NATIONAL UNIVERSITIES COMMISSION

BENCHMARK MINIMUM ACADEMIC STANDARDS FOR UNDERGRADUATE PROGRAMMES IN NIGERIAN UNIVERSITIES

for

ENVIRONMENTAL SCIENCES

APRIL, 2007

PREFACE

Decree (Act) No. 16 of 1985 as contained in the National Universities Commission amended Decree (Act) No. 48 of 1988 empowers the Commission to lay down minimum standards for all programmes taught in Nigerian universities. Consequently, the Commission in collaboration with the universities and their staff developed minimum academic standards for all the programmes taught in Nigerian universities in 1989. The Federal Government subsequently approved the documents in 1989.

After more than a decade of using the Minimum Academic Standard (MAS) documents as a major instrument of accreditation, the Commission in 2001 initiated a process to revise the documents. The curriculum review was necessitated by the fact that the frontier of knowledge in all academic disciplines had been advancing with new information generated as a result of research. The impact of Information and Communication Technologies on teaching and learning and the competitiveness engendered by globalization were also compelling reason for the curriculum review.

Other compelling reasons included the need to update the standard and relevance of university education in the country as well as to integrate entrepreneurial studies and peace and conflict studies as essential new platforms that will guarantee all graduates from Nigerian universities the knowledge of appropriate skills, competences and dispositions that will make them globally competitive and capable of contributing meaningfully to Nigeria's socio-economic development.

Congnisant that the content-based MAS documents were rather prescriptive, a decision was taken to develop outcome-based benchmark statements for all the programmes in line with contemporary global practice. To actualize this, the Commission organized a stakeholders' statements were developed for each programme in all the disciplines taught in Nigerian universities. Subsequent to this exercise, it was discovered that the benchmarch-style statements were too sketchy to meaningfully guide the development of curricula and were also inadequate for the purpose of accreditation.

Given this scenario, the Commission therefore considered the merger of the Benchmark Style Statements and the revised Minimum Academic standards into new documents to be called Benchmark Minimum Academic Standards (BMAS) as an amalgam that crisply enunciates the learning outcomes and competences expected of graduates of each academic programme without being overly prescriptive while at the same time, providing the requisite flexibility and innovativeness consistent with a milieu of increased institutional autonomy.

Following this decision, the Commission initiated the process to produce the documents. The first, in the series, was the conduct of Needs Assessment Survey of Labour Market for Nigerian graduates. This was carried out for all the disciplines taught in Nigerian universities. The exercise involved major stakeholders particularly employers of Nigerian graduates. The objectives of the need assessment survey included identification of expected knowledge, attitudes and skills for graduates and their ability to fit into the requirements of the new national and global economy. Secondly, a workshop was held at which academic experts across Nigerian universities including vice-chancellors participated with the objective of effecting the merger. At the end of the workshop, draft BMAS documents were produced for the thirteen disciplines and the General Studies programme taught in Nigerian Universities. The documents were later sent to the Universities offering relevant disciplines for comments and input. Following the return of the inputs and comments from the universities to the Commission, a one-day workshop was held at which invited academic experts studied and incorporated the comments and inputs into the draft document.

To ensure that the documents were free from technical errors, the documents were sent to another set of academic experts for editing who also attended a one-day workshop to finally harmonize the BMAS documents.

Following the aforementioned processes, BMAS documents were produced for the underlisted academic disciplines:

i) Administration; Management and Management Technology;
ii) Agriculture, Forestry, Fisheries and Home Economics;
iii) Arts;
iv) Basic Medical and Health Science
v) Education;
vi) Engineering and Technology;

vii) Environmental Sciences;
viii) Law;
ix) Pharmaceutical Sciences
x) Medicine and Dentistry;
xi) Science;
xii) Social Sciences;
xii) Veterinary Medicine.

The process has been a rather long and tortuous one but it is gratifying to note that the BMAS documents will for long be an enduring academic covenant between the universities and the students that will be enrolled to study in their different programmes.

On behalf of the National Universities Commission, I wish to express my sincere gratitude to all Nigerian universities and their staff for their cooperation and immense contribution towards the development of the BMAS documents.

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APRIL, 2007

ENVIRONMENTAL SCIENCES

1.0 GENERAL

1.1 LIST OF PROGRAMME(S) AND DEGREE(S) IN VIEW

The nomenclature of each of the disciplines should conform to generally accepted titles to reflect the various professions. Such titles therefore, take the following forms:

S/NO.	PROGRAMME	DEGREE(S) IN VIEW
1.	Architecture	B. Env. Sc. (Arch.) B. Sc. (Arch.) B. Tech. (Arch.)
2.	Building	B. Sc. (Bldg.) B. Tech. (Bldg.)
3.	Environmental Management a) Toxicology b) Management Resources	B. Sc. (Env. Mgt.) B. Tech. (Env. Mgt.)
4.	Estate Management	B. Sc. (Est.) B. Tech. (Est.)
5.	Fine Arts	B. A. (Fine Arts) B. A. (Fine & Applied Arts)
6.	Industrial Design	B. A. (Industrial Design) B. Sc. (Industrial Design) B. Tech. (Industrial Design)
7.	Survey and Informatics	B. Sc. (Land Surveying) B. Sc. Surveying & Geo-Info.) B. Tech. (Land Surveying)
8.	Landscape Architecture	B. Sc. (Landscape Arch.) B. Tech. (Landscape Arch.)
9.	Quantity Surveying	B. Sc. (Quantity Surveying) B. Tech. (Quantity Surveying)
10.	Urban and Regional Planning	B. Sc. (URP) B. Tech. (URP) B. URP.

1.2 PHILOSOPHY AND OBJECTIVES OF THE DISCIPLINE

Environmental Sciences deal with the planning, design, construction, management and conservation of man-made and natural environment. The various disciplines that constitute environmental sciences are concerned with ordering the surface of the earth with a view to making it functionally appropriate, aesthetically pleasing, culturally relevant, environmentally healthy, and at the same time, optimally utilizing available resources economically without disrupting the balanced eco-system.

The main objective is:

To produce competent graduates with sufficient contemporary theoretical knowledge and practical skills to deal with planning, design, construction, management and conservation of man-made and natural environment. The details of the objectives and content will be found in the programme specifications for each discipline.

1.3 BASIC ADMISSION REQUIREMENTS AND EXPECTED DURATION OF THE COURSE

1.3.1 University Matriculation Examination (UME)

A minimum of five (5) credits in not more than two (2) sittings, in English Language, Mathematics, and any other three relevant subjects to the programme in the Senior Secondary School Certificate Examinations (SSCE) or its approved equivalent by Federal Ministry of Education should form the basis for admission into programmes in the Faculty/School of Environmental Sciences.

The duration of degree programmes in Environmental Sciences shall be a minimum of eight (8) academic semesters. Students in each of the programmes in Environmental Sciences are expected to take a minimum of 180 credit units for the award of a Bachelor's degree.

A minimum of 15 credit units should be taken by each student per semester. Each of the courses in all the programmes is expected to be taught for a semester which will last an average of 15 weeks. The teaching should be distributed into lectures, tutorials and workshops/studio practical hours. One hour of lecture or tutorial and between 2 and 4 hours of workshop/practical/studio would earn a credit unit.

1.3.2 Direct Entry (D.E.)

Candidates who fulfill the requirements in 1.3.1 above and who have obtained General Certificate of Education (GCE), Advanced Level; Higher School Certificate (HSC)/Interim Joint Matriculation Board (IJMB) or other approved equivalent passes by Federal Ministry of Education in two relevant subjects to a particular programme, at a sitting, may be admitted into the 200 level.

The duration of degree programmes in Environmental Sciences for Direct Entry students shall be a minimum of six (6) academic semesters. Students in each of the programmes, are expected to take a minimum of 132 units for the award of the Bachelor's degree.

1.4 GRADUATION REQUIREMENTS

It is expected that each student shall satisfy the general and specific requirements in their programmes as scheduled in regard to core/compulsory, optional, elective courses, and practicals. To qualify for a degree, each student should have completed and passed all the required courses.

1.4.1 Degree Classification

The classification of the overall performance of each student shall be based on Cumulative Grade Point Average (CGPA) system.

Class of Degree (Based on 5-point scale)	**CGPA**
First Class Honours	4.50 – 5.00
Second Class Honours (Upper Division)	3.50 – 4.49
Second Class Honours (Lower Division)	2.40 – 3.49
Third Class Honours	1.50 – 2.39
Fail	Below 1.50

1.4.2 Probation

A student shall be placed on academic probation if at the end of the second semester of an academic year the student scored less than 1.0 Cumulative Grade Point Average (CGPA).

1.4.3 Withdrawal

A student shall be requested to withdraw from a particular programme if at the end of a probation period, the student still does not make satisfactory progress. Such student shall be at liberty to apply for a change of programme within the university.

1.4.4 Course Credit System

Students in each of the programmes in Environmental Sciences are expected to take a minimum of 180 credit units for the award of a Bachelor's degree in the appropriate courses.

A minimum of 15 credit units should be taken by each student per semester. Each of the courses in all the propgrammes is expected to be taught for a semester which will last for a minimum of fifteen (15) weeks.

The teaching should be distributed into lectures, tutorials and workshops/studio practicals.

1.4.5 Grade Point Average and Cumulative Grade Point Average

This should be based on the following grading systems:

Grading System:

Marks	Attainment Level	Points
70 – 100	Grade A	5 Points
60 – 69	Grade B	4 Points
50 – 59	Grade C	3 Points
45 – 49	Grade D	2 Points
40 – 44	Grade E	1 Point
Below 40	Grade F	0 Point

1.5 EVALUATION

1.5.1 Techniques of Students Assessment

The evidence on which the assessment of a student's achievement is based, should include the following:

Formal examinations
Laboratory Reports
Problem Solving Exercises
Oral Presentations
Essay Assignments/Term Papers
Collaborative Project Work
Individual Project Work
Report on External Placement (SIWES)
External Examiners Report
Surveys and Evaluations

1.5.2 External Examiner's System

External examiners shall be appointed once in a year particularly at the end of each session to moderate examination questions, review the scripts of the students, and provide an overview of the work of the students in all classes, particularly those in the final year. It shall be mandatory on the Chief Examiner to review the questions set by his colleagues before those questions are forwarded to the External Examiner in order to ensure that they reflect the coverage of the syllabi and the manner in which they were taught. The system also provides avenues for assessing comparability of programmes and the maintenance of minimum standards.

1.5.3 SIWES Rating and Assessment

Students should be exposed to a combination of field and office experience both in the public and private sectors and/or construction activities relevant to their individual disciplines. All students in the Environmental Sciences discipline should be exposed to a period of compulsory, supervised Student Industrial Work Experience Scheme (SIWES) in addition to Laboratories/Workshop/Practical/Studio Training as reflected in the individual programmes. Such training shall be undertaken in an approved establishment. A minimum period of a semester is considered to be adequate. The student is expected to submit a systematic log-book for assessment at the end of the training period. Students with unsatisfactory performance shall be required to repeat the training programme.

1.5.4 Students' Evaluation of Courses

At the end of every semester, students shall be given the opportunity to evaluate the courses taken in the semester based on the following criteria:

1 relevance
2 adequacy in terms of time and content coverage
3 students understanding of the courses
4 adequacy of lectures, tutorials and practicals
5 standards of continuous assessment and examinations

1.5.5 Maintenance of Curricula Relevance

The various curricula for Environmental Sciences should be reviewed from time to time as reflected in each individual programme. General reviews should be conducted every five (5) years, in full consultation with the relevant professional bodies.

1.5.6 Performance Evaluation Criteria

The general performance indices useful to accreditation assessors and for internal review terms are as specified in each individual programme, especially as these relate to the following:

- staff/student ratio
- facilities: laboratories, workshops, library/Information and Communication Technology (ICT)
- staff composition
- minimum space requirements

1.6 RESOURCE REQUIREMENTS

The personnel requirements for each of the programmes should reflect students population and the variety of activities to be performed in the classrooms, studios, laboratories and workshops. The ratios should conform with the guidelines on staff/student ratio of 1:15, or as may be required in each programme.

1.6.1 **Personnel**

a) **Academic:**

For the academic staff, the point of entry for each of the recognized positions should reflect appropriate academic qualifications, full registration with relevant professional bodies, experience in both teaching and professional practice. Details of the requirements for the various positions are as follow:

	Positions	**Qualifications**
1.	Graduate Assistant	A good Bachelor's degree or approved equivalent. This should be a training position and Graduate Assistants should be attached to senior academic staff.
2.	Assistant Lecturer	A good Bachelor's degree or approved equivalent, plus a Master's degree in the same discipline.
3.	Lecturer II	A Master's degree with full registration with relevant professional bodies or/and a Ph.D in the relevant discipline.
4.	Lecturer I	Basic qualifications for Lecturer II in addition to a minimum of three years of teaching experience. A visible evidence of continued research by having published articles and other publications to his/her credit.
5.	Senior Lecturer	A candidate must have at least three years teaching experience as Lecturer I in addition to the basic qualifications. Must have demonstrated research capability through good academic publications. Possession of a Ph.D degree is also mandatory.
6.	Associate Professor/Reader	Basic qualifications set out for Senior Lecturer, plus at least 3 years experience as Senior Lecturer. Must have considerable publications resulting from research ability. Should have evidence of participation in university administration and community activities and should have been externally assessed.
7.	Professor	Basic qualifications as Senior Lecturer, should demonstrate a clear evidence of scholarship through considerable academic publications.

		Must have had some university administrative experience as well as some professional recognition and he/she should have been externally assessed.

b) **Non-Academic**

The non-academic staff shall consist of technical officers and technologists categorized as follows:

	Positions	**Qualifications**
1.	Technical Officer/Higher Technologist	Possession of Ordinary National Diploma (OND) or, its approved equivalent in the relevant field.
2.	Higher Technical Officer/Higher Technologist	Possession of Higher National Diploma (HND) or its approved equivalent in the relevant field.
3.	Senior Technical Officer/ Senior Technologist	As in the Higher Technical Officer with more approved experience.
4.	Principal Technical Officer/ Principal Technologist	As in the Senior Technical Officer with more approved experience.
5.	Assistant Chief Technical Officer/ Technologist	As in the Principal Technical Officer with approved experience.
6.	Chief Technical Officer/Technologist	As in Assistant Technical Officer with approved experience.

1.6.2 **Physical Facilities**

(a) **Spaces**

For the good administration of each programme, adequate facilities should be provided for the office of the Dean and for each of the departments. The required minimum standards for each of the departments are reflected in the relevant section for each course. This will include:

i) Office Accommodation
ii) Classroom Space

iii) Studio Space
iv) Seminar Rooms
v) Drawing Offices
vi) Workshop Spaces
vii) Library

In the case of the Office of the Dean, office accommodation should be provided as follows:

i) Dean's Space
ii) Vice Dean/Sub Dean
iii) Secretary to the Dean
iv) Assistant Registrar
v) Administrative Secretariat
vi) General Office
vii) Conference Room
viii) Faculty Office

(b) **Equipment**

Each Faculty/School should be provided with requisite laboratories, studios and workshops with their relevant equipment in relation to student population and variety of activities performed in each department. Provision shall be made for laboratories, classrooms and studios for the use of academic staff. Workshops and Demonstration Centres shall be equipped for the use of non-academic staff.

1.6.3 Library and Information Resources

Each Faculty/School should be provided with fully equipped library and information technology centre with computers and internet connectivity and current books, periodicals and journals with audio-visual films. Provision shall be made for adequate furniture: seats, benches, tables, chairs, etc.

1.7 GENERAL STUDIES

1.7.1 Goal

To produce a well-rounded, morally and intellectually capable graduates with vision and entrepreneurial skills in an environment of peace and social cohesiveness.

1.7.2 Objectives

The objectives of the General Studies programme consist of the following:

a) Acquisition development and inculcation of the proper value-orientation for the survival of the individual and society.

b) The development of intellectual capacities of individuals to understand, appreciate and promote peaceful co-existence.

c) Production graduates with broad knowledge of the Nigerian National and people with a view to inculcating in them mutual understanding and patriotism.

d) Exposing graduates of Nigerian Universities to the rudiments of ICT for computer literacy and ability to live usefully in this ICT age.

e) Preparing students for a post university life with opportunities for job creation and entrepreneurial skills.

f) Production of graduates capable of communicating effectively (both oral and written).

1.7.3 COURSES

GST 111: Communication in English (2 Units)

Effective communication and writing in English, Language skills, writing of essay answers, Comprehension, Sentence construction, Outlines and paragraphs, Collection and organization of materials and logical presentation, Punctuation.

GST 112: Logic, Philosophy and Human Existence (2 Units)

A brief survey of the main branches of Philosophy Symbolic Logic Special symbols in symbolic Logic-conjunction, negation, affirmation, disjunction, equivalent and conditional statements law of tort. The method of deduction using rules of inference and bi-conditionals qualification theory. Types of discourse, Nature or arguments, Validity and soundness; Techniques for evaluating arguments; Distinction between inductive and deductive inferences; etc. (Illustrations will be taken from familiar texts, Including literature materials, Novels, Law reports and newspaper publications).

GST 113: Nigerian Peoples and Culture (2 Units)

Study of Nigerian history, culture and arts in pre-colonial times, Nigerian's perception of his world, Culture areas of Nigeria and their characteristics, Evolution of Nigeria as a political unit, Indigene/settler phenomenon, Concepts of trade, Economic self-reliance, Social justice, Individual and national development, Norms and values, Negative attitudes and conducts (cultism and related vices), Re-orientation of moral and national values, moral obligations of citizens, Environmental problems.

GST 121: Use of Library, Study Skills and Information Communication Technology (ICT) (2 Units)

Brief history of libraries, Library and education, University libraries and other types of libraries, Study skills (reference services). Types of library materials, using library resources including e-learning, e-materials; etc, Understanding library catalogues (card, OPAC, etc) and classification, Copyright and its implications, Database resources, Bibliographic citations and referencing. Development of modern ICT, Hardware technology Software technology, Input devices, Storage devices, Output devices, Communication and internet services, Word processing skills (typing, etc).

GST 122: Communication in English II (2 Units)

Logical presentation of papers, Phonetics, Instruction on lexis, Art of public speaking and oral communication, Figures of speech, Précis, Report writing.

GST 123 Communication in French (2 Units)

Introduction to French, Alphabets and numeric for effective communication (written and oral), Conjugation and simple sentence construction based on communication approach, Sentence construction, Comprehension and reading of simple texts.

OR

GST 123: Communication in Arabic (2 Units)

Introduction to Arabic alphabets and writing systems, Elementary conversational drills, Basic reading skills, Sentence construction in Arabic.

GST 211: History and Philosophy of Science (2 Units)

Man – his origin and nature, Man and his cosmic environment, Scientific methodology, Science and technology in the society and service of man, Renewable and non-renewable resources – man and his energy resources, Environmental effects of chemical plastics, Textiles, Wastes and other material, Chemical and radiochemical hazards. Introduction to the various areas of science and technology. Elements of environmental studies.

GST 212: Human Sexuality and Reproductive Health and Rights (2 Units)

Biology of Human reproductive organs. Human Right issues: the six human right instruments. Human sexuality, positive interactions and negotiations: Sexual attitudes, friendship, courtship and marriage. Pre-marital and extra-marital sexual relationships: effects on the male and female. Reproduction and parental responsibilities. Contraception, birth control and family planning. Immaturity of relationships and sexual aberrations. Homosexuality, Lesbianism and Heterosexuality. Sexually transmitted diseases, HIV and

AIDS: Pathology and epidemiology of diseases, voluntary counseling and tests. Behavioural changes, peer education and youth friendly services.

Gender issues, Convention on the Elimination of all forms of Discrimination Against Women (CEDAW). Traditional practices that are harmful to men and women: Female Genital Cutting (FGC), Puberty and Widowhood rites, Male Child Preference and discrimination against girl child, forced early marriage, wife inheritance and hospitality practices, violence against men and women, sexual abuse and women trafficking.

GST 222: Peace Studies and Conflict Resolution (2 Units)

Basic Concepts in peace studies and conflict resolution, Peace as vehicle of unity and development, Conflict issues, Types of conflict, e. g. Ethnic/religious/political/economic conflicts, Root causes of conflicts and violence in Africa, Indigene/settler phenomenon, Peace – building, Management of conflict and security. Elements of peace studies and conflict resolution, Developing a culture of peace, Peace mediation and peace-keeping, Alternative Dispute Resolution (ADR).
Dialogue/arbitration in conflict resolution, Role of international organizations in conflict resolution, e.g. ECOWAS, African Union, United Nations, etc.

GST 223: Introduction to Entrepreneurial Skills (2 Units)

Introduction to entrepreneurship and new venture creation; Entrepreneurship in theory and practice; The opportunity, Forms of business, Staffing, Marketing and the new venture; Determining capital requirements, Raising capital; Financial planning and management; Starting a new business, Feasibility studies; Innovation; Legal Issues; Insurance and environmental considerations. Possible business opportunities in Nigeria.

1.8 DEFINITION OF TERMS

1.8.1 Core/Compulsory Courses

These are courses which are important for each programme without which the student cannot be awarded the requisite degree. Additionally, such courses are requirements for professional registration and license. These courses account for 60% of the total weighting of the programme.

1.8.2 Elective Courses

These are courses from which a student can make a selection relevant to his career interest. This group of courses accounts for approximately 1-15% of the total weighting of the programme.

1.8.3 **Optional Courses**

Optional courses are those that a student can take from outside his own Faculty or School, with the intention of enhancing and broadening his academic and professional horizons.

Pre-requisite Courses

Pre-requisite courses are those courses which a student must take and pass before a higher but similar course can be registered for. For example, a student may not register for Graphic Presentation II, until he has registered and passed Graphic Presentation I.

Required Courses

These are courses which must be registered for and passed by students; regardless of their own programmes. They are usually prescribed by the university authority specifically to broaden the intellectual and professional horizons of the students. For example courses in English Language, Psychology, Sociology, etc.

Minimum Credit Load per Semester

This defines the minimum credits which a full-time student must register and pass in each semester. This ranges between 15 and 18 credit loads as may be prescribed by each university.

1.8.7 **Credit Unit System**

One hour of lecture or tutorials and between two and four hours of workshops/practicals/studio are recommended to earn one (1) credit unit.

1.8.8 **Grade Point Average**

Grade Point Average (GPA) is the summation of the product of the credit unit and the score rating divided by the total number of units carried by the students.

1.8.9 **Cumulative Grade Point Average**

To compute the Cumulative Grade Point Average, the total of Grade Points multiplied by the respective Credit Units for all the semesters are added and then divided by the total number of Credit Units for all courses registered by the student.

2.0 DEGREE PROGRAMMES

2.1 Benchmark-Style Minimum Standard for Architecture

2.1.1 Introduction

The benchmark statement for Architecture is to provide a guideline for the description and the characteristics of the degree programme and to articulate the abilities and skills expected of graduates of Architecture.

In the context of Nigerian Universities, a two-tier degree structure has been operated over the last two decades. The first-tier leads to the award of a non-professional Bachelor's degree while the second-tier leads to the professional masters degree. This statement provides a guide for designing the Bachelor's degree programme. The Masters degree is considered as post-graduate.

The benchmark statement takes into consideration, current development in the environmental design discipline in general and in Architecture in particular. New body of knowledge in the areas of Environmental impact assessment, pollution control, entrepreneurship, Information Technology, Facilities Management have been incorporated to cater for these developments.

Nomenclature: Architecture

Degree in View: Bachelor of Science (Arch.)
Bachelor of Technology (Arch.)
Bachelor of Architecture
Bachelor of Environmental Studies (Arch.)

2..1.2 Admission Requirements

Admission into the Architectural programmes may be through any of the following modes:

Normal Admission: Candidates who have successfully completed the Senior Secondary School or its equivalent obtained five credits in Mathematics, English Language, Physics and two other subjects from the following list will be eligible for admission; Chemistry, Biology, Technical Drawing, Fine Arts, Geography, Economics, Building Construction and Land Surveying.

Advance Standing Admission: Candidates who fulfil the requirements above and who have obtained G. C. E. Advanced level, H.S.C/IJMB or equivalent passes in Mathematics and Physics, or Mathematics or Physics and any other subject noted above may be admitted into the 200 - level of the programme.

Special Admission: A candidate who fulfils normal admission requirements and in addition holds an ND or HND certificate in Architecture or Allied Subjects at Credit Level can be considered for Admission into the programme at the appropriate level.

Transfer Cases: Candidates wishing to transfer from one school of Architecture to another for some good reasons may be considered for absorption at the appropriate level. Any deficiencies in their background should be rectified by taking appropriate courses.

2.1.3 Expected Duration

The Schools of Architecture shall offer a two-tier degree programme. The first-tier is a minimum of 10 semester's duration leading to a provisionally registrable Bachelor degree. A minimum of six months of Industrial Training shall be incorporated in the programme.

The second-tier of 4-semester duration leads to a professional Master degree.

2.1.4 Purpose, Aims and Objectives of the Minimum Academic Standard (MAS) Benchmark Statements

The purpose of the MAS Benchmark Statement is to:

1 assist Universities and Schools of Architecture in designing and approving programmes of study.

2 assist professional bodies in their accreditation and review of programmes relating to professional competence.

3 assist Students, Employers, Internal Organisations etc when seeking information about Architectural education.

2.1.5 Statement of Components of Benchmark Statements

The benchmark statement is made up of four major component parts as follows:

- The objectives and purpose of the bachelor degree in Architecture
- The essential courses expected to be covered in the programme leading to the award of the degree.
- The competencies, abilities and skills expected of a graduate of Architecture.
- Assessment procedures and criteria for evaluating the body of knowledge covered and different levels of abilities and skills attained.

Statement of Intended use of the Benchmark

The benchmark statements are intended to provide a broad framework within which educators can develop appropriate and challenging Architecture programme that respond to the needs of the student, changing nature of Architecture, as well as new

developments in Technology. The benchmarks are not intended as straight-jackets that would stifle innovation in Architectural programme development and in the designing of learning experiences. They seek to articulate the primary qualities expected of Bachelors degree students at the end of their programme and to maintain the standard of Architecture degree programme.

2.1.6 **Philosophy and Objectives**

General Philosophy In Architectural Education

The overall national philosophy in Architectural education can be stated in general terms as follows:

The range of exposure and scope of the programmes in a school of architecture should produce a competent, skilled and versatile individuals capable of facing a broad spectrum of challenges of the environment for human and other activities;

Every school should aim at exploring the rich cultural and traditional architectural resources in the country in general and within its immediate environment in particular;

Architectural schools should inculcate the understanding of the environmental problems of the community and make efforts towards evolving solutions to these problems;

A graduate of architecture is therefore trained in the art and science of planning, design, erection, commissioning, maintenance, management and co-ordination of allied professional inputs in the development of the environment; There should be flexibility in the development of courses to allow for the changing needs of architectural education arising from changing social, economic, psychological and technological environment.

2.1.7 **Aims and Objectives of Architectural Education Programmes**

An Architectural Education programme should be committed to:

a) A high-quality of professional education aimed at producing Architects capable of understanding and solving complex technical and environmental problems as well as applying the knowledge to tackle and co-ordinate other related professional inputs in the development of the environment;

b) The infusion in the student of an understanding of the context of the design and construction in physical, cultural, social, economic and technological terms;

c) Equipping the student with adequate knowledge, creativity, specialised skills and leadership capabilities that will enable the graduate to co-ordinate and control the design and construction processes and inputs thereto by allied professionals and executors;

d) Training graduate Architect to be a consultant capable of undertaking:

i) Brief development, feasibility studies;

ii) Project initiation and development;

- Producing Professional Architect, capable of undertaking the whole range of Architectural design activities from schematic design through working and drawing to construction detailing and workshops drawing production.

- Providing the student with the knowledge and skills to undertake a wide range of management activities such as coordinating site meeting, site management, facilities management, post construction evaluation, etc.

- Providing the student with the knowledge and skill base from which he/she can proceed to further studies in architecture or related areas.

- Provide the student with entrepreneurial knowledge and skills to enable him/her to be self-reliant.

2.1.8 **Learning Outcome**

Learning Outcomes: Regime of Subject Knowledge

Each School of Architecture providing a Bachelor degree programme is free to decide on the actual content, nature and organisation of its courses or modules to reflect their own peculiar characteristic. However, the over 150 course titles offered in Nigeria schools of Architecture fall within eight instructural modules listed below. It is expected that all programmes will ensure that students are instructed in the main aspects of Architecture:

a) Architectural Design
b) Communication Skills
c) History and Theoretical Studies
d) Building Construction Technology
e) Arts and Humanities
f) Environmental Services
g) Physical Sciences and Information Technology
h) Management Studies and Entrepreneurship Studies.

Core of the Programme.

The core of any Architectural education programme should consist mainly of studio courses from Architectural design and communication Skills, lecture courses from History and Architectural Theory and Technical Courses from Building Construction Technology, Environmental Control Systems and Management Studies. The

foundation programme may have a core heavily grounded in the Physical Sciences and communication skills to cater for deficiencies in the secondary education.
The main goal of the Core Programme is to expose the student to broad range of issues, skills and techniques required for the solution of most environmental design and construction problems. At the early years, a student is expected to grasp the general principles of organisation of space and to proceed sequentially to more complex problems of Building design and construction. At the end of the programme, a student should be able to handle and manage Architectural and Urban design problems involving high level of technology and great complexity in programme requirements.
The Core Courses also enable him to acquire skills of manipulation of space and communication techniques that are required in the creation of three-dimensional space. General principles acquired should be competently applied to specific Architectural design and construction problems. The core of the programme should account for approximately 60% of the total credit load of the Architectural education programme.

Cognate Courses

The choice of cognate courses provides each School of Architecture with a clearly defined identity and an opportunity to play a singular role in architectural development in this country. This group of courses should account for approximately 25% - 30% of the architectural programme.

Elective Courses

This should constitute a set of course, from which a student can make a selection and should account for approximately 10% - 15% of the total weighting of the programme.

Competencies and Skills

The main abilities and skills (Cognitive, Architectural and General). The modules are expected to inculcate in the students are as follows:

a) **Architectural Design (Module A)**

- To develop the skills and techniques in problem recognition, information gathering, solution, synthesis, evaluation and design.

- To undertake design exercises varying in magnitude from relatively simple human environmental requirement, through buildings requiring mechanical services, to urban planning and landscape design problems that need the use of the specialist consultants.

- To be able to grapple with technical, social, environmental, aesthetic, as well as financial aspects of architectural problems during these exercises.

- To be able to handle constructional technology and detailing at certain levels of the skills acquisition process within this module.

b) **Communication Skills (Module B)**

- To provide the Architecture student with the basic experience and skills in the arts.

- To develop imaginative and creative faculties of the student so as to gain confidence in working processes requiring Communication skills.

- To undertake diverse exercises in studios or workshops focusing on the application of art to architectural design in art - line, shape, form, colour, texture, proportion, light and shade, etc.

c) **History and Theoretical Studies (Module C)**

- To develop an understanding of the history and theory of Architecture both western and non-western aimed at clarifying the scale of values and concepts within which architecture is created.

- To examine pre - colonial architecture and urbanisation in Africa are aimed at stimulating students to the recognition of the existence of conceptual resources in their immediate cultural environment.

- To develop the necessary framework upon which the student bases his creative work.

d) **Building Construction Technology (Module D)**

* To develop the understanding of components of buildings, the structure and the process involved in putting them together to realise an architectural piece.

* To understand the structural and constructional application of timber, masonry, reinforced concrete, steel, aluminium, as well as local traditional materials units within this module.

* To develop an understanding of implementation, cost implication, managerial, as well as various processes that go into realising an architect's concept.

e) **Arts and Humanities (Module E)**

- To expose the students of architecture to the general cultural, historical, psychological and sociological context within which architecture is created.

- To clarify some practical implications of design decisions from the point of view of the users, the client and the public at large.

- To expose the students to the legal, political and economic frameworks within which he is expected to operate as an architect.

f) **Environmental Services (Module F)**

- To make students aware of the relationship between man and the natural, physical and built environment.

- To expose the student to environmental control services such as heating, cooling, ventilation, fire services, acoustic, plumbing and drainage, electrical, lighting, vertical transport systems, security systems, etc.

- To expose the student to environmental impact of human activities such as pollution and assess its impact.

- To acquire knowledge to be able to determine space requirements and to integrate services within the fabric of buildings.

g) **Physical Sciences and Information Technology (Module G)**

- To master the basic techniques, skills and principles of Physical Sciences as it relates to the building industry.

- To acquire the knowledge and skills in Information Technology and application of Computer to the building industry.

- To acquire proficiency in Computer Aided Design, Word processing, Data processing and Internet.

h) **Management and Entrepreneurship Studies (Module H)**

- To equip the student with management tools required for the co-ordination, control, administration and management of project execution.

- To expose the students to basic principles of law, professional practice and Contract administration and management.

- To develop entrepreneurship skills that enable the student to be resourceful and self reliant.

- The Student Industrial Work Experience Scheme (SIWES) is to expose the student to:

    - competence in the execution of practical Architectural projects

- skills to observation, recording and documentation on construction sites**.**
- skills in safe handling of equipment and avoidance of hazards associated with them**.**
- architectural office practice in a real environment.

Behavioural Attributes

Graduates of Architecture are governed by the code of professional conduct of the professional body (Nigerian Institute of Architects)

These attributes relate to:

a) the ability to discharge professional obligations to members of the public
b) display of professional integrity
c) competence with General Ethics
d) Compliance with the Regulation about Advertisement
e) General Comportment
f) Participation in N.I.A Activities

2.1.9 **Resource Requirement for Teaching and Learning in the Programme**

Academic Staff

The academic staff requirement is a staff/student ratio of 1:15. The academic staff should be made up of:

- Assistant Lecturer
a) Lecturer II
b) Lecturer I
c) Senior Lecturer
d) Reader/Associate Professor
e) Professor

The point of entry for each of the positions shall reflect academic qualification, teaching experience and practical professional experience as detailed in the general benchmark statement for environmental studies.

In addition to the regular academic staff, School of Architecture should be able to benefit from the wealth of experience of professional from the field who could join the teaching staff for short period as:

-	Studio Senior Lecturer	Must be a Registered Architect with a minimum of 15 years relevant field experience

Non-Academic Staff

Senior Technical Staff

Considering the technological bias of Architectural education, the ratio of Senior Technical staff is 1:5. The specialisation of the technical staff may vary depending on the situation of the particular school. Schools that exist within institutions or faculties where technical staff from Building Departments, Engineering and Physics Department can make input, need not recruit technical staff in all specialisation required in Architectural programmes. Requisite specialisation can range from modelling, Reprographics, Architectural Technology, Laboratory Technology, Presentation Techniques to Electrical installation, Building Technology and Plumbing.

Senior Administrative Staff

The ratio of Senior Administrative staff should be minimal in view of the technical nature of the programme.

Junior Staff

An overall ratio of Junior Staff is to be minimal. Two categories of Junior Staff are needed in a School of Architecture: Junior Technical Staff and Junior Non-Technical Staff. The distribution between these two categories should be roughly 1:1.

a) Junior Technical Staff can Include:

Computer Graphists, Draughtsmen, Carpenters, Modelists, Masons, Painters, Welders, Photographers, Drivers/Mechanics, Storekeepers, etc.

b) Non-Technical Staff Include:

Clerical officers, Typists, Cleaners, Studio Attendants, Messengers, Gardeners, Library Attendants and so on.

Academic Physical Spaces

Office accommodation for academic, non-academic staff and students per capital should be based on the following guidelines:

Minimum Space Allowance

NO	SPACE	USE	MINIMUM M^2
1.	Professors Office	Academic	24
2.	Head of Department	Administration	24
3.	Senior Lecturer	Academic	20

4.	Lecturer	Academic	16
5.	Asst. Lecturer	Academic	12
6.	Senior Technical Staff	Technical	12
7.	Senior Administrative Staff	Administration	12
8.	Junior Technical Staff	Technical	6
9.	Junior Administrative Staff	Administration	4
10.	Studio Space	Students	3
11.	Lecturer Space	Students	0.5
12.	Seminar Space	Students	0.5
13.	Laboratory Space	Students	2
14.	Library	Students	2
15.	Social Space	Students	0.5
16.	Storage Space	Students	0.5

2.1.10 **Equipment**

Equipment needed for the running of an Architecture programme fall into four categories:

a) Research and teaching equipment
b) Drawing and reprographic equipment
c) office equipment and
d) Vehicles.

Research and Technical Equipment

Most Schools of Architecture depend on Engineering Faculties for most Material testing equipment for both staff and students. Physics, Building, Survey and Electronic Departments also provide input in Architecture programmes and their equipment and facilities should be available for use.

It is important in the area of equipment for teaching research to ascertain that:

a) A school of Architecture is associated with departments, faculties or institutions which can provide the wide range of equipment and facilities required for the proper training of the Architects;

b) Facilities and equipment required for the effective teaching of any particular course on its curriculum are readily available and are used in the education process.

Drawing and Reproduction Equipment

Reprographic technology is developing so fast and the rate of obsolescence is so high that any attempt to be specific in this area is fruitless. However, certain categories of equipment can be identified:

a) T-square, Set-square, I-square and Drawing boards;

b) Various types of drawing instrument used by staff and students, which are usually owned by them;

c) Plan printing machines, Trimming machines and Light tables for reading drawings etc;

d) Cameras and essential equipment for photographic work should also be considered essential;

e) Slide projectors, Overhead projectors and Epidiascopes can also be included as essential equipment.

f) Computers, Printers, Scanners, UPS, digitizers, Plotters, Multi-media Projector etc.

Office Equipment

These include computers, printers, filing cabinets, and photocopiers, duplicating machines, scanning machines and so on.

Vehicles

One 40 Seater bus for site visits
One car for department use.

A department with a population of over 240 students should own and maintain a minimum of:

2.1.11 Library and Information Resources

In addition to the University central library, each school of Architecture should have a library/data room well stocked with current journals, textbooks and reference materials for the use of staff and students. The library should be linked with the Internet for information sourcing.

2.1.12 Course Evaluation

In the evaluation of courses offered in Schools of Architecture, the relationship between theory subjects and studios based subjects have to be taken into account. A pass in a core subject at a lower level is pre-requisite for registration for that subject at a higher level.

Assessment of Theory Subjects

Assessment used for theory subjects should include continuous monitoring of student's progress by subject lectures through course work evaluation. Continuous assessment may involve class tests, tutorial assignments, seminar presentations, and reports on fieldwork, class attendance and so on. These should carry between 40% and 60% of the total weighting for any subject. The final examination of the end of the semester should account for the balance of 60% to 40% of the overall marks for the subjects.

Assessment of Studio Work

In the case of Studio Work a jury system is the normal practice. A jury consisting of a number of competent persons examine the work of a student in a given studio assignment and award marks.

2.1.13 Expectations of the Graduates of School of Architecture

a) Ability to analyse design and environmental development problems, synthesise the various elements and provide appropriate solutions;

b) Ability to understand the needs of his client and users of the built environment and to cater for these;

c) The ability to produce appropriate and imaginative solutions that are technologically sound, economically feasible, environmentally friendly and aesthetically pleasing;

d) The ability to analyse the feasibility, legal implication, and impact of design schemes on users and the public at large;

e) The ability to understand and assess the impact of development schemes on the environment;

f) The ability to communicate his proposals in the appropriate medium to his client, the public, and members of the building professions and construction team, and

g) The ability to integrate and co-ordinate the inputs of other professionals in the building team to achieve the objectives of the project(s).

2.1.14 **Maintenance of Curricula Relevance**

The following actions are recommended:

- To review Benchmark statements every 5 years
- Periodic visitations to schools of Architecture
- Universities to routinely request for feed back from employers of their graduates.

