |  |
| BUK-BUD 421 | Real Estate and Affordable Mass Housing Development | 2 | C | 30 |  |
| BUK-BUD 422 | Alternative Construction Technologies and Methods | 2 | C | 30 |  |
|  | **Total** | **10** |  |  |  |

**500 Level**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Course Code** | **Title** | **Units** | **Status** | **LH** | **PH** |
| BUK-BUD 511 | Buildability & Maintainability Analysis of Building Projects | 2 | C | 30 |  |
| BUK-BUD 513 | Skill and Entrepreneurial Development | 2 | C | 15 | 45 |
| BUK-BUD 514 | Finance Management in Construction | 2 | C | 30 |  |
| BUK-BUD 523 | Building Production Management | 2 | C | 30 |  |
| BUK-BUD 524 | Builders Professional Practice and Ethics | 2 | C | 30 |  |
|  | **Total** | **10** |  |  |  |
|  | **GRAND TOTAL** | **46** |  |  |  |

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 116: Introduction to Building Quantities (2 Units C: LH 30)**

**Senate-Approved Relevance**

Infrastructural development is capital intensive. Therefore, there is need for economic sustainability of the projects. This calls for training and development of competent professionals that will undertake the task of contract administration and effective cost management for sustainable infrastructural development. This is in tandem with the vision and mission of BUK which is to utilise available human and technological resources for teaching, research, and to diligently pursue scholarship and deploy its output for human capacity development, economic growth and sustainable development in the society. The development of competent construction professionals and construction of sustainable infrastructural development are imperative to actualisation of BUK vision and mission statement. Consideration and application of cost optimization principles in infrastructural development is fundamental to developing infrastructure that are economically viable, socially responsible and environment friendly. It will help to curb the menace of project abandonment, there achieving a healthy, and sustainable built environment.

**Overview**

The incessant abandonment of construction projects in Kano state and Nigeria at large is not unconnected with project cost overrun. This course entails training construction professionals to have adequate knowledge and understanding of project cost management and optimization. It also involves creating the awareness and understanding of the roles of professionals in project administration and cost management in the built environment. This course explores the relationship and interrelationship among professionals for efficient project delivery.

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The students will also be trained on basic working documents of a cost estimator. This course exposes the students to the contract drawings (Architectural, Structural, Electrical, Mechanical, Surveying), specifications, contract conditions and Bill of Quantities (building and engineering works). The Purposes of Bill of Quantities (BoQ) will be taught. The Building elements and infrastructure will be explained. The student will be taught the activities that constitute the substructure. Other aspects covered in this course include understanding of the Superstructure of a building, Finishes, Fittings and furniture, Services and External works. Principles underpinning the measurement and description of construction works using the Building and Engineering Standard Method Measurement (BESMM), setting out descriptions and dimensions in taking off dimensions from drawings and Applied Mensuration will be studied.

**Objectives**

The objectives of the course are to

1. understand the functions of a Quantity Surveyor and the career opportunities available to him/her;
2. create an awareness and understanding of various professionals and professional bodies in the construction industry and the interrelationships of various professionals;
3. create an awareness and understanding of the relationships between the Nigerian Institute of Quantity Surveyors (NIQS) and the Quantity Surveyors Registration Board of Nigeria (QSRBN);
4. acquire the knowledge and skill for measuring girths, areas and volumes of regular and irregular shapes as well as setting up dimensions on taking off sheets;
5. create an awareness and understanding of the principles underpinning the measurement and description of construction works using the Building and Engineering Standard Method of Measurement (BESMM);
6. acquire the knowledge and skill for setting out descriptions and dimensions in taking off dimensions from drawings;
7. acquire the knowledge and skills for measuring substructure up to and including ground floor bed for ordinary strip foundation; and
8. acquire skill for bill of quantities production from the measured substructure using manual method and MS Excel.

**Learning Outcomes**

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

1. gain an awareness and understanding of Quantity Surveying as a profession and its historical development;
2. state the functions of a Quantity Surveyor and the career opportunities available to him/her;
3. express an awareness and understanding of various professionals and professional bodies in the construction industry and the interrelationships of various professionals;
4. evaluate an awareness and understanding of the relationships between the Nigerian Institute of Quantity Surveyors (NIQS) and the Quantity Surveyors Registration Board of Nigeria (QSRBN);
5. demonstrate the knowledge and skill for measuring girths, areas and volumes of regular and irregular shapes as well as setting up dimensions on taking off sheets;
6. illustrate an awareness and understanding of the principles underpinning the measurement and description of construction works using the Building and Engineering Standard Method of Measurement (BESMM);
7. demonstrate the knowledge and skill for setting out descriptions and dimensions in taking off dimensions from drawings;
8. display the knowledge and skills for measuring substructure up to and including ground floor bed for ordinary strip foundation; and
9. demonstrate an understanding and skill for bill of quantities production from the measured substructure using manual method and MS Excel.

**Course Contents**

Definition of Quantity Surveying; historical development of the quantity surveying profession. Functions performed by a quantity surveyor. Career opportunities for the Quantity Surveyor. Professionals in the construction industry and their interrelationships. Professional bodies in the construction industry and their significance. The relationships between the Nigerian Institute of Quantity Surveyors (NIQS) and the Quantity Surveyors Registration Board of Nigeria (QSRBN). Basic working documents of a Quantity Surveyor: the Standard Method of Measurement (SMM) for building and engineering works, functions of SMM, the contract drawings (Architectural, Structural, Electrical, Mechanical, Surveying), specifications, contract conditions. Bill of Quantities (building and engineering works). Purposes of Bill of Quantities (BoQ). Building elements and infrastructure: definition of building element, and infrastructure. Substructure. Superstructure: frames, upper floors, staircase, windows, and external doors, internal doors, external walls, internal partitions, and roofs. Finishes: floor, wall and ceiling. Fittings and furniture. Services. External works. Applied Mensuration: Measurement and computation of girth, area and volume for both regular and irregular shapes from dimensioned drawings; Principles of measuring gross and adjustments. Setting up dimensions on taking off sheets and squaring to compute girths, areas and volumes. Introduction to the use of SMM.

**Minimum Academic Standards**

A conducive classroom and seminar space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 123: Building and Architectural Science (2 Units: LH 30)**

**Senate Approved Relevance**

The building and architectural science course details control of the internal conditions of a building in relation to the prevailing environmental factors. It creates a sensory balance of the internal conditions of a building, including: the visual comfort and performance, control of sound and elimination of noise, thermal comfort and general Indoor Air Quality (IAQ). Ensuring comfortable conditions in buildings can be provided through passive controls of the environmental conditions (heat, light and air) or active controls using energy (mechanically and electrically). Architectural science creates a link between design principles and building production. At all points in the delivery of the course, the indispensability of sustainability and energy efficiency must be ingrained, especially in the planning, design, production and operation of the buildings.

The building and architectural science course is, therefore, purposed to produce graduates that are highly knowledgeable in the theoretical, technological and applied aspects of the building and architectural sciences.

**Overview**

Climate change and its attendant impacts have greatly influenced the Architecture, Engineering and Construction (AEC) sector, and heralded the need for an active re-evaluation of the design considerations, choice of building materials and construction methodologies.

The building and architectural science course is an introduction to building physics and aims to familiarize the students with processes of thermal comfort, lighting, acoustics and heat transfer in Buildings. The course goes beyond the traditional approaches to building production to sustainable strategies that will explore natural means of excluding unwanted effects in buildings and admitting the desired processes like day-lighting, solar heating and energy generation, and natural ventilation.

Students shall be required to carry out material investigations, architectural designs and energy assessments, in order to establish potentials for integration of sustainable materials and energy sources in the building facility. The building and architectural science course shall explain the approaches to functional designs and construction that will enhance the building performance in the tropical region of Nigeria, especially using the abundant natural resources of the country.

**Objectives**

The learning objectives of this course are to:

1. examine the given conditions (site conditions, climate, daylight, noise climate);
2. establish the limits of desirable or acceptable conditions (temperatures, lighting and acceptable noise levels);
3. attempt to control these variables (heat, light and sound) by passive means (by the building itself) as far as practicable;
4. provide for energy-based services (heating, cooling, electric lighting, amplification or masking sound) only for the residual control task.
5. explain the nature of light and electromagnetic radiation

**Learning Outcomes**

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

1. explain thermal comfort in buildings;
2. explain transmission and vibration in buildings;
3. identify and apply acoustic materials in buildings;
4. calculate reverberation time; and
5. carry out simple lighting design in buildings.

**Course Contents**

Introduction to building physics, thermal comfort, lighting, acoustics, heat transfer in buildings. Acoustics: nature of sound, sound pressure, intensity and power. The Decibel. Sound level meter and weighting scales. Transmission of sound and vibration in buildings. Transmission loss. Maximum acceptable noise levels. Means of noise and sound insulation. Room Acoustics – Room Acoustics criteria and principles. Geometric design techniques. Sound absorbents. Case studies of some acoustical buildings. Types of auditoria. Noise Effects, noise limiting curves, hearing risk, construction site noise, noise control. Reflection. Types of reflectors, panels and curves. Echoes – absorption, absorption coefficient, types of absorbers – porous, panel, cavity. Reverberation, reverberation time, calculation of reverberation time. Light: Nature of light, Electromagnetic radiation, Elementary Physiology of the eye,

accommodation, adaptation, colour sensitivity; Basic units of measurement luminous flux, solid angle, luminous intensity, luminance; Behaviour of light on surfaces; Introduction to main criteria in lighting design acuity, glare, modelling appearance and costs.

**Minimum academic standards**

A conducive learning environment, standard studio and well-equipped building laboratory, in line with the NUC-MAS requirements, are vital.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

BUK-BUD 124: **Nature of Environmental Science** (2 Units; Compulsory; LH 30)

**Senate-Approved Relevance**

The provision of highly trained and skilled building production managers that will utilise the characteristics of the environment, through the knowledge of the nature of environmental sciences, to produce sustainable buildings, agrees with BUK’s vision and mission statement of developing human capacity for sustainable development. Subsequently, graduates from the building programme in BUK will be able to utilise their knowledge of the nature of the warm humid climate environment to produce sustainable buildings.

**Overview**

An ample knowledge of the nature of environmental science relating to man and his environment both internal and external is germane to the success of every discipline advanced in the built environment to address the needs of man of which the building programme is one. Building, being at the centre of the immediate environment of man, requires an in-depth knowledge of the nature of environmental science to be able to produce buildings that will be responsive to the characteristics of the external environment.

This course is designed to furnish students with the knowledge of the nature of the environment of man in relation to his built environment so that the need of man could be meet while the environment is still sustainable. The importance of this course lies in the quest to meet the ever-increasing need of man for shelter without jeopardising future generations from meeting their own needs in relation to the environment which will require a good knowledge of the nature of environmental science. Further it will contribute to the Social Development Goals in the area of sustainable cities and communities, responsible consumption and production, and life on land. The objectives of the course, learning outcomes, and contents are provided to address this need.