2.1.15 **Performance Evaluation Criteria**

a) Periodic visitation s to Schools of Architecture by the Architects Registration Council of Nigeria
b) Appointment of external examiners who should include people in professional practice.
c) Evaluation of academic staff performance by students
Through questionnaires

TABLE 2.0

DISTRIBUTION OF COURSES BY SEMESTER

SEMESTERS MODULES	FIRST-TIER				SECOND-TIER		TOTAL CREDIT UNITS
	1 2	3 4	5 6	7 8	9 10	11 12	
A. ARCHITECTURAL DESIGN	0 0	3 3	4 4	6 6	8 8	12 12	66
B. COMMUNICATION SKILLS	4 4	3 3	1 1	0 0	0 0	0 0	16
C. HISTORY & THEORETICAL STUDIES	3 3	3 3	2 2	2 2	2 2	0 0	24
D. BUILDING CONSTRUCTION TECHNOLOGY	4 4	4 4	4 4	4 4	3 3	2 0	40
E. ARTS AND HUMANITIES	3 3	0 0	2 2	2 2	0 0	0 0	14
F. ENVIRONMENTAL SERVICES	0 0	3 3	3 3	2 2	2 2	0 0	20
G. PHYSICAL SCIENCES AND INFORMATION TECH.	4 4	2 2	2 2	2 2	0 0	0 0	20
H. MANAGEMENT & ENTREPRENEURSHIP STUDIES	0 0	2 2	0 2	2 2	2 2	2 3	18
TOTAL	18 18	20 20	18 20	20 20	17 17	16 15	219

APPENDIX 2.0

SYNOPSES OF COURSE MODULES IN ARCHITECTURE

1. **Module A: Architectural Design**

The number of courses that constitute this module are all intended to develop awareness of the various factors that contribute to architectural environment and to the design of this environment. They are also intended to develop the skills and techniques in problem recognition, information gathering solution, synthesis, evaluation and design. Kind of design exercises varying in magnitude from relatively simple human environmental requirement, through buildings requiring mechanical services, to urban planning and landscape design problems that need the use of specialist consultants. This module is often undertaken in every semester for the duration of the educational programme. A student is expected to grapple with technical, social, environmental, aesthesis, as well as financial aspects of architectural problems during these exercises. Particular emphasis is placed upon constructional technology and detailing at certain levels of the skills acquisition process with this module.

2. **Module B: Fine and Applied Arts**

The aim of this module is to provide the architecture student with the basic experience and skills in art. The aim is to develop imagination and creative faculties and to gain confidence in working process in fine and applied arts. Understanding and application of visual phenomena and skills, and an acquaintance with visual communication in art – line, shape, form colour, texture, proportion, light and shade etc. Courses in this module include diverse exercises in studios or workshops focusing on the application of art to architectural design. Units of study in this module may be taken from Art School from among their traditional courses.

3. **Module C: History and Theoretical Studies**

The emphasis in this module is the understanding of the history and theory of architecture. The study of architectural history both western and non-western is aimed at clarifying the scale of values and concepts within which architecture is created. Examination of pre-colonial architecture and urbanization in Africa are aimed at stimulating students to the recognition of the existence of conceptual resources in their immediate cultural environment. Theory and Philosophy of architecture may create the necessary framework for understanding architectural creation, it was also provide the foundation in which the student bases his own creative work.

Method of instruction in this module is usually by lectures, seminars and audio-visual presentation. In addition students may undertake case studies and present measured drawing exercises.

4. **Module D: Building Systems Technology**

Architectural design cannot be realized without the aid of a number of technical disciplines. Studies in Building System Technology emphasize the understanding of components of buildings, the structure, the methods of putting them together and the process involved in putting them together to realize architectural piece. Structural and constructional applications of timber, masonry, reinforced concrete, steel, aluminium, as well as local traditional materials are examined in various course units within this module.

The realization of an architectural design involves various participants who represent many aspects of the building industry. This module seeks to clarify implementation, cost implication, managerial, as well as various processes that go into realizing an architect's concept.

5. **Module E: Humanities and Social Studies**

These are courses aimed at exposing the student of architecture to the general cultural, historical, psychological and sociological context within which architecture is created. The Module aims at clarifying some practical implication of design decision from the point of view of the users, the client and the public at large. The student is exposed to the complexities of the

human social and cultural environment in its various dimensions. This enables him to understand man historically, culturally and psychologically, and to take such factors in making proposals. Furthermore, the module attempts to expose the students to the legal political and economic framework within which he is expected to operate as an architect.

6. **Module F: Environmental Control Systems**

The prime aim of this module is to make students aware of the relationship between man and the natural physical environment and the built environment, through a number of courses and exercises. The unit also deals with Environmental Control Technologies – the preliminary design or selection of building services. These include heating, cooling, ventilation, fire services, acoustic, plumbing and drainage, electrical, lighting, vertical transport systems, security systems and so on.

Student should acquire knowledge to be able to determine space requirements and to integrate services within the fabric of buildings. Attempts should be mad towards an integrated approach rather than the study of discrete units with no relation to one another or to the architectural design.

7. **Module G: Physical Sciences**

Pre-requisite to a thorough understanding of the technical discipline in architecture is a knowledge of underlying principles in the sciences. A mastery of the basic techniques, skills and principles embodied in physical sciences is a sine qua non for the success of the building industry.

The module includes both Pure Sciences like Mathematics, Physics, Geology and Botany; and Applied Sciences, such as Mechanics, Electronics and Thermal properties of matter. Of special significance to present day architectural education is Computer Literacy. The Physical Science module should provide courses aimed at providing familiarity with skills in the operation of and application of computer methods.

APPENDIX 2.1
Distribution of Courses

Tables 2.2 – 2.13 show analytical distribution of courses for each semester. This is a model to guide architecture schools. This model can be varied to suit their own purpose.

TABLE 2.1

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCES (ARCHITECTURE)

Year 1 (1st semester)

Course		Pre-requisite	L	T	P	U
Code	**Title**					
	General Mathematics I		2	1	0	3
	Physics I		3	1	0	4
	Introduction to Architecture		2	1	0	3
	Architectural Graphics and Lettering I		1	1	0	2
	Free hand Sketching I		0	0	8	2
	Nature of Environmental Science		1	0	3	2
	Use of English		2	0	0	2
	Total		**11**	**4**	**11**	**18**

L = Lectures, P = Practicals, T = Tutorials, U = Credit Units

TABLE 2.2

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ARCHITECTURE)

Year 1 (2nd semester)

Code	Course Title	Pre-requisite	L	T	P	U
	General Mathematics II		2	1	0	3
	Physics II		3	1	0	4
	Introduction to Architecture II		2	1	0	3
	Architectural Graphics and Lettering II		1	0	3	2
	Free hand Sketching II		0	0	8	2
	Basic Elements of Planning		1	0	3	2
	Use of English		2	0	0	2
	Total		**12**	**3**	**11**	**18**

L = Lectures P = Practicals
T = Tutorials U = Credit Units

TABLE 2.3

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ARCHITECTURE)

First semester Year 2

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design I		1	0	12	4
	Building components and Methods I		1	1	0	2
	Descriptive Geometry I		1	0	3	2
	Introduction of Computer Science		1	0	4	2
	History of Arch. I		2	0	0	2
	Building Structures I		1	1	0	2
	Land Surveying		1	0	3	2
	General Studies (Logic & Philosophy)		2	0	0	2
	Total		**10**	**2**	**22**	**18**

L = Lectures P = Practicals
T = Tutorials U = Credit Units

TABLE 2.4

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ARCHITECTURE)

Second semester Year 2

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design II		1	0	12	4
	Building components and Methods II		1	1	0	2
	Descriptive Geometry II		1	0	3	2
	Computer applications		0	0	8	2
	History of Architecture II		2	0	0	2
	Building Structures II		1	1	0	2
	Land Surveying		1	0	3	2
	General Studies (Nigerian People & Culture)		2	0	0	2
	Total		**9**	**2**	**26**	**18**

L = Lectures P = Practicals
T = Tutorials U = Credit Units

TABLE 2.5

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ARCHITECTURE)

First Semester Year 3

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design III		1	0	12	4
	Urban Design		1	0	3	2
	Environmental Science		1	1	0	2
	Building Services I		1	1	0	2
	Theory of Architecture		2	0	0	2
	Building components and		1	1	0	2
	Methods III		1	1	0	2
	Building Structures III					
	Sub-Total		8	4	15	16
	Elective of 2 Units from below					2
	TOTAL					18
	Sociology of Housing		1	0	3	2
	Psychology of Perception		2	0	0	2
	Detailing		1	0	3	2

L = Lectures P = Practicals
T = Tutorials U = Credit Units

TABLE 2.6

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCES (ARCHITECTURE)

Second Semester Year 3

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design IV		1	0	12	4
	Landscape Design		1	0	3	2
	Interior Design		1	0	3	2
	Building Services II		1	1	0	2
	Theory of Architecture		2	0	0	2
	Building components and		1	1	0	2
	Methods IV		1	1	0	2
	Building Structures IV					
	Sub-Total		8	3	18	16
	Electives of 2 Units from below					2
	TOTAL					18
	Working Drawing		1	0	3	2
	Development Economics		2	0	0	2
	Environmental Planning		1	0	3	2

L = Lectures P = Practicals
T = Tutorials U = Credit Units

TABLE 2.7

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCES (ARCHITECTURE)

First Semester Year 4

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design V Rural Development and Planning Building Components and Methods V Quantities and Estimating Research Methods Building Structures V		1 1 1 1 1 1	0 0 1 1 1 1	12 3 0 0 0 0	4 2 2 2 2 2
	Sub-Total		6	4	15	14
	Electives of 4 Units from below					4
	TOTAL					18
	Contract Law Building climatology Acoustics and Noise Control Water Supply and Drainage		1 1 1 1	1 1 1 1	0 0 0 0	2 2 2 2

L = Lectures P = Practicals

T = Tutorials U = Credit Units

TABLE 2.8

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ARCHITECTURE)

Second Semester Year 4

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design VI Public and Institutional Buildings Building Components and Methods VI Building Economics Building Contract and Arbitration Building Structures VI		1 2 1 2 2 1	0 1 1 1 0 1	12 0 0 0 0 0	4 3 2 3 2 2
	Sub-Total		9	4	12	16
	Electives of 2 Units from below					2
	TOTAL					18
	Public Health Engineering Pollution Control Natural and Artificial Lighting		1 1 2	1 1 0	0 0 0	2 2 2

L = Lectures P = Practicals

T = Tutorials U = Credit Units

TABLE 2.9

SUMMARY OF COURSE REQUIREMENTS FOR MASTER OF SCIENCE (ARCHITECTURE)

First Semester Year 5

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design VII Advanced Architectural Structures Project Planning and Control Advanced Landscape Design		1 1 2 1	0 1 0 0	16 0 3 3	5 2 3 2
	Sub-Total		5	1	22	12
	3 Units of Electives from Below					3
	TOTAL					15
	Design Economics and Cost Planning Architectural Practice and Management Building Maintenance and Management Principles of Construction Management		1 1 1 1	0 0 0 1	3 0 3 3	2 1 2 3

L = Lectures P = Practicals

T = Tutorials U = Credit Units

TABLE 2.10

SUMMARY OF COURSE REQUIREMENTS FOR MASTER OF SCIENCE (ARCHITECTURE)

Second Semester Year 5

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design VIII Advanced Urban Design Restoration and Preservation Advanced Building components & Methods		1 2 1 1	0 0 1 1	16 3 0 0	5 3 2 2
	Sub-Total		5	2	19	12
	3 Units of Electives from Below					3
	TOTAL					15
	Operations Research Environmental Resource Management Human Spatial Organization Design Economics and Cost Planning		2 2 1 1	0 1 0 0	0 0 0 3	2 3 1 2

L = Lectures P = Practicals
T = Tutorials U = Credit Units

TABLE 2.11

SUMMARY OF COURSE REQUIREMENTS FOR MASTER OF SCIENCE (ARCHITECTURE)

First Semester Year 6

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design/Project Specification Writing Professional Practice and Procedure		1 2 2	0 0 1	20 0 0	6 2 3
	Sub Total		5	1	20	11
	3 Units of Electives from below					3
	Grand Total					14
	Construction Management Environmental Impact Assessment Tourism Planning and Development Urban Renewal Techniques		2 2 2 2	0 0 0 0	3 3 3 3	3 3 3 3

L = Lectures P = Practicals
T = Tutorials U = Credit Units

TABLE 2.12

SUMMARY OF COURSE REQUIREMENTS FOR MASTER OF SCIENCE (ARCHITECTURE)
Second Semester Year 6

Code	Course Title	Pre-requisite	L	T	P	U
	Architectural Design Project Seminars		1 2	0 1	20 0	6 3
	Sub-Total		3	1	20	9
	3 Units of Electives from below					3
	Grand Total					12
	Personnel Management and Industrial Relations Building Climatology Highway Engineering Technical Communication Interior Design		2 1 1 1 1	0 0 1 0 1	0 0 0 0 0	2 1 2 1 2

L = Lectures P = Practicals
T = Tutorials U = Credit Units

APPENDIX 2.2 COURSE SYNOPSES

Introduction to Architecture

An introductory course to architecture stressing the architect's role in the building industry; design aims and tools; drawing and the various graphic communication media and reproduction equipment and materials; significant building in architecture and practitioners.

Architectural Graphics and Lettering I

A laboratory course in mechanical drawing, descriptive geometry, perceptive and shades and shadows including freehand drawing.

Freehand Sketching I

Sketching and architectural drawing from life.
The course aims at developing graphic language by which an architect explains buildings and other objects to himself and others using dry media such as pencils, crayons, etc.

Freehand Sketching II

Sketching and architectural drawing from life. A continuation of freehand sketching with greater emphasis on quick sketching techniques using wet media such as water and poster colours, inks, etc.

Architectural Graphics and Lettering II

Presentation of architectural drawings. Greater emphasis will be laid on presentation and rendering techniques, using different media.

Building Components and Methods I/II

Basic Building materials and their characteristics – timber, stones, bricks, cement and sand Crete blocks, concrete and R.C. concrete, mortars and Rendering. Elements and components of construction – foundations, load bearing walls, opening in walls, doors and windows, floors, simple roofs and finishes.

Building Components and Methods III/IV

Building materials and their characteristics – cast stone Asbestors Cement Products, Asphalt and bituminous fetts, glass paints steel, aluminium and other metals plastics, materials for sound and thermal insulation and their application and traditional building materials. Elements of Building Construction – Load bearing elements Partitions, Staircases and ramps intermediate floors ceilings, roofs, internal and external surface finishes and traditional construction methods.

Land Surveying

Linear measurement, chaining over obstacles, leveling, plotting simple section, measurement of horizontal angles in close and open traverses. Triangulation networks, procedure in the field, field record, use of bearing and co-ordinates and the setting out of building and simple road works.

History of Architecture I

A course in architectural history from earliest times to the Romanesque period with emphasis on the forces which shaped the history both in Western as well as in African societies.

Building Structures I/II

Fundamentals of strength of materials with emphasis on their application to architectural structures. Intuitive, qualitative and quantitative approaches to structural mechanics; force flow and structural configurations.

Building Economics

Some general terms in Building Economics. Cost planning as a design tool, factors governing building costs, price analysis, Bills of Quantities cost criteria, cost research and estimating cost plants.

Rural Development and Planning

Basic for settlement and settlement pattern, Rural structure and rural-urban continuum, village planning and community development, supported with village and village centre surveys.

Building Services I

Cold and hot water supply. Sources of water and water distribution. Cold and hot water installation, calculations of standard consumption velocity, demand and plumbing fittings leading to a complete design surface water drainage, sewage and waste disposal and sanitary systems.

Fire in Buildings

Fire prevention methods, protection equipment, control systems, classification of material/component ratings, means of egress, National Fire Safety code.

Building Climatology

Studies in how climatic factors affect human comfort. Climatic decisions in the design process, identification and analysis of climatic problems for the purpose of (heat) and glare effect of solar radiation. Thermal characteristics of building materials and some elements of construction sun shading devices the climatological zones of

Nigeria and their characteristics, study of traditional buildings in varying climatic zones and their problem solving potentials.

Building Services II

1. Natural lighting. Special lighting requirements, space geometry and light distribution for special effects. Artificial lighting basic principles, characteristics of various fittings, light service distribution and space geometry.

2. Electrical installation. Types of electrical supplies in Nigeria. Design procedure and data requirements. Domestic installations, service units and Ring man. Non-domestic installations, voltage drops ring and rising main distribution. Industrial installations, fitting switch gear, fuses, etc.

3. Illumination: Basic principles of illumination and illumination standard light distributors: Acoustics, Basic principles and laws of sound propagation, sound in an enclosed space. Room acoustics transmission and insulations of sound, insulation and absorption. Noise control demonstration through case study.

4. Special problems in architectural acoustics, broad study of function acoustics design in Architecture based on project work.

Urban Design

Lectures covering the aims and scope of planning – its social, economics and physical basis. Origins of modern town planning concentrating on urban planning problems – densities; neighbourhood, central, industrial and economical area development, shopping/market precincts. Field study and design of urban farms and spaces.

Environmental Science

A lecture – discussion course studying mechanical equipment, illumination and acoustics and the architectural and technical requirements for human comfort.

Building Structures III/IV

A lecture/laboratory course to develop understanding of the behaviour of timber, steel and reinforced concrete in structures, to design simple structural elements of these materials and to develop graphic skills in the presentation of design results.

Landscape Design

A theory project course to develop general appreciation of natural and man-made landscape Elements of landscape and their contribution in the design of open spaces in relation to buildings.

- Designing with nature or subjugation of nature
- Landscape architecture of the territorial, urban neighbourhood or single building lands.

- Climate and environmental constraints.
- Spatial relationship between architectural interiors and landscape.
- Traditional building techniques and landscape.
- Analysis of the elements of urban landscape.
- The use of natural resources: Trees, bushes, grass, rocks, water, etc in urban landscape (housing recreation areas).

Building Structures V/VI

Approximate analysis techniques for the various structure systems (form-active, vector-active, bulk-active, surface-active and vertical structure) to illustrate design criteria needed for architectural decisions. The relationship between structural behaviour and structural form. The morphology of forms will be discussed using both natural and man-made forms as examples. Economic and aesthetic suitability as applied to architectural problems.

Building Components and Methods V/VI

Complex building constructional elements advanced flooring, roof light, advanced doors and windows, curtain walling, infilling panels and solar control in building.

2.2 Benchmark-Style Minimum Academic Standards for Building Degree Programme

2.2.1 Introduction

This benchmark statements for the Building Programme is an attempt to allow for the much-desired flexibility of allowing each Institution to describe the nature and characteristic of each programme. This should be done without compromising the academic standards, the attributes and capabilities that holders of such qualifications should possess.

Nomenclature: Building/ Building Technology

Degree in view: Bachelor of Science/Bachelor of Technology (Building).

2.2.3 Basic Admission Requirements and Duration of Programme

Admission Requirement: Admission to Building Programme can be classified into normal admission into 100 level for holders of SSSC or equivalent and special admission for holders of other qualifications which will be evaluated for placement at the appropriate level.

a) **Normal Admission**

To be eligible for admission, candidates most have 5 credit passes at SSSCE or equivalent in Mathematics, English Language, Physics, and any one from Building Construction, Land Surveying, Fine arts, Technical Drawing, Economics, Geography, Chemistry and Biology.

b) **Special Admission**

Holders of HSC, GCE (A/L) IJMB and OND in appropriate discipline would be admitted to the 200 level of the programme. HND holders in Building or Civil Engineering and other qualifications will be evaluated for placement at the appropriate level. Any deficiencies in candidates background should be rectified by taking appropriate courses.

2.2.4 **Expected Duration:** The duration of the degree programme is for minimum of ten (10) semesters and maximum of fifteen (15) semesters out of which at least one full semester and the intervening holiday are devoted to industrial training (SIWES).

2.2.5 The purpose, aims and objectives of Minimum Academic Standards (MAS) Benchmarks Statements

The purpose of the MAS benchmark statement is to assist:

* The external examiners, reviewers and professional bodies in the accreditation exercise and serve as the basis of comparing notes.
* Enquirers with all relevant information about the programme.

2.2.6 **Statement on the Components of the Benchmark**

The benchmark statements is made up of four major parts as follows:

* The objectives and purposes of the Bachelor of Science or Bachelor of Technology (Building) degree.
* The essential courses expected to be covered in the programme leading to the award of the degree.
* The competencies, abilities and skills expected of a graduate of the programme.
* Assessment procedures and criteria for evaluating the body of knowledge covered and different levels of abilities and skills attained.

2.2.7 **Philosophy, Aims and Objectives**

a) **Philosophy**

The philosophy underlying Building Education is to develop and advance the Science and practices of building technology and construction management. It is important to emphasis that building technology involves building assembly/construction techniques, construction building process in the areas of site management, contract management, financial management, building production and maintenance

Building graduates are therefore expected to devote substantial part of their lives to solving national problems on how to make Nigeria technologically and truly independent and break new grounds in all aspects of building techniques and processes.

(b) **Aims/Objectives of Building Programme**

The objectives of a degree programme in building are to train competent graduates in building construction process and its management. In addition, the programme should provide sufficient general knowledge and specified skills/techniques which will enable the professional builder to co-ordinate and control the technological, economic, human and material resources involved in the building process.

The building graduate is also trained to interact with other allied professionals in the construction industry and be fully equipped for public service and self employment.

2.2.8 **Learning Outcomes: (Regime of Subject Knowledge)**

While flexibility is allowed in the depth of the body of knowledge required in the Building programme it is essential that all programmes will ensure that students become conversant with the following major aspects of Building.

(a) Building and Construction Technology
(b) Building Materials
(c) Building Services, Equipment and Infrastructure
(d) Building Structures
(e) Construction Management
(f) Project Management
(g) Construction Plant & Equipment
(h) Tendering
(i) Environmental Impact Assessment
(j) Building Maintenance
(k) Building Surveying
(l) Professional Practice and Ethics
(m) Awareness of major issues currently at the frontiers of Building research and development.
(n) Information Technology.
(o) Management and conservation of man made and natural environment
(p) Entrepreneurship for Builders
(q) Architectural Design for Builders
(r) Structural detailing
(s) Rural development

Competencies and Skills

Graduates of Building are expected to develop a wide range of different abilities and skills among which the following are essentials:

Building-related cognitive abilities and skills

a) Ability to understand the essential facts, concepts, principles and theories relating to the subject areas identified under (3.3) above.

b) Ability to apply the acquired knowledge to solving familiar and unfamiliar qualitative and quantitative problems.

c) Ability to identify and analyse new problems and plan strategies for the solution.

d) Ability to evaluate, synthesize and interpret Building industry information and data using IT.

e) Ability to present orally and in written form, scientific materials, contract documents, detailing and arguments clearly and correctly to the client and other range of audience.

Practical - skills

- Competence in feasibility and viability studies.
- Competence in building assemblage and construction
- Skills in coordination of Building projects

- Skills in the management of Building works and profitability of all the operations involved.
- Skills in the monitoring, control and inspection of site operative works.
- Competence in the most appropriate and cost effective method of construction and sequence of site operations for the entire Building construction project - this will include the preparation, updating and monitoring method statement, construction programme, information requirement schedule (IRS) and Early Warning System (EWS)
- Skills in the setting out of building, ensuring correct positioning of all aspects of building and supervision of foundation, formwork and temporary support, superstructure, concrete and structural steel works.
- Skills in obtaining and analysing quotations and making recommendations for the purchase of all materials, components and sub-contract works and other construction resources required for building project.
- Skills in the preparation of project Quality Manual, Fire, Health, Safety plan and Instructions for building construction.
- Skills for self employment.

General Skills:

- Written and oral communication skills
- Information technology skills.
- Information - retrieval skills in relation to primary and secondary sources including information retrieval through on-line computer search internet, emails
- Inter personal skills - ability to engage in team work.
- Qualitative and qualitative problem solving skills.
- Time – management
- Study skills needed for continuing professional development (CPD)

Behavioural Attributes

The behavioural attributes of the holders of bachelor degree in Building are expected to be governed by the laws of Nigeria in general and the code of Professional conduct in particular. The following are the specific attributes:

- ability to discharge responsibilities to the client or employer with full regard to the public and Building profession interest.
- ability to uphold the dignity, standing and reputation of the Nigerian Institute of Building and the Council of Registered Builders of Nigeria (CORBON).
- ability to keep confidential information confidential
- ability to give fair and unbiased advice
- ability to be free from corruption
- ability to use professional skills and integrity acquired for the good of the society

- skills to be abreast with the new thoughts and development in the Building Industry.

2.2.9 **Resource Requirement for Teaching and Learning in the Programme**

Academic staff: This should be in the ratio of one academic staff to fifteen students.

Non-Academic: This should be reduced to the barest minimum to take advantage of Information technology and other technological literacy

Academic physical spaces: See Table 1 for minimum space allowance

Equipment: All the necessary equipment for all the major subject area identified under (3.3) above (see appendix attached).

Library and Information resources: Internet connectivity equipment, facilities for creating Website and Library well equipped with facilities for fast information retrieval system.

2.2.10 **Maintenance of Curricular Relevance**

The success of this bench-mark style minimum Academic standards will depend largely on proper monitoring and evaluation.
The Employers, academic staff student external examiner and employer should be involved in the accreditation. The Curricula should be reviewed every five years while the accreditation should be done every three to four years.

2.2.11 **Performance Evaluation Criteria**

Even though all successful students who graduate with Bachelor's degree in Building are expected to demonstrate that they have acquired knowledge, abilities and skills in the areas already identified in the different section above yet it is certain that there will be significant differences in their attainment.

If a new criteria is to be adopted which will be different from the traditional degree classifications it must carry appropriate incentive such that an attainment of level A (the highest) will attract better remuneration than an attainment of level E (the lowest).

Course Evaluation

Course evaluation in the programme should strike a balance among theory subjects, continuous assessment of lectures and tutorials as well as practical/laboratory assignments.

Continuous Assessment

The methodologies of assessments include the presentation of term papers on current literatures on the subject; providing answers to short tests on the contents of the syllabuses; seminar presentation on topics of relevance to the course; report writing on techniques/experiences and observations on current practices and future possibilities; outcome of studio work of design nature, quality of work in the workshop/laboratories and field trip reports. A combination of the above should cover between 30% - 60% of the grade for each course.

End of Semester's Examinations

The end of semester's examination for each course shall attract 40% - 70% of the grade for each course to complement the continuous assessment

2.2.12 **External Examiners System**

External examiners shall be appointed once in a year particularly at the end of each session to moderate examination questions, review the scripts of the students, and provide an overview of the work of the students in all classes particularly those in the final year. It shall be mandatory on the Chief Examiner to review the questions set by his colleagues before those questions are forwarded to the external examiner in order to ensure that they reflect the coverage of the syllabi and the manner in which they were taught. The system also provides avenue for assessing comparability of programmes and the maintenance of minimum standards.

2.2.13 **Vacation Training Programmes (SIWES)**

Students on the B.Sc. Building programme shall comply with the provisions on Vacation Training Programme as discussed in Section I above.

2.2.14 P**ersonnel**

Academic Staff

A broad based outline on appointments/promotions of academic staff is provided in Section I above. With respect to appointments to the department of Building, the recruitment strategy should reflect the four main specializations available in the programme. These are Construction Management, Building Maintenance Management, Building Services and Building Structures.

Supporting Staff

The Current NUC standard on ratio of Academic Staff to other staff applies. In particular the following minimum staff strength are required.

Technical Support Staff

1 No. assistant Chief Technical Officer
2 Nos. Technologists

Structures Laboratory

1 No. Assistant Chief Technologist
2 Nos. Technologist

Services Laboratory

(a) 1 No. Assistant Chief Technologist
(b) 3 Nos. Technologist

Technical Drawing Room

2 Nos. Draughts men

Workshops

1 No. Technical Officer Carpentry
1 No. Technical Officer – Masonry
1 No. Technical Officer – Plumbing

Administrative Support Staff

1 Secretary to the department
1 No. confidential Secretary
1 No. Senior Typist

Junior Staff

2 Nos. Typists
2 Nos. Studio Attendants
1 No. Messenger
3 Nos. Laboratory attendants
1 No. Carpenter and Mate
1 No. Mason and Mate
1 No. Plumber and Mate
1 No. Iron Bender and Mate
1 No. Electrician and Mate

2.2.15 **Physical Facilities**

The minimum requirements are as per NUC guidelines.

Office Accommodation – will be provided for the following:

- Head of Department
- Secretary to Head of Department
- Professors/Readers
- Senior Lecturers
- Lecturers etc.
- Admin. Staff
- General Office/Stores
- Postgraduate Students

Classroom Space

Assuming 12 hours usable classroom time and 6 contact hours per day per year of course, 2 No. classrooms would be required for the undergraduates in Building.

Studio Space

Ideally one studio space is required by each class year. In view of the amount of time spent in laboratory, workshops etc. 2 No. studio rooms could be the minimum.

Seminar Space

This facility is expected to be frequently used and the student participation is more active. Fewer number of students than those in a class year is the norm. One of such facility is considered adequate and could accommodate other departments in the faculty.

Laboratory Spaces

The following laboratories with capacity for students at a given time are required in a department of Building:

(i) Materials Science Laboratory
(ii) Structures Laboratory including Building Materials
(iii) Service laboratory (may be sub-divided into Electrical, Water, and Mechanical etc).
(iv) Sound and thermal studies
(v) Computer room

Drawing Office

One drawing office is mandatory, essentially for staff.

Workshop Spaces

The following workshop spaces are required. Rapid turn over of each workshop are to be expected.

(i) Carpentry and Joinery/furniture
(ii) Masonry and concrete work
(iii) Simple electrical wiring
(iv) Plumbing and Drainage
(v) Model Making
(vi) Painting and Decorating
(vii) Mechanical shop and Welding

Space permitting, the above workshops should house the following Demonstration Units. In the alternative open spaces, covered where necessary, may also supplement the required spaces.

(i) Air Conditioning and refrigeration including room units, split system, package units etc. (This requirement may be met through collaboration with a department of mechanical engineering if available).

(ii) Sanitary/Plumbing systems using translucent pipe works

(iii) Electrical systems for domestic usage including illumination, insulation, switching devices, lighting conduit breakers and audio visual systems.

(iv) Proprietary products/Materials/Components including their durability, quality assessment, performance etc.

Table 3.0

Minimum Space Allowance

NO	SPACE	USE	MINIMUM
1	Professor's Office	Academic	24
2.	Head of Department	Administration	24
3.	Senior Lecturer	Academic	16
4.	Lecturer I & II	Academic	12
5.	Asst. Lecturer	Academic	8
6.	Senior Technical Staff	Technical	12
7.	Senior Admin. Staff	Admin	12
8.	Junior Technical Staff	Technical	5
9.	Junior Admin. Staff	Admin.	5
10.	Studio Space	Students	4
11.	Lecturer Space	Students	0.5
12.	Seminar Space	Students	0.5
13.	Laboratory Space	Students	2
14.	Library	Students	1.0
15.	Social Space	Students	0.5
16.	Storage Space	Students	0.1

2.2.16 **Equipment**

The department of Building in a Faculty of Environmental Sciences normally provides the essential workshops and technical facilities which are used not only by its students but also by students from other departments in the Faculty. Also the technical support staff are similarly attached to this department.

Under normal conditions students are grouped for experiments, workshop practices and other demonstration projects to reflect the amount of time allocated for practical classes in the curricula of studies. The equipment listed would be located in either the laboratories or the workshops described elsewhere below:

Essential Technical Equipment

(1 No. Each Except where Stated)

Wood/Timber Equipment
Woodworking machinery (all-purpose)
Wood making hand tools
Protective cover equipment
Circular Saw
Drilling Machine
Lathe Machine
Electric blower
Portable bracing machine
Dimension bench
Finishers
Portable cross out saw

Materials/Structures Equipment
Hand operated compression machine
Automatic compression machine with load paper
Flexural/Tensile Testing Apparatus - 4 Nos.

Compaction Factor Apparatus - 4 Nos.
Attorberg limit apparatus - 4 Nos.
Schmidt testing set - 2 Nos.
Bituminous plastic flow tester
Penetrometer - 2 Nos.
Vicat apparatus - 2 Nos.
Consistometer - 4 Nos.
Oven - Heating and Drying - 2 Nos.
Motar Capping Apparatus
Drying Shrinkage and Moisture movement Apparatus - 2
Aggregate Impact Value Apparatus
Aggregate Compression Machine
Curing Tanks - 2 Nos.
Riffle Boxes - 2 Nos.
Balances - 4 Nos.

Slump test apparatus	- 4 Nos.
Void measurement apparatus	- 2 Nos.
Moulds of all types	- 2 sets of each
Set of Sieves	- 2 sets
Flow table	
Sieve Shaker	- 2 Nos.
Speedy Moisture tester	
Concrete Test Hammer	
Stone/Concrete Cutter	

Service Laboratory Equipment

b)	Welding Apparatus	
c)	Electric Blower	- 2 Nos.
d)	Hand Drill	
e)	Electric heater	
f)	Soldering kit/apparatus	
g)	Acetylene regulator	
h)	Spark lighter	
i)	Lead pot	
j)	Sanitary Appliances and fittings	- 2 sets
k)	Water heater	
l)	Pipe Cutter	
m)	Portable Copper tube bending	
n)	Bench pipe vice	
o)	Cylinders	- 2 Nos
p)	Forging Machine	
q)	Plumbing and drainage pipe and fittings (assorted)	
r)	Sets of Tool Boxes	- 2 Nos.

Drawing Office Equipment

T-Squares and drawing tables (120)
Enlargement and Reducing Machine (Faculty access)
Guillotine
Photocopier
Duplicating machine
Slide projector
Scanner
Typewriters (3)

Transportation

The training Building undergraduates involves a lot of outside work for practicals and demonstrations, visits to historic sites, building sites, etc. The following should be provided:
1 No. Land-rover
1 No. Station Wagon

Construction Equipment

2 Nos. Concrete Mixer (1 small and 1 large)
1 No. Dumper
10 Nos. Vibration Poker
1 No Crain
4 Nos. Rammer
4 Nos. Shovels
4 Nos. Diggers

Surveying equipment (Faculty resources)

10 Nos. Theodolites
10 Nos. Quick set level
10 Nos. Chains
2 0 Nos. Tapes
20 Nos. Ranging Rods
3 Nos. 100 metres Tapes

Computer Laboratory

Internet connectivity
Minimum of 20 Desk Top computers
1 No. Printer
1 No. Plotter
1 No. Digitizer
1 No. Scanner
1 No. Overhead projector

APPENDIX 3.1

Distribution of Courses

Tables 3.1 – 3.9 show a typical outline of courses distributed over the ten semesters of studies indicating both the compulsory and elective courses. It would be observed that some of these courses may not be taught in a department of building particularly if a composite faculty structure is adopted where related departments are available.

It should also be noted that the course codes are necessary to effect specifying pre-requisites. These it is believed could easily be done by each institution.

TABLE 3.1

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE BUILDING

FIRST SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Nature of Environmental Science		1	0	3	2
	Building Construction and Material I		1	0	3	2
	Structural Mechanic I		1	0	3	2
	Computer Appreciation		2	0	4	2
	Mathematical Methods I		2	1	0	3
	Physics		2	0	3	3
	Principles of Economics for Builders		2	0	0	2
	Use of English		2	0	0	2
	TOTAL		13	2	13	18

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 3.2

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE BUILDING

SECOND SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Techniques of Drawing & Design		1	0	3	2
	Building Construction & Materials II		1	0	3	2
	Structural Mechanics II		1	0	3	2
	Computer Applications		1	0	4	2
	Mathematical Methods II		2	1	0	3
	Physics		2	0	3	3
	Introduction to valuation		1	0	3	2
	Communication Skills		2	0	0	2
	TOTAL		11	1	19	18

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 3.3

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE BUILDING

FIRST SEMESTER YEAR 2

Code	Course Title	Pre-requisite	L	T	P	U
	Building Construction & Materials III		1	1	3	3
	Structural Theory and Design I		2	0	0	2
	Building & Architectural Science		1	0	3	2
	Principles of Measurements &		1	1	3	3
	Description I		1	0	0	2
	Land Surveying I		2	0	4	2
	Environmental Education &		1	0	4	2
	Awareness		1	0	4	2
	Computer Aided Design		1	0	3	2
	Introduction to Quantity Surveying		2	0	0	2
	General Studies (logic and philosophy)					
	TOTAL		12	3	17	22

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 3.4

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE BUILDING

SECOND SEMESTER YEAR II

Code	Course Title	Pre-requisite	L	T	P	U
	Building Construction and Materials		1	1	3	3
	IV		1	1	3	3
	Structural Theory and Design II		1	1	3	3
	Principles of Measurement and		1	1	0	2
	Description II		1	0	3	2
	Land Surveying II		1	0	3	2
	Soil Mechanics and Foundation		2	0	0	2
	Basic Elements of Planning					
	General Studies (Nigerian People and Culture)					
	TOTAL		7	3	19	18

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 3.5

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE BUILDING

FIRST SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Construction Technology I Building Maintenance I Building Services and Equipment I Structural Analysis Engineering Thermodynamics Building Material Science Computer Applications in Project Management		1 2 1 2 1 1 0	1 0 0 0 1 1 0	3 0 3 3 0 0 8	3 2 2 3 2 2 2
	Sub-Total		8	3	17	16
	Electives of 2 units from below					2
	Grand Total					18
	Traditional Housing Design Case Studies on Glass in Building Clay and Clays Products		1 1 1	0 0 0	3 3 3	2 2 2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 3.6

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE BUILDING

SECOND SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Construction Technology II Building Maintenance II Building Services and Equipment III Reinforced Concrete Structure Project Planning and Control Soil Mechanics Timber Structures Building contracts Law & Arbitration		1 1 1 2 2 2 1 2	0 0 0 0 0 0 0 0	3 3 3 3 3 0 3 0	2 2 2 3 3 2 2 2
	Sub-Total		10	0	23	18
	Electives of 2 Units from below					2
	Grand Total					18
	Building Regulations, Laws and control Plastics in Building		1 1	0 0	3 3	2 2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 3.7

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE BUILDING

FIRST SEMESTER YEAR IV

Code	Course Title	Pre-requisite	L	T	P	U
	Production Management		2	0	0	2
	Building Economics and		1	0	3	2
	Measurement		0	0	9	3
	Integrated Studio Work		1	1	3	3
	Principles of Construction		1	0	3	2
	Management		2	0	0	2
	Design Economics and Cost Planning		2	0	0	2
	Operations Research					
	Sewage Treatment and Disposal					
	SUB-TOTAL		9	1	18	16
	Electives of 4 Units from below					4
	Grand Total					20
	Sociology of Housing		1	0	3	2
	Introduction to Estate Laws		2	0	0	2
	Business Organization and Accounts		1	0	3	2
	Rural Development Planning and		1	0	3	2
	Basic Infrastructure					

TABLE 3.8

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE BUILDING

FIRST SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Advanced Construction Technology I		1	1	3	3
	Advanced Project Management		1	1	3	3
	External Works in Building		2	0	0	2
	Professional Practices		1	1	0	2
	Building Material Development		2	0	0	2
	Project Reports I		1	1	0	2
	SUB-TOTAL		5	3	14	12
	Electives of 8 Units from below					8
	Grand Total					20
	Budgeting and Finance		1	0	3	2
	Geographic Information System (GIS)		1	0	4	2
	Analysis of Prices and Estimating I		1	0	3	2
	Construction Plant and Equipment		1	0	3	2
	Any one elective in the Structures Option		1	0	3	2
	Any one Elective in Building Maintenance Option		1	0	3	2

L = Lectures P = Practicals
T = Tutorials U =Credit Units

TABLE 3.9

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE BUILDING

SECOND SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Advance Construction Technology II		1	1	3	3
	Management of Building Projects		1	0	3	2
	Bidding Tendering and strategies		2	0	0	2
	Design of Steel Structure		2	0	3	3
	Environmental Impact Assessment		2	0	0	2
	Project report II		0	0	8	2
	SUB-TOTAL		8	1	17	14
	Electives of 8 Units from below					8
	Grand Total					22
	Productivity Studies on Site		1	0	3	2
	Advance Building Production/Process		1	0	3	2
	Analysis of Prices and Estimating II		1	0	3	2
	Specification Writing		1	0	3	2
	Case Studies/Seminar		1	0	3	2
	Any one elective in the Structures		1	0	3	2
	Option		1	0	3	2
	Any one elective in Building Maintenance					

L = Lectures P = Practicals
T = Tutorials U =Credit Units

APPENDIX 3.2

SYNOPSES OF COURSES

Building construction and Materials I

Site operations, General introduction to Basic Building, Construction, Operations and Techniques. Basic Building materials and components – Regional variations. Elements of Building – Foundation, Floors, Walls, Roofs.