**Objectives**

The objectives of the course are to:

1. describe the origin and evolution of human settlements and state the factors influencing human settlements.
2. identify the factors affecting the siting and development of villages and towns in the Niger Delta.
3. explain the land tenure systems in Nigeria and in the Kano state, and state the attendant tenure securities.
4. describe the philosophy of physical planning
5. identify the social and economic forces and their effects on demand of shelter and means of movement.
6. state development control tools, mechanisms, and development control challenges in warm humid climatic and marine environments.
7. describe basic elements and stages of environmental management systems
8. identify factors within the environment having influence on the health and well-being of individuals, and measures to improve environmental conditions
9. describe building and the environment, and state elements of the built environment.
10. describe the historical accounts of the evolution of buildings.
11. identify construction activities, operations defining scope of construction activities, and the problems facing the construction industry in our environments.
12. describe the people and sub-sectors involved in the construction industry.
13. state the stages and activities involved in the building process.
14. state the methods of obtaining and executing building works
15. identify participants in the building process, their functions and the relationships between them.
16. describe the members of the contractor’s team.
17. describe environmental, construction and building economics, and state the effects of demand and supply on physical development.

**Learning Outcomes**

On completion of the course, students should be able to:

1. describe the evolution of human settlements and state at least six factors influencing it.
2. identify and state at least four factors affecting the siting and development of villages and towns in Nigeria.
3. state at least four tenure systems and tenure securities in Nigeria.
4. state the philosophy behind physical planning.
5. state at least four social and economic forces and their attendant effects on the demand for shelter and means of movement.
6. describe development control tools, mechanisms and state at least five development control challenges in warm humid and marine environments in Nigeria.
7. describe at least five basic elements and stages involved in environmental management systems.
8. state at least five factors each within the environment having influence on the health and well-being of individuals and the measures to improve environmental conditions.
9. describe building and the environment and state at least 2 elements of the built environment.
10. describe at least four historical accounts in the evolution of buildings and describe building as a communal activity.
11. state at least five problems facing the construction industry in the warm humid and marine environments in Nigeria.
12. state at least five diversified operations in the construction industry.
13. describe at least four stages and activities involved in the building process.
14. state at least three methods of obtaining and executing building works and four components of contract documents.
15. identify at least five participants in the building process, the relationship between them, and state at least three of their functions each.
16. describe at least five members of the contractor’s team.
17. state environmental, construction and building economics, and present at least four effects of demand and supply on physical development.

**Course Contents**

The origin and growth of human settlements – what is human settlement, origin of human settlement, evolution of human settlement, factors influencing human settlements, and human settlements in present day. Factors affecting the siting and development of villages and towns in northern region. The system of land tenure and land use – what is land tenure, categories of land tenure, land administration, access to land, tenure security, and land tenure system in Nigeria. The philosophy of physical planning. Social and economic forces and their effects on demand for shelter and means of movement. The control of development – what is development control, development control tools and mechanisms, development control challenges in warm humid and marine environments. Environmental management systems – what is an EMS, basic elements of EMS, potential benefits of EMS, stages of EMS based on ISO 14001. Factors within the environment having influence on the health and well-being of individuals, and measures to improve environmental conditions. The built environment – building and the environment, and elements of the built environment. Evolution of buildings – Historical account of the evolution of buildings, building as communal activity, and the industrial revolution. The construction industry in Nigeria – construction activities and forms of construction demand, and problems facing the construction industry in the warm humid and marine environments in Nigeria. People and sub-sectors involved in the construction industry. The building process – Stages and activities involved in the building process. Methods of obtaining and executing building works – The contract methods, the direct-labour system, and contract documents. Participants in the building process, their functions and their inter-relationships. The contractor’s team. Economic forces and physical development – What are environmental economics, construction economics, and building economics, physical development and factors influencing physical development, conditions of demand and supply, effect of demand and supply on physical development and effect of economic forces on physical development.

**Minimum Academic Standards**

A conducive classroom space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 125: Computer Appreciation for Builders** **I (3 Units C: LH 45; PH 45)**

**Senate Approved Relevance**

In contemporary times, knowledge of computer in all fields of life has not only become essential, but indispensable. In the academic sector, computer has greatly enhanced learning and remarkably advanced research and knowledge sharing. Information that was previously contained in prints are now digitized and digitalized. Data, information and knowledge are no longer location-specific, but ubiquitous.

Appreciation of computer heralds its application. Information management is now easier with the adoption of computer. Collaboration and integration of stakeholders in all sectors of societies are made seamless due to the application of computer. The relevance of computer to builders’ cuts across the planning, bidding, design, execution, operation and maintenance of buildings.

**Overview**

Computer appreciation entails the acknowledgement of the need for computer. It is the first step to gaining computer knowledge and application of the computer processes. Computer appreciation requires a theoretical knowledge of the origin or history of computer. For any computer application to be effective, there is need for physical identification of the computer hardware. of various computer types. The computer appreciation for builders’ course shall help students understand the functions of each computer parts and components.

Word processing, spreadsheet and graphic software applications shall be detailed. The practical component of the programme shall be observed in the computer laboratory. The practical class shall involve cold and warm computer booting, installation of various software and their applications. For the computer appreciation for builders’ course, hands-on experience is essential. Students shall be required to practice the use of the computer software and shall be tested to assess their levels of performance in computer application.

**Objectives**

1. define computer, information and data
2. explain the relevance of computer in our society
3. explicate classes and characteristics of a computer
4. define computer software and hardware
5. elucidate on software for builders

**Learning Outcomes**

At the end of the course, students should be able to:

1. define and know the basic components of computer software and hardware
2. identify input and output devices
3. know the major functions of networks to a business, and
4. understand types of computer network
5. appreciate the essence of computer security
6. understand the various types of storage devices
7. identify issues of patents, ethics and license

**Course Contents**

Introduction and characteristics of computer. Classification of computers. Generations of computer. Representation of information. Hardware and Software description. Storage media. Operating systems. Mini and Microcomputers. Types of software. Computer application systems. Operating systems. Data processing and data coding. Information processing. Debugging. Deleting and Insertion. Sample programmes. Communication devices. Details on minicomputer and Microcomputer handling. Computer Networks. Computer Virus. Computer security.

**Minimum academic standards**

A conducive learning environment, well-equipped computer laboratory, in line with the NUC-MAS requirements, are vital.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK – BUD 231: Basic Surveying in Construction (2 units; Compulsory**; LH 15; PH 45)

**Senate-Approved Relevance**

The Bayero University is positioned to train and produce graduates that will be equipped with necessary and adequate competitive skills, craftsmanship, scientific and technological acumen to build and sustain the State’s and, at large, the country’s economy. Consequently, Builders from BUK should be able to deploy the versatility of the of surveying equipment and technology for successful delivery of construction project.

The central role of a builder in coordinating the working drawings by designers in the built environment into a physical building on the ground cannot be overemphasized. The skill and competence required of a builder in the course of the production of physical facilities underscores the relevance of this course.

**Overview**

A basic understanding of principles and methods of land surveying is paramount for a building graduate, as well as the use of equipment and technology for measuring and mapping land is paramount to successful delivery of construction project. Knowledge of surveying equipment and technology, including total stations, GPS, and other surveying instruments are necessary for modern day Builders. The principles of measurement and mapping, including horizontal and vertical measurement, and the creation of maps and diagrams provide guide for dimensional accuracies during the production management of buildings. Legal principles and regulations related to land surveying and land use, including property boundaries, property rights, and land use planning are essential for the avoidance of disputes.

The course may include both theoretical and practical components, including hands-on experience with surveying equipment and technology, and may also include fieldwork to gain experience in collecting and analyzing data.

**Objectives**

The objectives of the course are to:

1. describe the scientific process of measuring the dimensions of particular area of earth’s surface;
2. explain the process of measuring horizontal distances, directions, angles, and elevations,
3. describe the role of a land surveyor in the land-use planning and land development process.
4. explain the importance of land surveying in the planning, design, and construction of buildings and other structures.
5. describe the principles and methods of land surveying.
6. explore the use of equipment and technology for measuring and mapping land.
7. understand the use of different types of surveying equipment and technology, including total stations, GPS, and other surveying instruments
8. collect and analyse data to create accurate and precise plan of suitable scale.
9. describe horizontal and vertical measurement using surveying instrument.
10. explain the ability to communicate effectively with clients and other stakeholders involved in land surveying and land development projects.

**Learning Outcomes**

At the end of the course, the students should be able to:

1. understand the scientific process of measuring the dimensions of particular area of earth’s surface;
2. identify the process of measuring horizontal distances, directions, angles, and elevations,
3. understand the role of a land surveyor in the land-use planning and land development process.
4. explain importance of land surveying in the planning, design, and construction of buildings
5. enumerate the basic principles and techniques of land surveying.
6. identify different types of surveying equipment and technology, including total stations, GPS, and other surveying instruments
7. identify basic principles and methods used in ranging, chaining, off-setting, measurement of tie and check lines.
8. carry out measurements, apply necessary corrections to attain required accuracy;
9. collect and analyse data, and produce plan of suitable scale
10. identify legal principles and regulations related to land surveying and land use, and the ability to apply this knowledge in land development projects.
11. communicate effectively with clients and other stakeholders involved in land surveying and land development projects.
12. enumerate the safety and ethical considerations in land surveying profession.

**Course Contents**

Introduction to land surveying. The role of a land surveyor in the built environment. The importance of land surveying in the planning, design, and construction of buildings and other structures. Overview of different types of surveying. Surveying equipment and technology, including total stations, GPS, and other surveying instruments. Application of land surveying principles in the planning, design, and construction of buildings and other structures. Horizontal and vertical measurement. Basic principles and methods used in ranging, chaining, off-setting, measurement of tie and check lines. Principles and methods used in chain surveying. Carrying out measurements and plotting of chain survey of an area. Sources of errors, corrections and accuracy attainable in chain surveying. Principles and methods used in compass surveys. Collection of field data, processing of data and production of plan at suitable scale in compass surveying. Principles and methods, field observations, computations, sources/correction of errors. Production of plans at suitable scale in plane tabling. Safety and ethical considerations in land surveying profession.

**Minimum Academic Standards**

The course may include a capstone project or a final project where students can apply the knowledge they have acquired during the course to a real-world scenario.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 242: Mechanics/ Strength of Construction Materials (2 Units; Compulsory: LH 15; PH 45)**

**Senate-Approved Relevance**

The development of highly trained and skilled construction professionals who will be responsive to the need of the community to ensure an environmental, economic, safe, social and culturally sustainable built environment is akin to BUK’s vision and mission of developing human capacity for sustainable development that is sensitive to Nigeria’s northern rich cultural heritage. Consequently, Builders from BUK will be able to utilise materials, being vastly knowledgeable of their mechanical properties and behaviour under various forms of loadings. This will address building safety challenges and curb the menace of incessant building collapse in the northern region of Nigeria.

**Overview**

The safety of built infrastructure is a primary concern to stakeholders in the construction industry. Knowledge of mechanics/ strength of materials is a core requirement to understanding the behaviour of structures, providing designers and building with relevant information needed to ensure their strength and stability. This underscores the need for highly trained and innovative students with the knowledge and skills to effectively analyse structural sections under various forms of loadings, using analytical techniques available in literature.