Building Construction and Materials II

Detailing of elements of Buildings of all types – Residential, Industrial, commercial etc. Sub-soils and conditions. Non-load bearing and load bearing walls. Types of floors and roofs. Drainage, External Works and landscaping.

Structural Mechanics I

Introduction to mechanics and design of building structure. Forces, moments, stress, strain. Properties of structural sections. Friction, Energy, Shear Force and Bending Moments – Graphical and mathematical derivations.

Structural Mechanics II

Kinematics of particles and rigid bodies, Newton's laws of motion, impulse, Momentum, Energy and Power. Stresses, Deflections, Strain, Loading, Stiffness Design of Beams, Columns, Bulking of slender columns.

Building Construction and Materials III

Detailed study of materials and their performance in construction.
Processing of building materials,
Current bye laws, specifications,
Builders tools and equipment, soil explanations

Building Construction and Materials IV

Detailing of Construction works.
Builder's drawings, shop drawings.
Functional requirements of buildings and how to fulfil these proprietory Construction details.
Types of finishes and relative merits and cost. Schedules of finishes, doors windows, etc.
Development of new building materials – adaptations.

Structural Theory and Design I

Introduction to Structural Systems and forms system of loads,
Design of statically determinate structures.
Trussess – stresses and design, methods of joints and sections.
Frames structures.
Influence Lines,
Analysis of statically indeterminate structures.
Three moment and slope deflection equation, moment distribution.

Structural Theory and Design II

Space frames, stress analysis
Deflection of statically indeterminate structure, Bridge and roof trusses.
Long span structures
Arches, cables, - Theory and design.

Building and Architectural Science

Environmental Physics – heat, light, sound
Psychophysics, Tarmat Design

Ventilation and Air conditioning
Lighting system, light and illumination
Daylight in buildings
Noise and Buildings
Acoustics, Soil, reverberation and soil insulation.

Soil Mechanics

Introduction to soil theory
Soils, their classification, behaviour etc.
Strength and deformation of soils
Soil stresses, settlements and movements due to loading. Geotechnical investigation and tests
Soil stabilization – Lowering ground water, binding agents and their effects/properties.

Engineering Thermodynamics

Definition of essential terms and general concepts
First and Second Law of Thermodynamics – Applications to open system, heat engines, Entropy, First and Second law combined. Perfect Gasses.
Joule Thompson Co-efficient Equilibrium processes.
Maxwell's relations Two phase system Thermodynamics
Functions of solution P-V=T relationship. Work from heat energy – Refrigeration

Measured Institutional Buildings

The need to preserve Institutional Buildings. Their solution updating and preservation.
Identification, measurements, preparation of drawings and models as appropriate.

Construction Technology I

The course deals with "Whole structure concept" of the technology of building assembly Domes, Shell roof, Portal roof, folded slab, Hyperbolic paraboloids, Framed buildings in steel, concrete and timber. Integration of structure with services and equipment communications in building assembly. Horizontal and Vertical circulation/Movements.

Construction Technology II

Productions of Buildings for different social service organization of building activities, Building Regulations and how to satisfy these Fire Protection, Safety of Building sites, Temporary supports in building Proprietory Building systems.

Building Maintenance I

The Course deals with Building maintenance technology
Decay of Building – Agencies involved

Alternations, Conversion, extention, improvement in Building dimensional consideration.
Design defects and remedies
Structural surveys of Buildings.
Maintenance of all types of Buildings Mechanical Services.

Building Maintenance II

The course deals with the management aspects of building maintenance
Maintenance cycles – for different types of Buildings,
Standards expected of buildings – deviations spots items. Planning maintenance – resources required.
Programming, execution, appraisal policy guidelines.

Building Services I

Water supply prospecting, purification, storage and distribution to communities Domestic, Industrial and Commercial needs, satisfactory and provision.
Bye-law requirements.
Drainage including roof drainage Sewage and Serverage.
Principles of fire fighting and associated equipment including by-law, regulations codes affecting Gas services.

Building Services II

Service and their equipment
Lifts, Escallators, Hoists
Telephones
Metering
System Designs
Fire fighting equipment

Structural Analysis

Structural analysis of deflections and other structural characteristics using methods of matrix/algebra – stiffness. Analysis of plane frames.
Design of shells, domes, folded plate structures etc.

Reinforced Concrete Structure

Introduction to R.C. Structure
Buni principles. Bending, shear and torsion in R.C.
Building frame. Its design scheduling
Use of CP 114 and CP 110
Design of Specific Elements
Flat stab, pre-stressed work.

Integrated Studio II

This is essentially a studio work to unify the entire courses offered by the main stream of students. Solutions of set assignments with adequate clarity and against a time frame.

Project Planning and Control

This course deals with the sequence, organization and control of projects and the responsibility of various groups on the implementation of capital projects. Management principles and practices are briefly covered, so also is introduction to work study productivity and financial implications, Legal implications etc.

Case Studies on Glass in Building

Introduction to Glass technology and manufacture
Utilization of Glass in Buildings
A critique of Glass as external curtain
Maintenance aspects. Problems
Case studies

Case Studies on Clays in Buildings

Clays as a basic product. The production
Clay products in Buildings – Foundation, Floors, Walls, Ceilings, Roofs, Finishes etc.

Performance of clays in Buildings
Maintenance aspects – problems
Case studies

Case Studies on Plastic in Buildings

Introduction to Plastic technology and Manufacture
Utilization of Plastics in buildings
Performance of plastics in buildings
Maintenance aspect, problems
Case studies.

Case Studies on Timber in Buildings

Timber as basic building materials
Renewal material – 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.

Advanced Construction Technology I

The course deals with complex contemporary buildings and construction problems

- Evaluation of alternative forms, performance of structural systems and building envelope
- Industrialised systems building versus traditional solution
- Standardisation, quality control and dimensional accuracies in buildings.
- Proprietory system in buildings.

Advanced Construction Technology II

The course deals with specialized topics in construction technology, includes industrial processes and engineering services required for effective functions.

- Mechanical and Electrical System and installations
- Mechanical plant on Site
- Refuse disposals
- Large open roofs systems
- Piling systems
- Basements, Retaining walls, swimming pools
- Case studies on building failures

Principles of Construction Management

The course deals with management principles and practice generally, management science, organization theory and their application to building projects.

- Personnel management
- Communication and Communicating systems
- Introduction to decision theory
- Financial Accounting
- Appraisal and control of capital project from conception to completion

Management of Building Projects

The course deals with building production procedures and practices which facilitate high productivity on the building site.

- Techniques of project management
- Clients, consultants and contractors Managerial staff relations
- Co-ordination of efforts of designers sub-contractors etc. With the construction process.
- Productivity, production targets and incentives
- The role of mechanical plants in construction projects management

Professional Practices

The course deals with principles of good practices by professional builders in relation to other sister professions and the interest of clients and the public.

- The NIOB rules of professional practice
- The Registration Boards and its regulation
- Joint consultative council
- SIWES Programme
- Partnerships and consortia, Design and Build
- Roles of Professional Builders
- Tendering and bidding strategies
- Consultancy practices and their regulations.

Design of Steel Structures

Introduction to steel structures; production and properties of steel and steel systems specific designs of members and composites. Welded and riveted connections. Application of current codes.

Project Report I & II

Each student is expected to work on an independent project involving practical and scientific investigations. The report may end at analysis and report stage or extend to a design solution. The course lasts a whole session.

Advanced Project Management

The course deals with the practice of project management as a direct service to clients on an in-House or consultancy basis.

Analysis of management thoughts, the use of electronic computers to analysis feasibility, design, execution and management of building projects including financial approval and use of scarce resources. CPM PERT etc. Marketing of construction.

Productivity studies on Building Sites

The course is aimed at increasing productivity of building construction by analyzing typical methods of construction and production processes.

- Work study flow charts – principles and techniques
- Case Studies.

Budgeting and Finance

- Introduction to form of Business Organization and Accounting requirement
- Accounting Theory, Cost Accounting and Purposes of Accounting
- Finance in general
- Budgeting, Control Systems and capital Budgeting, Cost control
- Working capital
- Profitability. Case studies.

Advanced Building Production/Process

The course is designed to expose the students to advanced system of building by highlighting possibilities now and future for example.

- Soil strengthening
- System of Prefabrication
- Self weathering applied finishes
- Joint less flooring

Development of New Building Materials

The course is designed to focus attention on research and development of new building materials.

- A review of current production processes of typical building materials
- Adaptation of existing processes for new building materials
- New building materials from local resources
- Quality control, Agreement and Quality assurance
- Case studies

Case Studies in Building

This course is an independent work of students looking into any aspect of Building specialization and to evolve a new approach, adapt existing methods, to the solution of building problems.

Highway Engineering

The course deals with the basic elements of highway design and construction as a primary infrastructure

- Planning requirements and layout
- Traffic Surveys
- Road design, construction and maintenance
- Highway structures
- Low cost roads, footpath and drive ways
- Location of services.

2.3 Benchmark – Style Minimum Standards for Environmental Management and Toxicology Degree Programme (Option One)

2.3.1 Introduction

The benchmark statement for Environmental Management and Toxicology is to provide a guideline for the description and the characteristics of the degree programme and to articulate the abilities and skills expected of graduates of Environmental Management and Toxicology.

In the context of Nigerian Universities, a five-year degree leading to a professional Bachelor's degree is being recommended. This statement provides a guide for designing the Bachelor's degree programme.

The benchmark statement emphasis the science underpinning Environmental Management and Toxicology. It also integrates various modules of the different Sciences of Biology, Chemistry, Physics etc. Body of knowledge in the areas of Environmental Impact Assessment, Pollution control, Entrepreneurship, Information Technology and Facilities Management have been incorporated to cater for these developments.

Nomenclature:	Environmental Management and Toxicology (EMT)
Degree in View:	Bachelor of Environmental Management and Toxicology with options in Environmental Management and Environmental Toxicology.

2.3.2 Philosophy and Objectives

The philosophy of the programme is in the training of Personnel from a wide range of disciplines and backgrounds, to the highest academic standard in the identification and resolution of environmental issues. The programme will provide skilled manpower, trained specifically for environmental surveillance, monitoring and management as against the present practice where these tasks were performed by people trained in Basic and Applied Sciences.

2.3.3 Aims and Objectives

The programme is designed to provide the training needed for an understanding of the environment and to build upon this foundation by exploring in some depths, specific aspect such as resource depletion, recycling, re-use and the impact of Science and Technology on the environment.

2.3.4 Admission Requirements

Admission into the programme may be through any of the following modes:

* **Normal Admission**: Candidates who have successfully completed the Senior Secondary School or its equivalent and obtained five credits in

Mathematics, English Language, Chemistry and Biology or Agricultural Science, in not more than two sittings. And candidates must also have at-least a pass in Physics.

* **Direct Entry**: Candidates who fulfils above requirements and who have obtained G.C.E Advanced Level, HSC or equivalent passes in Biology and Chemistry. may be admitted at the 200 level of the programme.

* **Special Admission**: A candidate who fulfils normal admission requirements and in addition holds an ND or HND certificate (minimum upper credit) in Health Technology, Agriculture and other related fields, can be considered for Admission into the programme at the appropriate level.

Transfer Cases: Candidates wishing to transfer from one programme to Environmental Management and Toxicology for some good reason(s) may be considered for absorption at the appropriate level. Any deficiencies in their background should be rectified by taking appropriate courses.

2.3.5 Expected Duration

Landscape is expected to last a minimum of 10 semester's duration leading to a registrable degree. A minimum of six months of Work Experience shall be incorporated in the programme.

2.3.6 Learning Areas

All the relevant Science subjects underpinning the study of Environmental Management and Toxicology.

2.3.7 Course System and Grade Point Average

Definition of Course Credit System

This is a system in which subjects are broken down into one or more convenient sections called courses, which are taught and examined within a semester. A course is assigned a specific number of lectures and/or practical hours and the total number of hours assigned to it will determine its unit value. A course unit is defined as fifteen hours of lecture (one lecture hour per week) or forty five hours of practical work (three hours of practical work per week for fifteen weeks).

2.3.7.2 Grade Point Average and Cumulative Grade Point Average

All examinations course shall be converted to letter grades ranging from A – F as shown in the table below. All letter grades are also assigned specific grade points, ranging from 5 (for A) to 0 (for F) and these grade points are used in the computation of grade point average (GPA) and cumulative grade point

average (CGPA) which forms the basis for degree classification at the end of each academic programme as shown in the table below:

Table 4.0 showing Scoring and Grading Systems

Exam. Score Percent	Letter Grade	Grade Point	CGPA	Class of Degree
70 – 100	A	5	4.5 – 5.0	1st Class
60 – 69	B	4	3.5 – 4.49	2nd Class (Upper)
50 – 59	C	3	2.4 – 3.49	2nd Class (Lower)
45 – 49	D	2	1.5 – 2.39	3rd Class
40 – 44	E	1	1.0 – 1.49	Pass
0 – 39	F	0	0.0 – 0.99	Fail

2.3.8 **Course Evaluation**

Courses shall be evaluated on the basis of continuous assessment and examination conducted at the end of each course. Courses which are largely lecture or tutorial-based shall be evaluated on the basis of continuous assessment score of 30% (short tests, take home assignments, term papers etc). And Course examination of 70% conducted at the end of each semester.

Courses which are largely practical-based shall be evaluated largely on continuous assessment basis (up to 80 to 100%) and a short examination not exceeding 10 – 20% of the scores. Courses based on Industrial Training shall be evaluated by direct assessment of students performance in the industry as well as students reports and seminar presentation.

2.3.9 **Graduation Requirements**

To qualify for the award of the degree of Bachelor of Environmental Management and Toxicology, a student:

(a) Must have spent minimum of 3,4 or 5 years on the programme depending on the year of entry.

(b) Must have passed all the University Compulsory courses.

(c) Must have passed all department and College Core courses and required elective.

(d) Should not have spent more than two years in excess of the prescribed minimum periods for the award of the degree.

(e) Should not have less than a CGPA of 1.0 at the end of the programme.

The distribution of units is as shown below:

Environmental Management Option/Environmental Toxicology Option

University Compulsory Course		3 Year Programme	4 Year Programme	5 Year Programme
(i)	General Studies	-	5	10
(ii)	Other Compulsory			
(c)	Courses (CPP201;			
(d)	APH 202, PHS 364)	1	7	7
(e)	100 Level Courses	-	-	33
Core Courses				
10	200 Level	-	23	23
	300 Level	35	35	35
	400 Level	18	18	18
	500 Level	30	30	30
	Industrial Training	16	16	16
ELECTIVES		10	10	10
TOTAL		110	144	182

2.3.10 **Repeating Failed Courses**

A pass mark for courses examined shall be 40%. All failed core/Compulsory course must be repeated before a student will graduate.

2.3.11 **Probation and Withdrawals**

(a) Any study who scores a grade point average (GPA) of less than 1.00 at the end of one semester shall be placed on probation during the next semester.

(b) Any student who has CGPA of less than 1.00 at the end of an academic session shall be on probation.

(c) Any student that scores a GPA of less than 1.00 in two consecutive semesters within an academic session shall be required to withdraw from the programme.

(d) A student who has a GPA of less than 1.00 in two consecutive semesters within a session and a CGPA of less than 1.00 at the end of the session shall be required to withdraw from the university.

(e) Any student asked to withdraw from the EMT programme shall be allowed to transfer to another degree programme, provided he has the minimum requirements to be admitted into that programme.

2.3.12 **External Examination System**

(a) All the final year examination questions must be reviewed and approved by the programme external examiner.

(b) At the end of the second semester of each academic session, the external examiner will visit the department to review all the examinations scripts, and students projects reports. The external examiner will also conduct an oral exam on the students projects, for all the final students.

2.3.13 **Purpose, Aims and Objectives of the Benchmarks Minimum Academic Standard (BMAS)**

The purpose of the MAS Benchmark Statement is to:

Assist Universities and upcoming departments of Landscape Architecture in designing and approving programmes of study.

Assist professional bodies in their accreditation and review of programmes relating to professional
competence.

Assist Students, Employers, International Organizations etc when seeking information about
Environmental Management Education in Nigeria.

2.3.14 **Statement of Components of Benchmark Statements**

The benchmark statement is made up of four major component part as follows:

The objectives and purpose of the Bachelor Degree in Environmental Management

The essential courses expected to be covered in the programme leading to the award of the degree.

The competencies abilities and skills expected of a graduate of Environmental Management.

Assessment procedures and criteria for evaluating the body of knowledge covered and different levels of abilities and skills attained.

2.3.15 **Statement of Intended Use of the Benchmark**

The benchmark statements are intended to provide a broad framework within which educators can develop appropriate and challenging Environmental Management programme that respond to the needs of the student, changing nature of the discipline, as well as, new developments in Technology. The benchmarks are not intended as straight-jackets that would stifle innovation in programme development and in the designing of Bachelors degree students at

the end of their programme and to maintain the standard of Environmental Management Degree.

2.3.16 **Philosophy and Objectives**

Description

The Bachelor of Environmental Management is a 5-year academic degree for undergraduates. It is focused on the development of knowledge and skills in landscape design, planning and management.

The degree should be accredited by the Nigerian Institute of Environmental Management, with recognition worldwide through the International Federation of Environmental Management.

A particular feature of the programme should be its emphasis upon studio. The design studios provide both a physical location and an educational philosophy, in which design is learned through undertaking a series of real world projects. While design application is critical, so also are ideas and critique.

Career Opportunities

Career prospects for talented Environmental Management are good, with worldwide opportunities in consultancy, private practice, the landscape industry, local government and central government agencies. The range of career opportunities for talented Environmental Management graduates is wide and still growing.

Environmental Management often work in teams which other disciplines. In site planning and design, they work closely with architects, engineers and horticulturalists. On a broader scale, they work with resource managers and planners. The distinctive approach that a Environmental Management brings to a project is a combination of creativity, critique and problem solving skills which are integrated with a broad understanding of the natural and cultural environment.

Professional Involvement

Environmental Management contribute to a wide range of projects for private, institutional and government clients. These include civic developments, urban design, tourism development, residential and lifestyle subdivision, and commercial, institutional and industrial projects. There is also opportunity to work on parks, highways, heritage conservation, ecological restoration and re-vegetation, city or rural planning and resource policy.

The practice of Environmental Management involves:- landscape assessment and resource consent applications, site design and master planning, contract documentation and landscape management. Environmental Management may be engaged in a range of roles, including presenting evidence to the

Environment Court, managing projects for developers, supervising site works or education.

Environmental Management has a strong ethical dimension and Environmental Management aim to design in a socially and environmentally responsible manner, whether working for a public or private client.

On graduating, the Environmental Management can early commence private practice and generate employment – raising of nursery, industry and city beautification projects.

General Philosophy Environmental Management Education

The overall national philosophy in Environmental Management Education can be state in general terms as follows:

The range of exposure and scope of the programmes in a department of Environmental Management should produce a competent, skilled and versatile individual capable of facing a broad spectrum of challenges of the environment for human and other activities.

Every school should aim at exploring the rich cultural and local Environmental Management resources in the country in general and within its immediate environment in particular Environmental Management departments should inculcate the understanding of the environmental problems of the community and make efforts towards evolving solutions to these problems.

A graduate of Environmental Management is therefore trained in the art and science of planning, design, erection, commissioning, maintenance, management and co-ordination of allied professional inputs in the development of Environmental Management. There should be flexibility in the development of courses to allow for the changing needs of education arising from changing social, economic, psychological and technological environment.

Aims and Objectives of Landscape Architectural Education Programmes

A Environmental Management Education programme should be committed to:

A high-quality of professional education aimed at producing Environmental Management capable of understanding and solving complex technical and environmental problems, as well as, applying the knowledge to tackle and co-ordinate other related professional inputs in the development of the environment. The focus is on development of knowledge and skills in Environmental Management design, planning implementation and management.

The infusion in the student of an understanding of the context of the design and construction in physical, cultural, social, economic and technological terms.

Equipping the student with adequate knowledge, creativity, specialized skills and leadership capabilities that will enable the graduate to coordinate and control and design and implementation processes and inputs thereto by allied professionals and executors.

Producing Professional Environmental Management , cap-able of undertaking the whole range of design activities from schematic design through working and drawing to construction detailing and planting programmes.

Providing the student with the knowledge and skills to undertake a wide range of management activities such as coordinating site meeting, site management, facilities management, post construction evaluation, in the area of Landscape development.

Providing the student with the knowledge and skill base from which he/she can proceed to further studies in Environmental Management or allied areas.

Provide the student with entrepreneurial knowledge and skills to enable him/her to be self-reliant, and provide jobs for others.

Provide the student with skills in computers and Information Technology to enable him fit in the current global professional arena.

2.3.17 **Learning Outcome**

Learning Outcomes: Regime of Subject Knowledge:

Each department of Environmental Management can fashion its actual course context, nature and organization of its course or modules to reflect its peculiarities. Furthermore, a Environmental Management programme can be domiciled as an option with the departments of Environmental Management, Urban and Regional Planning, Estate Management etc as an option. Whatever the approach adopted by a given School of Environmental Sciences, it is expected that the Environmental Management programme will select course from the following six instruction modules:

Environmental Management Design and Graphic Communication Skills
Art and Humanities
History and Theoretical Studies
Construction Technology and Environmental Services
Physical Sciences and Information Technology
Management and Entrepreneurial Studies

Core of the Programme:

The core of any Landscape Architectural Education is the emphasis upon studio and practical application. The Design Studio should provide both physical location and an education philosophy in which design is learned through undertaking a series of practical real world projects. Communication skills as well as Theory and Historical/Critique courses are essential component of this core. Similarly, Environmental Management construction techniques and services provide the skills needed in dealing with hard landscape elements, while courses from the Natural Sciences and Environmental Sciences modules provide the student with basic tools of understanding manipulating, preserving and managing Environmental Management elements at various scales.

This core of the programme should Account for at least 60% of the total credit load in the Environmental Management programme.

Cognate and Elective Courses:

These groups of courses should account for 30% to 40% of the total credit load of the programme. These courses are also chosen from the six modules out lined about but the selection is aimed at providing each Environmental Management programme the opportunity to play a unique and identifiable role in the Environmental Management of the country and the region. For example:

A programme domicile in a University of Technology may have more of the Construction, Environmental Services, Information Technology and related courses in its selection.

A programme domicile is a regular University and closely related to Urban Planning and Agriculture may have more of the Natural Sciences, Environmental Sciences, Ecology and Criticism and general History and Theory of the Landscape Architecture in its cognates and electives.

At the other end a programme domicile in an academic environment where sciences and other entry courses. Design programmes are available may emphasis cognates in the area of humanities, arts, painting, sculpture artistic materials and aesthetics consideration.

In addition, the electives enable a student to further identify areas of special interests and skills he would like to acquire to enhance his career prospects and education background.

Environmental Management Learning Outcomes: Competencies and Skills:

The main abilities and skills (Cognitive, Architectural and General). The modules are expected to inculcate in the students are as follows:

(a) Environmental Management Design and Communication Skills (Module A)

Students commonly take an introductory course in drafting (LDA 21) followed by a three-dimensional design course. The three-dimensional course is typically taken in Art or through Design 125 in our department. Other art courses are also available and encouraged. Drafting covers basic skills in graphic delineation of site analyses, site plans, section elevation, and perspective views, and color illustrations. Following this course, students take LDA 22, an advanced graphics course oriented toward rendering and hand-developed presentation graphics. LDA 22 is followed by LDA 23, the introductory, mackintosh-based computer graphics course. These courses are typically completed by the end of sophomore year. In the junior year, students may take LDA 120, the advance computer graphics course, which features CAD, GIS, and animation for landscape planning and design. All students also must take LDA 122, which concentrates on more advanced professional communication topics such as report, brochure and resume design, oral presentations, audio-visual and multimedia/video presentations. The complete graphic presentation sequence superbly prepares students for the communication challenges of the project and for subsequent professional practice.

The studio sequence in Environmental Management design consists of seven sequential courses. LDA – 11 is the first studio, and is taken in the sophomore year. It introduces students to the Environmental Management analysis and design process and provides introductory studio experiences at all physical scales and many land-use types. LDA-111 is the fall junior studio which emphasizes site analysis, site planning, the sitting of structures and the design of circulation systems. Emphasis is also placed on energy and water conservation methods in site design. LDA-112 follows in the winter quarter of the junior year, with emphasis on the role of creativity in the design process. LDA-112 emphasizes form, space, and artful expression in the landscape. Typical projects are those where form and symbolic content are paramount (as in the design of civic art plazas, memorials, etc.). The final studio in the junior year is LDA-113, which emphasizes regional-scale land planning and design issues and features more sophisticated land, resource, and community analysis techniques, user/user and user/resource conflict resolution, and large-scale master planning. Typical projects might include the planning of linear park and trail systems in cities, the adaptive re-use of surplus or decommissioned military bases, or the planning of large, mixed-use land developments.

To develop the skills and techniques in problem recognition, information gathering, solution, synthesis, evaluation and design.

To undertake design exercises varying in magnitude from relatively simple requirement, through to urban planning and Environmental Management design problems that need specialized skills and knowledge.

To be able to grapple with technical, social, environmental, aesthetic, as well as financial aspects of Environmental Management problems during these exercises.

To be able to handle Environmental Management planning and constructional technology and detailing at certain levels of the skills acquisition process within this module.

To develop imaginative and creative faculties of the student so as to gain confidence in working processes requiring communication skills.

To undertake diverse exercises in studios or workshops focusing on the application of art and design, texture, proportion, light and shade in design of landscape.

Environmental Management History and Theoretical Studies (Module B)

This sequence begins with the primary introductory lecture in landscape architecture, LDA 40, which is open to all students with no prerequisites. Taken early on in the curriculum, it is a foundation course covering history, theory, process and applications of Environmental Management and is a primary vehicle for attracting new students into the major. LDA 140, History of Environmental Management , is required for Environmental Management students but is also a General Education course and is quite popular on campus. Enrolment in this lecture course sometimes exceeds 300 students. Environmental Management students must also complete three repetitions of the one-unit professional seminar, LDA-190, also open to non-majors, which features quest speakers on the widest possible range of Environmental Management and closely related topics. This course is called the "pro-seminar", and also serves as a means for attracting talented and motivated students into the major.

To develop an understanding of the history and theory of Environmental Management both western and non-western aimed at clarifying the scale of values and concepts within which Environmental Management is created.

To examine landscape globally aimed at stimulating students to the recognition of the existence of conceptual resources in various Environmental Management traditions in the world.

To develop the necessary framework upon which the student bases his creative work.

(c) **Arts and Humanities (Module C)**

Students are required to take six General Education courses selected from a list published in the General Catalog. General education requirements emphasize broad social and environmental issues, critical thinking, and writing skills. Students are also able to take least 24 units of electives with no restriction whatsoever. However, students may choose to use some of these

units within the Landscape Architecture, or for directed group study or independent study projects with specific professors. All the required general course prescribed by the University.

To expose the student of Environmental Management to the general cultural, historical, psychological and sociological context within which Environmental Management is created.

To clarify some practical implications of design decision from the point of view of the users, the client and the public at large.

To expose the students to the legal, political and economic framework within which he is expected to operate as a Landscape Architect.

(d) **Environmental Management *construction Technology and Environmental Services (Module D)***

A course in general mathematics begins this sequence followed by a recommended but optional course in surveying. It is followed by a mandatory four-course sequence in landscape construction. LDA 131 is the course which utilizes the lecture and laboratory format to introduce the processes and materials of landscape construction. LDA 132, Site Engineering, follows and covers topography, grading, drainage, and road alignment. Next comes LDA 133, which emphasizes the design of "hard" construction details and technical systems in the landscape and teaches methods of preparing technical drawings of details. LDA 134 combines professional practice and project management with the preparation of construction drawings and documents for a complex, site-scale landscape project. LDA 132, 133 and 134 are all "technical" studio format courses. Computer graphics is introduced early in the sequence and becomes mandatory for part or all of the construction documents course outputs.

To develop the understanding of hard elements of landscape, the structure and he process involved in putting them together to complement the natural elements.

To expose the student to environmental services such as plumbing drainage, electrical, lighting, vertical transport systems, security systems and Environmental Management development.

To develop an understanding of implementation, cost implication, managerial, as well as, various processes that go into realizing designer's concept.

To acquire knowledge to be able to determine space requirements and to integrate services within the fabric of landscape.

(e) **Physical Sciences and Information Technology (Module E)**

Students are required to take an introductory biology course followed by either introductory botany or plant science. Also required is one introductory course

in geology, physical geography or soil science which deals with the land as a physical substance. Once these lower division courses are completed, students must take one upper division course in ecology and two upper division courses each focusing on a renewable natural resource, such as atmospheric science, forestry, native plant communities, solar energy, water science, or wildlife biology. This sequence builds competence for upper division studio work in planning and landscape ecology (LDA 181 and LDA 183).

Environmental Management students begin their exposure to horticulture with the sophomore-level course ENH 6, Introduction to Environmental Plants, which covers basic plant identification and characteristics of commonly used landscape plants. ENH 105, Taxonomy and Ecology of Environmental Plants, follows, covering more genera and species as well as advanced taxonomic and ecological principles. Arboriculture, ENH 133, comes next and covers the principles of establishment and management of woody plants. Students have the option of taking LDA 155, a General Education course in the cultural uses of plants in the environment. This course is open to non-majors as well and is often taken by prospective landscape architecture students. This course emphasizes the choice of plant material for such uses as erosion control, wildlife habitat improvement, water conservation, fire control, urban forestry, solar access and solar control, as well as cultural phenomena such as plant fads, aesthetic styles in planting design, simulated plants, Native American medicinal plant uses, etc. The final course in this sequence is LDA 156, Environmental Management Planting Design. This course provides students with skill and experience in the composition of planted landscapes where aesthetic, spatial, ecological, and formal properties are critical. The course emphasizes projects such as botanical gardens, arboreta, etc, where plant material selection and composition is the primary design variable considered.

Computers are an integral component of the curriculum in landscape architecture. The philosophy of the faculty is to "mainstream" computers, incorporating computer applications into a variety of courses and offering the student a choice of traditional as well as computerized media. Multiple computer work stations are now located in all studios. Students are first introduced graphics in the sophomore year, primarily through the Computer Graphics course (LDA 23), but also in the introductory graphics and studio courses (LDA 11, 21). In the Advance Communications course (LDA 122) students learn to use advanced interactive computer/video software programs in preparing professional quality presentations. A new, optional course in advanced computer graphics (LDA 120) was offered last summer and will become a regular course offering this academic year. In this course students learn advanced multi-media applications, such as CAD, GIS, solid modeling, simulation, and real-time multi-media animation. Computer-aided grading, drainage and cut/fill calculations are introduced in the landscape technology courses in the Junior and Senior years, while most students now produce much or all of their required construction documents in LDA 134 on the computer. Computerized plant selection is also introduced in the planting design studio (LDA 156).

To master the basic techniques, skills and principles of physical sciences as it relates to the building industry.

To acquire the knowledge and skills in Information Technology and application of computes to the landscape Construction.

To acquire proficiency in Computer Aided Design, Word processing, Data processing and Internet.

(f) **Management and Entrepreneurial Studies (Module F)**

LDA 190, or Pro-seminar in Environmental Management, is a one-unit seminar meeting once per week for each quarter during the year. It is open to majors and non-majors alike. Students are required to take a total of three units. The seminar consists of lecturers and discussions led by invited guests who are either practicing landscape architects or allied professionals or scholars. In many ways the Pro-seminar, informally known as "Lunch bag Lectures" because of their Friday noon-time period, is our most stimulating course. It is frequently the center of lively debate and attracts large numbers of prospective students to the major. It also serves as a major contribution of Environmental Management to the general academic climate of the campus.

To equip the student with management tools required for the coordination, control, administration and management of project execution.

To expose the students to basic principles of law, professional practice and contract administration and management.

To develop entrepreneurship skills that enables the student to be resourceful and self-reliant.

The Student Industrial Work Experience (SIWES) is to expose the student to:

Competence in the execution of practical Environmental Management projects.

Skills for observation, recording and documentation on construction sites.

Skills in safe handling of equipment and avoidance of hazards associated with them.

Environmental Management office practice and development is an office practice in a real environment.

Learning Outcome: Behavioural Attributes:

Graduates of Environmental Management are governed by their code of professional conduct of the professional body (Nigerian Association of Environmental Management).

These attributes relate to:

The ability to discharge professional obligations to members of the public
Display of professional integrity
Competence with General Ethics
Compliance with the Regulation of Society
Participation in Professional Environmental Management

2.3.18 **Resource Requirement for Teaching and Learning in the Programme**

Academic Staff:

The academic staff requirement is a staff/student ratio of 1:15. The academic staff should be made up of:

Assistant Lecturer
Lecturer II
Lecturer I
Senior Lecturer
Reader/Associate Professor
Professor

The point of entry for each of the positions shall reflect academic qualification, teaching experience and practical professional experience as detailed in the general benchmark statement for environmental studies.

In addition to the regular academic staff, Environmental Management should be able to benefit from the wealth of experience of professionals from the field who could join the teaching staff:

Studio Senior Lecturer	Must be a Registered Environmental Management with a minimum of 15 years relevant field experience.
Studio Associate Fellows	Must be a Registered Environmental Management with a minimum of 20 years relevant field experience, subject to peer review.
Studio Fellows	Must be a Registered Environmental Management and Fellow of Nigeria Institute of Environmental Management or its equivalent with a minimum of 25 years relevant field experience.

Non-Academic Staff:

(a) **Senior Technical Staff:**

Considering the technological bias of Environmental Management Education, the ratio of Senior Technical Staff is 1:5. The

specialization of the technical staff may vary depending on the situation of the particular school. Schools that exist within institutions or faculties where technical staff from Building Departments, Engineering and physics Department can make input, need not recruit technical staff in all specialization required in Environmental Management programmmes. Requisite specialization can range from modeling, Reprographics, Environmental Management Technology, Laboratory Technology, Presentation Techniques to Electrical installation, Building Technology and Plumbing. Computer Aided Design specialists Data Analysis.

(b) **Senior Administrative Staff:**

The ratio of Senior Administrative staff should be minimal in view of the technical nature of the programme.

(c) **Junior Staff:**

An overall ratio of Junior Staff is to be minimal. Two categories of Junior Staff are needed in a Environmental Management: Junior Technical Staff and Junior Non-Technical Staff: The distribution between these two categories should be roughly 2:1.

i. Junior Technical Staff can include:

Draughtsmen, Carpenters, Modelists, Masons, Painters, Horticulturists, Photographers, Drivers/Mechanics, Storekeepers, and Computer graphist.

ii. Non-Technical Staff include:

Clerical Officers, Typists, Cleaners, Studio Attendants, Messengers, Gardeners, Library Attendants, Data Analysis, Word processing Managers and so on.

Academic Physical Spaces:

Office accommodation for academic, non-academic staff and students per capital should be based on the following guidelines:

MINIMUM SPACE ALLOWANCE:

NO	SPACE	USE	MINIMUM (m)
1	Professors Office	Academic	24
2	Head of Department	Administration	24
3	Senior Lecturer	Academic	20
4	Lecturer	Academic	46
5	Assistant lecturer	Academic	12
6	Senior Technical Staff	Technical	12
7	Senior Administrative Staff	Administration	12

8	Junior Technical Staff	Technical	6
9	Junior Administrative Staff	Administration	4
10	Studio Space	Students	3
11	Lecturer Space	Students	0.5
12	Seminar Space	Students	0.5
13	Laboratory Space	Students	2
14	Library	Students	2
15	Social Space	Students	0.5
16	Storage Space	Students	0.5

2.3.19 **Equipment:**

Equipment needed for the running of Environmental Management programme fall into four categories:

Research and Teaching Equipment
Drawing and Reprographic Equipment
Office Equipment
Vehicles

Research and Technical Equipment:

Most Environmental Management depends on engineering Faculties for most Material testing equipment for both staff and students. Physics, Building, Survey and Electronic Departments also provide input in Environmental Management programmes and their equipment and facilities should be available for use.

It is important in the area of equipment for teaching research to ascertain that:

a. A Environmental Management is associated with departments, faculties or institutions which can provide the wide range of equipment and facilities required for the proper training of the Environmental Management.

b. Facilities and equipment required for the effective teaching of any particular course on its curriculum are readily available and are used in the education process.

Drawing and Reproduction Equipment:

Reprographic technology is developing so fast and the rate of obsolescence is so high that any attempt to be specific in this area is fruitless. However, certain categories of equipment can be identified:

a. T-square, Set-square, I-square and Drawing Boards;
b. Various types of drawing instrument used by staff and students, which are usually owned by them;

c. Plan printing machines, Trimming machines and light tables for reading drawings;
d. Cameras and essential equipment for photographic work should also be considered essential digital;
e. Slide projectors, Overhead projectors and Epidiascopes can also be included as essential
equipment digitizer'
f. Computers, Printers Scanners, UPS, Digitizer, Plotter, Multi-media project.

Office Equipment:

These include filing cabinets and photocopiers, duplicating machines, scanning machines and so on, Computer, Printers.

Vehicles:

One 40 Seater bus for site visits
One Car for department use (Station Wagon)

2.3.20 **Library and Information Resources:**

In addition to the University central library, each Landscape Architecture should have a library/data room well stocked with current journals, textbooks and reference materials for the use of staff and students. The library should be linked with internet for information sourcing.

2.3.21 **Attainment Levels**

To qualify for a degree, each student should have completed and passed all the required courses and be able to attain the achievement levels for each of the class of degree.

Students who are awarded a bachelor's degree in Landscape Architecture are expected to demonstrate knowledge and skills corresponding to at least attainment level C before they can be allowed to proceed to the professional Master's degree programme.

2.3.22 **Course Evaluation**

In the evaluation of courses offered in Environmental Management, the relationship between theory subjects and studios based subjects have to be taken into account. A pass in a core subject at a lower level is pre-requisite for registration for that subject at a higher level.

Assessment of Theory Subjects:

Assessment used for theory subjects should include continuous motoring of student's progress by subject lecturers through course work evaluation. Continuous assessment may involve class tests, tutorial assignments, seminar

presentations, and reports on fieldwork, class attendance and so on. These should carry between 30% and 50% of the total weighting for any subject. The final examination of the end of the semester should account for the balance of 50% to 70% of the overall marks for the subjects.

Assessment of Studio Work:

In the case of Studio Work a jury is the normal practice. A jury consisting of a number of competent persons examine the work of a student in a given studio assignment and award marks arriving at a consensus grade.

Expectations of the Graduates of Environmental Management :

a. Ability to analyze design and environmental development problems, synthesize the various
elements and provide appropriate solutions.

b. Ability to understand the needs of his client and users of the built environment and to cater for these.

c. The ability to produce appropriate and imaginative solutions that are technologically sound, economically feasible, environmentally friendly and aesthetically pleasing.

d. The ability to analyse the feasibility, legal implication, and impact of design schemes on users and the public at large.

e. The ability to understand and assess the impact of development schemes on the environment.

f. The ability to communicate his proposals in the appropriate medium to his client, the public, and members of the building profession and construction team, and;

g. The ability to integrate and coordinate the inputs of other professionals in the building team to achieve the objectives of the project(s).

2.3.23 **Maintenance of Curricula Relevance**

The following actions are recommended:

To review Benchmark Statements over 5 years
Periodic visitations to Environmental Management
Universities to routinely request for Environmental Management feedback from employers of their graduates.

2.3.24 **Performance Evaluation Criteria**

Periodic visitations to Environmental Management by the Professional Organization.

Appointment of external examiners who should include people in professional practice.

Evaluation of academic staff performance by students through questionnaires.

APPENDIX 4.0:

TABLE 4.0

COURSE DISTRIBUTION FOR ENVIRONMENTAL MANAGEMENT AND TOXICOLOGY

100 LEVEL

FIRST SEMESTER

COURSE CODE	**COURSE TITLES**	**U**		**T**	
MTS 101	**Algebra**	3	2	1	
EMT	Introduction to Practical Geography	2	1	-	
PHS	General Physics 1	3	3	-	
BIO	Introductory Biology 1	2	2	-	
CHM	Physical Chemistry 1	3	3	-	
CHM	Practical Chemistry 1	1	-	-	
PHS	Physics Laboratory 1	1	-	-	
BIO	Introductory Physiology	2	2	-	
GNS	*Use of English*	2	2	-	
GNS	*Introduction to Social Problems*	2	2	-	
	TOTAL	21	17	1	

TABLE 4.1

SECOND SEMESTER **CORE COURSES**

COURSE NUMBER	**COURSE TITLES**	**U**		**T**	
GNS	*Introduction to Nigerian History*	1	1	-	-
MTS	*Calculus and Trigonometry*	3	2	1	-
PHS	*General Physics II*	3	3	-	-
EMT	*Intr. to physical Geogr. and Meteorology*	2	-	-	1
BIO	*Introductory Biology II*	2	2	-	-
EMT	*Intr. To Environmental Studies I*	1	-	-	1
CHM	*Inorganic Chemistry I*	2	2	-	-
CHM	*Organic Chemistry I*	2	2	-	-
CHM	*Practical Chemistry II*	1	-	-	1
AEM	*Principles of Economics*	2	2	-	-
	TOTAL	23	18	1	3

*L = Lecture Units; *T = Tutorial Units; *P = Practical Units

TABLE 4.2
<u>200 LEVEL</u>

FIRST SEMESTER

COURSE CODES	COURSE TITLES	U	L	T	P
GNS	Literature in English	2	2	-	-
BIO	General Ecology	2	1	-	1
CSC	Computer Programming 1	3	2	-	1
CHM	Basic Inorganic Chemistry I	2	2	-	-
CHM	Basic Physical Chemistry I	2	2	-	-
CHM	Basic Organic Chemistry I	2	2		-
EMT	Introduction to Environmental Sciences II	2	2	-	-
CPP	Principles of Crop Production	3	2	-	1
EMT	Introduction to Rural and Urban Regional Planning	2	2	-	-
	TOTAL	20	17	-	3

TABLE 4.3

SECOND SEMESTER **CORE COURSES**

COURSE CODES	COURSE TITLES	U	L	T	P
CHM	Basic Organic Chemistry II	2	3	-	-
CHM	Basic Physical Chemistry II	2	2	-	-
EMT	Economic Geography	2	2	-	-
CHM	Basic Inorganic Chemistry II	2	2		
APH	Introduction to Animal Agriculture	3	2	-	1
GNS	Elements of Politics and Government	1	1	-	-
GNS	Introduction to social problems	2	2	-	-
EMT	Method in Environmental Analysis I	3	2		1
BIO	General Physiology	2	2	-	-
	Electives	4			
	TOTAL	22	20	-	2

ELECTIVES

COURSE CODES	COURSE TITLES	U	L	T	P
AMW	Introductory Climatology and Biogeography	3	2	-	1
AMW	Elements of Hydrology	2	2	-	-
FIS	Oceanography	2	1	-	1

TABLE 4.4

300 LEVEL

FIRST SEMESTER

COURSE CODES	COURSE TITLES	U	L	T	P
FWM	Remote Sensing and Mapping Techniques	3	2	-	1
EMT	Methods of Environmental Analysis II	3	2	-	1
EMT	Environmental Pollution Studies	2	2	-	1
FST	General Microbiology	3	2	-	-
EMT	Principles of Natural Resources Management	2	2	-	-
STS	Elementary Statistics for Non-Majors	3	2	-	1
EMT	Metals and the Environment	2	2	-	-
	Electives	2	2	-	-
	TOTAL	20	16	-	4

ELECTIVES

COURSE CODES	COURSE TITLES	U	L	T	P
EMT	Environmental Geosciences I	3	2	-	1
WMA	Water Resources of Nigeria	2	2	-	-
WMA	Agro-meteorology I	3	2	-	1
CHM	Industrial Raw Materials Resources Inventory	2	2	-	-

TABLE 4.5

SECOND SEMESTER

COURSE CODES	COURSE TITLES	U	L	T	P
EMT	Environment Ecosystem and Management	2	1	-	1
EMT	Environment Impact Assessment	3	2	-	1
EMT	Hazardous Substance Management	3	2	-	1
ERM	Water Quality Assessment and Pollution Control	2	2	-	-
EMT	Environmental Aspects of Pesticides and Other toxicants Usage	2	2	-	-
PHS	Energy and Environment	1	1	-	-
SOS	Soil Chemistry and Soil Micro-Biology	3	2	-	1
EMT	Entrepreneurial studies	2	2	-	-
	ELECTIVES	5	5	-	-
	TOTAL	21	17	-	4

ELECTIVES

COURSE CODES	COURSE TITLES	U	L	T	P
FWM	Aerial and Ground Survey	3	1	-	1
EMT	Introductory Toxicology	3	3	-	-
FMW	Wildlife Ecology and Management	3	2	-	1

TABLE 4.6

400 LEVEL
FIRST SEMESTER

COURSE CODES	COURSE TITLES	U	L	T	P
EMT	Environmental Monitoring System and Techniques	3	2	-	1
EMT	Environmental Aspect of Farming System	3	3	-	-
EMT	Environmental Education and Awareness	2	2	-	-
EMT	Principles of Toxicology I	3	2	-	1
EMT	Soil and Water Analyses	2	-	-	2
EMT	Experimental Pesticide Chemistry and Residue Analysis	1	-	-	1
EMT	Resource management	3	2	-	1
EMT	Entrepreneurial studies II	2	2	-	-
	Electives	2	2	-	-
	TOTAL	22	16	-	6

ELECTIVES

COURSE CODES	COURSE TITLES	U	L	T	P
WMA	Introductory Meteorology	3	2	1	-
CHM	Radio Nuclear Chemistry	2	2	-	-
EMT	Research Methodology	2	-	1	1

TABLE 4.7

SECOND SEMESTER

COURSE CODE	COURSE TITLES	U	L	T	P
EMT	Industrial Attachment	16	-	-	16

TABLE 4.8

500 LEVEL
FIRST SEMESTER

COURSE CODES	COURSE TITLES	U	L	T	P
EMT	Environmental Law	2	2	-	-
EMT	Principles of Analysis of Toxicants	3	2	-	1
EMT	Seminar	2	-	2	-
EMT	Structural Elucidation of Organic Pollutant	3	2	-	1
EMT	Ecological Disaster and Control	3	2	-	1
EMT	Environmental Biotechnology	2	2	-	-
	Elective	2	2	-	-
	TOTAL	17	12	2	3

ELECTIVES

COURSE CODES	COURSE TITLES	U	L	T	P
EMT	Environmental and Community Health	2	2	-	-
EMT	Principles of Toxicology II	2	2	-	-
WMA	Water Quality Assessment	3	2	-	1
WMA	Principles of Soil and Water Conservation	2	2	-	-
FRM	Forestry and Wildlife Policy Law and Adm.	2	2	-	-

TABLE 4.9

SECOND SEMESTER

COURSE CODES	COURSE TITLES	U	L	T	P
EMT	Project	4	-	-	4
EMT	Waste Management	3	2	-	1
EMT	Human Settlement and Development	3	2	-	1
EMT	Miscellaneous Techniques in Environmental Analysis	2	2	-	-
EMT	Conservation of Biology Diversity	3	3	-	
	Elective	3	3	-	-
	TOTAL	18	11	-	7

ELECTIVES

COURSE CODES	COURSE TITLES	U	L	T	P
EMT	Tourism and recreation	3	3	-	-
EMT	Environmental Geosciences II	3	2	-	1

APPENDIX 4.1: COURSE SYNOPSES

EMT: ENVIRONMENT, ECOSYSTEMS AND MAN (2 UNITS)

Population, community, ecosystem, environment and environmental factors. Study of communities and ecosystem, abundance, density, yield, cover, frequency. The ecology of niche, niche, overlap competition coexistency , resource shift. Habitats: The primary terrestrial and aquatic habitats which affect man. Alteration imposed on the habitats by man. Integration of ecology and environment into development planning. Ecological management. Ecodevelopment and integrated development. Environmental planning principles – inter-disciplinary not multidisciplinary, holistic, comprehensive, participative coordinated, integrated and continuous planning.

PRINCIPLES OF NATURAL RESOURCES MANAGEMENT (2 UNITS)

Natural resources types and origin, environment, resource and development; rational use of resources and concept of sustainable development. Management of forests, grazing, lands, soils, foods, minerals, etc. Community resource development, population and pressure on resource utilization, administration and management of natural resource in Nigeria. Resource economics and management. Environmental conservation – Protection of nature and conservation of species. Conservation of agricultural landscape. Case studies concerned with concepts of balanced approach to natural resources management. Development of planning and management principles of natural resources and ecosystem subject to increasing development processes.

ERM: WATER QUALITY ASSESSMENT AND POLLUTION CONTROL (2 UNITS)

Physical composition of water bodies. Water chemistry and nutrient cycles. Water quality requirements and guidelines for various uses, drinking, irrigation, livestock, recreation, fishing. Principles of physico-chemical and microbiological analysis of water. Types of water; lithological control of surface and ground-water, Water pollution studies; sources, fake pathways and effects of water pollutants; chemical, mechanical and biological methods of maintaining and improving water quality.

EMT: HAZARDOUS SUBSTANCES MANAGEMENT (3 UNITS)

The nature, origin and classification of hazardous toxic substances; Characteristics of wastes and hazardous substance,. Identification of hazardous substances. Sources and pathways of hazardous substances. Disposal methods and technology of hazardous substance. Geological environmental factors affecting choice of disposal site; contamination of water bearing strata; soil, plants, food webs and bio-concentration. Analysis of hazardous and toxic substances. Regulations and law governing the sale, importation, transportation, storage and disposal of hazardous and toxic substances.

EMT: METAL AND THE ENVIRONMENT (2 UNITS)

ORIGIN OF METALS. Classification of metals., Utilisation of metals in industries. Sources of metal pollution; geological weathering, industrial discharge, metals fabricating and furnishing, leaching of metals from garbage, agricultural waste products. Effect of metals on the environment sediment, waste, air and food. Adverse effect of heaby metals – poisoning effects of Ph. Cd. Zn and Hg. Other effects e.g. neurologic, and renal effects. Analysis of metals in environmental samples.

EMT: ENVIRONMENTAL MONITORING SYSTEMS AND TECHNIQUES (3 UNITS)

Definition, general principles of environmental monitoring. Organisation of monitoring programmes for site and resource specific strategies. Classification of monitoring techniques and use (physical, chemical, biological radioactive) global sources, sinks and transport (mass balance) of both mand-made and natural atmospheric trace components, Ocean-atmosphere interactions, reversible effect of human activities on the global environment e.g. green house effect, climate change, depletion of stratosphere ozone layer, acid rain. Air pollution meteorology, chemistry and biology. Atmosphere dispersion models. Elements of air pollution control. Sampling and air monitoring techniques. Mechanism of pollutant interaction with soil and vegetation. General principles of biotesting, aquatic toxicity, types, bio, assays, data analysis and interpretation.

EMT: ENVIRONMENTAL ASPECTS OF FARMING SYSTEMS (3 UNITS)

- Farm systems and farming systems.
- The relevance of the farm-system approach
- Classification of farming systems
- Difficulties of farming systems
- Problems and peculiarities of shifting cultication
- Characteristics and problems of permanent upland cultivation
- Irrigation farming
- Environmental and health implication of irrigation
- Perrenial crop farming
- Ranching
- Institutional and environmental requirements of site related systems.

EMT: ENVIRONMENTAL EDUCATION AND AWARENESS (2 UNITS)

Population and environment (responsible use). Role of educational intervention in environmental action. Methods of dissemination of environmental information; case studies of information to various target groups. Methods of public opinion assessment. Social theory for environmental psychology, ecological, psychology theory of participation, social response to environmental-pollution, environmental damage and compensation.

EMT: PRINCIPLES OF TOXICOLOGY 1 (3 UNITS)

History of toxicology, Biochemistry cellular and molecular toxicology. Biotoxins, carcinogenesis, tertratogenesis and mutagenesis/genetic toxiology, biotransformation of toxicants. Systematic toxicology, toxic responses of blood, liver, kidnery, respiratory systems, central nervous systems, skin, reproductive system, eye and the immune systems.
Practicals: Demonstration to topical application contract tests, systemic activity of pesticides. Acetycholinesterases inhibition in insects in VICO and in VITRO. Inhibition of egg hatch in nematodes and chitindeposition in insects.
Resistance tests in insects. Probit analysis. Effect of gamma irradiation on insect development studies. Effect of morphogenic agents on larval and pupa development in insects. Autoradiographic studies. Bioassay of resistant/susceptible strains of insects, audiovisuals. Pre-requisite BCM 201.

EMT: WATER ANALYSIS (1 UNIT)

Sampling and analysis of water for various biological and physico-chemical water quality parameters: PH, hardness, alkalinity, chlolride, phosphate, nature, ammonia, sulphate, sulphide, sulphite, fecal bacteria, etc. Determination of dissolved oxygen (D.O), chemical oxygen demand (COD), biochemical (BOD) dissolved and suspended solids, conductivity, turbidity, temperature, saturation index, sodium adsorption rationg, etc.,
Pre-requisite ERM 302.

EMT: EXPERIMENTAL PESTICIDE CHEMISTRY AND RESIDUE ANALYSIS (1UNIT)

Sampling, planning the sampling programme, sample containers, collection of various environmental samples –water solid sediments, vegetation, blood, milk, fish, investebrates birds, mammals, air etc.

SAMPLE PRESERVATION

Extraction and clean-up methods, instrumentation for pesticide analysis, use of gas chromatograph for determination of pesticide residues, Analytical quality assurance; recovery and precision studies. Pesticide formulation analysis. Experimental designs and field/green houses trials on effect of pesticide on (a) growth and yield of crops (b) control of pests and diseases. (c) insect resistance probit analysis. Screening of Nigerian herbs for pesticidal activities. Isolation and characterisation of active ingredients in Nigerian herbs. Maintenance, tgrouble shooting and calibration of instruments.

EMT: ENVIRONMENTAL LAW (2 UNITS)

Basic concept of environmental standard criteria and regulation. Federal environmental laws organisation of environment protection. States edict and regulation on the environment, plant and animal quarantine. Regulations and enforcement mechanisms, violations and sanctions. Comparative study of

environmental laws in some advance countries. e.g. USA, Canada, Thiland, etc. International Laws and conventions.
Pre-requisite EMT 407

EMT: ADVANCED PESTICIDE CHEMISTRY (3 UNITS)

History of pesticide development, nomenclature and classification, physical, chemical and biological properties and toxicology (lethal doses) of major groups of insectides.

Organochlorine
Organophosphates
Phrathroides and Prethrins
Carbamates
Other naturally occurring pesticidal compounds.

Chemistry of herbicides, fungicides and nematodes, pesticide formulations and formulation analysis. Mode of action related to chemical structure (structure activity relationship) of the different classes of pesticides. Metabolism and movement in the environment. Synergism, antogonism, potentiation, relative potency, half life, systemics, gunigants, contest and stomach poisons. Isotopic labelling. Acceptable daily intake (ADI). Calculation of dosage rates. The odsey of a candidate pesticide. The journey from the laboratory to the market. Probit analysis and dose response relationships.

ERM: ECOLOGICAL DISASTERS AND CONTROL (3 UNITS)

Ecological consequences of mismanagement of natural resources. Principles and practice of greebelt establishment in arid coastal areas. Origin causes of erosion. Erosion forecasting surface water management. Soil hydrology. Soil water movement. Drainage, leaching and water disposal. Economics and benefits of erosion control. Mechanics of erosion. Types and forms of erosion. Evapo-transportation. Erosion/food control measures, engineering and administrative measures.

EMT: PRINCIPLES OF TOXICOLOGY II (2 UNITS)

Sources, fate and effects of different toxicants in the environment; pesticides, metals, radiation and radioactive materials, plan and animal toxins, polyhalogenated compounds, hazardous wastes, dusts, asbestos, plastics. Factors that influence toxicity, route of administration, chemical and biological factors. Environmental toxicology, food additives and contaminants, atmospheric, aquatic and soil pollutants. Clinical toxicology, cosmetics and drugs, occupational toxicology and health. Autoradiography. Toxicity testing. Future of toxicology in the developing countries i.e. regulatory and legal requirements.

EMT: PRINCIPLES OF ANALYSIS OF TOXICANTS (3 UNITS)

Types and forms of wastes. Sources of waste. Methods of solid, liquid and gaseous wastes management technology including wastes recycling and utilization. Institutional arrangements for waste management. Environmental health effects of

waste management. Economics of wastes management, wastes management strategies. Case studies.

EMT: WASTE MANAGEMENT (3 UNITS)

Types, nature and characteristics of toxicants, sampling of air, soil, water and other ecological materials particularly using a staplex sampler at different flow rates and other modern methods. Sample preservation and preparation techniques. Samples collection techniques of air, soil, water, food, blood etc. Analytical methods for toxicants. Instrumental neutron,
Activation analysis. Atomic absorption spectrophotometer UV/Visible spectrophotometer. Gas chromatograph hybrid methods e.g. GC/Mass spectrometer. Auto-analyzer chemical separation methods. Gas analyzers. Quality assurance of analytical data statistical treatment of data. Interpretation of data.

EMT: HUMAN SETTLEMENT AND DEVELOPMENT (3 UNITS)

- Human settlements, size and density
- Factors influencing location, landscape designs, parks and reserves
- Rural, urban land use and environmental quality
- Culture and environment: patterns, health and safety
- Environmental ethics
- Impact of human settlement and development on the environment
- Case studies: examples of significant human settlements and developments projects and their environmental impacts.

EMT: SEMINAR (2 UNITS)

The purpose of this course is to familiarize the students with effective use of the library, preparation of project reports, papers for journal publication and journal reviews. Students will be given essays on topics of general interest from widespread areas of environmental management.

EMT: ENVIRONMENTAL ASPECTS OF PESTICIDE AND OTHER TOXICANTS USE (CM) (3 UNITS)

Movement and absorption of pesticides in soil. Factors affecting mobility of pesticides and other toxicants in the soil. Soil Herbicide interaction and herbicide efficacy. Famigant action and systematic activity. Pesticide conversion mechanisms in the environment. Enzymic and non-enzymic conversion, degradation of pesticides and other toxicants in soil, water, plants and in animals. Pesticides in food chains. Detection/determination and management of toxic wastes in the environment, sanitary fundamentals of pesticide application, safely measures in storage, dispensing, transportation and use of pesticides; disposal of pesticide containers and wastes ecological and environmental health effects. Environmental criteria standards, regulations on pesticidal hoe. Case studies of global disasters of misuse and abuse of pesticides.

EMT: STRUCTURAL ELUCIDATION OF ORGANIC POLLUTANTS

Structural elucidation of organic pollutants, basic instrumentation and techniques. Applications of ur, ir, n, m, r, and m, s in chemical analysis and structural elucidation of organic pollutants.

EMT: PETROLEUM AND ENVIRONMENT

Origin and composition of crude oil, composition of refund oils; extent, sources fate and effects of oil in the environment.
Characteristic of biogenic and petrogenic hydrocarbons control of oil pollution. Oil pollution monitoring , sampling, sample containers, extraction, clean-up, identification and quantitation, oil tagging. Use of bio-indicators in oil pollution monitoring. Biomarkers.

EMT: MISCELLANEOUS ADVANCED TECHNIQUES IN ENVIRONMENTAL ANALYSIS

Miscellaneous advanced techniques in environmental analysis X-ray methods, neutron activation and radiochemical methods, enzymatic and kinetic methods, automated and process analyzers.

EMT: PROJECT (CR) (4 UNITS)

Investigation of an environmental research problem.

2.4 Environmental Management/ Resource Management Degree Programme (Option Two)

2.4.1 Introduction

The benchmark statement for Environmental Management is to provide a guideline for the description and the characteristics of the degree programme and to articulate the abilities and skills expected of graduates of Environmental Management.

In the context of Nigerian Universities, a five-year degree leading to a professional Bachelor's degree is being recommended. This statement provides a guide for designing the Bachelor's degree programme.

The benchmark statement takes into consideration, current development in the environmental design discipline in general and in Environmental Management in particular. Body of knowledge in the areas of Environmental Impact Assessment, Pollution control, Entrepreneurship, Information Technology and Facilities Management have been incorporated to cater for these developments.

Nomenclature:	Environmental Management (EM)/ Environmental and Resource Management	
Degree in View:	Bachelor of Science Environmental Management Bachelor of Technology Environmental Management	)) Option B)

2.4.2 Philosophy And Objectives

2.4.3 Description

The Bachelor of Environmental Management is a 5-year academic degree for undergraduates. It is focused on the formulation, designing, planning implementation and monitoring of land use patterns and policy programmes and projects and their likely effects on the well-being of various aspects of the environment.

The degree should be accredited by the Nigerian Institute of Environmental Management, with recognition worldwide through the International Federation of Environmental Management.

2.4.4 Aims and Objectives of Environmental Management Education Programmes

Aims:

a) To provide a broad based education and training which will assist in developing the students intellectual and professional capabilities to a high standard

b) To produce a sound specialist professional environmentalist who can operate effectively in the field of environmental issues and related activities.

Objectives:

a) To develop the students understanding of environmental issues and management theories, methods and techniques for managing land use activities and the environment.

b) To use scheme preparation as a frame of reference within which to guide development

c) To regulate traffic movement by land, air, and sea through management and proper location of industries and utilities

d) To use the relevant environmental laws to establish well managed land economy and expand human welfare and security.

2.4.5 Basic Admission Requirements

Admission into the Architectural programmes may be through any of the following modes:

* **Normal Admission**: Candidates who have successfully completed the Senior Secondary School or its equivalent obtained five credits in Mathematics and English Language and any other three subject from the following list; Biology, Chemistry, Physics, Technical Drawing, Fine Arts, Geography, Economics, Government and Agriculture.

* **Advance Standing Admission**: Candidates who fulfils above requirements and who have obtained G.C.E Advanced Level, HSC/IJMB or equivalent passes in Biology and Physics, or Mathematics or Physics, or Geography and any other subject noted above may be admitted at the 200 level of the programme. Observed deficiencies must be remedied.

  Transfer Cases: Candidates wishing to transfer from one programme of Environmental management to another for some good reason may be considered for absorption at the appropriate level. Any deficiencies in their background should be rectified by taking appropriate courses.

2.4.6 Learning Areas/Core courses

The learning areas include quantitative and related techniques, ecosystems, aquatic resources and management, terrestrial resources and management, landscape resource planning and management, natural resources and environmental policy, human impacts and chance processes

2.4.7 Expected Duration

Landscape is expected to last a minimum of 10 semester's duration leading to a registrable degree. A minimum of six months of Work Experience shall be incorporated in the programme.

2.4.8 Purpose, Aims and Objectives of the Minimum Academic Standard (MAS) Benchmark Statements

The purpose of the MAS Benchmark Statement is to:

Assist Universities and upcoming departments of Landscape Architecture in designing and approving programmes of study.

Assist professional bodies in their accreditation and review of programmes relating to professional competence.

Assist Students, Employers, International Organizations etc when seeking information about Environmental Management Education in Nigeria.

2.4.9 Statement of Components of Benchmark Statements

The benchmark statement is made up of four major component part as follows:

The objectives and purpose of the Bachelor Degree in Environmental Management

The essential courses expected to be covered in the programme leading to the award of the degree.

The competencies abilities and skills expected of a graduate of Environmental Management.

Assessment procedures and criteria for evaluating the body of knowledge covered and different levels of abilities and skills attained.

2.4.10 Statement of Intended Use of the Benchmark

The benchmark statements are intended to provide a broad framework within which educators can develop appropriate and challenging Environmental Management programme that respond to the needs of the student, changing nature of the discipline, as well as, new developments in Technology. The benchmarks are not intended as straight-jackets that would stifle innovation in programme development and in the designing of Bachelors degree students at the end of their programme and to maintain the standard of Environmental Management Degree.

2.4.11 **Philosophy and Objectives**

Description

The Bachelor of Environmental Management is a 5-year academic degree for undergraduates. It is focused on the formulation, designing, planning implementation and monitoring of land use patterns and policy programmes and projects and their likely effects on the well-being of various aspects of the environment.

The degree should be accredited by the Nigerian Institute of Environmental Management, with recognition worldwide through the International Federation of Environmental Management.

Career Opportunities

Career prospects for talented Environmental Managers are good, with worldwide opportunities in consultancy, private practice, the landscape industry, local government and central government agencies. The range of career opportunities for talented Environmental Management graduates is wide and still growing.

Environmental Managers often work in teams which other disciplines. In site planning and design, they work closely with architects, engineers and horticulturalists. On a broader scale, they work with resource managers and planners. The distinctive approach that Environmental Management brings to a project is a combination of creativity, critique and problem solving skills which are integrated with a broad understanding of the natural and cultural environment.

Professional Involvement

Environmental Managers contribute to a wide range of projects for private, institutional and government clients. These include civic developments, urban design, tourism development, residential and lifestyle subdivision, and commercial, institutional and industrial projects. There is also opportunity to work on parks, highways, heritage conservation, ecological restoration and re-vegetation, city or rural planning and resource policy.

The practice of Environmental Management involves:- landscape assessment and resource consent applications, site design and master planning, contract documentation and landscape management. Environmental Managers may be engaged in a range of roles, including presenting evidence to the Environment Court, managing projects for developers, supervising site works or education.

Environmental Management has a strong ethical dimension and Environmental Managers aim to design in a socially and environmentally responsible manner, whether working for a public or private client.

On graduating, the Environmental Managers can early commence private practice and generate employment – raising of nursery, industry and city beautification projects.

General Philosophy Environmental Management Education

The overall national philosophy in Environmental Management Education can be stated in general terms as follows:

The range of exposure and scope of the programmes in a department of Environmental Management should produce a competent, skilled and versatile individual capable of facing a broad spectrum of challenges of the environment for human and other activities.

Every school should aim at exploring the rich cultural and local Environmental Management resources in the country in general and within its immediate environment in particular. Environmental Management departments should inculcate the understanding of the environmental problems of the community and make efforts towards evolving solutions to these problems.

A graduate of Environmental Management is therefore trained in the art and science of planning, design, erection, commissioning, maintenance, management and co-ordination of allied professional inputs in the development of Environmental Management. There should be flexibility in the development of courses to allow for the changing needs of education arising from changing social, economic, psychological and technological environment.

Aims and Objectives of Environmental Management Education Programmes

Environmental Management Education programme should be committed to:

A high-quality of professional education aimed at producing Environmental Management capable of understanding and solving complex technical and environmental problems, as well as, applying the knowledge to tackle and co-ordinate other related professional inputs in the development of the environment. The focus is on development of knowledge and skills in Environmental Management design, planning, implementation and management.

The infusion in the student of an understanding of the context of the design and construction in physical, cultural, social, economic and technological terms.

Equipping the student with adequate knowledge, creativity, specialized skills and leadership capabilities that will enable the graduate to coordinate and control the design and implementation processes and inputs thereto by allied professionals and executors.

Producing Professional Environmental Managers , capable of undertaking the whole range of design activities from schematic design through working drawing to construction detailing and planting programmes.

Providing the student with the knowledge and skills to undertake a wide range of management activities such as coordinating site meeting, site management, facilities management, post construction evaluation, in the area of Landscape development.

Providing the student with the knowledge and skill base from which he/she can proceed to further studies in Environmental Management or allied areas.

Provide the student with entrepreneurial knowledge and skills to enable him/her to be self-reliant, and provide jobs for others.

Provide the student with skills in computers and Information Technology to enable him fit in the current global professional arena.

2.4.12 **Learning Outcome**

Learning Outcomes: Regime of Subject Knowledge:

Each department of Environmental Management can fashion its actual course context, nature and organization of its course or modules to reflect its peculiarities. Furthermore, a Environmental Management programme can be domiciled as an option within the departments of Environmental Management, Urban and Regional Planning, Estate Management etc as an option. Whatever the approach adopted by a given School of Environmental Sciences, it is expected that the Environmental Management programme will select courses from the following six instruction modules:

Environmental Management Design and Graphic Communication Skills
Art and Humanities
History and Theoretical Studies
Construction Technology and Environmental Services
Physical Sciences and Information Technology
Management and Entrepreneurial Studies

Core of the Programme:

The core of any Landscape Architectural Education is the emphasis upon studio and practical application. The Design Studio should provide both physical location and an education philosophy in which design is learned through undertaking a series of practical real world projects. Communication skills as well as Theory and Historical/Critique courses are essential component of this core. Similarly, Environmental Management construction techniques and services provide the skills needed in dealing with hard landscape elements, while courses from the Natural Sciences and Environmental Sciences modules provide the student with basic tools of

understanding manipulating, preserving and managing Environmental Management elements at various scales.

This core of the programme should Account for at least 60% of the total credit load in the Environmental Management programme.

Cognate and Elective Courses:

These groups of courses should account for 30% to 40% of the total credit load of the programme. These courses are also chosen from the six modules outlined above but the selection is aimed at providing each Environmental Management programme the opportunity to play a unique and identifiable role in the Environmental Management of the country and the region. For example:

A programme domicile in a University of Technology may have more of the Construction, Environmental Services, Information Technology and related courses in its selection.

A programme domicile is a regular University and closely related to Urban Planning and Agriculture may have more of the Natural Sciences, Environmental Sciences, Ecology and Criticism and general History and Theory of the Landscape Architecture in its cognates and electives.

In addition, the electives enable a student to further identify areas of special interests and skills he would like to acquire to enhance his career prospects and education background.

Environmental Management Learning Outcomes: Competencies and Skills:

The main abilities and skills (Cognitive, Architectural and General). The modules are expected to inculcate in the students are as follows:

(a) Environmental Management Design and Communication Skills (Module A)

Students commonly take an introductory course in drafting (LDA 21) followed by a three-dimensional design course. The three-dimensional course is typically taken in Art or through Design 125 in a department. Other art courses are also available and encouraged. Drafting covers basic skills in graphic delineation of site analyses, site plans, section elevation, and perspective views, and color illustrations. Following this course, students take LDA 22, an advanced graphics course oriented toward rendering and hand-developed presentation graphics. LDA 22 is followed by LDA 23, the introductory, mackintosh-based computer graphics course. These courses are typically completed by the end of sophomore year. In the junior year, students may take LDA 120, the advance computer graphics course, which features CAD, GIS, and animation for landscape planning and design. All students

also must take LDA 122, which concentrates on more advanced professional communication topics such as report, brochure and resume design, oral presentations, audio-visual and multimedia/video presentations. The complete graphic presentation sequence superbly prepares students for the communication challenges of the project and for subsequent professional practice.

The studio sequence in Environmental Management design consists of seven sequential courses. LDA – 11 is the first studio, and is taken in the sophomore year. It introduces students to the Environmental Management analysis and design process and provides introductory studio experiences at all physical scales and many land-use types. LDA-111 is the fall junior studio which emphasizes site analysis, site planning, the sitting of structures and the design of circulation systems. Emphasis is also placed on energy and water conservation methods in site design. LDA-112 follows in the winter quarter of the junior year, with emphasis on the role of creativity in the design process. LDA-112 emphasizes form, space, and artful expression in the landscape. Typical projects are those where form and symbolic content are paramount (as in the design of civic art plazas, memorials, etc.). The final studio in the junior year is LDA-113, which emphasizes regional-scale land planning and design issues and features more sophisticated land, resource, and community analysis techniques, user/user and user/resource conflict resolution, and large-scale master planning. Typical projects might include the planning of linear park and trail systems in cities, the adaptive re-use of surplus or decommissioned military bases, or the planning of large, mixed-use land developments.

To develop the skills and techniques in problem recognition, information gathering, solution, synthesis, evaluation and design.

To undertake design exercises varying in magnitude from relatively simple requirement, through to urban planning and Environmental Management design problems that need specialized skills and knowledge.

To be able to grapple with technical, social, environmental, aesthetic, as well as financial aspects of Environmental Management problems during these exercises.

To be able to handle Environmental Management planning and constructional technology and detailing at certain levels of the skills acquisition process within this module.

To develop imaginative and creative faculties of the student so as to gain confidence in working processes requiring communication skills.

To undertake diverse exercises in studios or workshops focusing on the application of art and design, texture, proportion, light and shade in design of landscape.

Environmental Management History and Theoretical Studies (Module B)

This sequence begins with the primary introductory lecture in landscape architecture, LDA 40, which is open to all students with no prerequisites. Taken early on in the curriculum, it is a foundation course covering history, theory, process and applications of Environmental Management and is a primary vehicle for attracting new students into the major. LDA 140, History of Environmental Management , is required for Environmental Management students but is also a General Education course and is quite popular on campus. Enrolment in this lecture course sometimes exceeds 300 students. Environmental Management students must also complete three repetitions of the one-unit professional seminar, LDA-190, also open to non-majors, which features quest speakers on the widest possible range of Environmental Management and closely related topics. This course is called the "pro-seminar", and also serves as a means for attracting talented and motivated students into the major.

To develop an understanding of the history and theory of Environmental Management both western and non-western aimed at clarifying the scale of values and concepts within which Environmental Management is created.

To examine landscape globally aimed at stimulating students to the recognition of the existence of conceptual resources in various Environmental Management traditions in the world.

To develop the necessary framework upon which the student bases his creative work.

(c) **Arts and Humanities (Module C)**

Students are required to take six General Education courses selected from a list published in the General Catalog. General education requirements emphasize broad social and environmental issues, critical thinking, and writing skills. Students are also able to take least 24 units of electives with no restriction whatsoever. However, students may choose to use some of these units within the Landscape Architecture, or for directed group study or independent study projects with specific professors. All the required general course prescribed by the University.

To expose the student of Environmental Management to the general cultural, historical, psychological and sociological context within which Environmental Management is created.

To clarify some practical implications of design decision from the point of view of the users, the client and the public at large.

To expose the students to the legal, political and economic framework within which he is expected to operate as a Landscape Architect.

(d) **Environmental Management** ***construction Technology and Environmental Services (Module D)***

A course in general mathematics begins this sequence followed by a recommended but optional course in surveying. It is followed by a mandatory four-course sequence in landscape construction. LDA 131 is the course which utilizes the lecture and laboratory format to introduce the processes and materials of landscape construction. LDA 132, Site Engineering, follows and covers topography, grading, drainage, and road alignment. Next comes LDA 133, which emphasizes the design of "hard" construction details and technical systems in the landscape and teaches methods of preparing technical drawings of details. LDA 134 combines professional practice and project management with the preparation of construction drawings and documents for a complex, site-scale landscape project. LDA 132, 133 and 134 are all "technical" studio format courses. Computer graphics is introduced early in the sequence and becomes mandatory for part or all of the construction documents course outputs.

To develop the understanding of hard elements of landscape, the structure and the process involved in putting them together to complement the natural elements.

To expose the student to environmental services such as plumbing drainage, electrical, lighting, vertical transport systems, security systems and Environmental Management development.

To develop an understanding of implementation, cost implication, managerial, as well as, various processes that go into realizing designer's concept.

To acquire knowledge to be able to determine space requirements and to integrate services within the fabric of landscape.

(e) **Physical Sciences and Information Technology (Module E)**

Students are required to take an introductory biology course followed by either introductory botany or plant science. Also required is one introductory course in geology, physical geography or soil science which deals with the land as a physical substance. Once these lower division courses are completed, students must take one upper division course in ecology and two upper division courses each focusing on a renewable natural resource, such as atmospheric science, forestry, native plant communities, solar energy, water science, or wildlife biology. This sequence builds competence for upper division studio work in planning and landscape ecology (LDA 181 and LDA 183).

Environmental Management students begin their exposure to horticulture with the sophomore-level course ENH 6, Introduction to Environmental Plants, which covers basic plant identification and characteristics of commonly used landscape plants. ENH 105, Taxonomy and Ecology of Environmental Plants, follows, covering more general and species as well as advanced taxonomic and ecological principles. Arboriculture, ENH 133, comes next and covers the

principles of establishment and management of woody plants. Students have the option of taking LDA 155, a General Education course in the cultural uses of plants in the environment. This course is open to non-majors as well and is often taken by prospective landscape architecture students. This course emphasizes the choice of plant material for such uses as erosion control, wildlife habitat improvement, water conservation, fire control, urban forestry, solar access and solar control, as well as cultural phenomena such as plant fads, aesthetic styles in planting design, simulated plants, Native American medicinal plant uses, etc. The final course in this sequence is LDA 156, Environmental Management Planting Design. This course provides students with skill and experience in the composition of planted landscapes where aesthetic, spatial, ecological, and formal properties are critical. The course emphasizes projects such as botanical gardens, arboreta, etc, where plant material selection and composition is the primary design variable considered.

Computers are an integral component of the curriculum in landscape architecture. The philosophy of the faculty is to "mainstream" computers, incorporating computer applications into a variety of courses and offering the student a choice of traditional as well as computerized media. Multiple computer work stations are now located in all studios. Students are first introduced to graphics in the sophomore year, primarily through the Computer Graphics course (LDA 23), but also in the introductory graphics and studio courses (LDA 11, 21). In the Advance Communications course (LDA 122) students learn to use advanced interactive computer/video software programs in preparing professional quality presentations. A new, optional course in advanced computer graphics (LDA 120) was offered last summer and will become a regular course offering this academic year. In this course students learn advanced multi-media applications, such as CAD, GIS, solid modeling, simulation, and real-time multi-media animation. Computer-aided grading, drainage and cut/fill calculations are introduced in the landscape technology courses in the Junior and Senior years, while most students now produce much or all of their required construction documents in LDA 134 on the computer. Computerized plant selection is also introduced in the planting design studio (LDA 156).

To master the basic techniques, skills and principles of physical sciences as it relates to the building industry.

To acquire the knowledge and skills in Information Technology and application of computes to the landscape Construction.

To acquire proficiency in Computer Aided Design, Word processing, Data processing and Internet.

(f) **Management and Entrepreneurial Studies (Module F)**

LDA 190, or Pro-seminar in Environmental Management, is a one-unit seminar meeting once per week for each quarter during the year. It is open to majors and non-majors alike. Students are required to take a total of three units. The seminar consists of lecturers and discussions led by invited guests

who are either practicing landscape architects or allied professionals or scholars. In many ways the Pro-seminar, informally known as "Lunch bag Lectures" because of their Friday noon-time period, is our most stimulating course. It is frequently the center of lively debate and attracts large numbers of prospective students to the major. It also serves as a major contribution of Environmental Management to the general academic climate of the campus.

To equip the student with management tools required for the coordination, control, administration and management of project execution.

To expose the students to basic principles of law, professional practice and contract administration and management.

To develop entrepreneurship skills that enables the student to be resourceful and self-reliant.

The Student Industrial Work Experience (SIWES) is to expose the student to:

Competence in the execution of practical Environmental Management projects.

Skills for observation, recording and documention on construction sites.