This course is designed to equip students with the basic knowledge of building structural design concepts, in addition to analytic techniques needed for both structural design and structural assessment cases. The course lays a foundation which remains relevant up to higher levels of academic pursuit or professional practice. The importance of the course lies in its ability to empower students to idealise, analyse and make critical decisions bordering on the safety of not only buildings but also the lives and properties they accommodate. The objectives of the course, learning outcomes and contents are provided to address this need.

**Objectives**

The objectives of the course are to:

1. identify and describe structural design concepts, principles and technologies
2. apply units of measurement
3. evaluate simple stress systems
4. apply factor of safety
5. describe mechanical testing of common materials
6. describe behaviour of steel under load
7. evaluate complex stress systems
8. describe the concept of failure
9. describe the theory of pure bending, shear stress in beams and torsion of circular shafts
10. describe theory of plasticity.

**Learning Outcomes**

At the end of the course, the students should be able to:

1. identify basic principles and techniques of structural design concepts;
2. describe factor of safety;
3. describe simple stress systems;
4. state relationships connecting various elastic constants;
5. analyse complex stress systems using analytic methods;
6. analyse complex stress systems using graphical methods;
7. draw Mohr’s and Strain Cycles; and
8. apply the theory of pure bending to beam bending problems.

**Course Content**

Introduction to building structural design concepts, principles and techniques, concepts and units of measurements. Concept of factor of safety. Simple stress systems such as direct stress (tensile and compressive) and shear stress. Elastic constants: moduli of elasticity and rigidity, bulk modulus, poisson’s ratio and volumetric strain. Rotation between the elastic moduli. Stresses induced in compound ties or struts. Thermal stress and strain. Mechanical testing of materials, behaviour of steel under load. Complex stress systems such as oblique stress in two dimensions. Complex stress systems three dimensions. Principal planes and stresses. Graphical methods of stress analyses. Mohr’s circles and Strain cycle. Concept of failure. Theory of pure bending. Torsion of circular shafts. Theory of plasticity.

**Minimum Academic Standards**

A conducive classroom with ancillary facilities/fitting in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 243:** **Principles of Valuation for Builders (2 Units; Compulsory; LH = 30)**

**Senate-Approved Relevance**

The determination of the value or worth of an asset or real property is particularly necessary for the purpose of letting, purchase, sale, audit, rating, compulsory purchase or taxation. Valuation places great emphasis on the professional judgment that are associated in the exercise. Since valuation mostly deals with projections about future events, analysts should enhance their ability to balance and evaluate different assumptions used in each phase of the valuation exercise, assess validity of available empirical evidence and come up with rational choices that align with the ultimate objective of the valuation activity. The Bayero University is an academic citadel located in one of the very richly endowed and conducive natural environments where the values of real properties are not only influenced by the selling price or income factors,  supply, demand, depreciation, obsolescence, property’s life, efficiency, structure, maintenance, location, bank interest, etc. but also by the economic activities from commercial activities. It is very important for the university to produce built environment professionals who will be familiar with the basic principles of the valuation, its purpose, the relevant circumstances [assumptions](https://www.toppr.com/guides/reasoning-ability/statements/statements-and-assumptions/) and facts that are appropriate and hence the process to be used for sustainable valuation.

**Overview**

The study of principles of valuation basically contemplates development of expertise in determining the value as that amount which is acceptable to both the buyer as well as the seller. The value of a particular asset or capital amount varies with time, since market shares fluctuate every day, every minute or even every second. The course therefore provides an understanding of the process of developing an opinion of value, for real property. It helps in the overall growth of an economy, by imparting a balanced knowledge about how an owner can buy or sell assets at profitable rates. The course generally helps us to determine the fair price or costs of a property such as a building, factory, land, etc at present or future time for different economic purposes.

The course specifically provides an understanding of the broad principles of valuation of properties, the purposes for which valuation of properties is required, explain the various terms used to assign specific meanings to value, distinguish between value and cost, describe the set up and functions of the official and the private valuation machineries, and provide an understanding of the broad classification of the methods used in property valuation. The course discusses the fact that uncertainty will be consistently present in every valuation exercises. Therefore, when performing any valuation method, analysts will be able to account and include all potential risks that may affect price of assets sustainable performance of property values.

**Objectives**

The objectives of the course are to:

1. explain the meaning value
2. differentiate between cost and value
3. describe the concept of valuation
4. identify five to six roles of valuation
5. discuss the functions of a valuer
6. describe movable and immovable properties
7. identify factors affecting value of properties in northern region
8. discuss the purpose of valuation table
9. describe the general mathematics of valuation
10. explain computation involving arithmetic and geometric progression.
11. clarify computation on Simple and compound interest
12. describe properties depreciation and amortization in construction.
13. explain the construction and analysis of valuation table
14. discuss the various methods of valuation
15. explain the process of valuation and preparation of reports
16. discuss how to account and include all potential risks in valuation
17. explain the importance of valuation during investment
18. clarify the relationship between Environment and Valuation

**Learning Outcomes**

At the end of the course, the students should be able to:

1. understand the meaning value and differentiate between cost and value
2. understand the concept of valuation
3. mention five roles of valuation and identify the functions of the valuer
4. know and describe movable and immovable properties
5. identify factors affecting value of properties in northern region
6. understand purpose of valuation table
7. understand the mathematics of valuation
8. carry out computation involving arithmetic and geometric progression.
9. carry out computation on Simple and compound interest.
10. understand depreciation of properties and amortization in construction.
11. construct and analyse valuation table.
12. understand and use the various methods of valuation.
13. understanding valuation process and preparation of reports.
14. account and include all potential risks in valuation.
15. gain a good understanding of valuation and investment.
16. understand the relationship between environment and valuation

**Course Contents**

Definition of Value. Difference between cost and value. Concept of Valuation. Roles of valuation. The function of the valuer. Overview of movable and immovable properties. Factors affecting value of properties. The purpose of valuation table. The mathematics of valuation. Arithmetic and geometric progression. Simple and compound interest. Depreciation of properties. Amortization in construction. Construction and analysis of valuation table. Methods of valuation. Understanding valuation process and reports. Risks in valuation. Valuation and investment. Environment and Valuation. Discuss the negative value consequence on the environment.

**Minimum Academic Standards**

A conducive classroom and seminar space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 244: Soil Mechanics and Foundation Design I** **(2 Units; Compulsory; LH 15; PH 45)**

**Senate Approved Relevance**

Training of high-quality graduates who are highly skilled and knowledgeable to advance the Science and Practice of soil mechanics and foundation design in marine environment is in tandem to BUK’s Mission to address sustainable technological development through the utilization of soil of northern Nigeria, and Kano state in particular.

The course is seen to be relevance as the graduates are to be equipped on the characterization of marine soil with application to foundation design and thereby mitigating foundation failures, chemical attack of marine soil on building elements/components as well as building structure collapse which are common phenomena in some parts of Nigeria.

**Overview**

The study of soil mechanics and foundation design at the undergraduate level is paramount to solving most engineering problems associated with foundation failures especially in the marine environment of northern region of Nigeria. Therefore, it is necessary to expose the builder to the nature, properties and mechanisms of marine soil and its implication in foundation design and construction.

The course is design to address the basic principles of soil mechanics as it relates to marine environment. Emphasis is placed on characterization of soil grains and deformation behaviour due to influences such as loads, water, chemicals and other influences. The course is particularly relevance as it guides the students to generate soil information data relevant to foundation design that are compactable with the soil nature and thereby attaining to sustainable building construction.

**Objectives**

The objectives of the course are to:

1. identify basic soil mechanics properties in solving foundation engineering problems.
2. identify peculiar properties of soil in some parts of Nigeria.
3. describe various soil classification systems.
4. enumerate various methods of soil improvement.
5. identify various methods of carrying out soil exploration
6. identify various methods of determining soil bearing capacity.
7. conduct laboratory experimentation on determination of maximum density of soil.
8. enumerate types of foundations.
9. list steps involved in the designing of foundation.
10. design a typical strip foundation.

**Learning Outcomes**

At the end of the course, the students should be able to:

1. apply basic soil mechanics principles in solving problems of earthwork and foundation engineering in marine environment.
2. identify and classified soil with their peculiar properties.
3. identify various methods of soil improvements.
4. determine optimum moisture content and maximum dry density using standard proctor test in the laboratory.
5. carry out site investigation using different investigation methods.
6. determine bearing capacity of soils using different methods.
7. identify types of foundations and the basis of their choice.
8. design a strip foundation.

**Course Contents**

Soil formation, types and engineering definition of soil and their characteristics. Soil identification/classification: textural, AASHTO, and unified soil classification systems. Index properties of soil: grain size, particle shape, plasticity, and the Atterberg Limits. Compaction of soil: laboratory and field compaction methods; standard compaction, moisture content and dry density relationship. Soil stabilization methods: mechanical, lime, cement and bitumen. Seepage analysis, groundwater and soil moisture. Soil exploration: objectives, methods of investigation, sampling techniques, field test and laboratory identification tests, soil profile, soil survey reports. Bearing capacity of soil: ultimate, safe and allowable bearing capacity; equations for determining bearing capacity. Consolidation: theory of consolidation, compression curve, curve fitting and time settlement curve. Soils in the Niger delta region of Nigeria: formation and characteristics. Foundation types: strips, pad, raft piles etc; shallow and deep foundations. Factors influencing choice of foundation. Factors for consideration in foundation construction. Foundation design steps. Design of strip foundation. Basic principles of soil mechanics and their application to the solution of problems in earthwork and foundation engineering.

**Minimum Academic Standards**

A conducive classroom with ancillary facilities/fitting in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 311: Analysis of Indeterminate Structures (2 Units; Compulsory: LH 30; PH 45)**

**Senate-Approved Relevance**

The Bayero University has a vision and mission of developing human capacity for sustainable development that is sensitive to Africa’s rich cultural heritage. Highly skilled and trained construction professionals are required in the forefront of sustainable development. These professionals will be responsible to the need of the community to ensure a safe and sustainable built environment. This is akin to BUK’s vision. Building graduates of BUK need to be knowledgeable in the analysis of structural systems for design or assessment purposes. They will apply available concepts and methods to solve the most complex problems relating to the strength and stability of structures. This is vital in addressing the human material and economic losses experienced in the Nigeria, as a result of incessant collapse of buildings.

**Overview**

Most structures, both new and existing, are idealized structurally as indeterminate structures. These structures range from long span bridges to multi-storey buildings around us. Analysis of these complex structures are carried out prior to their design to assess their behaviour under normal and abnormal loading scenarios. The safety of these built infrastructures is a primary concern to it owners, users and the community at large.

This course will provide students with the core requisites needed to adequately analyse complex structural systems, this will pave the way for their development towards the design of these structures with safety and functionality being their core concern. The objectives of the course, learning outcomes and contents are provided to address this need.