Skills in safe handling of equipment and avoidance of hazards associated with them.

Environmental Management office practice and development is an office practice in a real environment.

Learning Outcome: Behavioural Attributes:

Graduates of Environmental Management are governed by their code of professional conduct of the professional body (Nigerian Association of Environmental Management).

These attributes relate to:
The ability to discharge professional obligations to members of the public
Display of professional integrity
Competence with General Ethics
Compliance with the Regulation of Society
Participation in Professional Environmental Management

2.4.13 **Resource Requirement for Teaching and Learning in the Programme**

Academic Staff:

The academic staff requirement is a staff/student ratio of 1:15. The academic staff should be made up of:

Assistant Lecturer

Lecturer II
Lecturer I
Senior Lecturer
Reader/Associate Professor
Professor

The point of entry for each of the positions shall reflect academic qualification, teaching experience and practical professional experience as detailed in the general benchmark statement for environmental studies.

In addition to the regular academic staff, Environmental Manager should be able to benefit from the wealth of experience of professionals from the field who could join the teaching staff:

Studio Senior Lecturer	Must be a Registered Environmental Manager with a minimum of 15 years relevant field experience.
Studio Associate Fellows	Must be a Registered Environmental Manager with a minimum of 20 years relevant field experience, subject to peer review.
Studio Fellows	Must be a Registered Environmental Manager and Fellow of Nigeria Institute of Environmental Management or its equivalent with a minimum of 25 years relevant field experience.

Non-Academic Staff:

(a) **Senior Technical Staff:**

Considering the technological bias of Environmental Management Education, the ratio of Senior Technical Staff is 1:5. The specialization of the technical staff may vary depending on the situation of the particular school. Schools that exist within institutions or faculties where technical staff from Building Departments, Engineering and physics Department can make input, need not recruit technical staff in all specialization required in Environmental Management programmmes. Requisite specialization can range from modeling, Reprographics, Environmental Management Technology, Laboratory Technology, Presentation Techniques to Electrical installation, Building Technology and Plumbing. Computer Aided Design specialists Data Analysis.

(b) **Senior Administrative Staff:**

The ratio of Senior Administrative staff should be minimal in view of the technical nature of the programme.

(c) **Junior Staff:**

An overall ratio of Junior Staff is to be minimal. Two categories of Junior Staff are needed in a Environmental Management: Junior Technical Staff and Junior Non-Technical Staff: The distribution between these two categories should be roughly 2:1.

i. **Junior Technical Staff can include:**

Draughtsmen, Carpenters, Modelists, Masons, Painters, Horticulturists, Photographers, Drivers/Mechanics, Storekeepers, and Computer graphist.

ii. **Non-Technical Staff include**:

Clerical Officers, Typists, Cleaners, Studio Attendants, Messengers, Gardeners, Library Attendants, Data Analysis, Word processing Managers and so on.

Academic Physical Spaces:

Office accommodation for academic, non-academic staff and students per capital should be based on the following guidelines:

MINIMUM SPACE ALLOWANCE:

NO	SPACE	USE	MINIMUM (m)
1	Professors Office	Academic	24
2	Head of Department	Administration	24
3	Senior Lecturer	Academic	20
4	Lecturer	Academic	46
5	Assistant lecturer	Academic	12
6	Senior Technical Staff	Technical	12
7	Senior Administrative Staff	Administration	12
8	Junior Technical Staff	Technical	6
9	Junior Administrative Staff	Administration	4
10	Studio Space	Students	3
11	Lecturer Space	Students	0.5
12	Seminar Space	Students	0.5
13	Laboratory Space	Students	2
14	Library	Students	2
15	Social Space	Students	0.5
16	Storage Space	Students	0.5

2.4.14 **Equipment:**

Equipment needed for the running of Environmental Management programme fall into four categories:

Research and Teaching Equipment
Drawing and Reprographic Equipment
Office Equipment
Vehicles

Research and Technical Equipment:

Most Environmental Management depends on engineering Faculties for most Material testing equipment for both staff and students. Physics, Building, Survey and Electronic Departments also provide input in Environmental Management programmes and their equipment and facilities should be available for use.

It is important in the area of equipment for teaching research to ascertain that:

a. A Environmental Manager is associated with departments, faculties or institutions which can provide the wide range of equipment and facilities required for the proper training of the Environmental Manager.

b. Facilities and equipment required for the effective teaching of any particular course on its curriculum are readily available and are used in the education process.

Drawing and Reproduction Equipment:

Reprographic technology is developing so fast and the rate of obsolescence is so high that any attempt to be specific in this area is fruitless. However, certain categories of equipment can be identified:

a. T-square, Set-square, I-square and Drawing Boards;
b. Various types of drawing instrument used by staff and students, which are usually owned by them;
c. Plan printing machines, Trimming machines and light tables for reading drawings;
d. Cameras and essential equipment for photographic work should also be considered essential digital;
e. Slide projectors, Overhead projectors and Epidiascopes can also be included as essential
equipment digitizer'
f. Computers, Printers Scanners, UPS, Digitizer, Plotter, Multi-media project.

Office Equipment:

These include filing cabinets and photocopiers, duplicating machines, scanning machines and so on, Computer, Printers.

Vehicles:

One 40 Seater bus for site visits
One Car for department use (Station Wagon)

2.4.15 **Library and Information Resources:**

In addition to the University central library, each Landscape Architecture should have a library/data room well stocked with current journals, textbooks and reference materials for the use of staff and students. The library should be linked with internet for information sourcing.

2.4.16 **Attainment Levels**

To qualify for a degree, each student should have completed and passed all the required courses and be able to attain the achievement levels for each of the class of degree.

Students who are awarded a bachelor's degree in Environmental Management are expected to demonstrate knowledge and skills corresponding to at least attainment level C before they can be allowed to proceed to the professional Master's degree programme.

2.4.17 **Course Evaluation**

In the evaluation of courses offered in Environmental Management, the relationship between theory subjects and studios based subjects have to be taken into account. A pass in a core subject at a lower level is pre-requisite for registration for that subject at a higher level.

Assessment of Theory Subjects:

Assessment used for theory subjects should include continuous motoring of student's progress by subject lecturers through course work evaluation. Continuous assessment may involve class tests, tutorial assignments, seminar presentations, and reports on fieldwork, class attendance and so on. These should carry between 30% and 50% of the total weighting for any subject. The final examination at the end of the semester should account for the balance of 50% to 70% of the overall marks for the subjects.

Assessment of Studio Work:

In the case of Studio Work a jury is the normal practice. A jury consisting of a number of competent persons examine the work of a student in a given studio assignment and award marks arriving at a consensus grade.

2.4.18 **Expectations of the Graduates of Environmental Management** :

a. Ability to analyze design and environmental development problems, synthesize the various
elements and provide appropriate solutions.

b. Ability to understand the needs of his client and users of the built environment and to cater for these.

c. The ability to produce appropriate and imaginative solutions that are technologically sound, economically feasible, environmentally friendly and aesthetically pleasing.

d. The ability to analyse the feasibility, legal implication, and impact of design schemes on users and the public at large.

e. The ability to understand and assess the impact of development schemes on the environment.

f. The ability to communicate his proposals in the appropriate medium to his client, the public, and members of the building profession and construction team, and;

g. The ability to integrate and coordinate the inputs of other professionals in the building team to achieve the objectives of the project(s).

2.4.19 **Maintenance of Curricula Relevance**

The following actions are recommended:

To review Benchmark Statements over 5 years
Periodic visitations to Environmental Management
Universities to routinely request for Environmental Management feedback from employers of their graduates.

2.4.20 **Performance Evaluation Criteria**

Periodic visitations to Environmental Management by the Professional Organization

Appointment of external examiners who should include people in professional practice.

Evaluation of academic staff performance by students through questionnaires.

APPENDIX 5.0: COURSE DISTRIBUTION FOR ENVIRONMENTAL MANAGEMENT

TABLE 5.0B

100 LEVEL

FIRST SEMESTER

COURSE NUMBER	COURSE TITLES	U	L	T	P
GST/GNS 101	Use of English I	2	2	-	-
GST/GNS 102	Philosophy and logic	2	2	-	-
GST/GNS 103	Citizenship Education	2	2	-	-
MAT 101	Basic Mathematics I	3	2	1	-
CHE 101	Introduction to Chemistry I	3	2	1	-
CHE 181	General Chemistry Laboratory	1	-	-	1
ERM 141	Introduction to Environmental Science	3	2	1	-
PHS 101	General Physics	3	2	-	1
ERM 161	Basic Element of Planning	2	1	1	
		21	15	4	2

TABLE 5.1

SECOND SEMESTER

COURSE NUMBER	COURSE TITLES	U	L	T	P
GST/GNS 104	History and Philosophy of Science	2	2	-	-
GST/GNS 106	Use of English II	2	2	-	-
GST/GNS 107	Citizenship Education II	2	2	-	-
MAT 102	Basic Mathematics II	3	2	1	-
CHE 102	Introduction to Chemistry II	3	2	1	-
PHS 102	General Physics II	3	2	-	1
ERM 142	Introduction to Environmental Science	2	2	-	-
ERM 162	II Element of Physical Geography	2	2	-	-
		19	16	2	1

TABLE 5.2

200 LEVEL

FIRST SEMESTER

COURSE NUMBER	COURSE TITLES	U	L	T	P
ERM 211	Basic principles of Surveying I	3	2	-	1
ERM 231	Natural Resource Conservation of Env. Mgt.	2	2	-	-
ERM 233	Introduction to Valuation I	2	2	-	-
ERM 243	Landscape Design and Planning I	3	1	-	2
ERM 245	Environmental Pollution	2	2	-	-
ERM 251	Economics of Environmental Management	3	2	1	-
ERM 261	Regional Development & Planning Technique	3	2	1	-
	Elective	3	2	1	-
		21	15	3	3

ELECTIVES

ERM 273	Environmental Sociology	3	2	1	-
ERM 275	Land Law	3	2	1	-

TABLE 5.3

SECOND SEMESTER

COURSE NUMBER	COURSE TITLES	U	L	T	P
ERM 214	Basic Principles of Surveying II	3	1	-	2
ERM 232	Natural Ecosystem	3	2	1	-
ERM 234	Introduction to Valuation II	2	1	-	1
ERM 244	Reclamation and Site Planning	3	2	1	-
ERM 252	State Economics	2	2	-	-
ERM 254	Environmental Degradation	2	2	-	-
ERM 292	Environmental factors in Construction	2	2	-	-
ERM 294	Quantitative Technique in Env. Mgt. I	2	2	-	-
	Elective	2	2	-	-
		21	16	2	3

ELECTIVES

ERM 272	Legislation and Environmental	2	2	-	-
ERM 274	Environment and Human Health	2	2	-	-

TABLE 5.4

300 LEVEL

FIRST SEMESTER

COURSE NUMBER	COURSE TITLES	U	L	T	P
ERM 307	Use of Computer I	2	1	-	1
ERM 301	Economics of Water Resources	2	2	-	-
ERM 303	Site Engineering	2	2	-	-
ERM 305	Transportation I	2	2	-	-
ERM 313	Environmental Information System	2	2	-	-
ERM 323	Hydrology System Analysis	3	2	1	-
ERM 331	Planning and Mgt of Renewal Resources	2	2	-	-
ERM 341	Land Degradation and Restoration Ecology	2	2	-	-
	Elective	2	2	-	-
		19	17	1	1

ELECTIVES

ERM 371	Environmental Protection	2	2	-	-
ERM 373	Land Management in Cities	2	2	-	-

TABLE 5.5

SECOND SEMESTER

COURSE NUMBER	COURSE TITLES	U	L	T	P
ERM 322	Environmental Planning and Management	2	2	-	-
ERM 326	Highway Engineering and Planning	2	2	-	-
ERM 396	Quantitative Technique in Env. Mgt. II	3	2	1	-
ERM 302	Use of Computer II	2	1	-	1
ERM 362	Ecosystem and Environmetal Change	2	2	-	-
ERM 382	Tourism Development Planning	2	2	-	-
ERM 386	Solid Waste Management	2	2	-	-
ERM 372	Transportation II	2	2	-	-
	Elective	2	2	-	-
		19	17	1	1

ELECTIVES

ERM 374	Hydrology	3	2	-	-
ERM 376	Sewage and waste Water Treatment	3	2	-	-

TABLE 5.6

400 LEVEL

FIRST SEMESTER

COURSE NUMBER	COURSE TITLES	U	L	T	P
ERM 421	Principles & Methods of Env. Mgt. Technique	3	2	1	-
ERM 423	Urban Environmental Mgt. and Housing	2	2	-	-
ERM 433	Research Methods and Remote Sensing	2	1	-	1
ERM 451	Parks and Open Space Planning	2	2	-	-
ERM 456	Natural Resources Planning Policies, Energy Production, Use and Conservation	3	2	1	-
ERM 465	Socio Economic Aspect of the Environment	3	2	1	-
ERM 481	Aquatic Ecology and Resources	2	2	-	-
ERM 483	Environmental and Planning Law	3	2	1	-
ERM 485	Soil Investigation and testing	2	2	-	-
	Elective	2	1	-	1
		24	18	4	2

ELECTIVES

ERM 471	Environmental Sociology	2	2	-	-
ERM 473	Land Law	2	2	-	-
ERM 475	Wildlife Conservation and Land use	2	2	-	-

TABLE 5.7

400 LEVEL

SECOND SEMESTER

SIWES		16			
TOTAL		40			

TABLE 5.8

500 LEVEL

FIRST SEMESTER

COURSE NUMBER	COURSE TITLES	U	L	T	P
ERM 501	Dissertation Project	3	-	-	3
ERM 525	Geomorphology	2	2	-	-
ERM 531	Wildlife Ecosystem	2	2	-	-
ERM 535	Landscape Design, Assessment and Clarification	3	1	-	2
ERM 563	Water Quality Management	2	2	-	-
ERM 561	Geographic Information System	2	1	-	1
ERM 571	Climatology and Meteorology	3	2	1	-
	Elective	2	2	-	-
		19	12	1	6

ELECTIVES

ERM 573	National Hazards and Coastal Zone Studies	2	2	-	-
ERM 575	Environmental engineering Services	2	2	-	-
ERM 577	Environmental Ethics & Professional Practice	2	2	-	-

TABLE 5.9

SECOND SEMESTER

COURSE NUMBER	COURSE TITLES	U	L	T	P
ERM 590	Dissertation Project	3	-	-	3
ERM 546	Soil Erosion and Environmental Management	2	2	-	-
ERM 562	Advanced Environmental Education, Field Ecology & Natural Resource Planning	2	2	-	-
ERM 564	Seminar on the Environment	2	-	-	-
ERM 568	Environmental Impact Assessment	2	-	-	2
ERM 592	Environmental Health and the Family	2	1	-	1
	Elective	3	2	1	-
		16	7	1	6

ELECTIVES

ERM 574	Landscape Design II	3	-	-	3
ERM 576	Regional Planning Case Studies	3	2	1	-

APPENDIX 5.1: COURSE SYNOPSES

ERM 141 INTRODUCTION TO ENVIRONMENTAL SCIENCE I (3 UNITS)

Energy system in the atmosphere, biosphere, hydrosphere and lithosphere. Current environmental issues including air pollution and other natural hazards, erosion, drought, rosion, drought, earthquakes, hurricanes, floods etc.

ERM 161 BASIC ELEMENTS OF PLANNING (2 UNITS)

To introduce the students to the nature and aims of urban planning/Environmental planning. To develop knowledge of the type of problems that urban planners/Environmentalists deal with and of current planning practices at various special scales. To introduce students to planning definition and various planning principles and inter-regional agencies and principles of planning reputing.

ERM 142 INTRODUCTION TO ENVIRONMENTAL SCIENCE II (2UNITS)

Definition of environment and science; consideration to human species, human needs; nature and interaction of above factors; material assets and cultural heritage. Sustainability relationship of environmental panning with other environmental disciplines as a process and activity oriented.

ERM 162 ELEMENTS OF PHYSICAL GEOGRAPHY (2UNITS)

The composition and structure of the lithosphere, atmosphere and hydrosphere; nature, distribution evolution and significance of the first order relief forms of the earth.

ERM 231 NATURAL RESOURCES CONSERVATION AND ENVIRONMENTAL MANAGEMENT (2UNITS)

Natural resources, concepts and definitions; Natural resources exploitation; Environmental/ecological implications of threatened/endangered natural resources (i.e. forests and wildlife species); sustainable use and conservation of natural resources.

ERM 232 NATURAL ECOSYSTEM (3UNITS)

Components of environment and the interaction among components, types of ecosystems (ecosystems as habitat); Principal plants in West Africa, their ecology as related o grazing; Factors affecting floral and fauna distribution at various scales. Vegetation changes through time, adaptation, succession and climax.

ERM 233 INTRODUCTION TO VALUATION I (2 UNITS)

The concept of valuation, the Estate control of land usage; the qualities of investments; investment opportunities; principles and sources of investments; features of property and property market. Factors which cause changes in the value of property; characteristics of land and property.

ERM 234 INTRODUCTION TO VALUATION II (2 UNITS)

The nature and definition of value; Definition and purpose of valuation; the function of value economic, Constitutional, geographical, environmental, political and legal basis of property value. The effect of the international situation. The capital market

and the principles governing interest rates and yield market analysis. Structure and environmental surveys and reports for valuation; the mathematical background and construction of valuation table – Field project.

ERM 243 LANDSCAPE DESIGN AND PLANNING I (3 UNITS)
To introduce the students to the principles of landscape planning and illustrate its relationship to statutory planning. Definition of landscape planning and landscape planning and their relationship with urban planning. A review historical garden forms and historical evolution of the Public park and recreational areas. An introduction to landscape materials and construction technique including land grading, structural elements and plants. The landscape planning and design process, including existing site inventory and analysis.

ERM 244 RECLAMATION AND SITE PLANNING (3 UNITS)
Map reading; location, recognition of relief forms, analysis and interpretation. Site selector definitions and scope of site selection and planning principles and factors of site selection. Site analysis investigation involving analysis of the site for purposeful design. Elements of site topography; soil conditions, ground water, vegetation microclimate and distinct features. Site design brief, goals and objectives; site plan, the scale and content, circulation and utility networks. Site engineering building lines, plot coverage, frontal design standard.

ERM 245 ENVIRONMENTAL POLLUTION (2 UNITS)
Sources of pollution and types (air, water, noise), Green house effect; ozone layer depletion, Types of pollutants (chemical, Biological) Pollution Control.

ERM 251 ECONOMIC OF ENVIRONMENTAL MANAGEMENT (3 UNITS)
Land as a scarce and exhaustible resources. Location theory, economic basis of urbanization, conflicting and competing demands for land use and conservation. Relationship between land use and land value. Effect of land use and land value on the operation of price mechanism. The process of land development economics of real estate, nature and function of the urban property, urban area, financial development and economic concepts.

ERM 252 ESTATE ECONOMICS (2 UNITS)
The formation of Estate ownership, estate planning and control. The National estate management of public estate; location theory. The housing market.

ERM 254 ENVIRONMENTAL DEGRADATION (2 UNITS)
Comprehensive studies of the types, causes and consequences of environmental degradation. Highlights of environmental degradation factors (e.g. uncontrolled deforestation, urbanization, industrialization, wars, erosion, flood, desertification, salinity, bush fires, etc.) Protective measures to sustainably conserve and manage the environment. Sources of pollution. Major pollutants of air, soil and water; noise pollution, management of pollutants; Ozone layer depletion and the green house effect.

ERM 261 REGIONAL DEVELOPMENT PLANNING TECHNIQUES (3 UNITS)

To introduce the students to the nature and aim of regional planning. Concept of a region, theories of regional growth and development. Growth Pole, theory, Core-periphery model, spatial eginlibrin model etc. Types of problem that regional planners deal with.

ERM 272 LEGISLATION AND ENVIRONMENT (2 UNITS)

National and International Law and Policies on environment, a reviewing of assessment of the effectiveness of legislation for environmental conservation, management and control.

ERM 273 ENVIRONMENTAL SOCIOLOGY (3 UNITS)

Impact of culture on the environment. The sacred forests (sacred groves) their original and functions including conservation values, protective role of culture (e.g. tradition including taboos) on plant and animal diversity and conservation. Effects of pollution, policy and education on the environment (e.g. Land use decree and Structural Adjustment Programme). Socioeconomic and cultural roles of conservation programme.

ERM 274 ENVIRONMENT AND HUMAN HEALTH (2 UNITS)

Waste generation and disposal, waste management technology i.e waste recycling, landfills establishment and management; Diseases and pests associated with environmental, changes include environmental degradation and pollution. The role of man in environmental health.

ERM 275 LAND LAW (3 UNITS)

Source of Nigerian land law, classification and types of property, ownership and possession, real property, customary land law; Nature of title to land under customary law. Nature and management of community land. Industrial rights in community land. Creation and determination of family property under customary law.

ERM 292 ENVIRONMENTAL FACTORS IN CONSTRUCTION (2 UNITS)

Environmental factors in topography, geology and ecology, climate etc. Basic principles of building design, types of building by use and functions, study of building and layouts in relationship with adjoining structures and external features. Alignment of utility, network, building materials and application of building services – plumbing and electrical and water supply. Construction of foundation, walls, roofs, stairs refinishing, building installations against weather, heart and sound. Practical exercise in design studio.

ERM 294 QUANTITATIVE TECHNIQUES IN ENVIRONMENTAL MGT. (2 UNITS)

To advance knowledge of statistical techniques needed in the analysis of environmental data. Descriptive technique, estimation techniques introduction to hypothesis testing, test of the mean normal and 't' distribution. Tests of the differences between means normal and 'T' distributions Tests involving the binomial and poison distributions. The chi-square test sign tests, the "U" test Applications and limitation of quantitative techniques in environmental management.

ERM 301 ECONOMICS OF WATER RESOURCES (2 UNITS)
The course will introduce the students to examine water as resource, water budget, water balance, Natural and man-made water resources direct and indirect use of water resources, water quality, demand and supply. Environmental problems of water resources development; impact of man on watershed, management and conservation.

ERM 303 SITE ENGINEERING (2 UNITS)
Design of public utilities – water supply drainage, electricity, telephone, postal systems. Design and management of sewers, treatment, disposal and management of sewage. Management of solid waste collection and disposal. Methods of site investigation for planning utilities. Management principles for other public utilities and services. Public health laws in Nigeria, case studies.

ERM 305 TRANSPORTATION I (2 UNITS)

The aims, objective and roles of transportation planning. The concepts, methods and policy issues in transport planning, transportation relationship with land use planning. Legal frameworks for transportation planning and federal, state and Local levels. Methods of urban transportation planning: data collection, anaysis and presentation. Traffic control measures; management problems of organization and regulation of public transportation and their impact on development.

ERM 313 ENVIRONMENTAL INFORMATION SYSTEM (2 UNITS)

Statistical sources and environmental data. Information base and source of environmental management. The proces of research survey. The scale of measurement methods of sampling. Frequency distribution and graphic presentation, measures of dispersion. The probability Theory, the normal and frequency distribution of population parameters and confidence intervals. The Binomial distribution. The Poison distribution.

ERM 322 ENVIRONMENTAL PLANNING & MGT. (2 UNITS)

Principles of management as applied to the environmental profession. Personnel management in environmental management, methods of financing of plans, implementing and managing land use plans (Political, technical, administrative requirements). The civil services and central administration. Private sector participation in environmental management and project implementation, management of Technical staff and office at Local, State and federal levels. Theories of Power (Elitism, pluralism and maxims).

ERN 323 HYDROLOGY SYSTEM ANALYSIS (3 UNITS)

Basic Principles of hydrology. precipitation, runoff and infiltration factors. Ground water and soil moisture, evaporation. The Drainage Basin, floods and flood control. Field and laboratory instrumentation and techniques. Hygrography analysis and other stream flow records.

ERM 326 HIGHWAY ENGINEERING & PLANNING (2 UNITS)

Principles of road planning, building and maintenance. The development of transportation planning - alternative strategies. Assessment of the options. Evolution of an implementation programme. Road Design controls and criteria. Design elements. Construction materials. Construction methods. Highway furniture. Road maintenance.

ERM 331 PLANNING & MANAGEMENT OF RENEWABLE RESOURCES (2 UNITS)

Scope and nature of urban renewal slums-basic factors and reasons for slum development, identification of slum areas. Urban Renewal techniques for improving living conditions. Socio-economic implications of slum clearance. The logic of urban renewal. Urban renewal processes. Citizen participation and plan implementation. Cost and benefit of urban renewal scheme. Case studies.

ERM 341 LAND DEGRADATION AND RESTORATION ECOLOGY (2 UNITS)

Types of Erosion, dessertification, sand dunes, etc. Socio-Economic effects of deforestation, biodiversity loss, etc. Causes and sources of land degradation and amelioration strategies. Resource exploitation, its implication on the environment. Principles of Agro-forestry, forest-tree crop integration. Sustainable management and conservation of environment.

ERM 362 POPULATION, ECOSYSTEM AND ENVIRONMENTAL CHANGE (2 UNITS)

Components of the environment, the interaction among components, types of ecosystem, ecosystem and habitats; population and environmental change. Population growth, distribution patterns, population trend and environment.

ERM 371 ENVIRONMENTAL PROTECTION (2 UNITS)

Soil erosion: causes, prevention and control technique (e.g. tree planning, use of sustainable farming system etc). Reclamation techniques for degraded mine sites, sand dune management (e.g. sand dune fixation with indigenous, and exotic plant species), zone afforestation and reforestation programmes. Reclamation/Rehabilitation of wetland, shelter belt establishment and management, micro and macro climatic applications.

ERM 373 LAND MANAGEMENT IN CITIES (2 UNITS)

Physical and Human Geography of Nigeria. Land forms and their effects on the location of towns and the nature and structure on settlement. The effect of climate and vegetation on the development of towns. Introduction to land uses; Urbanization focus on Nigeria. Spatial Theories – central place theory, settlement hierarchy-sizes and spacing of cities. The Internal structure of cities. The concentric theory, the sector theory. The multiple economic development factors affecting urban growth. Physical characteristics of Urban Growth. The concepts of centralization and decentralization.

ERM 396 QUANTITATIVE TECHNIQUES IN ENVIRONMENTAL MANAGEMENT II (3 UNITS)

Review of descriptive and basic inferential techniques. Hypothesis testing. Bivariate linear correlation and regression. Analysis of variance. Multiple liner correlation and regression. Principal components and factor analysis. Forecasting techniques. Possibilities and limitations in planning practice and research.

ERM 372 TRANSPORTATION II (2 UNITS)

To consolidate the understanding of concepts methods and principles of transport planning. Parking surveys and studies. Mass transit in urban centres. Survey and analysis: projection of mass transport needs. Planning mass transport facilities. Land Use/Transport modellings: trip generation, trip distribution, model split, trip assignment. Classification and hierarchies of roads. Traffic management and control. Regulatory methods and devices installation, design and operation of traffic signals. Preparation and implementation of transport plans. Location of transport terminal facilities railway stations, airports etc. Formulation of transport policies.

ERM 374 HYDROLOGY (2 UNITS)

These introduce students to the basic principles of hydrology. It will teach students facts of precipitation, runoff and infiltration factors. Groundwater and soil moisture. Evapotranspiration. The drainage basin, floods and flood control. Field and laboratory instrumentation and techniques. Hydrologic analysis and other stream flow records.

ERM 376 SEWAGE AND WASTE WATER TREATMENT (2 UNITS)

Treatment, disposal and management of Sewage. Management of solid waste, collection and disposal. Method of site investigation for planning utilities public health laws in Nigeria – case study.

ERM 382 TOURISM DEVELOPMENT PLANNING (2 UNITS)

To advance the knowledge of recreation and (R&T), attributes and categorization of (R & T) resources, infrastructure services and participation, socio-economic evaluation and the ecological impacts. Definition and Concept. Nature and classification of tourism resources and recreational land uses. Water base (R&T) Land base (R&T). Urban and Rural distributions Infrastructure and services. Administration and Management of (R & T). The positive and negative impacts of Recreation and Tourism.

ERM 386 SOLID WASTE MANAGEMENT (2 UNITS)

To make students aware of the impact of various pollutant with emphasis on atmosphere, water and soil: Environmental monitoring system. Abatement and control of solid waste. Refuse dump site, treatment and land fill.

YEAR FOUR (4) COURSE DESCRIPTION

ERM 421 PRINCIPLES AND METHODS OF ENVIRONMENTAL MANAGEMENT TECHNIQUE (3 UNITS)

Soil Erosion prevention and control, Reclamation of derelict lands, sand-clure management prevention and control of desertification. Environmental Conservation Strategies, eg. In-situ conservation, biosphere reserves.

ERM 433 RESEARCH METHODS AND REMOTE SENSING (2 UNITS)

Developing of geographical remote sensing from air photography to sophisticated sensor system. Techniques of remote sensing, use of Panchromatic infrared, black and white, intra-red false and true colour films image enlargement, multispectral photography and sensing. Use of side looking Radar and satellite emergency. Understanding of the role of research in Environmental management and ways to undertake a research.

ERM 451 PARKS AND OPEN SPACES PLANNING (2 UNITS)

Parks Surveys, sitting and construction of roads and tourist facilities and supervisor of anti poaching control. Open space for flood control, for future development, development control, for recreation, e.t.c.

ERM 456 NATURAL RESOURCES PLANNING POLICIES ENERGY PRODUCTION, USE AND CONSERVATION (3 UNITS)

Natural resources; uses of natural resources, exploitation of natural resources and environmental/ecological implications of threatened/endangered natural resources i.e. forest and wildlife species. Sustainable use of natural resources including conservation strategies.

ERM 465 SOCIO ECONOMIC ASPECTS OF THE ENVIRONMENT (3 UNITS)

Culture and Environment: Sacred forest/shrines, their uses and conservation values. Effects of population and government policies on the Environment.

ERM 471 REGIONAL PLANNING (2 UNITS)

Classification of techniques into analytical and procedural, dimensional regional planning problems in Nigeria. The regional planning process following the classical planning procedure, goal formulation objectives and strategies, data collection, analysis, evaluation of alternative choices, proposals and plan making. Case studies and application of relevant regional planning theories to existing situations. Analytical techniques, forecasting techniques. Model building focused particularly on input-output analysis. Industrial locational analysis on spatial interaction and gravity models, social accounting etc. Assessment of their usefulness and critical analysis of the state of individual techniques, their main strengths and weakness and their potential uses. Procedural techniques, checklist of criteria. Comparative cost and investment criteria. Comparative cost and investment appraisal. Threshold analysis, cost benefit analysis; social achievement matrices, and planning, programming and budging systems. Assessment of their usefulness and critical analysis of the state of individual techniques.

ERM 473 DEVELOPMENT CONTROL (2 UNITS)
Management and administration of planning. Role of Town Planning authorities and need for development control including enhancement of the quality of the environment. Strategies for development control, distribution of essential services and protection of individual rights. Development control and enforcement cases in planning. Special form of control-advertisement, listed building tree preservation order etc. Granting or refusing planning applications, rights of appeal, revocation and modifications of permission. Receiving, planning applications and reading the architectural drawings. etc.

ERM 475 WILDLIFE CONSERVATION AND LAND USE (2 UNITS)
Nigerian forest wildlife and conservation policies; traditional land use practices, charges-in land-use practices, population growth and land use practices. Management planning of game reserves and national parks. Wildlife management needs.

ERM 481 AQUATIC ECOLOGY AND RESOURCES (2 UNITS)
Water quality, bacteriological measurement, water balances, water resources. Application of water resources in development. Water Resources management.

ERM 483 ENVIRONMENT AND PLANNING LAW (3 UNITS)
The origin of urban and regional planning law in Nigeria. Its nature, scope and contents in the framework of the Nigerian judicial system. Powers and duties of the planning authorities; planning schemes; development control. Acquisition and disposal of land for planning scheme – compensation and betterment. The structure and working of the Nigerian legal system. The courts and their procedure, tribunals and inquiries, reference to courts for decision in any matter affecting a planning scheme and legal proceedings. Acts relating to highways, public health, industrial location e.t.c.

ERM 485 SOIL INVESTIGATION AND TESTING (2 UNITS)
Basic geophysical properties of soil, water and salt balance chemical properties. Basic geophysical properties of soil, chemical property. Analysis and measurement of water and wind erosion. Conservative tillage system and their effects on the physical, chemical and biological properties of the soil; ameliorating acidity salinity and drainage problems.

YEAR FIVE (5) COURSE DESCRIPTION

ERM 500 DISSERTATION PROJECT (3 UNITS)
The student is expected to undertake research work on any chosen topic as a special area of study as it pertains to the environment and environmental management. Students are required to demonstrate ability for individual research techniques, making contribution to knowledge with some guidance of an academic staff throughout the project. The examination will be conducted with a viva, which will be attended by the external examiner.

The dissertation project stretches to both session as ERM 590 (3 UNITS)

ERM 525 GEOMORPOLOGY (2 UNITS)

Studies on soil types and formation; zonal soils intrazonal soils. Methodological and substantive concepts in geomorphology. New developments; Morphometric analysis and introduction to geomorphologic mapping. Application of geomorphologic knowledge and techniques to environmental and developmental problems and issues.

ERM 531 WILDLIFE ECOSYSTEM (2 UNITS)

Research properties in wildlife management. Management Planning of game reserves and natural parks; Nigerian forest wildlife and conservation policies. Wildlife management needs.

ERM 535 LANDSCAPE DESIGN, ASSESSMENT AND CLASSIFICATION (3 UNITS)

Values, forces and institutions shaping urban form; principles of Landscape in urban design. Movement pattern and space organization. Scale in space organization. Elements within organized space. Theoretical concepts and approaches to urban form and design. Understanding emerging urban design realities in Nigerian towns and cities (e.g. functional distribution of mass and voids in relation to circulation and amenities). Studies of bases for designing cities (i.e. climate, landform, construction materials; and methods, clintal, and generic landscape impacts; environmental impact statement (EIS)

ERM 546 SOIL EROSION AND ENVIRONMENTAL MANAGEMENT (2 UNITS)

Soil erosion causes, prevention and control techniques, e.g. tree planting, use of sustainable farming systems, etc. Reclamation techniques for degraded mined sites. Sand dune management. E.g. sand dune fixation indigenous and exotic plant species. Arid zone aforestation and reforestation programmes. Reclamation/rehabilitation of wetlands, shelter belt establishment and management.

ERM 561 COMPUTING, MAPPING AND SPATIAL ANALYSIS (3 UNITS)

To understand the basic techniques of map making, use of variety of cartographic and other devices for mapping and gathering environmental date; scope and limitations of the visual presentation of statistics sources. Scale and error factors, map design, the logic of conceptual diagrams including system diagrams.

ERM 562 ADVANCE ENVIRONMENTAL EDUCATION FIELD ECOLOGY (2 UNITS)

The nature and potentials of the Natural Social and Human built environment, and their interdependency. Reciprocal relationship between man and environment. The family in an Ecosystem. The natural habitats. The Role of humans in environmental decay and preservation.

ERM 563 WATER QUALITY MANAGEMENT (2 UNITS)

Water sources, demand and supply, treatment and distribution. Sources of water pollution (i.e. urban storm water run-off, industrial run-off, pesticides, thermal pollution, pathogens in water supplies, toxicology, water pollution control.

ERM 564 SEMINAR ON THE ENVIRONMENT (2 UNITS)
Students are expected to choose topics on issue relating to the environment, students will be required to make a presentation of the chosen topic.

ERM 568 ENVIRONMENTAL IMPACT ASSESSMENT (2 UNITS)
Environmental impact of human actions. Response of society to environmental changes. Bio-geophysical and socio-economic impacts. Administrative procedures in planning/decision making of environmental impact assessment (EIA). Contents of EIA. Methods for identifying, predicting and interpreting impacts/effects and inspection procedures. Conceptual framework for EIA using simultaneous models and policy analysis. Socio-economic methods or EIA with respect to current socio-economic environment and methods for deriving impacts.

ERM 571 CLIMATOLOGY AND METREOLOGY (3 UNITS)
The course will teach the General circulation of the atmosphere; scales and laws of motion and the forces that drive the atmosphere. It will also examine the major features and models of the circulation. It will also include weather producing systems – masses and fronts, frontal and non-frontal depressions tropical systems. Weather forecasting.

ERM 573 NATURAL HAZARDS AND COASTAL ZONE STUDIES (2 UNITS)
The study will identify and examine the causes and consequences of natural hazards such as drought, land and coastal erosion, floods, landslides, desertification, strong winds etc and measures for control.

ERM 574 LANDSCAPE DESIGN II (3 UNITS)
The course is designed to advance students interpretation of land forms, aesthetic, climatic, socio-economic issues and cost in landscape design in practical framework. Live projects are emphasized.

ERM 575 ENVIRONMENTAL ENGINEERING SERVICES (2 UNITS)
The course will enable students to advance knowledge in engineering services and applicable installations, i.e. electricity, water supply, telephone services e.t.c.

ERM 576 REGIONAL PLANNING CASE STUDY (3 UNITS)
Review of the early regional plans for Doncaster Regional Planning Scheme 1922; South Wales regional Survey 1920; Plans for London and South East England 1944 – 1971: Also reviews of recent regional plans for East Anglia Regional Strategy. Regional Development plans for F.C.T. Abuja 1982.

ERM 577 ENVIRONMENTAL ETHICS AND PROFESSIONAL PRACTICE (2 UNITS)
The course deals with environmental management practice as a profession. Its relationship with clients and other bodies; principles of writing brief, decision making, code of conduct as prescribed by the professional body, procedures for membership, the politics of professionalism.

ERM 590 DISSERTATION PROJECT (3 UNITS)

This is a continuation of project dissertation for the first semester. The student is expected to take advantage of the performance in the first semester and improve on the quality of the research for final presentation to the academic staff and the external examiner.

ERM 592 ENVIRONMENTAL HEALTH (2 UNITS)

This course exposes students to what health really means. The effect of man's domestic, industrial and other productive activities on human health and family. It also elaborates on acceptable ameliorative measures to maintain environmental health, applying recent health models and theories.

2.5 Benchmark-Style Minimum Academic Standards for Estate Management Degree Programme

2.5.1 Introduction:

Estate Management is art and science of supervising the use, development and management of landed property, other natural resources and the built environment. The estate management programme is designed to prepare students to appreciate the complexity of legal economic, technological and social impacts on the use, development and management of land and the environment. The emerging world trend in technological advancement and environmental concern, calls for the need to design responsive programmes for the training of future graduates in Estate Management.

2.5.2 Nomenclature of Degree Programme

The degree envisaged may be a B.Sc. or B. Tech in Estate Management depending on the nature of the University where the programme is offered.

2.5.3 Admission Requirements

Five (5) credits in SSCE/GCE including English Language, Mathematics, Economics and any other two subjects from Chemistry, Physics Business Studies/ Commerce, Geography, Biology, Agricultural Science and Technical Drawing.

Holders of Higher School Certificate (HSC) /GCE 'A' Level in two relevant subjects; OND or HND in Estate Management or allied professions or professional certificate may be assessed and placed appropriately. Applicants must however meet the entry requirements in (a) above and take remedial courses as may be recommended.

Transfer from other Universities would be treated on their own merits.

2.5.4 Duration of Programme

The expected duration of the Bachelors Degree in Estate Management will be a minimum of TEN Semesters and a maximum of FIFTEEN Semesters for holders of SSCE/GCE Certificate.

2.5.5 Aims and Objectives of Benchmark Statements

The benchmark statements in Estate Management aims at providing a memo for the academic community to describe the nature and characterisitcs of the programme.

2.5.6 **Philosophy and Aims of the Degree in Estate Management**

To produce competent Estate Surveyors and Valuers with sufficient technical knowledge and skill in order to optimise the use of land resources to facilitate economic development.

The main aims should be to:

instill in students an appreciation of the complex nature of the relationships between man and his environment.

involve the students in an intellectually stimulating and satisfying experience of learning and studying.

provide a broad and balanced foundation of the knowledge of land and buildings and their exploitation and use.

develop in students the ability to apply their analytical skills to the solution of theoretical and practical land resource problems.

develop in students, entrepreneurial skills of value in self employment In the profession.

develop in the students survival skills in an ever changing economic, technological and political world.

lay the foundation on which students can proceed to further studies in specialised aspects of estate surveying practice or multi-disciplinary areas involving estate surveying and valuation.

create an appreciation of the importance of estate surveying and valuation in an industrial, environmental, economic and social context.

develop the students in the use of information Technology in the effective management of land and the environment.

Universities to articulate the learning outcomes associated with the programme but are not a specification of a detailed curriculum. This benchmark statement is to provide for variety and flexibility in the design of estate management programmes by individual Universities, to reflect their perculiar circumstances and location.

2.5.7 **Subject Knowledge**

While the depth of individual aspects of the programme will vary between institution offering estate surveying and valuation programmes, it is expected that the students will be conversant with the following main aspects of estate surveying and valuation.

- Knowledge and appreciation of the mathematical processes used in analysis and presentation, and developing intelligence in tackling practical problems, logically and sequentially.

- Use of data to describe the real world. Using statistical calculations to understand and present practical data.

- Appreciation of building forms and drawings. Understand the construction of buildings and building services and contemporary building materials.

- Acquisition of basic knowledge of the practical use of surveying instruments, measurement of buildings and land surveying.

- The construction industry and its relation to the national economy.

- Appreciation of spatial inequalities, the relationship between cities and the structure and development of cities, regions and urban areas. The components of an urban system and factors affecting urban growth and development. The role of industrial growth in urban development

- The use of law to regulate and control the use and development of land.

- Definition and scope of modern day agriculture and the use of land for agriculture, forestry and wildlife. Forest regulations, exploration deforestation, regeneration and aforestation.

- Understand basic principles and methodology of economics and economic institutions and government policy.

- Appreciate Accounting theory and develop an understanding of accounting as an information system in real estate business.

- Understand basic industrial processes where the Estate Surveyors and Valuers' skills may be required.

- Land as an economic resource and the use of the economic principles to Develop and manage land.

- The principles and practice of land resource appraisals and management.

- Development, management and maintenance of land and buildings.

- Managing buildings as a complex unit of the structure and its facilities.

- Theories and practices of land resource planning, development, utilisation and forecasting.

- Landed property rating and taxation.

- The valuation of specialised properties like plant and machinery, minerals properties etc.

- Principles and applications of Geographic and Land Information Systems and the computer environment

- Human resource management in complex development projects.

- Project planning and implementation

- Predictions and assessments of impacts of land development projects on the environment (Environmental Impact Assessment)

- Measurement and Control of Pollution, Erosion and other natural disasters.

- Environmental Management and Control

- Estate Surveying and Valuation Practice Ethics and code of conduct in the real world

- Basics of small business management.

Cognitive Abilities And Skills

At the end of the Bachelors degree in Estate Management, a graduate should be able to perform the following:-

a) Manage any type of 'land' within an existing framework, towards achieving any organisational goal, either in the private or public sectors.

b) Carry out property management involving preparation of schedules of condition and dilapidation; identifying building defects, specifications, remedies and organisation of maintenance works.

c) Prepare Valuation of any proprietary interest in land plant and machinery and landed property for all purposes and advising on their values.

d) Carry out feasibility and Viability studies in relation to proposed developments.

e) Prepare development proposals on the suitability of land for residential, commercial, industrial, recreational and other developments and advising on their economic and financial aspects.

f) Carry out Cost-Benefit Analysis of projects and advice on their desirable locations.

g) Carry out Research into the problems of the physical environment and advising on the values of damages to the environment. Provide data for policy formulation on land resources allocation, development, utilisation and maintaining a balance in the ecosystem.

h) Advise on the acquisition of land by compulsory purchase and or revocation of rights. Preparation of claims, settlement of terms with acquiring authorities and presenting expert evidence on value.

i) Advise on the value of landed properties and other land resource components of business organisations for sale or exchange.

j) Manage complex buildings and its facilities to ensure a controlled working environment.

k) Start up a business.

l) Cooperate with other professionals in solving contemporary land/environmental problems.

m) To perform a mediatorial role in the arrangement of real estate financing

General Skills

Students should possess:

- Written and Oral communication skills

- Problem-solving skills, relating to both qualitative and quantitative information and especially where information is limited.

- Computational and numeracy skills

- Information-retrieval skills, in relation to primary and secondary information sources, including information retrieval through on-line computer searches.

- Information technology skills such as word processing and spreadsheet use, data-logging and storage, internet communication etc

- interpersonal skills relating to working in multi-disciplinary teams.

- Time-management and organisational skills.

- Study skills needed for continuing professional development and research

2.5.8 **Credit Units**

180 Credit Units in the 5 year programme. A minimum of 15 credit units per semester is required.

Individual Institutions to work out details of credit units.

2.5.9 **Performance Evaluation Criteria**

Candidates for the examinations shall satisfactorily complete course work set in each subject in the form of term papers, continuous assessments, short quizes or short tests, a compulsory residential field trip and industrial attachment programme. Assessments shall be between 30% - 40% and the semester examinations which carries 60% - 70%.

2.5.10 **Behaviourial Attributes**

Candidates should be able to display honesty, integrity, devotion to professional work professional discipline and good human relation. Also maintain the dignity, carriage add demeanour in consonance with the professional of estate surveying and valuation and relate with the clientele effectively in a professional respect.

2.5.11 **Attainment Levels**

A total of 180 credit units will be required for graduation. A minimum load of 15 credit units per semester is required.

Semester examinations shall consist of questions on theoretical and practical aspects of the course. Grades for the Semester shall constitute 60 - 70% for examination and 30% - 40% for continuous assessment during the semester. Final year degree examination shall be moderated by an External Examiner who would be required to assess the quality of the students' performance as well as the overall standard of the course offered in the Department

2.5.12 **Maintenance of Curricula Relevance**

The Estate Management Programme is to be constantly reviewed to incorporate new and emerging technioques. It is expected that an internal department review will be undertaken every year. The professional Body and the Registration Board of the programme are to regularly accredit the programmes to ensure a feed back from the industry. Employers will be expected to send assessments to the departments every two years.

2.5.13 **Personnel**

Generally, the number of staff required to be based in the Department of Estate Management would depend on a number of variables such as students' population and the number of service courses which other available

departments can offer students of Estate Management. Specifically, the following categories of staff will be required.

Professor
Reader
Senior lecturer
Lecturer
Technical staff
Junior non-technical staff
Drivers

2.5.14 **Equipment**

Drawing Boards, T.Squares, financial and other calculators, Audio Visual Projector and Accessories. Computer and Accessories (IPC per 5 students).

Plan Printing machine, Guillotine Cutter, Spiral Binding Machine, 100 metre chains, Video and Digital Cameras, Photocopying Machines, Duplicating Machines, Electric Typewriters and Steel Cabinet.

A Peugeot 504 Station Wagon A bus capable of carrying not less than 40 students for field work.

2.5.15 **Physical Facilities**

Office Accommodation

- Professor's Office 24m2

- Head of Dept $24m^2$
- Senior lecturer $16m^2$
- Lecturer $12m^2$
- Assistant Lecturer $8m^2$
- Senior Tech. Staff $12m^2$
- Senior Admin $12m^2$
- Junior Tech. Staff $5m^2$
- Studio Space $4m^2$ per student
- Lecture space $0.5m^2$ per student
- Senior space $0.5m^2$ " "

Departmental Library equipped with relevant texts, in addition to the General University Library.

2.5.16 **Courses Requirements**

The principal course components are Property Valuation, Feasibility and Viability Studies, Property Management, Building Technology, Law, Economics, Land Economics and Town Planning. About 50% of these courses are offered outside the department. Essentially, these courses could be grouped into three. Those courses offered in the department of Estate Management, those courses offered in cognate departments and other courses

offered in the departments of General studies. The Synopses of these Courses are listed in Appendix 4.1.

Compulsory core courses Taught within Department of Estate Management

1. Introduction to Estate Management
2. Introduction to Valuation
3. Principle of Town and Country Planning
4. Taxation and Rating
5. Principles of Valuation
6. Land and Resources
7. Applied Town Planning
8. Arbitration and Awards
9. Property Management
10. Advanced Valuation
11. Feasibility and Viability appraisals
12. Estate and Development Finance
13. Project Dissertation
14. Land Economics
15. Professional Practice

Other Compulsory Courses or Compulsory Anciliary courses

1. General Mathematics
2. Architectural Graphics
3. Principles of Economics
4. Principles of Agricultural Production
5. Principles of Accounting
6. Building Construction
7. Building Materials
8. Economic Theory
9. Land Surveying
10. Basic Statistics
11. Basic computer programming
12. Building services and maintenance
13. Economics of Agriculture
14. Public Health Engineering
15. Nigerian Land Law
16. Law of contract and tort
17. Entrepreneurship Studies
18. Information Technology
19. Plant and Machinery Valuation

Distribution of Courses

Tables 5.0 – 5.8 show a typical outline of course distributed over the ten semesters.

Synopses of Courses

Appendix 5.1 contains details of the synopses of approved courses that are offered in a typical Bachelor of Science in Estate Management programme.

Course Evaluation

Candidates for the examinations shall satisfactorily complete the course work set in each subject in the form of term papers, continuous assessments, short quizzes or short tests which shall carry 30%-60% and the semester examinations which carries 40%-70%.

External Examiners

Degree examinations shall be externally moderated by external examiners who should be appointed yearly for the final year class.

Requirement for Award of Degree

An award of a degree is subject to a minimum total credit unit of 180, one semester practical experience, passing of all compulsory examinations and successful completion of project dissertation.

APPENDIX 6.0: COURSE DISTRIBUTION

TABLE 6.0

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ESTATE MANAGEMENT)

FIRST SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Introduction to Estate Management I		2	0	0	2
	General Mathematics I		2	1	0	3
	Architectural Graphics I		1	0	3	2
	Principles of Economics I		1	1	0	2
	Basic Elements of Planning		1	0	3	2
	Principles of Accounting I		2	1	0	3
	Nature of Environmental Sciences		1	0	3	2
	Use of English		2	0	0	2
	TOTAL		12	3	9	18

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 6.1

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ESTATE MANAGEMENT)

SECOND SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Introduction to Estate Management II		1	1	0	2
	General Mathematics II		2	1	0	3
	Principles of Land Economy		2	0	0	2
	Principles of Accounting II		1	1	0	2
	Basic Statistics		1	1	0	2
	Principles of Economics II		2	1	0	3
	Architectural Graphics II		1	0	3	2
	Use of English		2	0	0	2
	TOTAL		12	5	3	18

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 6.2

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ESTATE MANAGEMENT)

FIRST SEMESTER YEAR II

Code	Course Title	Pre-requisite	L	T	P	U
	Introduction to Valuation I		1	1	0	2
	Land Surveying I		1	0	3	2
	Principles of agric Production I		1	1	0	2
	Economics of Agriculture I		2	0	0	2
	Land Economics I		2	0	0	2
	Building, construction and Materials I		1	1	0	2
	Elements of Law of Contracts and		1	1	0	2
	Torts I		1	0	3	2
	Building Maintenances		1	1	0	2
	G.S. (Logic and Philosophy)		2	0	0	2
	TOTAL		13	5	6	20

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 6.3

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ESTATE MANAGEMENT)

SECOND SEMESTER YEAR II

Code	Course Title	Pre-requisite	L	T	P	U
	Introduction to Valuation II		1	1	0	2
	Land Surveying II		1	0	3	2
	Principles of Agric Production II			1	0	2
	Statistical Method II		1	1	0	2
	Land Economics II		2	0	0	2
	Economics of Agric II		2	0	0	2
	Building const. and Materials II		1	1	0	2
	Element of Law of Contracts and Tort II		1	1	0	2
	G.S. (Nigerian People and Culture)		2	0	0	2
	TOTAL		12	5	3	18

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 6.4

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ESTATE MANAGEMENT)

FIRST SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Principles of Valuation I		1	1	0	2
	Elements of Land Law I		1	1	0	2
	Intro. To Computer Science		1	0	4	2
	Principles of Town and Country		1	1	0	2
	Planning I		1	1	0	2
	National and Rating Taxation I		1	1	0	2
	Building Services I		1	0	3	2
	Building Maintenance II		2	0	0	2
	Environmental Education & Awareness		2	0	0	2
	Economic Theory I					
	Sub-Total		11	5	7	18
	4 Units of electives to be taken from below					4
	Total					18
	Arbitration and Awards I		1	1	0	2
	Building Economics		1	1	0	2
	Landscape Management		1	0	3	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 6.5

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ESTATE MANAGEMENT)

SECOND SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Principle of Valuation II		1	1	0	2
	Elements of Land Law II		1	1	0	2
	Computer Application		0	0	6	2
	Principles of Town and Country		1	1	0	2
	Planning II		1	1	0	2
	National and Rating Taxation II		1	1	0	2
	Building Services II		2	0	0	2
	Economic Theory II		2	0	0	2
	Entrepreneurship Studies I					
	Sub-Total		9	5	6	16
	4 Units of electives to be taken from below					4
	Total					18
	Arbitration and Awards II		1	1	0	2
	Building Economics II		1	1	0	2
	Building Maintenance I		1	0	3	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 6.6

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ESTATE MANAGEMENT)

FIRST SEMESTER YEAR IV

Code	Course Title	Pre-requisite	L	T	P	U
	Principles of Property Management		2	1	0	3
	Estate and Development Finance		2	2	0	4
	Comparative Land Policies		2	0	0	2
	Research Methodology		2	1	0	3
	Project Planning and Control		1	0	3	2
	Urban Land Economics		1	1	0	2
	Sub-Total		10	5	3	16
	4 units of Electives taken from below					4
	Grand Total					20
	Administrative Laws		1	1	0	2
	Natural Resources and Environmental		2	0	0	2
	Planning		1	1	0	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 6.7

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ESTATE MANAGEMENT)

FIRST SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Advanced Valuation I		2	1	0	3
	Land Use and Resources I		1	1	0	2
	Applied Property Management I		1	1	0	2
	Feasibility and Viability Studies I		1	1	0	2
	Project dissertation I		0	0	6	2
	Applied Town and Country I		1	1	0	2
	Geographic Information System (GIS)		1	0	3	2
	TOTAL		7	5	9	15

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 6.8

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (ESTATE MANAGEMENT)

SECOND SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Advanced Valuation II		2	1	0	3
	Land Use and Resources II		1	1	0	2
	Applied Property Management II		1	1	0	2
	Applied Town Planning II		2	0	0	2
	Feasibility and Viability Studies II		1	1	0	2
	Professional Practice		1	1	0	2
	Environmental Impact Assessment		2	0	0	2
	Project Dissertation II		0	0	12	4
	Total		10	5	12	19

Urban Land Economics

L = Lectures P = Practical
T = Tutorials U =Credit Units

APPENDIX 6.1: COURSE SYNOPSES

Introduction to Estate Management I

Introductory Management principles, Setting Objective, Planning, Co-ordinating and Control, Organization and directing Management Functions.

Introduction to Estate Management II

Functions of Estate Management. Interests in land. Motives of property ownership. Land tenure system in Nigeria. Management of private and public estate.

Mathematics I

Sequences and series: Limits continuity etc.
Calculus: Partial differentiation, total devicetive etc
Numerical Methods; Differential Equations

Mathematics II

Vector Theory: Vector and scalar field functions. Complex numbers, Linear Algebra. Basis; Rank and Nullity determinants.

Architectural Graphics I

The course deals with training of students in the basic skills of draughtsman-ship and presentation. Exercise should involve solid geometry and scale drawings.

Architectural Graphics II

Isometric and axonometric projections. Problems on simple building elements like steps, doors, etc. Construction of different scales and their uses in practice.

Principles of Accounting I

Meaning and purpose of accounting. Income statements, simple books of accounts.

Principles of Accounting II

Double entry, income and expenditure accounts. Trial balance, double entry balance sheet.

Economic Theory I

Introduction to basic concepts. Theories of consumer behaviour, production theory and supply. Functioning of market economy monopoly.

Economic Theory II

Scope of methodology of economic theory. Nature of economic systems. Micro-Economic principles issues of efficiency and equity. Organization of market structures, capital, land and labour.

Land Surveying I

Simple survey methods, types of maps produced or used in estate management, the basic instruments used, degrees of accuracy attained.

Land Surveying II

Making and plotting of surveys of buildings and building sites. The extraction of required data from published maps.

Basic Statistics

Introduction to statistics, presentation of data, bar charts, histogram, frequency distribution and curves. Averages, means, weighted means, medians, dispersion and standard deviation, statistical relationships – correlation and regression.

Introduction to Valuation I

An appreciation of economic basis of property values. The investment market, asset prices and the pattern of interest rates.
Incomes, prices, costs and their relation to value.

Introduction to Valuation II

The principal types of landed property and the interest existing therein.
Introduction to valuation methods, concept of years purchase, construction of and use of valuation tables.

Principles of Economics I

Introduction to Economics – Scope and methodology, price theory and function of market. Elasticity factors of production, marginal productivity theory.

Principles of Economics II

The cost function, firm and industry analysis, international trade theory, Introduction to resource Economics, market structure pure competition oligopoly; the Theory of distribution of wages, Rent interest profit.

Principles of Agric Production I

Principles of crop production including climatic factors and types of cropping system, land preparation, planting protection and harvesting annual crops and perennial crops.

Principles of Agric Production II

Soil profiles, soil formation and influence of parent material, relief, climate, vegetation, texture, structure, moisture relationships and soil air.

Economic of Agriculture I

Basic Economic tools and reasoning and their applicability to Agricultural problems. Structure of production units, capital and labour inputs, forms of costing and estimating term budgets scales economics.

Economic of Agriculture II

Role of theory in economic analysis
The structure of Nigeria's economy, Agriculture versus industry. Natural resources, Free enterprises; Centrally planned and mixed economic system.

Element of Law of Contract and Tort I

Principles of law of Contract and Principles of Law of Tort.

Element of Law of Contract and Tort II

Formation of contract, void and voidable, unforeseeable contracts, termination of contracts, remedies for break, Torts affecting land negligence, nuisance, trespass, liability for animals.

Statistical Method I

Nature of statistical methods
Frequency, Distribution.

Statistical Methods II

Time series Analysis
Regression analysis
Analysis of Variance
Source of Statistical Data in Nigeria.

Principles of Valuation I

Factors affecting supply and Demand for land and buildings. Principles of Investment. Stocks and shares. Interest rates and investment yields the property market methods of valuation.

Principles of Valuation II

Analysis of sales and letting of freehold and leasehold properties, use of valuation tables. Effect of income tax on sinking fund, premiums, surrender and renewals of leases.

Building Construction and Materials I

Introduction to basic building construction techniques, excavations, Foundations, Floors and walls. Bonding. Building and Construction Materials in the markets in Nigeria. Functional requirements of building fabrics.

Building Construction and Materials II

Detailing of elements of building, DPC, ground and suspended floor, load bearing walls and non-load bearing walls. Roofs and functional requirements, walls/floors (different types). Doors/windows types and functions. Manufacture, type, nature, properties defects uses, statutory controls.

Principles of Town and Country Planning I

Nature, scope and objectives of Town and Country Planning. Emergence of planning legislation and control. The urban structure. The component of urban areas, urban roads, components of residential area.

Principles of Town and Country Planning II

Study of urban structure with specific reference to residential areas and city centre. The structure of residential areas density – its determinations and control, Town Centres the structures and components, open space and leisure.

National and Rating Taxation I

Income tax nature and incident, allowances and deductions, assessment of owners and occupiers of landed property. Taxation of capital, Estate duty, capital transfer tax.

National and Rating Taxation II

Organization and administration of rating the valuation list and preparations, objections proposals and appeals assessment of properties.

Arbitration and Awards I

The nature of arbitration, its origin and application to valuation, the arbitration. Act reference to arbitration by consent.

Arbitration and Awards II

Procedure in arbitration awards, proceedings subsequent to award and the costs on award. Expert evidence and proof of evidence.

Principles of Property Management I

Management theory. Management evolution, principles of management, forecasting, planning, organization, co-ordination, control, motivation, communication.

Principles of Property Management II

Aims and policies of landed property management. The propertory unit as an area of decision. The proprietory land structure in Nigeria. The leasehold system. Estate Planning and Supervisor.

Building Services I

Introduction to Public health hygiene
Internal environment comfort standards, lighting and ventilation water services – sources hot and cold water service, reserviour and mains, treatment and filtration. Distribution of cold water, in building. Circulation in urban and rural areas. Storage of cold and hot water. Principles of sewage disposal.

Building Services II

Introduction to design consideration
Hot water production, storage and distribution planning, culinary and sanitary appliances; Fire regulations, control systems, fire alam systems and electrical services.

Elements of Land Law I

The principles of English Land Law. Historical outline of the development of freehold and leasehold estate and interests and legal and equitable estates and interest in land. Pledges and pawns mortgages and their nature.

Elements of Land Law II

The role of Land in indigenous Nigerian Society and economy. The nature of land holdings. Creation of family ownership, incidents of family ownership, customary forms of alienation. Dealings with family property. Compulsory acquisition and state grants. Registration of title of family land.

Advanced Valuation I

Advanced Valuation for compulsory purchases. Valuation of property assets of a company. The role of a value in the property market. Trends in value.

Advanced Valuation II

Appraisal of development projects. Developmental valuation. Mineral Valuations – Capital Budgeting, cash flow. Further discussions of the techniques in residential valuation. Valuation of special types of properties including petrol, filling stations, hotels, plant and machinery valuation of every leased easements.

Land Use and Resources Development I

Introduction to human settlement and land use. The evolution growth structure and pattern of human settlement. The proprietory land capital and income, obsolescence and urban renewal. The relocation problems.

Land Use and Resources Development II

Property Market and Estate investment, estate development, public control of land use, Land reform, Classification of land reform objectives and methods. National land policy.

Applied Town Planning I

Planning standards, methods of collection, organization and selection of planning data. Preparation of surveys and analysis of sources of information.

Applied Town Planning II

Surface and sub-surface conditions. Utility services, right of way, the landscape, accessibility and environmental standards, functional requirements of building environments in siting buildings. Introduction to planning law – machinery of planning control and planning application.

Applied Property Management I

Development and re-development process. Property Management in relation to social, political, economic, physical and location aspects.

Property Management process – strategy of estate owner and choice of alternatives to achieve owner' objectives. Management Techniques including P.P.Bs critical path analysis.

Applied Property Management II

Leasing agreements, rent collections, insurance maintenance and other obligations. Conservation of property.

Project identification and feasibility studies. Management of residential, commercial and industrial properties, selection of tenants, restrictive covenants, tenancy agreements and their termination or maintenance works.

Feasibility and Viability Studies I

The nature of investment projects, identification and preparation. Application of modern appraisal techniques. Discount cash-flow, internal rate of return and not present value, sensitivity analysis, cost benefit analysis.

Feasibility and Viability Studies II

Investment decision process. An examination of projects from an investment point of view-sources of information, financial plans, feasibility studies. Project supervision and management monitoring and evaluation.

Estate and Development Finance I

Meaning and purpose of accounting. Income statements and balance sheets.

Estate and Development Finance II

Analysis and interpretation of accounts. Sources of Development capital, control and management of working capital. Budgeting and financial forecasting.

Research Methodology

This course aims at giving the student an opportunity to develop his research techniques and writing skill, the course incorporates the use of elementary statistical analysis in problem solving.

Project Dissertations

At the beginning of the final year, the student will be given a project on which be will be required to prepare a project report. The project will require a student to plan and carry out an investigation on a living project under the supervision of a member of academic staff.

Land Economics I

Meaning of land, concept of rent, land as a factor of production, land market, price determination location theory.

Land Economics II

Theories of consumption, Theories of Income, employment and International Trade, Theories of interest and asset prices, nature of investment decision and appraisal.

Public Health Engineering

Meant to give students the basic elements of estate engineering with particular reference to primary infrastructure:

- Water supply system, water circulation, sources of water; rainfall runoff, collection and storage.
- Sewage disposal system, types of sewage, quantity and quality and characteristics, factors affecting sewage planning development. Types of sewage treatment plants. Septic tanks and soak away system.

Drainage system and bye-laws

Comparative Land Polices

The nature of customary tenure in the economic and social structure of selected countries in West Africa. Social and legal theories of property. Properietory land use analysis. The purpose of progress in national land reforms in selected countries. Implementation of land policies and specialized institutions of government and other bodies related thereto.

Professional Practice

The course deals with professional practice of a value and its relation to clients and other bodies.

- Rules of professional practice and code of conduct
- The Nigeria Institution of Estate Surveyors and Valuers
- The Estate Surveyors and Valuers Registration Board of Nigeria
- The roles of a valuer in the Public and Private sectors and relationship with other professional bodies
- Professional firms, groups, partnerships and their management
- Rules of Thumb in real estate practice.

2.6 BENCHMARK-STYLE MINIMUM STANDARD FOR FINE AND APPLIED ARTS DEGREE PROGRAMME.

2.6.1 Introduction

This benchmark statement is meant to allow some flexibility as desirable by each institution in the description and formulation of the nature and character of each programme in Fine and Applied Arts .
This document was derived from the existing booklet of the Minimum Academic Standard (MAS) previously approved and used by the National Universities Commission (NUC) for accreditation of programmes. Each institution is therefore required to use this benchmark statement to describe the detailed syllabus of the scope, content and sequence of its own programme based on this Benchmark Minimum Academic Standards, the attributes and capabilities, which graduates of such qualifications, should possess.

Nomenclature: Fine Arts/Applied Arts

Degree in view: Bachelor of Arts (Fine Arts)
Bachelor of Arts (Applied Arts)

2.6.2 Admission Requirement

Admission to Fine Arts Programme can be categoriesed into two:

(i) Normal Admission into 100 Level for holders of SSC or equivalent and
(ii) Special admission for holders of these qualification which will be evaluated for placement at the appropriate level.

Normal Admission

Candidates must have 5 credits passes at SSCE or equivalent in English Language and Fine Arts and any other 3 subjects

Direct Entry Admission

Holders of Ordinary National Diploma (OND) or National Certificate in Education (NCE) with credit pass may be admitted into the 200 level.

Special Admission

Holders of Higher National Diploma (HND) or its equivalent who meet the requirements for normal admission and graduated with an average of B+ or Upper Credit may be admitted to the 300 Level courses.

2.6.3 **Expected Duration**

Duration of the degree programme in Fine and Applied Arts is a minimum of ten semesters and maximum of fifteen semesters out of which at least one full semester and interviewing holiday will be devoted to industrial training (SIWES).

26.4 **The Purpose, Aims and Objectives of Minimum Academic Standards Benchmark Statements**

The purpose of the MAS benchmark statement is to assist:

The external examiners, reviewers and professional bodies in the accreditation exercise and to serve as the basis of comparing notes.

2.6.5 **Component of the Benchmark Statements**

(a) The benchmark statements are made up of four major parts as follows:

(i) The objectives and purposes of the Bachelor of Arts Fine/applied Arts degree.

(ii) The competencies, abilities and skills expected of a graduate of the programme.

(iii) Assessment procedures and criteria for evaluating the body of knowledge covered.

(iv) different levels of abilities and skills attained.

2.6.6 **Intended use of the Benchmark Statements**

The benchmark statement is to be used to acquire all relevant information about the programme in consideration of flexibility and the autonomy of individual universities.

2.6.7 **Philosophy, Aims and Objectives**

General Philosophy

a) the philosophy of academic training in Fine and applied Arts (the visual Arts) was originally conceived to enable individuals develop their artistic skill with regards to accurate expression in drawing, painting, sculpture and related fields.

b) the aim has since evolved into an enterprise for stimulating visual creativity through manipulation of firms and materials.

c) Fine Art studies should emphasise the interrelation between art (as creative expression) and cultural growth in the humanities, as well as a cultural catalyst with close relationship to Science and Technology.

d) Art should be taught not only to produce painters, sculptors potters, printmakers, illustrators, textile designers and graphic designers.

e) Art should be taught to influence developments in Architecture, Urban Planning and landscape Design, resource management and modern technology in general.

f) No art form will be valid if it does not reflect and advance the hopes and aspirations of the society of which it is a part.

g) Fine and Applied Arts Graduates are therefore, expected to depend a greater deal of their studies and experiences solving national problems of how to project Nigeria and develop it culturally and technology.

Specific Objectives of Fine and Applied Arts Programme

a) To produce artists and designers capable of understanding and solving complex problems in the field of fine and Applied Arts.

b) To train competent graduate artists with knowledgeable Fine Art processes, use of materials and skills and their techniques and technology and management.

c) To promote adequate general knowledge and specific skills and techniques to enhance the effective performance of graduates in the special areas to use materials with technological methods for the benefit of human resources and economic and social needs.

d) To interrelate with other professionals in the allied fields of literary Arts, Industrial and Engineering Design, Architecture production Industries and fully skilled with production techniques for public service and self employment entrepreneurship activities.

2.6.8 **Learning Outcomes:**

Subject Knowledge

Each Institution should concentrate on areas for which it has the required staff. Therefore, flexibility is allowed in the body of knowledge required in the programme of Fine Arts and Applied Arts.

It is important however that all programmes will emphasise that students become familiar with the following major components of Fine and Applied Arts.

a) Theoretical and Technical ability in areas of specialization and other related fields of learning.

b) Elements and principles of Art theory and practices.
c) Basic Design
d) Design method and practices
e) Drawing
f) Painting
g) Sculpture
h) Art History
i) Art Education
j) Textile Design
k) Graphic Design/Applied Arts
l) Landscape Drawing and Painting
m) Murals and wall Decoration
n) Ceramics
o) Print Making
p) Jewelry and metal works
q) Exhibition
r) Research Projects/Methods
s) Entrepreneurship training
t) Exploration of Indigenous materials
u) Computer training

2.6.9 **Competencies and skills**

Cognitive Abilities Relating to Intellectual Tasks including Problem Solving in specific Disciplines

a) Graduates of Fine and Applied Arts are expected to develop a wide range of difference abilities and skills, among which the following are essentials:
i) ability for artistic creativity in all its ramifications
ii) Theoretical knowledge of visual and cultural literacy
iii) deep knowledge of local artistic and cultural traditions.
iv) high professional skills of exploitation and use of indigenous Materials and notify and the cultivation of personal idiom of expression.
v) ability to reflect and advance the hopes and aspirations of the Society through problems solving with familiar and unfamiliar cultural phenomena.
vi) ability to resent orally and written from of literary materials, project writing and technical reports and be able to criticise a work of art as a socio-cultural material.
vii) computer Literacy
viii) entrepreneurship
ix) ability to relate to the larger community to influence the Society at large
x) skills in art criticism and art appreciation

The following major aspects of curriculum design is recommended for Fine and Applied Arts programme as categorised into four modules as follows:

Cognitive Knowledge
Area of Specialization
General Electives
General skills

Module I Cognitive Knowledge

General Drawing
Element and principles of Fine and Applied Arts
History of Art and Design
Art Education theories and practices

Module II Area of Specialization

Graphic Design (Applied)
Textile Design (Applied)
Ceramic Design (Applied)
Painting
Sculpture
Art education
Art History

Module III General Skills

Use of English Language course
Library Studies
Information Technology
Computer Literacy Courses
Industrial Training
Entrepreneurship courses
Research and Development

Module IV General Electives

Humanities
Education courses
Social Sciences
Cultural Studies

2.6.10 **Practical Skills**

Competencies
Competence in production of paintings and patraits
Competence in production of sculptures, textiles, graphics, Art Historical Writings
Competence in Art Education in extensive knowledge of teaching Artin schools
Skills of sculpturing
Skills of Landscape drawing
Skills of Quick Sketches

Skills in mural Design and wall decoration
Skills and techniques of making toys
Skills of self employment, exhibition and marketing of art works
Skills to exhibit to demonstrate entrepreneurship practice

2.6.11 **General Skills: relating to non-subject specific competencies e.g. computer literacy, numeracy Problem Solving**

Written and oral communication skills
Computer graphic skills
Computer Research Internet e-ail skills
Team work skills
Study skills
Industrial Training
Studio Management practices
Entrepreneurship learning capabilities

2.6.12 **Behavioural Attributes**

The behavioural attributes of a graduate of Fine and Applied Arts are described below:

- Should be creative and imaginative
- Should be innovative in his activities
- Should be industrious
- Should be ethical
- Should be honest
- Should be reliable
- Should be current with modern trends and techniques of production
- Modern trends and techniques of production
- Should be descent and be respectable.

2.6.13 **Resource Requirements for Teaching and Learning in the Programme**

This should be in the ratio of one academic staff to eight students where a department has up to six areas of specialization, each area should have at least two lecturers. This number may be increased where thee are post graduate programmes.

Supporting Staff

To prevent the practice of indigenous arts and crafts from becoming extinct, traditional craftsmen should be invited to the University for short periods as Artists - in - Residence. It is expected that this will enable them to transfer their skill to younger generation.

i) Technical Staff - Professional
ii) Technical Officer - Experienced
iii) Studio Assistant - 4 to assist the Senior Technical Officers.

First School Leaving Certificate is required

Artisan (Carpenter)	-	FSLC is required
Studio Models	-	2 for life drawing and painting
Administrative Staff	-	2
Clerks	-	1
Typist	-	3
Messengers	-	1

Office Space

Professor	-	24 squire metres should be provided as minimum
Senior Lecturer	-	16 squre metres
Other Lecturers	-	12 squire metres for other categories of lecturers.

Non-Academic Staff

Position of appropriate laboratory/studio and office space to perform their functions.

2.6.14 **Attainment Level**

A minimum of 15 credit load per semester is ideal to cover lecturers, tutorials, laboratory work, studio design workshop practices and Industrial Training fields is expected to acquire a minimum of 180 credit units before graduation.

2.6.15 **Maintenance of Curricula Relevance**

The success of this benchmark style Minimum Academic Standard will depend largely upon the proper monitoring and evaluation. The following groups should be involved in the constant evaluation of the benchmark style Minimum Academic Standard.

he employers, academic staff and students, external students external examination should be involved in the accreditation.

The curricula should be reviewed every five years while the accreditation should be done every three to four years.

2.6.16 **Performance Evaluation Criteria**

The general interpretation of these criteria is that all successful students who graduate at Bachelor degree's in Fine and Applied Arts will demonstrate that they have acquired knowledge, abilities and skills in their specialised areas and as indicated above.

However, there will be significant differences in their attainment. The highly rated students will demonstrate outstanding characteristics of efficiency and accuracy.

Lower grades are to reveal the observable deficiencies in the student's performances.

Therefore, any other criteria that may be used which may deviate from the existing traditional degree classifications must take cognisance of the appropriate merits, and honours associated with an attainment of Grade A (the highest) for a distinction than the Grade Level E (the lowest).

2.6.17 **Academic Physical Spaces**

Large studio spaces for each option and level

2.6.18 **Equipment**

1 Computer PC to 5 Students

Art History/Art Education

2 slide projectors
Slide sorters
Slide trays

Ceramics

5 throwing wheels 4 manual and 2 electrical

Equipment and Studio Requirement

(q)	Metal foundry	(r)	furnace
(s)	Grinding Machine	(t)	Centres

Painting

(a)	30 Painting easels	(b)	30 drawing donkeys
(c)	Grinders		

Glass Design and Technology

(a)	Glass Blower	(b)	15 Working tables and stools
(c)	Welding machine	(d)	Other essential equipment

Metal Work

(a)	Anvils	(b)	Vices
(c)	Assorted clamps	(d)	Hammers
(e)	1 Welding machine	(f)	Other essential equipment

Photography

(a)	15 Cameras	(b)	A full equipped dark room
(c)	Dryer	(d)	Hammers

Other essential equipment

Musicology

(a)	Fumigants	(b)	Fume Cupboards
(c)	6 Shelves	(d)	Glazing Equipment

2.6.19 **Physical Facilities**

5 **Office Accommodation:** will be provided for the following as per NUC guidelines:

(i)	Head of Department	(ii)	Professor/Reader
(iii)	Senior Lecturer/Lecturer	(iv)	Lecturer and Graduate Assistant
(v)	Technical Officer	(vi)	Studio Assistant
(vii)	General Office	(viii)	Store

(b) **Art History Room**

For projecting slides (capacity: 60-70 students)

(c) **Studio Space**

(i)	1 Life Drawing studio (for 30 students)	(ii)	1 Basic Design Studio (for 30 students)
(iii)	2 Sculpture studio (for 30 students)	(iv)	1 Print room (for 30 students)
(v)	2 Graphic Design studios (for 15 students)	(vi)	1 Print room (for 10 students
(vii)	1 Photography Studios	(viii)	1 Press Room (for 15 students)
(ix)	1 Dark Room for Photography	(x)	2 painting studios (for 30 students)
(xi)	2 Sculpture Studios (for 15 students)	(xii)	1 Glass Design Studio (for 15 students)
(xiii)	Metal Work Studio (for 15 students)	(xiv)	1 Musicology Studio (for 12 students)

Research Laboratories

6 Laboratories

(e) Vehicle: 1 Saloon Car 1 Heavy duty truck

APPENDIX 7.0: COURSE DISTRIBUTION

TABLE 7.0

DISTRIBUTION OF COURSE FOR YEAR I FINE ART BY WEIGHTING FOR

FIRST SEMESTER

Code	Course Title	Pre-requisite	L	T	P	U
	Basic Drawing I		0	1	3	2
	Two Dimensional Design I		0	2	4	3
	Three Dimensional Design I		0	2	4	3
	Art appreciation I		2	1	0	3
	Sociology I		2	0	0	2
	Use of English		2	0	0	2
	Nigerian People and Culture I		2	0	0	2
	TOTAL		8	6	11	17

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 7.1

DISTRIBUTION OF COURSE FOR YEAR I FINE ART BY WEIGHTING FOR

SECOND SEMESTER

Code	Course Title	Pre-requisite	L	T	P	U
	Basic Drawing II		0	1	3	2
	Two dimensional Design II		0	2	4	3
	Three dimensional Design II		0	2	4	3
	Art appreciation II		2	1	0	3
	Communication Skills		2	0	0	2
	Sociology II		2	0	0	2
	Computer Applications		2	0	0	2
	TOTAL		**8**	**6**	**11**	**17**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 7.2

DISTRIBUTION OF COURSE FOR YEAR II FINE ART BY WEIGHTING FOR

FIRST SEMESTER

Code	Course Title	Pre-requisite	L	T	P	U
	Still-life drawing		0	1	3	2
	Painting		0	2	4	3
	Sculpture		0	2	4	3
	History of Art I		2	1	0	3
	General Studies (Nigerian People and Culture) II		2	0	0	2
	Computer Graphics I		2	0	0	2
	One Foreign Language		2	0	0	2
	TOTAL		**8**	**6**	**11**	**17**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 7.3

DISTRIBUTION OF COURSE FOR YEAR II FINE ART BY WEIGHTING FOR

SECOND SEMESTER

Code	Course Title	Pre-requisite	L	T	P	U
	Figure Drawing		0	1	3	2
	Textile Design		0	2	4	3
	Pottery		0	2	4	3
	History of Art II		2	1	0	3
	History and Philosophy Arts		2	0	0	2
	Environmental Education and		2	0	0	3
	Awareness		2	0	0	2
	Philosophy and Logic					
	TOTAL		**8**	**6**	**11**	**18**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 7.4

DISTRIBUTION OF COURSE FOR YEAR III FINE ART BY WEIGHTING FOR

FIRST SEMESTER

Code	Course Title	Pre-requisite	L	T	P	U
	Draughtsman-ship I		0	1	3	2
	Area of specialization		0	0	0	8
	History of African art		1	1	0	2
	African craft Techniques		0	0	6	2
	Environmental Law		2	0	0	2
	Computer Graphics II		2	0	0	2
	Electives					
	Humanities/Social Science		1	1	0	2
	TOTAL		**6**	**3**	**9**	**20**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 7.5

DISTRIBUTION OF COURSE FOR YEAR III FINE ART BY WEIGHTING FOR

SECOND SEMESTER

Code	Course Title	Pre-requisite	L	T	P	U
	Draughtmanship II		0	1	3	2
	Area of specialization		0	4	12	8
	Art and Society in Africa		1	1	0	2
	Creative Exploration of Indigenous Form		0	1	3	2
	& Materials					2
	Entrepreneurial Studies I		2	0	0	2
	Electives					
	Humanities/Social Science		1	1	0	2
	TOTAL		**4**	**8**	**18**	**20**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 7.6

DISTRIBUTION OF COURSE0 FOR YEAR IV FINE ART BY WEIGHTING FOR

FIRST SEMESTER

Code	Course Title	Pre-requisite	L	T	P	U
	Advanced Drawing I		-	1	3	2
	Area of Specialisation		-	4	12	8
	Contemporary African Art		1	1	-	2
	Advance Exploration of Indigenous		-	1	3	2
	Art Form I		-	-	-	4
	Long essay/Project Report					
	Entrepreneurial Studies II		2	0	0	2
	TOTAL		**3**	**7**	**18**	**20**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 7.7

DISTRIBUTION OF COURSE FOR YEAR IV FINE ART BY WEIGHTING FOR

SECOND SEMESTER

Code	Course Title	Pre-requisite	L	T	P	U
	Advanced Drawing II			1	3	2
	Area of Specialisation		-	4	12	8
	African Architecture		1	1	-	2
	Advanced Exploration of Indigenous		-	1	3	2
	Art Forms II		-	-	-	4
	Long Essay/Project Report					
	TOTAL		**1**	**7**	**18**	**18**

L = Lectures P = Practical
T = Tutorials U =Credit Units

APPENDIX 7.1

SYNOPSIS OF COURSES AND AREAS OF SPECILIZATION
MODULE A: ART THEORY AND PRACTICE

(a) General/Foundation Courses

Art Appreciation

- Development of visual literacy through analysis of works of art
- Principles of art
- Form, meaning, context and significance
- Aesthetic Analysis

2. **Drawing**

- Development of drawing skills through the study of Nature, still-life and figure drawing etc.
- Perspective, Proportion and outdoor studies of figure in action. Drawing in different media
- Cultivation of advanced draghtsmanship through imaginative use of lines, mass, texture, volume, etc.