**Objectives**

The objectives of the course are to:

1. describe the fundamentals of static equilibrium;
2. apply the flexibility method to beam, truss and frame problems;
3. apply the stiffness method to beam, truss and frame problems;
4. apply the force method to beam, truss and frame problems;
5. apply software to analysis and design of structures;
6. describe structural forms, systems and elements;
7. describe stability of structural systems;
8. describe statical and kinematic determinacy;
9. apply moment distribution method to the analysis of beams, trusses and frames;
10. apply slope deflection method to the analysis of beams, trusses and frames; and
11. apply the finite element analysis method to the analysis of beams, trusses and frames.

**Learning Outcomes**

At the end of the course, the students should be able to:

1. apply fundamentals of static equilibrium in analysing beams, trusses and frames;
2. carry out analysis of framed structures by flexibility method;
3. apply stiffness method in analysing frame structures;
4. calculate and determine shear forces and bending moments by moment distribution method;
5. apply slope deflection methods in frame analysis.

**Course Contents**

Structural idealisation and Free bodies diagrams. Fundamentals of static equilibrium: application to the analysis of beams, trusses, and frames. Shear and moment diagrams, and sectional area properties. Flexibility method: Basic concepts, member flexibility matrix and application to pin-jointed redundant truss, plane frame, continuous beam and space frame. Stiffness Method: Basic concepts and formulation of the stiffness matrices, application to Pin-jointed redundant truss, plane frame, continuous beam and space frame. Analysis of structures by the method of forces. Programmes design/Analysis by software application. Introduction to structural forms, systems and elements, stability of structural systems. Statically and kinematic indeterminacy. Moment Distribution Method: Concepts and theories, application of the method to the analysis of continuous beam, frames with and without sway action. Slope-Deflection Method: Concepts and theories, application to continuous beam. Frames with and without sway action. Application of matrices to the slope-deflection method. Lateral load analysis in High-rise Buildings using the Cantilever method. Portal frame method. Finite element analysis. Yield line analysis.

**Minimum Academic Standards**

A conducive classroom with ancillary facilities/fitting in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 313: Science of Building Materials (2 Units; Compulsory: LH 15; PH 45)**

**Senate-Approved Relevance**

The Bayero University (BUK) has a vision and mission of developing human capacity for sustainable development that is sensitive to Africa’s rich cultural heritage. Highly skilled and trained construction professionals are required in the forefront of sustainable development. These professionals will be responsible to the need of the community to ensure a safe and sustainable built environment. This is akin to BUK’s vision. Building graduates of BUK need to be knowledgeable in the science of building materials so as to effect their correct application, weighing the material properties against their strength requirements, physical requirements, prevailing environmental conditions during use, as well as predicted future conditions (possibly due to climate change). Consideration of prevailing and future environmental conditions is vital in the northern region of Nigeria. They will carry out required tests to certify appropriateness of materials for use with standards of professionalism above the average standard of care expected, as stated in codes and building regulations.

**Overview**

Building and engineering structures are constructed with the sustainable use of materials sourced from above or below the earth’s crust. Some of these materials exist naturally in states where they could be used without additional processing while for others, the level of processing could range from simple to high energy consuming procedures. These processes determine the quality and properties of materials available to architects, builders and civil engineers for the development of the Africa and the global physically built environment.

This course will educate undergraduate students on the contemporary materials available for construction purposes. Their sources, extraction, manufacturing and processing will be discussed. This is in addition to tests demonstrated to determine the physical, chemical and mechanical properties of selected contemporary materials. These properties establish the suitability of materials for designed application and in specific environments. Case studies on the application of contemporary materials in proposed or existing structures will enlighten students on the vital roles and responsibilities expected of them in their future practice. The objectives of the course, learning outcomes and contents are provided to address this need.

**Objectives**

The objectives of the course are to:

1. describe the mining and extraction of metals used for construction, properties, problems and their tests methods;
2. describe the production of cement, concrete and mortar, types, properties, problems and their tests methods;
3. describe the production of timber used for construction, species, properties, problems and their tests methods;
4. describe the extraction of clay used for construction, properties, and associate problems;
5. describe the production of plastics used for construction, properties, problems and their tests methods;
6. describe the production of glass used for construction, properties, problems and their tests methods; and
7. describe through case studies issues associated with contemporary building materials and their use in Nigeria.

**Learning Outcomes**

At the end of the course, the students should be able to:

1. discuss on the extraction and production of contemporary building materials;

2. discuss the properties of contemporary building materials;

3. carry out further tests on concrete, contemporary building materials;

4. discuss the application of contemporary materials in building and associated problems; and

5. discuss case studies on contemporary building material.

**Course Contents**

This is a combination of theory and lab work dealing with the properties of more conventional and contemporary building materials and how they may be tested. Contemporary building materials are tested using standard procedures to establish design criteria, inspection and quality control programs. Studies on cement in buildings: cement raw materials; the production; and types. Cement products in buildings: foundation, floors, walls, ceilings, roofs and finishes; concrete and mortar; problems, case studies. Experiments on cement, concrete and mortar quality, strength and workability. Studies on metals in buildings: types of metal, iron, aluminium, copper, zinc, steel, etc; mining and extraction and uses. Uses of metals in building elements and components, problems, case studies. Experiments on metal quality and strength (elasticity, plasticity, stiffness, creep, hardness, toughness and fatigue). Studies on bitumen and asphalt in buildings: bitumen and asphalt as basic products, the production and problems, case studies. Studies of paints and vanishes in buildings: production and types of paints and vanishes; uses and problems, case studies. Studies on timber in buildings: Timber as basic building materials, Renewal materials – an advantage, afforestation and cause of deforestation, timber products in buildings – Foundation, Floors, walls, ceiling, roofs, finishes, structural frames. Performance of timber in buildings, maintenance aspects, problems, case studies. Experiments on timber physical and mechanical properties. Studies on glass in buildings: introduction to glass technology and manufacture, utilization of glass in buildings. Critique of glass as external curtain, maintenance aspects, problems, case studies. Experiments on glass physical and mechanical properties. Studies on plastics in buildings: introduction to plastic technology and manufacture, utilization of plastics in buildings. Performance of plastics in buildings, maintenance aspect, problems, case studies. Studies on clays in buildings: clay as a basic product; the production. Clay products in buildings foundation: floors, walls, ceilings, roofs and finishes; problems, case studies.

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**Minimum Academic Standards**

A conducive classroom with ancillary facilities/fitting in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 323: The Thermodynamics of Buildings in the Tropics (2 Units C: LH 15; PH 45)**

**Senate Approved Relevance**

The goal of ensuring safe, comfortable, functional and environmentally-friendly buildings heralded the introduction and study of the thermodynamics of Buildings in the Tropics course at various universities of Nigeria. This branch of engineering provides detailed training on the design, installation, operation and monitoring of various mechanical equipment, especially for various building types and processes. With BUK’s zero tolerance for practices capable of leading to any form of environmental degradation, building services specialists in the Department of Building aim to uphold and teach the utilization of renewable energy sources, eco-friendly strategies that undergo thermodynamic processes during operations.

**Overview**

Sustainability, digitalization, carbon reduction and energy conservation in buildings are prevailing global drivers toward a carbon neutral-built environment. This course provides strategic methods of analysing indoor thermal conditions, human thermal requirements and the tropical environmental conditions.

The course details the energy conservation principles, steady state conditions, behaviour and properties of pure substances, first and second laws of thermodynamics and the underlying principles. The course further explains heat and work reversibility, nature and exchange of energy. This course will equip students with an invaluable knowledge of the basic concepts and principles of thermodynamics of buildings in the tropics, management of energy in buildings, understanding of the extant laws regulating the design and installation of thermodynamic systems for both domestic and commercial purposes.

**Learning Outcomes**

At the end of the course, students should be able to:

1. define and explain basic concepts of thermodynamics; and
2. state laws of thermodynamics.
3. explain thermal efficiency, heat, work and their relationships.
4. define energy and state the different forms of energy
5. explain how heat engines (refrigerators, AC units, etc.) work
6. Use the steady state energy equations to estimate work, heat and energy flows.

**Objectives**

The objectives of this course are to:

1. understand the basic laws and principles of thermodynamics of Buildings in the Tropics
2. apply the established principles to real thermodynamic systems;
3. appreciate the science of transferring energy from one state and place to another state an place.
4. introduce the tools required for analysing energy systems from renewable and fossil sources.
5. Identify environmental issues associated with various energy systems.

**Course Contents**

Definition of essential terms and general concepts. Laws of Thermodynamics especially with respect to building services and systems. Definition and basic concepts of thermodynamics system concept, open and closed systems. Flow and non-flow pressures. State of a system. Properties of a system. Temperature, work and heat the cycle. The first law of thermodynamics. Mechanical equivalent of heat, corollaries of the first law. Energy equation (of the first law) and reversibility. Work and reversibility. Heat and reversibility. Constant volume process. Constant pressure process. Polytrophic process. Adiabatic process. Isothermal process. The steady flow energy equation (of the first law). Open systems with steady flow, nozzle and diffuser, turbine and compressor, throttling reciprocating compressor.

The second law of thermodynamics. Cycle efficiency. The Clausius statement of the second law.

**Minimum academic standards**

A conducive learning environment and well-equipped building services laboratory, in line with the NUC-MAS requirements, are vital

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**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK – BUD 324:** Soil Mechanics and Foundation Design II (2 units; compulsory; LH 15; PH 45)

**Senate Approved Relevance**

The Bayero University is an academic citadel located in one of the very richly endowed and conducive natural environments in Nigeria. The University has enormous potentials for the training of graduates in the area of science, technology and engineering towards providing solutions to enormous human and environmental issues.

BUK is therefore positioned to train and produce graduates that will be equipped with necessary and adequate knowledge in sciences and technology of soil mechanics and foundation designs toward building a sustainable environment. It will also provide indigenous and local remediation techniques to reposition foundation design thereby mitigating failures associated with foundations in some parts of Nigeria.

**Overview**

The study of the course will equip the graduates of building to the analysis of soil properties and its application in foundation design, as well solving most engineering problems associated with foundation failures especially in sub-Saharan Africa.

The course is design to address the principles of soil mechanics as it relates to marine environment. Emphasis is placed on the mechanical behaviour of soil grains due to imposition of external loads. The course is particularly relevance as it guides the students to generate soil information data relevant to foundation design that are compactable with the soil nature and thereby attaining to sustainable building construction.

**Objectives**

The objectives of the course are to:

1. describe shear strength of soils.
2. conduct various laboratory tests on shear strength of marine soil.
3. identify various types of settlement/consolidation
4. enumerate various methods of computing earth pressure.
5. analyse various slope stability in relation to marine soils.
6. identify types of soil stresses.
7. identify various methods of water flows in soils.
8. analyse and design pad foundation.
9. analyse and design combined footings.
10. enumerate types of deep foundations.

**Learning Outcomes**

At the end of the course, the students should be able to:

1. discuss shear strength of soil, and carry out tests on shear strength determination
2. explain the various types of soil settlement and consolidation particularly in marine soils
3. list various methods of computing earth pressure.
4. discuss various analysis of slope stability in marine environment.
5. explain types of soil stresses.
6. identify various methods of water flow in soils
7. design pad, combined footings as well as mention types of deep foundations.

**Course Contents**

Shear strength of soils: General strength consideration, state of stress at a point, and Mohr’s stress circle. Shear tests: vane, shear box, and triaxial shear strength of saturated clay, shear strength of compacted unsaturated clay. Settlement: causes, immediate and consolidation settlement, analysis of total and time of settlement. Consolidation: primary and secondary consolidation, one – dimensional consolidation Oedometer test. Earth pressure: pressure equilibrium, active, and at rest, earth pressure coefficients. Computation of earth pressure using Ranks and Coulomb’s wedge theories. Earth pressure on retaining walls. Stability of slopes: types and mechanics of earth failure, immediate and long term slope stability problems. Theoretical solutions of slope stability problems. Graphical solutions of slope stability problems. Soil stresses: neutral and effective stresses in soils, modules of elasticity, poison’s ratio. Stress analysis and displacement: Wastergard, Boussineq, Brumister methods, and Newmark. Water in soil: seepage through soils, flow net. Foundations: analysis and design of combined footings. Deep foundations: use and general characteristics of piles, piles in sand, piles in clays, negative skin friction, piles group. Bearing capacity and settlement of pile groups.

**Minimum Academic Standards**

A conducive classroom with ancillary facilities/fitting in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 414: Research Methods in the Built Environment** **(2 Units; Compulsory; LH = 30)**

**Senate-Approved Relevance**

The turning out of students who can carry out investigation to unravel the solution to social economic and environmental problems in the African area is germane to the realization of the goals of a citadel of learning for the overall development of the Nation. The process of research opens up and expands new [opportunities for learning](https://openeducationonline.com/) and growth. It encourages finding of the [most recent information available](https://news.google.com/topstories?hl=en-US&gl=US&ceid=US:en) and gives you a solid foundation on which you can build your ideas and opinions

Research introduces new ideas which help in problem solving and building of credibility. The process of research helps raise awareness of specific and general issues in the built environment. The curiosity and discernment imbibed through research helps to bring about innovation and development.

**Overview**

Research methods involves a systematic enquiry into an observed problem, this encompasses systematic gathering of data and information and its analysis for advancement of knowledge in the built environment especially in an area prone to the consequences of oil exploration, underground and surface water. It attempts to find answer to intellectual and practical questions through application of systematic methods. Specifically, research is a studious inquiry, examination or investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws which must be responsive to global environmental changes.

Research is sometimes considered as a movement, which involves transition from the known to the unknown. Because research is universal, the students must be made to understand the systematic process of enquiry and documentation of fact for universal acceptability of results. In view of the dynamics of life, problems generated by man in the environment and the need for technological development it is pertinent to continue review and study various challenges for social, economic and environmental sustainability.

**Objectives**

The objectives of the course are to:

1. describe the general definition, purpose and benefits of research.
2. identify the overall process of designing a research study from its inception to its report.
3. identify and discuss the ethical issues in educational research, including those issues that arise in using quantitative and qualitative research.
4. identify and discuss the primary characteristics of various types of research
5. describe how to develop a researchable topic and identify the research problem in the study.
6. describe how to write a good introduction to a research study and the components that comprise such an introduction.
7. identify the process of conducting a literature review for a scholarly educational study
8. identify and discuss the components of research methodology including defining and conceptualization of independent, dependent, and mediating variables, development of research instruments.
9. distinguishing between a population and a sample
10. identifying and discussing appropriate tools for analysis
11. identifying the process of discussion of result, conclusion and recommendation.
12. describe the general principle of referencing
13. describe the general process of presentation of result.

**Learning Outcomes**

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

1. describe at least five research techniques for scientific enquiry
2. identify two research problems and develop corresponding research topic
3. develop researchable objectives based on the identified research problems
4. carry out detailed research in specific areas of specialisation
5. develop variables, obtain data, analyse and interpret result in line with the objectives
6. discuss the result, conclusion and recommendation in line with the aim and objectives
7. prepare a detailed research report.

**Course Contents**

Meaning and types of research. Criteria and quality of a good research. Classification of research. Identification of a research problem. Sources of research problem. Formulating study topic and objectives. Hypothesis and its formulation. Discussion of other components of introduction. Meaning and importance of literature review. Meaning and characteristics of a theory in research. Meaning of theoretical framework. Definition of conceptual framework.

Elements of research methodology (Research design, Population, Sampling, Instruments for data collection, Instrument validity and reliability, Conceptualization of research variables, Data collection and analysis, guide for selection of tools for data analysis), Guide to referencing.

**Minimum Academic Standards**

A conducive classroom and seminar space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 415: Building Contracts Law and Alternative Resolution** (2 Units; Compulsory; LH 30)

**Senate-Approved Relevance**

Provision of highly trained and skilled building production managers that will aid construction project success through effective contract administration, professionalism in the avoidance of litigations and peaceful resolution of construction disputes is in line with BUK’s Vision and mission of developing human capacity for sustainable development. Subsequently, graduates from the building programme in BUK will be able to deploy their trainings, skills and professionalism in contract administration and peaceful resolution of construction disputes to enhance construction project success in Akwa Ibom State, Nigeria.

**Overview**

Effective contract administration and professionalism in the handling and avoidance of disputes is a crucial consideration for project success which in turn will facilitate infrastructure development, aid housing delivery, and reduce conflicts and disputes on construction projects. Considering the volume of construction activities in Kano State, Nigeria, every effort to enhance project success cannot be ignored.

This course is therefore intended to equip students with the knowledge of: contract administration in relation to the prevalent contract types in Kano State, Nigeria; law of torts with respect to persons, properties, negligence, and nuisance, which is essential for professionalism in the avoidance of litigations; and the principles of arbitration for amicable settlement of disputes, should it arise. This course is important in developing human capacity that will contribute to projects success in the State through professionalism, effective contract administration and skills in peaceful resolution of construction disputes. Consequently, it will contribute to the Social Development Goals in the area of building resilient infrastructure by aiding construction projects’ successes. The objectives of the course, learning outcomes, and contents are provided to address this need.

**Objectives**

The objectives of the course are to:

1. describe the elements of construction contracts for projects executed in Kano State, Nigeria.
2. clarify conditions of contract.
3. describe standard forms of building contracts in Kano State, Nigeria.
4. state the rights, responsibilities and relationships of parties to a building contract.
5. explain elements to be considered in creating and drafting the sub-contract documents for building projects in Kano State, Nigeria.
6. describe the contract types employed for building projects in Kano State, Nigeria.
7. state components of building contract documents used for procuring building projects in Kano State, Nigeria.
8. describe the nature of the law of torts.
9. present the general defences and remedies against any action in tort.
10. clarify torts affecting property, and persons.
11. explain the tort of nuisance and negligence.
12. describe the nature of arbitration.
13. explain the principles of arbitration under the 1988 Arbitration and Conciliation Act (ACA).
14. describe the characteristics of arbitrators
15. explain the conduct of an arbitral proceeding
16. present the nature of the award handed down by arbitral tribunal.

**Learning Outcomes**

On completion of the course, students should be able to:

1. describe at least 4 elements of construction contracts for projects executed in Kano State, Nigeria.
2. distinguish between express and implied conditions of contract.
3. describe at least two standard forms of building contracts for project procurement in Kano State, Nigeria.
4. state at least four rights, responsibilities and relationships of parties to a building contract.
5. state at least 3 elements to be considered in creating and drafting the sub-contract documents for building projects in Kano State, Nigeria.
6. describe at least two contract types employed for building projects in Kano State, Nigeria.
7. state at least five components of building contract documents used for procuring building projects in Kano State, Nigeria.
8. describe at least damage and liability in tort, compare intra vires and ultra vires activities; and joint tortfeasor and vicarious liability.
9. present at least four general defences and remedies against any action in tort.
10. state at least two trespass and three defences in torts affecting persons and properties respectively.
11. explain contributory negligence and at least three elements necessary for an action of tort of negligence.
12. describe arbitration, state three disputes that can be referred to arbitration, and 3 differences between arbitration, mediation and conciliation.
13. state the form and terms of arbitration agreement, three facts relating to amendment of arbitration agreement, and three actions that can be taking to compel a recalcitrant party to proceed with arbitration.
14. state at least three facts in the appointment of an arbitrator, three list-procedure for the court to follow in the appointment of a sole arbitrator, and 3 conditions for termination of an arbitrator.
15. state at least three duties of an arbitrator following appointment, and three conditions for arbitral proceedings to proceed exparte.
16. explain the form and content of an award, three types of awards, and five things that could constitute misconduct on the part of the arbitrator.

**Course Contents**

Basic principles of contract law. Nature of building construction contracts, formation of contracts, and rectification. Conditions of contracts and standard forms of building contracts (FMW, JCT, FIDC). Rights, duties and the relationships between various parties to a construction contract. Basic principles in the formation and compilation of sub-contract documentation for contracts executed in Nigeria. Contract types employed for building projects in Nigeria, their conditions and disadvantages. Standard contract documents and articles of agreement for building projects executed in Nigeria. General principles of tort – damage and liability, liabilities of corporations including intra vires and ultra vires activities, liability for torts of independent contractors, termination of liability in tort, joint *tortfeasor* and vicarious liability. General defences against any action in torts. Remedies to injury or loss suffered in an action of tort. Specific torts - torts affecting property, torts affecting persons. Tort of nuisance – public nuisance, and private nuisance. Tort of Negligence. Nature of arbitration – definition of arbitration, disputes that can be referred to arbitration, parties to agreements to arbitrate. Distinction between arbitration and other forms of ADR (mediation, and conciliation). Arbitration under the 1988 Arbitration and Conciliation Act (ACA) – Arbitration agreements (form and terms), amendment or alteration of arbitration agreement, revocation of arbitration agreement, and enforcement of an arbitration agreement. The nature of arbitrators – Appointment of arbitrators, appointment by the court, challenge of arbitrator, termination of arbitrator’s mandate, appointment of substitute arbitrator. Conduct of arbitral proceedings – preliminary proceedings, hearing, proceedings exparte, closing of proceedings. The award – types of awards, form and content of an award, correction and interpretation of award, impeaching the award, and enforcement of the award.

**Minimum Academic Standards**

A conducive classroom space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 415: Alternative Construction Technologies and Methods (2 Units; Compulsory: LH 30)**

**Senate-Approved Relevance**

The Bayero University (BUK) has a vision and mission of developing human capacity for sustainable development that is sensitive to African rich cultural heritage. Highly skilled and trained construction professionals are required in the forefront of sustainable development. These professionals will be responsible to the need of the community to ensure a safe and sustainable built environment. This is akin to BUK’s vision. Building graduates of BUK need to be knowledgeable in alternative construction technologies and methods so as to make available the benefits accrued from the use of these technologies and methods to the people of Africa and the world at large. A broad incorporation of local, renewable and recycle-able materials into these technologies make the vital towards the pursuit of economic and environmental sustainability, be it at the international, national or regional level. The course educates and empowers building graduates and students of BUK to be at the forefront of this drive.