3 **Two Dimensional Design**

- Principles of sculptural form and spatial organisation
- Use of line, shape, value, form and texture for aesthetic and utilization purposes
- Introduction of mosaic and textile designs, etc..
- Introduction to lettering, poster and printmaking

4 **Three Dimensional Design**

- Principles of sculptural form and spatial organisation
- Modeling and carring
- Relief sculpture
- Mobiles
- Introduction to Pottery

Long Essay/Project Report

- An original essay or project report on the area of specialisation to be submitted for assessment during the second semester of the final year.

(b) **Areas of Specialisation**

ART EDUCATION

1) History of Art Education

- Development of Art Education in the Western Worlds, history or Art Education in Nigeria
- Current state of Art Education in Nigeria

2) **Aesthetic Education**

Aesthetic as part of general education
Aims and goals of aesthetic education
Aesthetic judgements and decisions in architecture, Science and Technology
Stages of creative growth
Stages and imagination in the creative process

3) **Art Curriculum Development Methodology**
Art curriculum in relation to cultural needs
The social functions of art
Iconic and non-iconic imaginery
Symbolic association
Art write ups for schools and colleges
Conducting art classes

4) **Philosophy of Art Education**
Philosophical principles with special reference to art
Art and the development of the personality
Sense data as determinants of reality and perception

CERAMICS

1. Materials and Methods
Types of clay
Clay Preparation
Pinch, coil, slab and thrown pottery
Traditional pottery forms
Ceramic Sculpture

2 **and Built Pottery**

Traditional Methods
Contemporary methods
Production of traditional pottery forms
Tiles, slabs, extrusions
Press and drape molding
Decorative techniques
Kiln packing for bisque firing

3. **Wheel Thrown Pottery**
Use of potter's wheel
Clay preparation
Blending of sands and grogs
Trhowing methods for various shapes
Glaze mixing and testing
Firing for bisque, glaze and stoneware in electric and fuel burning kilns
Construction of kilns, potters wheels and ceramic tools

4. **Ceramic Glazes**
   Glazing materials
   Preparation
   Application
   Firing procedure
   Glase coloring and testing
   Hot joining of coloured and colourless glasses
   Designing and building glass furnaces
   Electric, gas and oil fired furnaces
   Defects of glass manufacture

GRAPHIC DESIGN

1. **Theory of Graphics**
   Problems of communication through graphic art processes
   Visualisation
   Layout
   Constructed and scripted lettering
   Type faces

2. **Printmaking and Illustration**
   Printmaking techniques - relief, intaglio, dry point, stencil, silk screen, line cut
   Application to advertising and reproduction work in mixed media

3 **Handlettering, Typography and Layout**
   History, principles and techniques of various letters and type faces
   Type faces names and construction and meaning of term used in layouts
   Typographical calculation and setting

4 **Photography and Reprography**
   Principles, techniques and procedures
   Camera characteristics
   Picture taking and processing techniques
   Studio and outdoor photography
   Scientific Photography
   Use of photography in conjunction with posters, packaging, brochures and book jackets

5 **Advertising**
   Advertising and the artist
   Promoting consumer goods
   Bill board and poster design
   Package and trade mark design
   Product advertising

6. **Book Design and Production**
   Cover design
   Type selection and layout
   Illustration
   Production

7. **Catooning and Animation**
   Characterisation in cartooning
   Animation for the mass media

HISTORY OF ART

History of Art (from Paleolithic to Modern times
   Palaelithic in Europe
   Art in Mesopotamia and Egypt
   Art in Ancient Greece and Rome
   Early Christian and Medieval Art
   Renaissance Art in Italy and the rest of Europe
   National Schools and/Romanticism
   Impressionism and Post Impressionism
   Modern Art Movements

Art of the Near and Far East
   Art of India, China and Japan before the Monghul invasion
   Islamic art and its manifestations in Asia, Europe and Africa

History of Architecture (earliest time to the present)
   Stone Age
   Mesopotamia, Egypt, Greece and Rome
   Byzantine, Romanesque, Gothic
   Baroque and Rococco
   Industrial Revolution
   Use of iron and steel
   Steel and Concrete
   International style
   African Architecture
   Oriental Architecture

Special Topics in Art History
   Advanced Studies for Students specializing in Art History

8) **Modern Art**
   Major developments
   Influence of African Art on Modern Art
   Oceanian and Orient on Western Art

MUSEOLOGY (SOMBINED WITH ART HISTORY)

Museeography
   History, types and functions
   Administration
   Museum techniques
   Cataloguing
   Conservation and restorations
   Presentation and display
   Photography

History of Museums

Historical development of museum - ancient world
In Europe
In Africa
In Nigeria

Museum and Gallery Management

Scope of Museum and gallery work
Modern concept of museum
Management
Laws and ordinances, decrees relating to museums
And works of art

PAINTING

Figure Painting and Composition

Study of human figure in various poses, moods and actions
Indoors
Outdoors
Singly
In groups
Emphasis on anatomical structure

Still Life Studies

- Composition with man-made and natural objects to emphasize shape, structure, form, spatial orgainsation

Land/Seascape Studies

Environmental Studies to show seasons of the year land/water/cloud formation.

- Flora

Portraiture

- with emphasis on anatomical correctness
- Physical and psychological resemblance

Composition

Pictorial composition with

- figures and natural objects
- Abstraction
- Organisation of form and space
- Unity and balance

Mural Painting

History of mural decoration in various media
Formal and spatial problems
Symbolism in traditional mural decoration

9. **Scenography**
   - Problem of colour and space in theatre design, stage painting and decoration

TEXTILES

Design Theory and Techniques

- Art, science and technology in textile production
- Design and pattern terminology
- Repeating patterns for block and screen production
- Textual values, proportion, rhythm and colour in design
- Fabrics inks and dyes
- Designs and production for various types of fabrics
- Methods for creating dyed, printed and woven fabrics

Dyed Textiles

- Resist materials: wax, starch
- Dyes - indigenous, imported
- Methods - tie and dye, fold and dye, resist
- Production of fabrics

Printed Textile

- Printing methods
- Handcut stencil, block, rubber, silk screen
- Positive and negative processes
- Mixed techniques

Weaving

- Loom types, indigenous, imported
- Loom mechanism
- Classification of textile figures
- Drafting on paper for woven patterns
- Preparatory processed - winding, warping,sizing,drawing-in,
- Sleighing
- Knitting
- Felting
- Weaving
- Producing pile structure
- Hand and industrial production
- Woven garment construction and other useful production, rugs
- Blankets, etc.

Textile Organisation and Management

- Presentation of design to client
- Marketing of textile goods
- Problems of large and small scale textile
- Organisation and Industries
- Setting up and managing small textile industry

METAL WORK

- Introduction to Silver-smithing
- Applied metal Design
- Metal forming Processed
- Metal and their properties
- Casting Methods
- Product Design
- Advanced Jewellery Design
- Welding Methods

MODULE B: AFRICAN ART
HISTORY OF AFRICAN ART

- The rock art of North Africa, Ancient Sahara, Eastern and Southern Africa
- Ancient Egyptian Art
- The Ancient Arts of Africa South of the Sahara

ART AND SOCIETY IN AFRICA

- African Art and Religion
- African Art and Leadership
- Socio-Cultural Survey of the traditional Arts of various groups

FORM AND MEANING IN THE AFRICAN ART

- Iconographic study of figure, sculpture, mask, Ritual Implements, etc

TRADITIONAL AFRICAN ARCHITECTURE

- Architectural Types
- Ecology, Materials and Techniques
- Form and Function
- Spaitial Organisation and Significance

CONTEMPORARY AFRICAN ART

- Colonialism and the Emergence of new art forms
- Contemporary Art in Anglophone, Francophone and Lusophone
- Selected African Artists and their works
- Selected problems in Contemporary African Art

AFRICAN CRAFT TECHNIQUES
Introduction to indigenous Craft techniques in:

- Wood carving/stone carving
- Bronze casting
- Weaving
- Jewellery/Metal Work
- Pottery
- Leather work, bead work and Embroidery
- Calabash Carving/Decoration

2.7 Benchmark Style Minimum Academic Standard for Industrial Design Degree Programme

2.7.1 Introduction

This benchmark statements for Industrial Design programme is intended to promote some flexibility as desirable by each institution in the description of the nature and character of each programme. This document was based on the existing MAS as previously approved in the earlier document produced in 1995 and used for accreditation of the programmes in 1997.

Each institution is therefore required to use this benchmark statement to describe the scope, content and sequence of its own programme based on the minimum academic standards, the attributes and capabilities, which graduates (holders of such qualifications), should posses.

Nomenclature: **Industrial Design**

Degree in View Bachelor of Technology (Industrial Design)
Bachelor of Science (Glass Design)

Bachelor of Science (Industrial Design)

2.7.2 Admission Requirement:

Design programme can be catogrized into three (i) Normal admission, (ii) Direct Entry Admission, iii) Special Admission.

Normal Admission:

i) **B.Tech. Industrial Design**

Candidates must have 5 credits passes at SSCE or equivalent in English Language, and mathematics, and at least a pass grade in Chemistry and Physics.

ii) **B.Sc. Industrial Design**

Candidates wishing to pursue B.Sc. Degree in Industrial Design must obtain at least 5 credit at SSCE or its equivalent, 3 of the subjects must be Art, English Language and mathematics.

iii) **B.Sc Glass Technology**

Candidates majoring in Glass Design and Technology must obtain at least 5 credits at SSCE or its equivalent, of the subjects should include

English Language, Chemistry, mathematics or Physics. Credit in Art will be an advantage.

200 Level (B. Tech. Industrial Design)

Candidates seeking admission to 200 level, in addition to 1.4(i) above, must obtain advanced level A/L pass or its equivalent such as OND and ND upper credit. The course taken at this level must include Art, and Chemistry.

i. **200 Level B.Sc. Industrial Design**

For 200 level, candidate in addition to 1.4.(ii) above, must obtain advanced level (A/L) pass or its equivalent such as NCE OND, and ND etc. the courses taken at this level must include Art.

ii **200 Level B.Sc. Glass Design and Technology**

For 200 level, candidates must in addition to 1.4 (ii) above, obtain advanced level (A/L) pass or its equivalent at NCE, OND, the courses taken at this level must include chemistry, mathematics or physics.

2.7.3 **Expected Duration**

The duration of the degree programme is for a minimum of ten semesters and a maximum of fifteen semesters out of which at least one full semester and interlining holiday are devoted to industrial training (SIWES).

2.7.4 **The purpose and aims and objectives of Minimum Academic Standards (MAS) Benchmark Statements**

The purpose of the MAS benchmark statement is to assist:

The external examiners, reviewers and professional bodies in the accreditation exercises and to serve as the basis of comparing notes.

2.7.5 **Component of the benchmark Statements:**

a. The benchmark statements are made up of four major parts as follows:

b. The objectives and purposes of the bachelor of Technology degree or Bachelor of Science Industrial Design.

c. The essential courses expected to be covered in the programme leading to the award of the degree.

d. The competencies, abilities and skills expected of a graduate of the programme.

e. Assessment procedures and criteria for evaluating the body of knowledge covered and different levels of abilities and skills attained.

2.7.6 Intended Use of the Benchmark Statements

The Benchmark statement is to be used to acquire all relevant information about the programme in consideration of flexibility and the autonomy of Industrial Universities.

2.7.7 Philosophy Aims and Objectives

General Objectives

1. The philosophy of academic training in Industrial Design, based on the range of exposure and the scope of the programmes, are aimed at producing competent skilled and creative individuals capable of upholding, sustaining, and linking educational experiences to the values and needs of the Nigerian society.

   The programme is aimed at exploiting the rich cultural and traditional design and production processes in Nigeria is endowed with to enrich the contemporary National industry.

   To involve schools in the process of expositing Design and production problems of our national industries generally and attempt to find solution to the problems.

   To promote the national industry and help it to meet the fast changing needs of Nigerians.

Specific Objectives of Industrial Design

a. To produce designers capable of understanding and solving complex problems in the field of industrial design

b. The objectives of a degree programme in industrial design are to train competent graduates in Industrial Design knowledge processes skills and their techniques and technology and management

c. In addition, the programme should be able to promote adequate general knowledge and specified skills and techniques.

To enhance the effective performance of graduates designers to use technological methods, techniques skills and material involved in Industrial Design for economic and human needs.

2.7.8 **Learning Outcomes**

Regime of Subject Knowledge

While flexibility is allowed in the depth of the body of knowledge required in Industrial Design programme, it is essential that all programmes should ensure that students become familiar with the following major aspects of curriculum design recommended Industrial Design as categorized into five modules as follows:

Cognitive Knowledge

- Basic Design competencies
- Area of specialization
- General Electives
- General skills
- Cognitive knowledge
- General Drawing
- Elements and Principles of Design
- Design methods theories and synthesis
- Design theories and practices
- History of art and Design (Philosophy of Design)
- History of Technology and Industrial Design
- Art Appreciation

Module Basic Design – theories, practices

- Lettering
- Graphic Communication
- Photographic methods and Techniques
- Printing Techniques methods and principles
- Auto mobile Design

Module Areas of Specialization

- Graphic Design
- Textiles Design
- Ceramic Design
- Glass Design and Technology
- Interior Decoration and Painting
- Metal works and Jewelry
- Printing Technology

Module General Electives

- Engineering Drawing
- Chemistry 101
- Physics 101
- History of Scientific ideas
- Cultural studies

Module General Skills

- Use of English Language course
- Library studies
- Information Technology
- Computer Literacy courses
- Industrial Training
- Raw material Studies
- Entrepreneurship courses
- Research and Development

Other Courses that may be offers are as follows:

- Studio professional practices

- Environmental Design
- Murals and wall Decoration
- Print making
- Fashion Design etc.

Competencies and Skills

a. Graduates of Industrial Design are expected to develop a wide range of different abilities and skills among the following essential aspects:

b Design and production abilities and skills

c Ability to understand basic knowledge of design, concepts, principles and theories related to specializations in industrial design

d Ability to apply design knowledge and techniques for solving familiar and unfamiliar social and economic problems.

e Ability to discuss theories and criticisms of Africa History

f Ability to identify and analyze new problems and plan strategies for their solution.

g Ability to use computer for design purposes

h Ability to present orally and in written form literary materials projects writing and technical reports, and to perform editorial job in printing technology.

i Sales marketing ability

j Entrepreneurship and self reliant production management

k Ability to relate to their clients and their community through usual communication to influence the society at large.

Practical Skills

a. competence in production of Designs

b. competence in production of usable utilities, textiles; ceramics, and glass wares wall tiles, printed and dyed textitles, clothing,

Skills in print making

Skills in photography

Skills and techniques in making jewelry and metal works

Skills and techniques in murals and wall decoration

Skills and techniques interior Decoration

Skills and techniques in Drawing

Competence and skills in design and

Sewing and production of fashion dresses

Skills for self employment etc.

General Skills

a. Written and oral communication skills

b. Computer Graphics skills

Computer search internet, emails skills

Team work skills, - integrative skills

Study skills

Entrepreneurship skills

Behavioural Attributes

The behaviour attributes of a graduate of Industrial Design should demonstrate the followings:

a. should be creative and enterprising
b. should demonstrate innovative activities
c. should be enterprising
d. should be industrious
e. should be production oriented, design production and be able to carry out any project or commission given to him
f. should be ethical, honest and trustworthy and reliable in the production of goods and services.
g. should not make promises of production and services
h. should not make-promises of production and fail
i. should be hard working

j. should honour all contracts and obligations by delivery of goods and products to his clients.
k. Should be current with modern trends and techniques of production.
l. Should be descent and respectable

2.7.9 **Resource Requirement for Teaching and Learning in the Programme**

Academic Staff

This should be in the ratio of one academic staff to eight students, where a department has up to six areas of specialization each area should have at least two lecturers. This number may be increased where there are postgraduate programmes.

Supporting Staff

The prevent the practice of indigenous arts and crafts from becoming extinct, traditional craftsmen should be invited to the university for short periods as Artist-in-Residence. It is expected that his will enable them to transfer their skills to younger generation.

i) Artist-in-Residence – Professional experience

ii) Technical staff

Technical officer – 4

Studio Assistant – 4 to assist the senior technical officers

iii First school leaving certificate is required
Artisan (Carpenter) 1
Studio models – 2 for life drawing and painting

iv	Administrative Staff	-	2
	Clerks	-	1
	Typist	-	3
	Messengers	-	1

Academic Staff: This should be in the ratio of one academic staff to fifteen students.

Professors	-	24 square metres
Senior Lecturer	-	16 square metres
Other Lecturers	-	12 square metres for other categories of lecturers

Non Academic Staff

Provision of appropriate Laboratory/Studio and office space to perform their functions

2.7.10 **Attainment Level**

A minimum of 18 credit load per semester is ideal to cover lectures, tutorials laboratory work, studio design workshop practices, and industrial.

2.7.11 **Maintenance of Curriculum Relevance**

The success of this benchmark style minimum Academic Standard will depend largely upon the proper monitoring and evaluation. The following groups should be involved in the constant evaluation of the benchmark style minimum Academic Standard:

a The employers, academic staff and students external examination should be involved in the accreditation.

b The curricular should be reviewed every five years while the accreditation should be done every three to four years.

2.7.12 **Performance Evaluation**

The general interpretation of this criteria is that all successful students who graduate at Bachelor degree in Industrial Design will demonstrate that they have acquired knowledge, abilities and skills in their specialized areas as indicated above.

i. However, there will be significant differences in their attainment. highly rated students will demonstrate outstanding and accuracy.

ii. Lower grades are observable deficiencies in the students performances.

iii. Consequently any other criteria that may be used which may deviate from classifications must take cognizance of the appropriate merits and honours associated with an attainment of Grade A (the highest) fora distinction than the Grade Level E (the lowest).

2.7.13 **Equipment**

A. Ceramics

i. 6 Throwing wheels (4 manual and 2 electrical)
ii. 4 Firing Kilns (Large, Medium, Small)
iii. Fuga Mill
iv. Plunger
v. Weighing Scale
vi. 20 Modelling Stands

vii. Working Table
viii. Shelves

B **Graphic Design**

i. 30 Studio Tables and Stools
ii. Letter Press Printing Machine
iii. Etching/Lithography/Offset Press
iv. Desktop computer for graphic work
v. Enlarging Machine
vi. Box of types
vii Guillotine
viii type-setter benches
x. Silk-screen printing equipment
xi. Photocopier
xii. Reprographic equipment

C. **Fashion Design**

i. 15 Design Tables
ii. 15 Stools
iii. Sewing Machines and Accessories
iv. other essential equipments

D. **Textile Design**

i. 6 Looms and Accessories
ii. Large Printing Tables
iii. Cupboards
iv. 15 Design Tables
v. 15 Stools

E. **Glass Design and Technology**

i. Glass blower
ii. 15 Working tables and Stools
iii. Furnaces
iv. Other essentials equipment

F. **Metal Work**

i. Metal Work Table with 2 Racks
ii. Anvils
iii. Vices
iv. Assorted Clamps
v. Hammers
vi. 1 Welding Soldering and Bracing Machine
vii. Other essential equipments

G. **Photography**

i. 15 Cameras
ii. A well equipped dark room
iii. Dryer
iv. Glazing Equipment
v. Other essential equipments

7.10 PHYSICAL FACILITIES

A. **Office Accommodation**

Office accommodation will be provided for the following as per NUC guideline:

i. Head of Department
ii. Professor/Reader
iii. Senior Lecturer/Lecturer
iv. Graduate Assistant
v. Technical Officer
vi. Studio Assistants
vii. General Office
viii. Store

B. **Studio Space**

i. 1 Life Drawing Studio (for 30 students)
ii. 2 Ceramics Studios (for 30 students)
iii. 2 Fashion Design Studio (for 15 students0
iv. 2 Graphics Design Studios (for 15 students)
v. 1 Print room (for 10 students)
vi. 1 Photography Studio
vii. 1 Press room for Photography
viii. 1 Dark room for Photography
ix. 1 Glass Design Studio (for 15 students)
x. 1 Metal Work Studio (for Students)

APPENDIX 8.0: COURSE DISTRIBUTION

TABLE 8.1
SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) FIRST SEMESTER YEAR ONE

Code	Course Title	Pre-requisite	L	T	P	U
	General Drawing I		0	0	6	2
	Art Appreciation I		2	0	0	2
	Basic Design I		1	0	3	2
	Use of English I		2	0	0	2
	History of Scientific Ideas I		2	0	0	2
	General Mathematics I		1	2	0	2
	Chemistry I		1	1		2
	Theatre Workshop I		2	0	0	2
	Sub Total		9	3	9	16
	Choose 2 Units of Elective from below					2
	Grand Total		20	6	18	18
	Introduction to Architecture I		2	0	0	2
	Sociology		2	0	0	2
	Use of Library		1	0	0	1
	Principles of Economics I		2	0	0	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.2

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) SECOND SEMESTER YEAR ONE

Code	Course Title	Pre-requisite	L	T	P	U
	General Drawing II		0	0	6	2
	Art Appreciation II		2	0	0	2
	Basic Design II		1	0	6	3
	Use of English II		2	0	0	2
	General Mathematics II		2	1	0	2
	Chemistry II		1	0	0	2
	Theatre Workshop II		2	0	3	2
	Sub Total		10	1	15	15
	Choose 2 Units of Elective from Below					2
	Grand Total		20	2	24	17
	Introduction to Architecture I		2	0	0	2
	Man's Physical Environment		2	0	0	2
	Africa in World History		2	0	0	2
	Principles of Economics II		2	1	0	3

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.3

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) FIRST SEMESTER YEAR TWO

Code	Course Title	Pre-requisite	L	T	P	U
	2 – Design		1	0	8	3
	General Drawing III		0	0	6	2
	History of Design III		2	0	0	2
	Material Science III		2	0	0	2
	Computer Appreciation		1	0	3	2
	Environmental Education and Awareness		2	0	0	2
	Art and Visual Appreciation I		2	0	0	2
	Nigeria Peoples and Culture		2	0	0	2
	Sub Total		12	0	17	17
	Choose 3 Units of Electives from below		2	1	0	3
	Grand Total		24	1	17	20
	Introduction to Textile and Fashion		2	1	0	3
	Introduction to Sculpture, Lettering and Typography		2	1	0	3
	Art History		2	1	0	3

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.4

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) SECOND SEMESTER YEAR TWO

Code	Course Title	Pre-requisite	L	T	P	U
	3 – D Design		1	0	6	3
	General Drawing IV		0	0	6	2
	History of Design II		2	0	0	2
	Art and Visual Appreciation II		2	0	0	2
	Material Science II		1	0	0	2
	Logic and Philosophy		2	0	0	2
	Computer Applications to Technology Design		1	0	3	2
	Sub Total		9	0	15	15
	Choose 5 Units of Electives from below					5
	Grand Total					20
	Introduction to Ceramic and Glass Design					3
	Introduction to Metal Design					2
	Introduction to Painting					2
	Technical Drawing					2
	Photography					3
	Introduction to Graphic Design					2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.5

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) CERAMICS OPTION
FIRST SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Basic Throwing I		1	0	6	3
	Hand Building I		1	0	6	3
	Wheel Throwing I		1	0	6	3
	Theory of Ceramics Tech. I		1	0	6	3
	Contemporary Methods and Materials		2	0	0	2
	Environmental Law		2	0	0	2
	Drawing I		0	0	6	2
	Sub Total		8	0	30	18
	Choose 4 Units of Electives from below					4
	Grand Total					22
	Architectural Ceramics I	0				2
	Ceramic Sculpture I	0				2
	Texture Surface Designing	0				2
	Technical Drawing					2
	Housing and Interior Decoration	1	0	3		2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.6

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) CERAMICS OPTION SECOND SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Basic Throwing I		1	0	6	3
	Hand Building		1	0	6	3
	Theory of Ceramics Tech. I		1	0	6	3
	Drawing II		0	0	6	2
	Decorating Unfired Body		1	0	6	3
	Entrepreneurship Studies I		2	0	0	2
	Sub Total		6	0	30	16
	Choose 5 Units of Electives from below					5
	Grand Total					21
	Architectural Ceramics II		0	0	3	1
	Ceramic Sculpture II		0	0	3	1
	Sociology of Industry		2	1	0	3
	Photography		0	0	9	3
	Methods of Firing		1	1	0	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.7

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) CERAMICS OPTION
FIRST SEMESTER YEAR FOUR

Code	Course Title	Pre-requisite	L	T	P	U
	Drawing II		0	0	6	2
	Theory of Ceramics Tech. III		1	0	6	3
	Ceramics Screen Printing		1	0	3	2
	Product Design		1	1	3	3
	Kiln Design and Building		1	0	6	3
	Research Methods and Techniques		2	0	0	2
	Entrepreneurship Studies II		2	0	0	2
	Special Project I		0	0	9	3
	Sub Total		8	1	27	20
	Choose 2 Units of Electives from below					2
	Grand Total					22
	Principles and Issues of Design in W/Africa		1	1	0	2
	Drama Costume and make up Design		1	0	3	2
	Landscape Design I		1	0	3	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.8

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) CERAMICS OPTION
FIRST SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Planning of Moulds and profile Template		1	0	6	3
	Theory of Ceramics Tech. IV		1	0	6	3
	Casting Techniques II		1	0	6	3
	Kiln Design and Building II		1	0	6	3
	Special Product II		0	0	6	3
	Law of Contract I		2	0	0	2
	Sub Total		6	0	33	17
	Choose 2 Units of Electives from below					2
	Grand Total					19
	Presentation Techniques		0	0	3	1
	Mosaic and Wall Decoration		0	0	3	1
	Figure Drawing		0	0	0	1
	Glass Mosaics in Studio Glass making		1	0	0	1

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.9

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) CERAMICS OPTION SECOND SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Product Development		1	0	6	3
	Project Dissertation		0	0	9	3
	Law of Contract II		2	0	0	2
	Management, Marketing and Exhibition		3	0	0	3
	Sub Total		6	0	15	11
	Choose 7 Units of Electives from below					7
	Grand Total					18
	Cultural Anthropology		2		0	3
	Psychology		2	1	6	3
	Sociology of Development		2	1	0	2
	Economy and Society		2	0	0	2
	Clothed Figure Drawing		0	0	0	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.10

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) FASHION DESIGN OPTION FIRST SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Fashion Drawing I		0	0	6	2
	Methods and Materials I		2	1	0	3
	Introduction to Textiles		2	1	0	3
	Pattern Making		0	0	6	2
	Construction Techniques		1	0	6	3
	Fashion Design I		1	0	6	3
	History of Fashion		2	0	0	2
	Sub – Total		8	2	24	18
	Choose 1 Unit of Elective from below					
	Grand Total					
	History of African Design		1	0		
	Art Education I		1	1		
	Housing and Interior Decoration		1	0		
	Texture Surface Designing		1	0		

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.11

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) FASHION DESIGN OPTION SECOND SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Principles and Issues in Fashion Design		2	1	0	3
	Fashion Design II		1	0	6	3
	Fashion Drawing II		0	0	6	2
	Methods and Materials II		2	1	0	3
	Clothing Construction Techniques		1	0	0	3
	Entrepreneurship Studies I		2	0	6	2
	Sub Total		8	2	18	16
	Choose 4 Units of Electives from below					4
	Grand Total					20
	Sociology of Industry		2	1	0	3
	Art education II		0	0	3	1
	Mosaic and Wall Decoration		0	0	3	1
	Methods of Firing		1	1	0	2
	Rural Sociology		2	0	0	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.12

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) FASHION DESIGN OPTION FIRST SEMESTER YEAR FOUR

Code	Course Title	Pre-requisite	L	T	P	U
	Technical Drawing I		0	0	6	2
	Interior Decoration		0	0	6	2
	Fashion Design III		0	0	6	3
	Fashion Design III		1	0	6	3
	Recent Developments in Clothing and Textiles		2	0	0	2
	Research Methods and Techniques		2	1	0	3
	Entrepreneurship Studies II		2	0	0	2
	Special Project I		0	0	9	3
	Sub Total		8	1	33	20
	Choose 2 Units of Electives from below					2
	Grand Total					22
	Principles and Issues of Design in West Africa		1	1	0	2
	Landscaping Design I		1	0	3	2
	Drama Custom and Make up Design		1	0	3	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.13

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) FASHION DESIGN OPTION FIRST SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Technical Drawing II		0	0	6	2
	Fashion Design IV		1	0	6	3
	Fashion Drawing IV		0	0	6	3
	Fashion Merchandizing Organisation I		2	1	0	3
	Law of Contract I		2	0	0	2
	Special Project II		0	0	6	3
	Sub Total		5	1	24	16
	Choose 2 Units of Electives from below					2
	Grand Total					18
	Presentation Techniques		0	0	3	1
	Mosaic and Wall Decoration		0	0	3	1
	Figure Drawing		0	0	6	1
	Glass Mosaic in Studio Making		1	0	0	1

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.14

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) FASHION DESIGN OPTION SECOND SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Fashion Industry		2	1	0	3
	Fashion Merchandizing Organisation		2	1	0	3
	Law of Contract II		2	0	0	2
	Management, Marketing and Exhibition		2	1	0	3
	Project Dissertation		0	0	9	3
	Sub Total		6	3	9	14
	Choose 5 Units of Electives from below					5
	Grand Total					19
	Cultural Anthropology		2	1	0	3
	Psychology		2	1	0	3
	Sociology of Development		2	0	0	2
	Economy and Society		2	0	0	2
	Clothed Figure Drawing		6	0	6	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.15

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GRAPHIC OPTION FIRST SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Drawing I		0	0	6	2
	Illustration I		0	0	6	2
	Advertisement Design Systems and Methods I		1	0	6	3
	Photography I		1	0	6	3
	Introduction to Computer Graphics		0	0	6	2
	Methods and Materials in Graphics I		2	0	0	3
	Typography and General Printing Process		1	1	6	3
	Environmental Law		2	0	0	2
	Sub Total		7	1	36	20
	Choose 2 Units of Electives from below					2
	Grand Total					22
	History of African Design		1	0	0	1
	Arts Education I		1	1	0	2
	Housing and Interior Decoration		1	0	3	2
	Textured Surface Designing		1	0	0	1

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.16

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GRAPHIC OPTION
SECOND SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Drawing II		0	0	6	2
	Illustration II		0	0	6	2
	Advertising Design Systems and Methods II		1	0	6	3
	Methods and Materials Graphics II		2	1	0	3
	Photography II		1	1	6	3
	Technical Drawing		0	0	6	2
	Entrepreneurship Studies I		2	0	0	2
	Sub Total		6	2	30	17
	Choose 2 Units of Electives from below					2
	Grand Total					19
	Sociology of Industry		2	1	0	3
	Arts Education II		1	0	0	1
	Mosaic and Wall Decorations		0	0	3	1
	Methods of Firing		1	1	0	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.17

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GRAPHIC OPTION FIRST SEMESTER YEAR FOUR

Code	Course Title	Pre-requisite	L	T	P	U
	Drawing III		0	0	6	2
	Scenic Design, Caption and Story Board		1	0	6	3
	Editorial Graphics and Press Advert		1	0	6	3
	Outdoor Advertising Graphics		1	0	6	3
	T.V Graphics and Animation		1	0	6	3
	Reprography I		1	0	6	3
	Research Methods and Techniques		3	0	0	3
	Entrepreneurship Studies II		2	0	0	2
	Sub Total		10	0	36	22
	Choose 2 Units of Electives					2
	Grand Total					24
	Principles and Issues of Design in West Africa		1	1	2	2
	Landscaping Design I		1	0	2	2
	Drama Costume and make up Design		1	0	2	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.18

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GRAPHIC OPTION
FIRST SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Drawing IV		0	0	6	2
	Reprography II		1	0	6	3
	Experimental and Applied Photography		1	0	6	3
	Package Design and Reproduction		1	0	6	3
	Product Design I		1	0	6	3
	Law of Contract I		2	0	0	2
	Special Project I		0	0	9	3
	Sub Total		6	0	39	19
	Choose 2 Units of Electives from below					2
	Grand Total					21
	Presentation Techniques		0	0	3	1
	Mosaic and Wall Decoration		0	0	3	1
	Figure Drawing		0	0	6	2
	Glass Mosaics in Studio Glass Making		0	0	0	1

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.19

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GRAPHIC OPTION SECOND SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Product Design II		1	0	6	3
	Law of Contract II		2	0	0	2
	Special Project II		0	0	9	3
	Computer Application in Graphics		0	0	6	2
	Project Dissertation		0	0	6	2
	Management, Marketing and Exhibition		3	0	0	3
	Sub Total		6	0	30	16
	Choose 2 Units of Electives					2
	Grand Total					18
	Sociology of Development		2	0	0	2
	Economy and Society		2	0	0	2
	Clothed Figures Drawing		0	0	6	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.20

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) TEXTILE OPTION FIRST SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Textile Design I		1	0	6	3
	Dyed and Printed Textile I		1	0	6	3
	Woven and Constructed Textiles I		1	0	6	3
	Drawing I		0	0	6	2
	Methods and Materials in Textile I		2	1	0	3
	History of Fashion		2	0	0	2
	Sub Total		7	1	24	16
	Choose 2 Units of Electives from below					2
	Grand Total					18
	History of African Design		1	0	0	1
	Art Education I		1	1	0	2
	Housing and Interior Decoration		1	0	3	2
	Textured Surface Designing		1	0	0	1

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 7.20

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) TEXTILES OPTION SECOND SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Textile Design II		1	0	6	3
	Dyed and Printed Textile II		1	0	6	3
	Woven and Constructed Textiles II		1	0	6	3
	Drawing II		0	0	6	2
	Methods and Materials in Textile II		2	1	0	3
	Computer application in Textile Design		0	0	6	2
	Entrepreneurship Studies I		2	0	0	2
	Sub Total		7	1	30	18
	Choose 2 Units of Electives from below					2
	Grand Total					20
	Art Education II		1	0	0	1
	Mosaic and Wall Decoration		0	0	3	1
	Methods of Firing		2	0	0	2
	Rural Sociology					

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.21

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) TEXTILES OPTION
FIRST SEMESTER YEAR FOUR

Code	Course Title	Pre-requisite	L	T	P	U
	Textile Design III		1	0	6	3
	Dyed and Printed Textiles III		1	0	6	3
	Woven and Constructed Textile III		1	0	6	3
	Creative Textiles		1	0	6	3
	Special Project I		0	0	9	3
	Research Methods and Techniques		3	0	0	3
	Entrepreneurship Studies II		2	0	0	2
	Sub Total		9	0	27	18
	Choose 2 Units of Electives from below					2
	Grand Total					20
	Principles and Issues of Design in West Africa		1	1	0	2
	Landscape Design I		1	0	3	2
	Drama Costume and Make up Design		1	0	3	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.22

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) TEXTILES OPTION
FIRST SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Textile Design IV		1	0	6	3
	Dyed and printed Textiles IV		1	0	6	3
	Woven and Constructed Textile IV		1	0	6	3
	Law of Contract I		2	0	0	2
	Special Projects II		0	0	9	3
	Computer Application in Textile		0	0	6	2
	Sub Total		5	0	33	16
	Choose 2 Units of Electives from below					2
	Grand Total					18
	Presentation Techniques		0	0	3	1
	Mosaic and Wall Decoration		0	0	3	1
	Glass Mosaics in Studio Glass Making		1	0	0	1
	Figure Drawing		0		6	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.23

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) TEXTILES OPTION SECOND SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Law of Contract II		2	0	0	2
	Project Dissertation		0	0	9	3
	Textile Organisation and Management		0	1	3	2
	Management, Marketing and Exhibition		3	0	0	3
	Textile Industry		2	0	0	2
	Sub-Total		7	1	12	12
	Choose 6 Units of Electives from below					6
	Grand Total					18
	Cultural Anthropology		2	1	0	3
	Psychology		2	1	0	3
	Sociology of Development		2	0	0	2
	Economy and Society		2	0	0	2
	Clothed Figure Drawing		0	0	6	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.24

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GLASS DESIGN AND TECHNOLOGY OPTION FIRST SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Introduction to Properties and application of Glass		1	0	6	3
	Glass Melting Furnace		0	0	6	3
	Batch Calculation Methods					
	Techniques of Free blowing		2	0	0	2
	Principles of Glass Table Wave Designing		1	0	3	2
	History of Glass Designs		1	0	6	2
	Sub Total		5	0	21	14
	Choose 4 Units of Electives from below					4
	Grand Total					18
	History of African Design		1	0	0	1
	Art Education I		1	1	0	2
	Housing and Interior Decoration		1	0	3	2
	Textured Surface Designing		1	0	0	1
	Technology and Social Change		2	0	0	3

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.25

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GLASS DESIGN AND TECHNOLOGY OPTION SECOND SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Properties and Application of Glass		2	0	0	2
	Refectories, Fuels and Fuel Economics		3	0	0	3
	Techniques of Casting and Flame making		1	0	6	3
	Glass Preparation Process		2	0	0	2
	Glass Mosaic in Studios Glass Working		0	0	1	1
	Textured Surface Design in Glass		1	0	0	1
	Product Design		1	0	3	2
	Engineering Drawing		1	0	3	2
	Entrepreneurship studies I		2	0	0	2
	Sub Total		13	0	15	18
	Choose 3 Units of Electives from below					3
	Grand Total					1
	Sociology of Industry		2	1	0	1
	Art Education II		1	0	0	3
	Mosaic and Wall Decoration		0	0	3	2
	Photography		0	0	9	3
	Method of Firing		1	1	0	
	Probability I		3	0	0	