**Overview**

The sustainability of built infrastructure and their process of construction is a primary concern to the global community. Knowledge of alternative construction technologies and methods that are green and sustainable is important to stay relevant and actively contributing towards targeted sustainable development goals. This underscores the need for highly trained and innovative students with the knowledge and skills to develop new sustainable alternative construction technologies and methods or effectively apply existing technologies.

This course is designed to equip students with the basic knowledge of consideration, limitations, advantages, examples and application of alternative construction technologies and methods. The importance of the course lies in its ability to empower students towards being professionally responsible in their practice, through concern for their sustainable use of energy and renewable materials in methods employed. The objectives of the course, learning outcomes and contents are provided to address this need.

**Objectives**

The objectives of the course are to:

1. identify and describe considerations for alternative construction technologies and methods,
2. describe the evolution of alternative construction technologies and methods,
3. describe the limitations of alternative construction technologies and methods,
4. examine local technologies in relation to intermediate and international technologies,
5. develop construction methodologies for various design solutions, and
6. describe the relationship between sustainability and alternative construction technology and methods.

**Learning Outcomes**

At the end of the course, the students should be able to:

1. identify alternative construction technologies and methods;
2. state advantages and disadvantages of alternative construction technologies and methods;
3. state the limitations of alternative construction technologies and methods;
4. describe the Bamboo construction technique; and
5. describe the Rammed earth construction technique.

**Course Content**

Technology options for various design solutions. Examination of local technology, intermediate technology and examination of technology involved in other parts of the world. Construction methodologies to explored by the registered builder for various design solutions. Hypothetical or real-life project scenarios. Evolution of alternative construction technologies and methods. Limitations of alternative construction technologies and methods. Advantages and disadvantages of alternative construction technologies and methods. Rammed earth construction technique. Stra-bale construction technique. Bio-concrete construction technique. Ashcrete technologies. Papercrete construction technique. Bamboo construction technique. Earthship construction technique. Shipping containers construction technique. 3-D printed homes. Crumb rubber construction technique. Bottle buildings. Newspaper wood construction technology.

**Minimum Academic Standards**

A conducive classroom with ancillary facilities/fitting in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 416: Health and Safety Management in Construction** (2 Units; Compulsory; LH 15; PH 45)

**Senate-Approved Relevance**

The development of highly trained and skilled health and safety officers and building project managers that will be responsive to the need of the construction industry to ensure a safe work environment that will be environmentally, socially and culturally sustainable is akin to BUK’s Vision and mission of developing human capacity for sustainable development that is sensitive to Nigeria’s rich cultural heritage. Consequently, graduates from the building programme in BUK will be able to utilise their trainings and skills to produce health and safety plans and Building Production Managers that will curb the rate of accident occurrence, injuries to workers, sicknesses and ultimately loss of life on construction projects in Nigeria and Africa.

**Overview**

The importance of health and safety performance on construction projects cannot be overemphasised following the hazardous nature of construction activities, its environment and the fatalities of occurrence of accidents and sicknesses. Following the increasing pace of construction activities in Kano state as being a commercial centre in West Africa, consideration of health and safety performances of construction projects becomes imperative.

This course is designed to provide students with the requisite trainings and skills, not only to function as health and safety officers, but also to manage construction projects safely. The students, bearing in mind the safety cultures of construction companies in the state, will be able to prepare health and safety plans for construction projects, which is fast becoming an essential component of a building contract document. The importance of the course is derived from the need to arrest the rate of accident occurrence and absenteeism on construction sites with its attendant consequences of loss of lives, injury, wastage of resources, and etc. Further, it will aid in the achievement of the sustainable development goals (SDGs) in the area of good health and well-being. The objectives of the course, learning outcomes, and contents are provided to address this need.

**Objectives**

The objectives of the course are to:

1. describe the characteristics of construction industry directly associated with construction safety
2. describe safety culture and identify safety cultures of construction companies in Kano State.
3. describe Occupational Safety and Health Management Systems (OSHMS) and identify elements of OSHMS in OSHMS standards.
4. state the components of health and safety policy for an organisation.
5. identify hazards and risks associated with elements of construction projects
6. describe the development of health and safety plan for construction projects based on ISO 45001 standards and prevalent safety cultures in Kano state.
7. explain safety hierarchy of controls and the steps in hazard control planning.
8. describe lagging and leading indicators of safety performance.
9. explain the procedures for accident/incident reporting and steps required in writing the report.
10. clarify the best practice for setting up safety committees.
11. define construction housekeeping and state house keeping checklists for construction sites
12. explain the considerations for selecting appropriate PPE and state the categories of PPE and their uses in the construction industry in Kano State.
13. describe common risks facing construction workers and the ergonomic solution

**Learning Outcomes**

On completion of the course, students should be able to:

1. describe at least 3 characteristics of construction industry directly associated with construction safety
2. describe safety culture and identify safety cultures of one construction company in Kano State.
3. state the meaning of Occupational Safety and Health Management Systems (OSHMS) and identify at least five elements of OSHMS in 2 OSHMS standards.
4. state at least five components of health and safety policy for an organisation.
5. identify at least five hazards and risks associated with 2 elements of construction projects
6. develop health and safety plan for at least one construction project based on ISO 45001 standards and prevalent safety cultures in Kano state.
7. state safety hierarchy of controls and list at least five steps in hazard control planning.
8. describe at least 3 lagging and leading indicators of safety performance in each case.
9. state the procedures for accident/incident reporting for one category of accident and at least 4 steps required in writing the report.
10. state at least five considerations for setting up safety committee and five duties of a health and safety committee.
11. define construction housekeeping and state at least ten housekeeping practices for construction sites
12. state at least five considerations for selecting appropriate PPE applicable for construction projects executed in Kano State, five categories of PPE and three uses in each category.
13. state at least five common risks facing construction workers in Kano state and the ergonomic solution

**Course Contents**

Main characteristics of construction industry directly associated with construction safety. Safety culture definitions, characteristics of a safety culture, types of safety culture, and culture change management. Health and Safety Management Systems (Definitions of Safety Management Systems, overview of OSHMS standards – BS 8800, OSHAS 18001, HSG 65, ILO-OSH 2001, and ISO 45001, benefits of OSHMS in the construction industry). Elements of Occupational Health and Safety Management Systems (Elements of OSHMS in ISO 45001, OSHAS 18001, HSG 65, ILO-OSH 2001, BS 8800). Development of health and safety policy for an organization. Health and safety planning, implementations and control. Assessment of hazards and risks in each element of construction. Development of Health and safety plan for a construction project ISO 45001 standards. Assessment and implementation of Risk Control Plan. Safety performance measurement. Lagging indicators of safety performance – Total Recordable Incident rate (TRIR), Lost Time Cases (LTC), Days Away Restricted or Job Transfer (DART), and Experience Modification Rate (EMR). Leading indicators of safety performance measure. Accidents and incidents investigation process. Reporting of accidents. Formation and duties of Health and Safety Committee in an organization. Housekeeping at Construction site. Selection and utilization of appropriate PPEs at site. Ergonomics in project delivery process.

**Minimum Academic Standards**

A conducive classroom and seminar space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-** **BUD 421: Real Estate and Affordable Mass Housing Development (2 Units C: LH 30)**

**Senate-Approved Relevance**

The development of sustainable infrastructure is imperative to actualisation of Bayero University vision and mission statement. Commitment to real estate and mass housing development is fundamental to solving the problem of housing deficit in Kano State in particular and Nigeria at large. The development of real estate and mass housing units that are economically viable, socially responsible and environment friendly will curb crime and other societal problems associated with homelessness. This will help to achieve the millennium development goals. This course will equip the professionals in the built environment to have adequate knowledge of management practices of real estate and affordable mass housing development and contemporary technologies that are required to solve the problem of inadequate housing provision in Kano State in particular, and Nigeria at large.

**Overview**

Housing development is a physical development that must satisfy its functions and functional requirements. Some regions of Nigeria have suffered environmental degradation as a result of oil exploration activities in the region. Environmental pollution from the activities of the construction sector has also contributed to the problem. Therefore, considerations of sustainability concerns (Environmental, economic, and social) during the planning stage, construction, and operation phases of real estate and mass housing development will help to solve sustainability issues within the built environment. Developing real estate and affordable housing units in Kano and its environs is a good initiative but must not be carried out at the detriment of environmental and social sustainability of the host communities. Hence the need to understand the sustainability dimensions and incorporate them throughout the developmental stages. Shelter is one of the basic needs of mankind. It has become a big challenge for many citizens to have affordable housing to accommodate themselves and their families. Individuals, families, cooperatives and government at all levels have tried different options but their efforts have not yielded the desired results. There is a great need to provide housing for all. This is line with millennium development goals (MDGs). Adequate knowledge and application of technology have been identified as one of the drivers of housing provision. Therefore, this course is structured to study contemporary technologies and their application in the management ofreal estate and affordable mass housing development.

To develop real estate and affordable mass housing, there is need to understand the role and importance of real estate, parties in real estate, real estate development processes, off takers, sustainable sources of finance for the development, and how to secure the finance for the real estate and affordable housing development. There is also the need to understand demand and supply side for real estate, and financial and legal aspects of real estate and housing development. This course covers in-depth study on contemporary technologies, and their application in the management of real estate and housing development. The course appraises the challenges in the adoption of contemporary technologies in real estate and housing development. There is need for sustainable real estate and housing projects, hence the need for green technology principles in housing projects.

**Objectives**

The objectives of the course are to:

1. understand the role and importance of real estate
2. understand the responsibilities of parties in real estate
3. understand Real Estate and mass housing development processes
4. study financial and legal aspects of real estate and mass housing development.
5. identify off takers
6. understand Demand and supply side for real estate
7. understand conventional technology in real estate and mass housing development and its challenges
8. understand contemporary technologies for real estate and affordable housing development
9. appraise the challenges in the adoption of contemporary technologies in real estate and mas housing development.
10. generate innovative alternatives in real estate and mass housing development
11. manage risks in real estate and mass housing development
12. explore green housing development
13. explore green finance for housing development
14. explore green materials for green housing development
15. assess factors affecting the development of real estate
16. assess factors affecting the development of affordable housing
17. create business models for sustainable real estate development

**Learning Outcomes**

At the end of the course, the students should be able to:

1. understand the role and importance of real estate
2. understand the responsibilities Parties in real estate
3. understand real estate development processes
4. study financial and legal aspects of real estate and mass housing development.
5. identify off takers
6. understand demand and supply side for real estate
7. understand conventional technology in real estate and housing development and its challenges
8. understand contemporary technologies for real estate and affordable housing development
9. understand the challenges in the adoption of contemporary technologies in real estate and housing development.
10. generate innovative alternatives in real estate and housing development
11. manage risks in real estate and mass housing development
12. explore green housing development
13. explore green finance for housing development
14. explore green materials for green housing development
15. assess factors affecting the development of real estate
16. assess factors affecting the development of affordable housing
17. create business models for sustainable real estate development

**Course Contents**

Study the role and importance of real estate. Understand the responsibilities of Parties in real estate. Understand Real Estate Development Processes. Study financial and legal aspects of real estate and mass housing development. Identify Off takers. Understand Demand and supply side for real estate. Discuss conventional technology and its challenges. Discuss contemporary technologies for real estate and affordable housing development: prefabrication technology and its benefits and challenges, industrialised technology and its benefits and challenges, alternate Formwork Systems, Prefabricated Sandwich Panel Systems, Steel Structural Systems, Precast Concrete Construction. Appraise the challenges in the adoption of contemporary technologies in real estate and housing development. Generate innovative alternatives in real estate and housing development. Manage risks in real estate and mass housing development. Explore Green housing development. Explore Green finance for housing development. Explore Green materials for green housing development. Assess Factors affecting the development of real estate. Assess Factors affecting the development of affordable housing. Create business models for sustainable real estate development.

**Minimum Academic Standards**

A conducive classroom and seminar space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 511: Buildability and Maintainability Analysis of Building Projects** (**2 Units C: LH 15; PH 45**)

**Senate-Approved Relevance**

The development of competent construction professionals and construction of sustainable infrastructural development are imperative to actualisation of BUK vision and mission statement. Consideration and application of buildability and maintainability principles in building projects is fundamental to developing infrastructure that are economically viable, socially responsible and environment friendly. It will help to curb the menace of building collapse and infrastructural decay, there achieving a healthy, and sustainable built environment.

**Overview**

Building project is a physical development that must satisfy its functions and functional requirements. Faulty design, poor or inappropriate materials and poor construction can inhibit its ability to perform effectively/optimally, and generate enormous waste during construction. There is need to design for the economical use of skilled personnel during assembly, design for the use of widely available and versatile tools, plants and equipment, design simple and practical interfacing and fixing components, avoid conversions between materials, components and sub- assemblies which are complex, especially on site, use standard interfaces and fixings as much as possible, and specify well established and understood materials, components and sub-assemblies.

Buildability and maintainability analysis report include dimensional coordination, tolerance, discrepancies, omissions, errors, variety, conversions, handling, personnel skill, details, spare parts, access for maintenance, and buildability and maintainability factor. This course helps to reduce waste construction materials and time on site. It also ensures ease of access to the building when there is need for maintenance in the building.

**Objectives**

The objectives of the course are to:

1. define buildability and maintainability
2. identify alternative name of constructability
3. develop concepts and principles of buildability
4. identify stages of consideration,
5. establish the benefits of good buildability
6. identify support for buildability
7. identify barriers to implementation
8. identify the need for buildability
9. identify project aspects influencing buildability
10. identify the construction process
11. develop conceptual planning for buildability
12. identify information for preparing buildability analysis
13. identify the responsibilities of the construction professionals involved
14. identify techniques of assembly
15. establish personnel organization.

**Learning Outcomes**

At the end of the course, students should be able to:

1. understand concepts and principles of build ability and maintainability;
2. carry out build ability and maintainability analyses;
3. prepare build ability and maintainability reports for building projects.;
4. identify barriers to implementation; and
5. identify project aspects influencing buildability
6. give advice on efficient, economic and optimal solution to all issues observed in the production information

**Course Contents**

Definition of buildability. Alternative name of constructability. Development of concepts and principles of buildability. Stages of consideration. Benefits of good buildability. Support for buildability. Barriers to implementation. The need for buildability. Project aspects influencing buildability. The construction processes. Conceptual planning for buildability. Information for preparing buildability analysis. Responsibilities. Techniques of assembly. Personnel organization. Analyse the observations in terms of cost to arrive at buildability and maintainability factor. Carry out comparative cost analysis of design simplicity.

**Minimum Academic Standards**

A conducive classroom and seminar space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

BUK-BUD 513: **Skills and Entrepreneurial Development** (2 Units; Compulsory; LH 15; PH 45)

**Senate-Approved Relevance**

The production of students with the knowledge, zeal, motivation for entrepreneurial development and requisite skills in the building industry is in consonance with BUK’s vision and mission statement of developing human capacity for sustainable development. Subsequently, graduates from the building programme in BUK will be able to deploy their knowledge and zeal of entrepreneurship in the construction industry to be self-employed or employable by taking advantage of the opportunities inherent in the State’s rich oil and gas resources with its attendant high volume of construction activities.

**Overview**

Skill acquisition and entrepreneurial development are essential considerations for economic growth and development. This is true, especially for a developing nation like Nigeria and particularly for South-South, Nigeria where the poverty level is high and there are enormous opportunities arising from its rich human and natural resources. The building industry, being one of the highest employers of labour after the government, offers great opportunities, both for employment and business developments.

This course is intended to equip students with the knowledge of the essentials and requirements of becoming a successful construction business entrepreneur or a much sought-after employee who possesses the right skills for the industry. This course is important in addressing the problems of skill deficit in the building industry and high level of unemployment in the country, particularly in north-west, Nigeria. Consequently, it will contribute to the Social Development Goals in the area of no poverty, and decent work and economic growth. The objectives of the course, learning outcomes, and contents are provided to address this need.

**Objectives**

The objectives of the course are to:

1. describe Entrepreneurial theories, interpersonal or personal characters and behavioural traits required for a successful entrepreneur.
2. state the considerations necessary for starting a business.
3. explain the structure of different business types and state the responsibilities of the categories of personnel involved.
4. describe business ethics and social responsibility
5. describe business promotion agencies in Nigeria.
6. explain the roles of the government in business promotion in Nigeria.
7. identify the problems of construction business enterprises generally and in South-South, Nigeria.
8. state peculiarities of construction business enterprises generally and in South-South, Nigeria.
9. state the opportunities and nature of construction business in South-South, Nigeria.
10. explain the elements in a condition of service and the rights and obligations of employees.
11. state the rights and responsibilities of trade unions in relation to the trade unions Act 2005.
12. explain the procedure for undertaking case study.
13. describe a business case for a construction business.
14. explain the National Occupation Standards.
15. describe Nigerian Skills Qualification Framework for building trades in Nigeria.
16. explain Skills Sector Council, Awarding Body and Training Providers.
17. describe the processes involved in skills qualification delivery.

**Learning Outcomes**

On completion of the course, students should be able to:

1. state at least five characters and behaviour traits essential for an entrepreneur.
2. present at least five considerations necessary for starting a business generally and in South-South, Nigeria.
3. describe the structure of at least two different business types and state at least four responsibilities of the categories of personnel involved in each of the business types.
4. describe business ethics and social responsibility and state at least five business ethics and five social responsibilities of a business enterprise.
5. describe at least three business promotion agencies in Nigeria and state at least four functions of each.
6. state at least five roles of the government in business promotion in Nigeria.
7. identify at least five problems of construction business enterprises generally and in South-South, Nigeria.
8. state at least four peculiarities of construction business enterprises generally and in South-South, Nigeria.
9. identify at least four opportunities and four nature of construction businesses in South-South, Nigeria.
10. state at least five elements in a condition of service and five rights and obligations of employees.
11. present at least four rights and responsibilities of trade unions in relation to the trade unions Act 2005.
12. undertake a case study of one construction enterprise and present the report.
13. present a business case for establishing one construction business.
14. define National Occupation Standards and state how it relates to national, occupation, and standards.
15. describe Nigerian Skills Qualification Framework for building trade in Nigeria and state at least five objectives of NSQ.
16. describe Skills Sector Council, Awarding Body and Training Providers and state at least five conditions and procedures for establishing sector skills council.
17. describe the twelve processes involved in skills qualification delivery and acquire skills in at least one building trade from a training provider.

**Course Contents**

Entrepreneurial theories, interpersonal or personal characters and behavioural traits required for a successful entrepreneur. Operational functions of an entrepreneur (production, marketing, financial management, accounting). Basic consideration in starting business. Organisation and management of business. Business ethics, social responsibility of business. Business promotion agencies in Nigeria. Problems of Nigerian business enterprises. Peculiarities of construction business enterprises. Construction and property business in Nigeria. Service organisation, labour management relations. Labour legislation, trade union rights and responsibilities. Principles of case study – defining the case, selecting the case, collecting and analysing the data, interpreting data, and reporting the findings. Case studies in construction entrepreneurship. Business case – meaning, the need for a business case, and how to write a business case. National occupational standards for building trades. National skills qualification framework for building industry in Nigeria. Skills Sector Council, Awarding Body and Training Provider. Skills acquisition in construction and supervision of building trades in construction.

**Minimum Academic Standards**

A conducive classroom space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 514: Finance Management in Construction (2 Units; Compulsory; LH = 30)**

**Senate-Approved Relevance**

Bayero University is located in the northern region prone to the consequences of populated density, this poses a lot of burden on the resources harnessed and used in building and other infrastructural development in Kano state. Generally, project execution in the construction industry is prone to more risks than any other industry. The primary source of failure for many construction companies in this area has been attributed to poor financial management, and failure to make business decision based on sound financial data and judgement.

The knowledge of this course is very vital because the execution of every project needs finances to fund their expenditures and continue the operations and survival of the firms in midst of the available risks. These finances are provided by clients or investors so that the firms invest those money and earn a return over the invested amount and ensure the investor gets value and return.

Finance Management is the field of accounting which deals primarily with cost controlling techniques and optimal utilization of money in funding scarce resources. Financial Management helps in controlling costs, devising appropriate strategies for raising and allocating funds. It is also concerned with the profitability and better liquidity of the company. Financial Management is involved in planning organizing and implementing the projects and controlling the costs for the success of the financial aspects of an organisation

**Overview**

Finance management in construction involves planning and making estimates of the targeted revenues and expenses from the inception to the completion of a project. Management of finance includes proper knowledge of accounting procedures and systems, management of the company’s cash flow, accurate tracking and management of job and equipment costs, overhead, planning for and achieving an acceptable profit margin, and debt management.

Financial management also deals with raising more funds or finances through debt or further equity issuance in order to allocate them on components of the projects. Financial management helps in managing the cash inflows and outflows, or in other words the cash receipts and payments of the supplies and inventory. It enables understanding of the structure of construction financial statements, including the different ledgers used by construction accounting systems.

Managers can gain a better understanding of how different accounting transactions are processed in the accounting system. It teaches the differences among the methods available for depreciating construction assets, including the methods used for tax purposes. It teaches how to use financial ratios to analyse the company’s financial statements, including comparing the company’s ratios to industrial averages. It ensures the adequate management of the company’s costs and profits, learn to set profit margins for use in bidding and how the profit changes as the volume of work changes. The course teaches how to determine the volume of construction work and profit and overhead, mark-up necessary to cover the costs associated with the general overhead

**Objectives**

The objectives of the course are to:

1. describe elements of accounting for financial resources
2. describe the structure of construction financial statements, including the different ledgers used by construction accounting systems.
3. identify the accounting transactions used in the accounting system.
4. identify the methods available for depreciating construction assets, including the methods used for tax purposes.
5. describes the use of financial ratios in analysis of the company’s financial statements, including comparing the company’s ratios to industrial averages.
6. describe the management of company’s costs and profits
7. describe the setting of profit margins for use in bidding and how the profit changes as the volume of work changes.
8. determine the volume of construction work and profit and overhead, mark-up necessary to cover the costs associated with the general overhead
9. describe process of managing cash flows, and
10. identifying the process of making financial decisions.

**Learning Outcomes**

At the end of the course, the students should be able to:

1. understand and apply accounting equations
2. understand how different accounting transactions are processed
3. understand principles of accounting for construction and work progress
4. describe and carry out cash flow analysis in construction
5. prepare and interpret profit and loss account of construction firms
6. determine the volume of construction work, profit and overhead, and mark-up necessary to cover the costs associated with the general overhead
7. establish profit margins for use in bidding and how the profit changes in line with changes in work volume
8. identifying the process of making financial decisions

**Course Contents**

Definition of accounting. The scope and function of financial accounting. The accounting Equations. The theory of double entry bookkeeping. Accounting for construction and work in progress. Profit and loss account of a construction firms. Depreciation of assets. Cost of capital, working capital and flow of funds. Cash flow analysis. Construction financing during all phases of project development involving permanent loans. Construction loans, sources of mortgage funds and venture capital, and tax and interest considerations. Process of setting profit margins for use in bidding and how the profit changes as the volume of work changes. Determination of the volume of construction work and profit and overhead, mark-up necessary to cover the costs associated with the general overhead. Process of making financial decisions in construction.

**Minimum Academic Standards**

A conducive classroom and seminar space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

BUK-BUD 523: **Building Production Management** (2 Units; Compulsory; LH = 30)

**Senate-Approved Relevance**

The construction of buildings to provide man and his activities is a team work which involves various profession at the design and construction phases. The central role of a builder in coordinating the working drawings by designers in the built environment into a physical building on the ground cannot be overemphasized. The skill and competence required of a builder in the course of the production management underscores the relevance of this course. Bayero University is an academic citadel located in densely populated area where both public and private building construction developments are on the increase to compete with the growing population occasioned by business activities in Kano state. It is very important for the university to produce building graduates with the prerequisite core competence and responsibility of managing the entire production process, to ensure sustainable development and prevention of building failure and collapse.

**Overview**

The transformation of working drawings by designers in the built environment into a physical building on the ground requires a combinative conversion of resources known as production. The management of the production of a building is entirely the responsibility of a builder. Therefore, the course endeavours to ensure that builders imbibe the required knowledge and skills to coordinate all the resources (men, money material, machine, time, information, etc.), for the successful delivery of a building project bearing in mind the scarcity of resources.

The course ensures that a builder acquires the skills and knowledge required to study and criticize working drawings for buildability and maintainability. He is trained to thereafter use the information available from the working drawings to prepare the production control documents bearing in mind the level of availability and restrictions placed on the resources. The builder then arms himself with the prepared production control tool to proceed to the site execution of the project. Considering the numerous cases of building collapse in Kano and the Nigeria, it is important to ensure the principle of good practice where a builder carries out his duties in the area of his competence without being found wanting.

**Objectives**

The objectives of the course are to:

1. discuss the basic concepts of building production processes and management.
2. discuss the general process of analysing, obtaining and extracting production information from working drawings/contract documents (Architectural, Electrical, Structural, Bills of Quantities etc.).
3. describe the techniques for buildability and maintainability analysis.
4. prepare students to carry out Buildability and maintainability analysis and prepare report
5. describe the process of Construction planning and analysis.
6. discuss the fundamental of construction programmes preparation
7. identify and discuss the various available construction methods
8. explain the implications of alternative construction methodology on project performance.
9. identify the sources and control of construction hazards.
10. explain the preparation of health and safety plans for any building project
11. describe the standards and quality required in the construction of a building
12. explain the preparation of quality management plan for a building project
13. discuss the use and preparation of early warning system chart
14. describe the elements of information requirement schedule
15. explain the Management of site execution in building projects
16. discuss the process of monitoring and coordinating site activities using the

production documents.

1. discuss the application of building regulations in the control of building works

**Learning Outcomes**

At the end of the course, the students should be able to:

1. understand the basic concepts of building production processes and management.
2. understand the general process of analysing, obtaining and extracting production information from working drawings/contract documents (Architectural, Electrical, Structural, Bills of Quantities, etc.).
3. know the techniques for buildability and maintainability analysis.
4. carry out buildability and maintainability analysis and prepare report.
5. carry out Construction planning and analysis.
6. prepare construction programmes.
7. identify and understand the various available construction methods.
8. understand the implications of alternative construction methodology on project performance.
9. identify the sources and control of construction hazards.
10. prepare health and safety plans for any building project
11. understand the standards and quality required in the construction of a building
12. prepare a quality management plan for a building project
13. understand the use and preparation of early warning system chart
14. describe the elements of information requirement schedule
15. carry out the Management of site execution in building projects
16. know the process of Monitoring and coordinating site activities using the production documents.
17. understand the application of building regulations in the control of building works

**Course Contents**

Basic concepts of building production processes and management. General process of analysis, obtaining and extraction of production information from working drawings/contract documents (Architectural, Electrical, Structural, Bills of Quantities, etc.). Techniques for buildability and maintainability analysis. Preparation of Buildability and maintainability analysis report in building. Construction planning and analysis. Preparation of construction programs. Understanding the various available construction methods. The implications of alternative construction methodology on project performance. Understanding the sources and control of construction Hazards. Preparation of health and safety plans. Understanding standards and quality in building construction. Preparation of quality management plan. Understanding the use and preparation of early warning system chart. The elements of information requirement schedule. Management of site execution in building projects. Monitoring and coordinating off site activities using the production documents. Application of building regulations in the control of building works.

**Minimum Academic Standards**

A conducive classroom and seminar space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.

**BAYERO UNIVERSITY KANO**

**EARTH AND ENVIRONMENTAL SCIENCES**

**QUANTITY SURVEYING**

**BSc BUILDING**

**BUK-BUD 524:** **Builders Professional Practice and Ethics (2 Units; Compulsory; LH = 30)**

**Senate-Approved Relevance**

Bayero University is an academic citadel located in one of the very richly endowed and conducive natural environments in sub-Saharan Africa. It is located in a State and Region that bounds with the natural resources. The economy of the community encompasses economic activities from resources associated natural resources and business activities. The economic potentials within and about the University’s locational environment calls for a University that should anchor and pride her specialty in the sustainable exploitation of the abounding and untapped resources of the economy and associated with rich environment.

BUK, therefore, seeks to train and produce professionals that will be equipped with necessary and adequate competitive skills and competence to sustainably build and develop the emerging and untapped blue economy resources while developing indigenous and local remediation techniques to rescue the debased green economy that had been seriously depleted through years of hazardous oil and natural gas exploration and exploitation. The professionals in the built environment require high degree of collaboration and competence for professionalism and service delivery as capture in the content of the course.

**Overview**

The execution of construction projects in the built environment requires high level of professionalism and collaboration among many professionals who must carry out their duties and responsibilities with utmost expertise and confidence. Therefore, study strive to ensure that builders demonstrate good knowledge of a professional builders practice, delivery expectations in the building industry viz-a-viz practical and theoretical experience.

Professionals are highly trained, well experienced and knowledgeable in a complex specialist area of expertise, and hold qualifications and accreditations in their field of expertise. They have to acquire the prescribed qualification and procedures to overcome the entry barriers in **the** field of consultancy services. The service delivery of professional Builders are tailored to meet client's needs which leads to greater customisation of services and high levels of variance in service quality. These are high contact, people-based services with high degree of specialisation with high expectation to deliver services to the satisfaction of clients and the general public. Considering the numerous companies and professionals operating in Kano and the Nigeria, it important to ensure principle of good practice among the professional builders to create trust and confidence in the minds of the clients

**Objectives**

The objectives of the course are to:

1. describe the principles of good practice by registered builders in relation to other sister professions and the interest of clients and the public.
2. demonstrate good knowledge of a professional builders practice, delivery expectations in the building industry
3. demonstrate good knowledge of a professional builders practice, delivery expectations in the building industry
4. establish the characteristics of a profession.
5. identify the nature of relationship between professional associations and their regulatory bodies.
6. describe professional registration boards in the construction industry and their regulation
7. identify professional code of conduct, ethics and moral obligations for Builders
8. identify the elements of Partnerships and consortia.
9. define a builder and the significance of the building code.
10. identify the contract and construction documents in the Nigerian building code
11. mention the core competency and services of professionals
12. describe at least four procurement methods
13. explain building production management (BPM) as a distinct technical service of the registered builder.
14. describe the principles, preparation and use of building production management documents and reports
15. mention the roles of resident builders, and builders in contracting and client organisations
16. describe the elements of consultancy practice.
17. identify the consultancy services of registered builders on building projects preconstruction (predesign, design and tendering stages), construction stages, post construction stages (facility management, maintenance, and deconstruction stages).
18. describe the concepts and theories of professional fees
19. explain tendering and bidding strategies
20. explain the role and relevance of a builder in sustainable construction and green building
21. identify the entrepreneurship and job prospect for builders.

**Learning Outcomes**

At the end of the course, the students should be able to:

1. understand the general principles of good practice by Professional Builders
2. explain relationship between the professional associations and regulatory bodies
3. understand the roles of professional builders as consultants and construction managers
4. describe the core competency and services of professionals
5. understand the use and relevance of at least four procurement methods
6. prepare and use building production management documents and reports
7. understand the elements of consultancy practice and services of registered builders
8. understand the concepts, theories and calculation of builders’ professional fees
9. understand the principles of tendering and bidding strategies for projects
10. identify the areas of entrepreneurship and opportunities for builders
11. know the act of mentorship and its relevance in building practice
12. understand the role and relevance of a builder in sustainable construction and green building.

**Course Contents**

The course deals with the principles of good practice by registered builders in relation to other sister professions and the interest of clients and the public. Characteristics of a profession. The relationship between professional associations and their regulatory bodies. The professional registration boards in the construction industry and their regulation. Ethics and professional practice. Professional ethics and moral obligations. Partnerships and consortia; The builder and the building code. Contract documents and construction documents in the Nigerian building code. Core competency and services of professionals irrespective of procurement methods. Design and build. Building production management (BPM) as a distinct technical service of the registered builder. Principles, preparation and use of building production management documents. Roles of builders in contracting organisations. Roles of builders in client organisations. Consultancy office and practice. Consultancy services of registered builders on building projects preconstruction (predesign, design and tendering stages), construction stages, post construction stages (facility management/maintenance and deconstruction stages). Roles of resident builders. Concepts and theories of professional fees. Tendering and bidding strategies. Building production management reports. The builder and sustainable construction. Green building. Entrepreneurship for builders. Prospecting for jobs. Consultancy or contracting. Mentorship and business packaging for builders. National and international building codes, regulations and byelaws.

**Minimum Academic Standards**

A conducive classroom and seminar space with ancillary facilities/fittings in line with the NUC-MAS requirements are essential.