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.26

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GLASS DESIGN AND TECHNOLOGY OPTION FIRST SEMESTER YEAR FOUR

Code	Course Title	Pre-requisite	L	T	P	U
	Industrial Flat Glass Manufacturing Process		2	1	0	3
	Terminal Compositional and Structural Effects		2	0	0	2
	Primary Sensors for Glass Industry		2	0	0	2
	Laminated Techniques		1	0	3	2
	Advanced Technical Drawing (Glass Furnace)		1	0	3	2
	Glass Blowing, Casting and Flame Working		1	0	6	3
	Research Methods and Techniques		3	0	0	3
	Entrepreneurship Studies II		2	0	0	2
	Sub Total		14	0	6	21
	Choose 2 Units of Electives from below					
	Grand Total					
	Principles and Issues of Design in West Africa		1	1	0	2
	Landscape Design I		1	0	3	2
	Drama Costume and Make up Design		1	0	3	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.27

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GLASS DESIGN AND TECHNOLOGY OPTION FIRST SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Industrial hollow Ware and Fibre Glass		2	1	0	3
	Crystallization in glass		2	0	0	2
	Display System in Process Control		3	0	0	3
	Copperfoil and annealing Techniques		0	0	0	2
	Advanced Technical Drawing of Machine Parts and Tools		0	0	6	2
	Computer application in Glass Design		0	0	6	2
	Law of Contract I		2	0	0	2
	Sub Total		9	1	12	16
	Choose 2 Units of Electives from below					2
	Grand Total					18
	Presentation Techniques		0	0	3	1
	Mosaic and Wall Decoration		0	0	3	1
	Figure Drawing		0	0	6	2
	Glass Mosaic in Studio Glass Making		0	0	6	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.28

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) GLASS DESIGN AND TECHNOLOGY OPTION SECOND SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Product Development		1	0	6	3
	Management, Marketing and Exhibition Techniques		3	0	0	3
	Problems of Designing for Industries		2	0	3	3
	Law of Contract II		2	0	0	2
	Project Dissertation		0	0	9	3
	Sub Total		8	0	18	14
	Choose 4 Units of Electives from below					4
	Grand Total					18
	Sociology of Development		2	0	0	2
	Economy and Society		2	0	0	2
	Clothed Figure Drawing		0	0	6	2
	Rural Sociology		2	0	0	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.29

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) METAL DESIGN OPTION FIRST SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Jewellery I		1	0	6	3
	Metal Smithing I		1	0	6	3
	Theory of Metals I		3	0	0	3
	Metal Designing I		1	0	6	3
	Foundry Practice I		1	0	6	3
	Drawing I		0	0	6	2
	Sub- Total		7	0	30	17
	Choose 2 Units of Electives from below					2
	Grand Total					19
	History of African Design		1	0	0	1
	Art Education I		1	1	0	2
	Housing and Interior Decoration		1	0	3	2
	Textured Surface Designing		1	0	0	1

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.30

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) METAL DESIGN OPTION SECOND SEMESTER YEAR THREE

Code	Course Title	Pre-requisite	L	T	P	U
	Jewellery II		1	0	6	3
	Metal Smithing II		1	0	6	3
	Theory of Metals II		3	0	0	3
	Metal Designing II		1	0	6	3
	Foundry Practice II		1	0	6	3
	Drawing II		0	0	6	2
	Entrepreneurship Studies I		2	0	0	2
	Sub Total		9	0	30	19
	Choose 2 Units of Electives from below					2
	Grand Total					21
	Art Education II		1	1	0	2
	Methods of Firing		1	0	0	1
	Mosaic and Wall Decoration		0	0	3	2
	Rural Sociology		2	0	0	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.31

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) METAL DESIGN OPTION FIRST SEMESTER YEAR FOUR

Code	Course Title	Pre-requisite	L	T	P	U
	Jewellery III		1	0	6	3
	Metal Smithing III		1	0	6	3
	Theory of Metals III		1	0	6	3
	Computer Application in Metal Design		0	0	6	2
	Drawing III		0	0	6	2
	Special Project I		0	0	9	3
	Research Methods and Techniques		3	0	0	3
	Entrepreneurship Studies II		2	0	0	2
	Sub Total		8	0	39	21
	Choose 2 Units of Electives from below					2
	Grand Total					23
	Principles and Issues of Design in West Africa		1	1	0	2
	Landscape Design I		1	0	3	2
	Drama Costume and Make up		0	0	3	2

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.32

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) METAL DESIGN OPTION FIRST SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Jewellery IV		1	0	6	3
	Metal Smithing IV		1	0	6	3
	Metal Designing IV		1	0	6	3
	Theory of Metals IV		3	0	0	3
	Drawing IV		0	0	6	2
	Special Project II		0	0	9	3
	Law of Contract I		2	0	0	2
	Sub Total		5	0	39	19
	Choose 1 Unit of Elective from below					1
	Grand Total					20
	Presentation Techniques		0	0	3	1
	Mosaic and Wall Decoration		0	0	3	1
	Glass Mosaic in Studio Glass Makings		1	0	0	1

L = Lectures P = Practical
T = Tutorials U = Credit Units

TABLE 8.33

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (INDUSTRIAL DESIGN) METAL DESIGN OPTION SECOND SEMESTER YEAR FIVE

Code	Course Title	Pre-requisite	L	T	P	U
	Traditional Forging Techniques		3	0	0	3
	Metal Casting		1	0	6	2
	Law of Contract II		2	0	0	3
	Management, Marketing and Exhibition Techniques		3	0	0	3
	Project Dissertation		0	0	9	3
	Sub Total		5	0	15	14
	Choose 4 Units of Electives from below					4
	Grand Total					18
	Sociology of Development		2	0	0	2
	Economy and society		2	0	0	2
	Clothed Figure Drawing		0	0	3	1

L = Lectures P = Practical
T = Tutorials U = Credit Units

APPEDIX 8.1

SYNOPSES OF COURSES

FIRST AND SECOND YEAR INDUSTRIAL DESIGN

General Drawing I

Introduction to basic problems in the observation and interpretation of forms with concern for space, time, shapes, form and composition.

General Drawing II

Studies in the basic problems in the observation and interpretation of form using variety of media and subject matter.

Art Appreciation I and II

Development of visual literacy through analysis of works of art; Principles of art; forms; meaning; context and significance; Aesthetic analysis.

Basic Design I and II

General introduction to basic tools, materials and techniques used in ceramics, fashion design, graphics, textiles, glass design and technology and metal design. It serves as a foundation course that involves the practical exploration of the language and grammar of design at both two and three dimensional level.

History of Design I and II

Pre – historic design in Africa (North, West, East and South Africa). Concept of design in Africa discussed, 16^{th} – 19^{th} centuries History of Art and Design in Africa, Europe and America; schools of thought on Design; lectures, tutorials and library investigations. Surface and structured decoration in Nigeria design with references to ceramics, textiles, graphics, fashion design, glass, metal work, Jewellery and twill weave sampler.

Material Science I

Focus on conventional materials for ceramics, graphics, textiles, fashion design, glass and metal design; studio equipment, techniques and analytical survey of materials e.g. Composition strength and types of uses.

Materials Science II

New materials for ceramics, textiles, graphics, fashion design, glass and metal design polyester and fibre glass, P.V>C (vine mold) and other thermoplastic materials; equipment and machines, chemicals, release and parting agents, finishing pastes and polishes.

2.-Dimensional Design

Treatment and use of various surface for design purposes; Presentation of surface decoration; Balance compositional balance; pictorial unity, and harmonies of contrasts. Introduction to nature of colours; Exercises from still-life and simple objects and original imaginative composition. Uses and care of materials.

3-Dimensional Design

Elements and principles of 3 dimensional concepts of Arts and design; Individual skills development; creative problem solving projects in 3 dimensional concepts; Introduction to studio areas; use of space in 3 dimensional forms; special projects for individual needs obtaining and using materials from local sources.

Introduction to Textiles and Fashion design

Introduction to the tools and materials of textile manufacture and textile design; Equipment of textile manufacture; textile designs, repeating and non-repeating designs colour; line theory, form plane, etc. History, development and marketing of textiles, use of textiles; Relationship between textiles and fashions; fashion vocabulary (style, mode, vogue, culture, fad, etc); A look at careers and opportunities in the fields.

Introduction to Ceramic and Glass Design

Exploration of basic construction techniques, (priching, coiling, stabbing etc) Introduction to ceramic raw materials; Basic Glass and Techniques. Brick construction-mould making and specifications; introduction to basic kiln construction-covering principles; Introduction to industrial techniques.

Introduction to Graphic Design

Practical exploration of language and grammar of design at both two and three dimensional levels; Basic topography, layout rendering, the organization of verbal and non-verbal elements of design, theoretical design principle.

Introduction to Metal Design

Practical exploration of language and grammar of design at both two and three dimensional levels; basic topography, layout rendering, the organization of verbal and non-verbal elements of design; Theoretical design principle.

Introduction to Metal Design

General introduction to metals and the technology of fine metal works.

CERAMIC OPTION

Hand Building I

Clay work and slab construction of geometric and other forms. Coil building on wheeler; exploring pinched methods and globular shapes. Different aspects of decorations; embossing dyes and rollers.

Hand Building II

Further coil and slab building; combining various forms for utility and aesthetic considerations; Modeling planters and use of various decorative techniques; Maudling over forms of natural objects.

Wheel Throwing

Introduction to the various types of wheels (kick, electronic, cone and belt driven and hand turning wheels), Clay preparation for throwing starting with cylinders as simple open bowls. Concepts of designing in pottery and ceramics.

Basic Throwing I & II

This course provides students with experience on potters' wheel to work towards production. It further provides ability in the improvisation of and use of common tools and materials which would be of service in a pottery studio e.g. wood rib, rigid and flexible (inside and outside) tool, modeling tools, rouletten, etc.

Wheel Throwing II

Creating thrown forms from sketches; the use of granular materials in throwing clay; Techniques of functional design decoration created from tool marks and natural objects; slip and enrobe decorations on tableware (casseroles to wine beakers); Techniques of making handles.

Theory of Ceramic Technology I

Kinds of clays and their characteristics with regards to chemical composition and physical properties; Non-plastic ceramic materials; Quartz inversion and thermal expansion; Tri-axial blending in body composition; Glaze composition with silica as the basis of glass and the glass distinction.

Theory of Ceramic Technology II

Early types of glaze; Egyptian glazes and the early lead glazes Egyptian paste; Ash, slip, Feldspar and salt glazes. The oxides and their functions in glazes; Other raw materials from antimony oxide to zircomnium oxide in glaze development.

Ceramic Sculpture I

Introduction to ceramics sculpture; the techniques of clay modeling; Clay preparation and introduction to the various tools; the creation of clay works (terracotta) based on human and animal forms.

Ceramic Sculpture II

Work involving the use of life models; Techniques of portraiture, male or female; Plaster preparation; types of moulds; out door ceramic sculpture.

Architectural Ceramic I

Art works incorporating the techniques of ceramic sculpture and architecture; Decorative techniques involving bricks and tiles (sanitary ware, lamp bases and shades).

Architectural Ceramic II

Designing outdoor ceramic stools and indoor sanitary ware; Fountains with ceramic mural decoration.

Contemporary Methods and Materials in Ceramics

The achievement to Nigerian cultural needs in ceramics, a critical approach to produce sculptural ceramics to highlight this aspect in practical terms, e.g. costumes, head gear, traditional stools, roval staffs, etc.

Decorating Unfired Body

Methods of decorating green waves produced by them during their throwing exercise and sculptural works. For example, incise and spring-on moist clay, dry carve slip painting with the use of brush and tracing. The use of engobe agraffite decoration, etc.

Casting Techniques

This is strictly designed for students with knowledge in industrial slip casting techniques. Preparation of two-piece or multiple moulds. Defloculation and flocculation of clay. Students will be encouraged to initiate projects, which center on one area of slip casting towards mass production.

Planning the Mould and Profile Template for Jiggering

Detailed plan of mould and template from frawing, preparation of finished state to meet industrial needs.

Management, Marketing and Exhibition

Organisation and Management of studio pottery; use of equipment and how to manage and repair them. Highlight of the role of the designer in the development of Educational and trade shows exhibition. Marketing strategy in the design of effective 3-D environments. Space planning, lighting audiovisual presentations, and materials are explored.

Theory of Ceramic Technology III

Concepts and principles involving simple glaze calculations. The study of raw materials table, their molecular and atomic weights and various feldspar formulae.

Theory of Ceramic Technology IV

Concepts and principles involving complex glaze calculations (from batches or recipes, to formulae). Calculation of the batch from the formula. Practical problems in glazes. The composition of glazes experimenting with local materials. Sources of colours in flows and their remedies.

Kiln Design and Building I

The development of early kilns. Principles of kiln design. Refractory materials and their usage. Practical aspects of kiln construction.

Kiln Design and Building II

The various types of kiln including wood-fired kiln. Factors affecting the usage and construction of kilns. The techniques of packing and firing. Individual or group assignment involving kiln building and designing.

Special Project I

A practical project based on the student's cumulative experiences in ceramic art. Work could be based on any aspect of ceramic art, namely, ceramic sculpture, murals etc. and attempts in the construction of simple ceramic equipment.

Special Project II

Continuation of project I. The final product is to be made on a large scale supported by a long essay on the day to day experiences and problems arising during the execution of the project and the solutions found.

FASHION DESIGN OPTION

Fashion Design I

Style development, garment design and presentation. Croquis.

History of Fashion

History of costume from primitive to modern Evaluation of styles. Roles of designers. Sociological and psychological aspects of clothing. West Africa Fashions.

The Fashion Industry

Study of designers, manufacturers, retailers, buying officers, traders, shops, boutiques, etc. National and International advertising media.

Introduction to Textiles

Introduction to the various aspects in designing for textiles. Application of specific reproduction techniques in textiles.

Methods and Materials I and II

A study of the theoretical aspects of the sewing machine and its practical use. The course will cover the study of machine parts and their individual functions. It is aimed at helping students in using the major equipment accurately.

Interior Decoration

Advanced furnishing will entail a consideration of interior design with a focus on construction, space, form and arrangement of furniture and other furnishing accessories. Aesthetic, economic, social consideration in interior designs.

Recent Development in Clothing and Textiles

To acquaint students with current trends in the field of fashion equipment, fabrics, garment styles and accessories, to adapt existing idea to new trends.

Fashion Drawing I

Drawing the figure and apparel.

Fashion Drawing II

Advanceed fashion drawing with emphasis on action such as walking, running, reclining, kneeling, bending etc. Drawing from photos and altering them in stylized way, e.g. getting more swing, more style and different postures. Drawing from models and stylizing the drawing with clothes.

Management, Marketing and Exhibition

The course will teach student how to conduct a small business like controlling, organizing and directing a personal business, employee and employers relationship will be taken into consideration. A survey of fashion market prices and a comprehensive analysis of cause of the rising cost of grants. Exhibition techniques and exhibition of fashion products.

Construction Techniques

Process, methods and materials of clothing construction.

Pattern Making

Fundamental principles of pattern making.

Fashion Design II

Designing, executing original pattern. Emphasis on innovation in African fashion.

Fashion Design III

Design and production of a variety of garments from original sketches.

Fashion Merchandising I

The clothes buyer. Purchasing and marketing of clothes. Style evaluation. Emphasis on West Africa.

Fashion Merchandising II

Showing the line. Decisions on seasonal styles, advertising, style evaluation, and marketing.

Special Project I

Independent study in fashion. Work guided by lecturer.

Special Project II

Independent study in fashion design. Work guided by lecturer.

Fashion Drawing III

Illustration: figure and apparel.

Fashion Drawing IV

Illustrating; Developing a portfolio of original sketches.

GRAPHIC DESIGN OPTION

Illustration I

Historical survey of prints making convering relief, serigraphy and lithography. Relief printing (letterpress): equipment, printing process of linoleum, woodcut by eliminating and separation methods. Black and white multi-coloured printing.

Illustration II

Continuation of illustration I with emphasis on silkscreen and photoscreen printing. Various techniques of printing to be examined. Students will be required to learn the construction of basic equipment. Multi-cololur printing and registration methods will be explored.

Advertising Design System and Methods I

This course has three interrelated aims, the understanding design systems, the component and interaction between targeted system structures (audience) and synthesis for design implementation and strategy.

Advertising Design System and Methods II

Students are given wider scope in the design of poster, book, jacket, logo, and letter headings, Lettering and typographical composition. Discussions, field trips of printing houses and advertising studios. Projects to realize design implementation.

Photography I

Historical development of photography. Photography as science and Art. The camera and its components. Introduction to basic working knowledge of the photographic process; materials, equipment and chemicals, darkroom practices. Development in the printing of firms.

Photography II

Continuation of photography I with emphasis on the ability to use the camera creatively. Exploration of photography as an image-making process with more emphasis on darkroom techniques.

TEXTILES OPTION

Textile Design I

The role of the textile designer. Pattern building. Designing for reproduction. Identification of textile fibres. Chemical construction of fibres and fabrics. Methods and techniques of colour application. Textile paints and pigment.

Textile Design II

Focus on textile design development. Designing for furnishing and dress fabrics. Concentration on international textile markets an consumer demands. Industrial dyeing methods. Chemical construction of dyes pigments and paints. Textile finishes. Textile performance. Generic and trade names of textiles.

Printed and Dyed Textile

Introduction to modern industrial methods, roller direct pigment and merchandized printing, etc. History of the printing fabric. History of resist dyeing, studio work involving and dye, plangi, tritik and batik.

Printed and Dyed Textile II

Adaptation of designs for printing and dyed fabrics. Mark survey of printed and dyed textiles. Studio experiment with waz, lafum, indigo, and other local and industrial materials.

Woven and Constructed Textiles I

History of the woven cloth. Basic techniques to understand fabric structure. Exploration of traditional weaving methods and techniques of African woven textiles. Weaving on table looms, (frame and inkle looms).

The Textile Industry

Introduction to the textile industry, study of the industry and its process and products with regards to printing, weaving, resist and dyeing. Industrial directory, setting and managing small scale textile industry.

Textile Design and Technology III

Designing for the industry. Constumerism. Comprehensive study of design priorities for West Africa. Fabric decoration, application of surface designs, fabric aesthetics. Manufacturing companies and their trade marks.

Textile Design and Technology IV

Individual project development. Portfolio, presentation and promotion of designs. Advanced industrial problems. Limitations of technology on designs. A look at West Africa textile industries.

Printed and Dyed Textiles III

Effects and faults of modern printed textiles. Colour fastness. Comprehensive study of imported and domestic textiles. Studio work using various pigments and methods, block printing, screen printing.

Printed and Dyed Textiles IV

General survey of printed and dyed textiles. Design and production of several lengths of fabric using various media.

Woven and Constructed Textile III

General survey woven constructed textiles. Weaving on horizontal looms and vertical looms.

Woven and Constructed Textile IV

Weaving design workshop.

Creative Textiles

Practical Work on some more specialized areas to show that students can independently create ideas with textile goods. Some of these ideas may be for furnishing or dress. They can be done son as to include other related accessories.

Computer application in Textile Design

Use of computer as a design tool is presented. Lectures, demonstrations, and assignments emphasize the application of computer in textile design.

Textile Organisation and Management

The course focuses on the processes of establishing a textile mill organization and management.

Special Project I and II

Directed research into a problem mutually defined by student and lecturer. Indepth study of techniques, processes of traditional aspects of textiles.

GLASS DESIGN AND TECHNOLOGY

Introduction to Properties and Application of Glass

Physical properties of glass. Mechanical properties; strength, elasticity hardness, density and specific gravity. Thermal properties; thermal endurance, thermal conductivity, heat capacity and specific heat capacity.

Glass Melting Furnaces

General description of glass melting furnaces. Periodic tank furnace, day tank and pot furnace. Electric melting consideration in furnace design construction.

Batch Calculation Method

Batch calculation methods; arithmetical approximation, method of simultaneous equation, computerized batch calculation, supplementary information relating to glass composition and batch calculations. Provision of basis for evaluation of raw material; introducing raw or modified batches into the operation; taking samples for control analysis. Batch handling and preparation method.

History of Glass

The Western European revival glass; manufacture in France, Spain, Netherlands, Scandinavia and Russia. German glass houses.

The techniques of Free Blowing

Techniques for the individual; warming outing cane and slabs, clearing pre-heating, positioning rods and accessory tool handling. The free-blowing team "shop" stem preparation for goblet production.

Principles of Glass Ware Designing

Glass designing for tableware. Working from drawings making of glasses using calipers and songs. Designing in clear crystal with internal air lecoration.

Glass Raw Material Analysis

Preparation of reagents and standard solutions for glass raw material analysis. Introduction to instrumental method. Physical and chemical methods in analyzing glass making raw materials.

Properties and Application of Glass

Optional properties; detractive and absorptive properties. Electrical properties, electrical conductivity of glass, dielectric properties, viscosity, surface tension. Chemical properties; the chemical durability of glass diversification.

Refractors, Fuel Economics

Refractors, properties and testing. Classification of refractors principles of refractory manufacture, slip laws and concepts. Theory governing combustion calculations. Coal carbonization, coke. Solid and liquid fuel combustion. Injectors and electric heating.

Glass Preparation Process

Resection occurring during glass preparation, melting phase, firing phase, Homogenizing phase, head conditioning phase, defects in glass, phase, phase equilibrium, identification and interpretation of stone and cords in glass.

Glass Mosaic in Studio Glassmaking

Using of gliry-hole, construction of abstract plants, creatures and easer, shorr bird etc. Principal functions of gaffer. Use of millifical in the production of glass ornaments. Production of winged goblets, glass, the technique of line engraving and polishing of fire or pumic.

Textured Surface Designing of Glass

Design vases with textured surfaces, application of dietreta decoration with emphasis on opaque coloured glasses.

Industrial Flat Glass Manufacturing Processes

Flat glass manufacturing process; sheet glass fourcault method, Pittsburgh processes, lof-colbum method. Plate glass. Bichereux semi-continuous casting, PPG ring roll Process continuous horizontal rolling and polishing operations. Patterned glass manufacturing processes. Float glass. Hand production processes where applicable.

Thermal, Compositional and Structural Effect

Relationship of properties to thermal history, composition and structure of glass such as viscosity, surface tension, density and specific gravity chemical durability, electrical properties, optical properties, mechanical properties and their relationship to glass structure.

Primary Sensors for Glass Industry

Temperature measuring devices; thermocouple, recitation phyrometers, total radiation, spectrally selective optical and two colour pyrometers. Thermometers; gas liquid and resistance thermometers. Thermomistors pyrometric cones. Flow measurements; orifice plate, flow nozzle, venture tube, laminar flow element, pilot tube. Variable area, Turbino and magnetic flow meters pressure transmitters and strain gauges.

Principles of Overlay

Introduction to drawn shank and stuck shank. Blowing and spinning to produce flat disos, use of tongs, shears, and calipers for measuring. Overlay glass, cameo cutting and intaglio, facet cutting, cristallo faceted pendant drops.

Laminated Glass Techniques

Working with laminated glass covered with scales, custom made chandeliers, slumping coloured glasses for production of hanging lamp.

Glass Blowing Casting and Flame Working

General laboratory flame working practice. Safety precautions fabrication of laboratory glasswork e.g. Funnels, test tubes, pipettes etc. Casting glass forms.

History of European and America Design

Modern glass design and major influences of the 20^{th} century. Traditional Nigerian glass development of the modern Nigerian glass industry, its location, management, products and objectives.

Advanced Technical Drawing and Fibric Glass

Set projects on industrial glass furnaces in Nigeria furnances for container glass, both regenerative and recuperative. Day tank furnaces. Forming machines and moulds.

Industrial Hollow Ware and Fibric Glass

Container glass manufacturing process; bottles and other hollow ware glass articles, fore-heath and job feeder, lynch blow – and – blow machine. Press mould and metals in forming, past moulds. Corning bulb machine (ribbon machine). Tolerances in bottle manufacturing. Production of glass rubbing and rods; Dinner, vello, and schuller processes. Glass fibre, textile fibre, insulating glass fibre wools.

Crystallisation in Glass

Crystallisation in glass nucleation and crystal growth, Homogenous and heterogeneous nucleation glass ceramics.

Display System in Process Central

Blowing functional vessels, decanters and stoppers to match. Muster stoppers, friggers, hoops of trailed glass, fasters patterns, principles of annealing, temperature time circles and a second look at annealed glass. Cracking off and copper foil joining techniques.

Problems of Designing for Industry

Designing for industry, the designer client relationship. Production of finished presentation drawings for bowls, decanters, jugs and evers, saltcellars, hanging rases, and arebitretual applications of glass.

Product Development

Batch calculation and test melting based on individually tested samples. Analysis and testing of melted glass to determine the suitability for glass making. Development and fabrication of glass house tools; submission of written project report.

Advance Technical Drawing of Machine Parts and Tools

Continuation of set projects; sheet glass furnaces; Auxilliery furnaces burners machine parts and tools.

Management, Marketing and Exhibition

Organisation and management of glass product, use of equipment and how to manage and repair them; marketing strategies of finished products. Acquainting of students with the various methods and appropriate ways of conducting business with glass products and glass goods generally e.g Mounting, laminating, exhibition of glass products.

Computer Application in Glass Design

Use of the computer as a design tool is presented. Lectures, demonstrations, and assignments to emphasize the application of computer in glass Design.

Special project I

A practical project based on the students' cumulative experiences in glass design. Work could be base on any aspect of glass design and attempts in the construction of simple glass equipment.

Special Project II

Continuation of project I. The final product is to be made on a large scale supported by a long essay on the day to day experiences and problems arising during the execution of the projects and the solution found.

METAL DESIGN OPTION

Jewellery I

Workshop function. Use of tools. Basic forming techniques. Handling of precious metals. Introduction to jewellery processes, sawing, filling and sanding, etching, polishing, engraving, etc. chains, tubing and hinges, Metal inlay.

Jewellery II

Enamelling. Filigree. Production of cast Jewellery. Construction and assembly of sets of Jewellery. Processes; chasing and repousse. Applique

Metal Smithing I

Construction, fabrication and finishing of steel, aluminum copper and its alloys. Planishing, raising, hollowing and general beaten metal work.

Metal Smithing II

Forgework. Tool-making. Drawing down. Metal construction and assembly scroll work.

Theory of Metals I

History of metals. Basic metallurgy of noble metals, iron, aluminum, copper and its alloys. Workshop methods, Processes; etching, lacquering, embossing, etc chemical and mechanical treatment of metals.

Theory of Metals II

Alloy calculation. Identification of metals. Assaying. Processes; hardening, tempering, normalizing, etc. enamel. Colouring of metals.

Metal Designing I

Working drawings for studio projects; scaled drawing and design for sets of products.

Foundry Practice I

Principles of design for cast products. Introduction to foundry practice. Equipment and tools for ferrous and non-ferrous metal founding. Pattern making; single and split patterns. Introduction to various industrial metal casting processing; emphasis on shell mould and investment mould casting.

Foundry Practice II

Sand casting. Cores, core prints and core boxes. Sand moulding; green/damp sand moulds and skin dry mould. The furnace and melting techniques.

Jewellery III

Complex compositions and advanced techniques in Jewellery. Workshop refining of precious metals. Colouring of jewellery. Finishing of Jewellery.

Jewellery IV

Gem setting; mountings and findings. Combination of processes for complex works in Jewellery. Hallmarking. Granulation.

Computer Application in Metal Design

Use of a computer as a design tool is presented. Lectures, demonstrations, and assignments to emphasize the application of computer in metal design.

Management, marketing and Exhibition

Organisation and management of metal product. Use of equipment and how to manage and repair them; marketing strategies of finished products. Acquainting students with the various methods and ways of conducting business with metal product and goods generally and techniques of presentation of metal products e.g. mounting, lamination. Exhibition of metal products.

Metal Smitting III

Advanced work in ferrous and non-ferrous metals. Heat treatment of metals; hardening, tempering, normalizing, etc. Practical demonstration in areas covered under. Theory of Metals III Forging.

Metal Smithing IV

Practical demonstration of Theory of Metal IV. Completion of assignment involving advanced work. Metal spinning.

Theory of Metal III

Decorative techniques, Gem setting. Tool making. Aluminum fabrication and finishing. Electroplating, refining of precious metals.

Theory of Metals IV

Cremology; stones, synthetic and imitation. Calculation of alloys of nobe; Metals; calculation for gold colours, raising and lowering of determined weights. Calculation of solder alloys. Calculation of steel alloys.

Metal Designing III

Applied industrial metal design; themes ranging from single industrially produced objects made of metals such as stainless steel, aluminium, iron, brass, etc. To complete sets of appliances for homes, schools, hospitals, etc. Items include ovens, fridges, etc.

Metal Designing IV

Applied agricultural tools design; appropriate hand tools for indigenous farming; hoes, cutlasses, lploughs etc. Metal interior design; metal furniture and decorationl, door handles, lamps, composition for assembly halls churches, etc.

Special Project I and II

A major project work in metal. An attempt to improve existing techniques and designs. The student is allowed to select topics which shall be approved and carried out under supervision of a lecturer.

GENERAL COURSES

History of African Design

Pre-historic design in Africa (North, West, East and South Africa). Concepts of design will be discussed, 16^{th} – 19^{th} centuries History of Art and Design in Africa. Various design schools of thought in Africa will be treated through lectures, tutorials and library investigations. Reference to Textiles, Graphics, Ceramics, Glass, Metal Work, Jewellery, leather and other crafts.

Technical Drawing

Introduction to drawing tools and equipment. The use of lines and angles, circumscribing circles, construction of polyzins and eclipses. Principle of tangency. Orthographic lectures, Isometric and oblique projections. Sections views, developments and the application of Technical Drawing to design problems.

Principles and Issues of Design in West Africa

Structures of small and large scale local Industries in Nigeria. Discussions on design and production in Nigeria. Sources and processing of raw materials, procurement of tools and equipment. Apprenticeship, professional associations. Issues of copyright laws.

Product Design

Improvement to an existing product design, or designing of an original prototype or model of an industrial or domestic product which has aesthetic and/or practical value.

Methods of Firing

Expose the students to kilns, bonfire and other intermittent kilns, their firing system, fuels, possibilities and limitations. Experimentation with raku firing

Photography

Principles of photography including film exposure, darkroom procedures for printing and processing as well as evaluating negatives and prints. Depth of field action photograph, composition and nature photography.

Research Methods and Technology

This course aims at giving the student an opportunity to develop his research techniques and writing skills, the course incorporates the use of elementary statistical analysis in problem solving.

Project Dissertation

At the beginning of the final year, the student will be given a project on which he will be required to prepare a project report. The project will require a student to plan and carry out an investigation on a living project under the supervision of a member of academic staff.

2.8 Benchmark-Style Minimum Academic Standard for Surveying and Geoinformatics Degree Programme

2.8.1 Introduction

Surveying is the science that provides the spatial location of the earth's features and other environmental information, necessary for map production, designing engineering works, planning, location and exploitation of natural resources, as well as land administration. It is a multi-disciplinary subject which serves as foundation discipline in engineering (particularly civil engineering), environmental studies, analysis and planning. Geoinformatics is an integrated process for map and geoinformation production through the supporting technologies of photogrammetry, remote sensing, cartography and computer science.

2.8.2 Nomenclature of the Degree Programme and the Degree in View

Nomenclature For The Degree Programme

The last decade has witnessed dramatic changes in the field of surveying. Recent advances in computer and space technologies have revolutionised the methods of collection and dissemination of geodata and geoinformation products. As a result, the classical analogies method is giving way to the more modern digital methods in both data acquisition, processing and presentation. These changes have propelled surveyors to change their way of doing things and to expand their scope of activities. Consequently, the term SURVEYING no longer, adequately describes all their activities and products. The nomenclature adopted by some Surveying Departments and organizations (in Europe and some Commonwealth countries) are GEOINFORMATICS or GEOMATICS. In pursuance of this, the Surveyors Council of Nigeria (SURCON) recommended that Nigerian Institutions/Departments offering "Surveying" as a programme should change their nomenclature, hence the change to Surveying and Geoinformatics. Most institutions have changed while others are yet to conform.

Degree In View

The nomenclature of the degree that will be awarded is (B.Sc.) or (B. Tech.) Surveying and Geoinformatics.

2.8.3 Basic Admission Requirements and Duration of Programme

Admission Requirements

There are two modes of admission as shown below:

(a) **UME Admission (Normal Admission)**
Holders of Senior Secondary School Certificate (SSSC) or its equivalent with credit in at least five subjects, in not more than two

sittings including Mathematics, Physics and English Language may gain entry into the programme.

(b) **Direct Entry Admission**
Candidates who satisfy the requirement specified below may be admitted into a four-year programme in which case they start from the second year of the five-year standard programme.

i) Candidates who have passes in Mathematics and Physics at the G.C.E. (A/Level) or its equivalent, and have in addition, three other credit level passes in SSSC or GCE (O/Level) or its equivalent.

ii) Holders of the Ordinary National Diploma (OND) in Surveying and related fields from an NBTE accredited institution.

Duration of Course

The duration of the course is a minimum of 10 semesters for UME candidates.

2.8.4 **Purpose Aims And Objectives Of The Minimum Academic Standards Benchmark Statements**

The purpose of the Minimum Academic Standards benchmark information is to articulate the abilities and skills expected of Bachelor;s graduates in Surveying and Geoinformatics. Such information should assist:

- Departments offering Surveying and Geoinformatics in designing their programmes of study.

- External Examiners and academic reviewers in verifying and comparing standards.

- Professional bodies in their accreditation and review of programmes relating to professional competence.

- Students and employers when seeking information about

- Surveying and Geoinformation education in Nigeria.

2.8.5 **Statement on Components of the Benchmark**

Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of programmes in a specific subject. They also represent general expectations about the standards for the award of qualifications at a given level and articulate the attributes and capabilities that those possessing such qualifications should be able to demonstrate.

2.8.6 **Statement on Benchmark in Respect of Flexibility and Autonomy of Individual Universities**

For each University to use the benchmark statement as a minimum academic standard for studies but particularizing on the solution to the problems of their immediate environment.

2.8.7 **The Philosophy of the Programme**

The philosophy of the programme is to expose students to the essential academic and practical training needed to make him grow into full and well-qualified professional who is abreast with technological advancements in the field of Surveying and Mapping and to inculcate in the student Entrepreneurial skills geared towards self employment.

The Courses are Designed:

* To produce Surveyors or Geoinformation experts with sound knowledge in the theory and practice of the key areas of the discipline including land surveying, hydrography, surveying, geodesy, photogrammetry and remote sensing, cartography and geospatial information management.
* To ensure adequate knowledge of mathematics, physics, computer science, environmental management and protection, law, finance and management studies need by surveyors.
* To provide students with a broad and balanced foundation in theoretical and practical skills.
* To develop in students the ability to apply of theoretical and practical problems in surveying and geoinformatics.
* To provide students with knowledge and skills base from which they can proceed to further studies in the specialized areas enumerated above.

2.8.8 **Learning Outcomes-Regime of Subject Knowledge**

Key Areas

It is expected that all programmes will ensure that students become conversant with the main aspects or key areas in Surveying and Geoinformatics. The key areas (which form the body of knowledge to be acquired by the undergraduate) are as follows:

(i) **Foundation And Support Courses**

These should include, General Studies (English Language, Social Sciences and Humanities), General and Advanced Mathematics, General and Advanced Physics, Computer Science (Basic Computer Programming), Statistics, Adjustment Computations, Geology and Geophysics, Economics, Accounting and Management, Urban and

Regional Planning, Environmental Management and Protection, Entrepreneurship, Health and physical Education (swimming).

(ii) Land Surveying
(iii) Hydrographic Surveying
(iv) Geodesy
(v) Photogrammetry And Remote Sensing
(vi) Cartography
vii) Survey Laws, Regulations and Professional Practice
(viii) Geospatial Information Management

Award of Degree

To qualify for the award of a degree, a student must:

(a) Pass all compulsory subjects and compulsory electives.
(b) Complete, satisfactorily a minimum of 180 units.
(c) Satisfy the requirements for practical and SIWES.

Credit Units

A minimum load of 18 units per semester of about 30 contact hours per week is ideal to cover lectures, tutorials, laboratory work and practical work. Each semester is expected to last 15 weeks of lecture. On the whole, students are expected to acquire a minimum of 180 units before graduation. The successful completion of SIWES should also be mandatory for each student before he/she can graduate. See section 7.2.2.1. credit units should be assigned to each course for each semester in accordance with the quantum of work envisaged.

2.8.9 Course Requirement By Semester

Individual departments should design minimum course requirement by semester Design should show clearly courses which are compulsory and those which are electives. Some of the electives are expected to be taught from other faculties/departments.

Elective Courses

Elective courses should constitute a set of courses from which a student can make a selection and should account for approximately 15% of the total weighting of the programme.

2.8.10 Learning Outcomes: Practical Competencies and Skills

The main abilities and skills that students are expected to have developed by the end of their Bachelor's degree programme in Surveying and Geoinformatics are as follow:

Cognitive Abilities And Skills

Sound theoretical knowledge of the basis of the standard methodology employed in the various key areas of the discipline underlying such methodology.

Ability to demonstrate the knowledge and understanding of essential facts, concepts, principles and theories relating to the subject areas identified above.

Ability to apply such knowledge and understanding to the solution of qualitative and qualitative problems of Surveying and Geoinformatics.

Skills in the evaluation, interpretation and analysis of geoinformation or geodata.

Ability to carry out accurate survey measurement.

Ability to produce plans, maps and computer-related graphics.

Ability to use geospatial information derived from various sources such as remote sensing, scanners, etc

Practical Skills
The student should be exposed to all the basic instrumentation in the discipline especially those equipment he would meet in his working life time.

Practical skills needing in making relevant measurements (with modern equipment) to such a standard that will qualify him or her to practice the qualification in all the key areas of the discipline.

Skills required for the conduct of standard field procedures using modern survey equipment.

Skills in the monitoring by observation and changes and the systematic and reliable recording and documentation thereof.

Competence in planning, design and execution of mapping or Geoinformation projects from the beginning to an end. This will include the ability to select and appropriate techniques and procedures.

Skills in the operation of standard surveying and Geoinformatics instruments under production conditions.

Ability to analyse and transform data obtained from different data acquisition systems.

General Skills

The student should acquire transferable skill relating to non-subject specific competencies in the following areas:

- Communication skills, covering both written and oral communication.
- Problem-solving skills, relating to qualitative and quantitative information, extending to situations where evaluations have to be made on the basis of limited information.

- Numeracy and computational skills, including such aspects as error analysis, correct use of units and modes of data presentation.
- Information-retrieval skills, in relation to primary and secondary information sources, including information retrieval through on-line computer searches.
- Information-technology skill such as word-processing and spreadsheet use, data-logging and storage, internet communication, etc.
- Interpersonal skills, relating to the ability to interact with other people and to engage in team work.
- Study skills needed for continuing professi8onal development.

2.8.11 **Behavioural Attributes**

Students on graduation are expected to show high sense of professional ethics and other behavioural attributes consistent with the code of conducts of the survey ors Registration Council of Nigeria (SURCON). They should be able to put up with hazards of field conditions.

2.8.12 **Resources Requirements for Teaching and Learning in the Programme**

The minimum expectations of resources capacity to enable effective teaching and learning are as follows:

Academic Staff

As a professional discipline, academic staff to student ratio of 1 :8 is ideal. As for as possible, appointments of staff should conform to the regulations laid down by each University. Recruitment strategy, however, should reflect the main specialisation areas. See section 7.3.

Non-Academic Staff (Supporting Staff)

The minimum supporting staff strength required should be in the ratio off 1:20.

Technical Support Staff

i. Senior Technical/Technologist staff
ii. Intermediate Technical/Technologists staff
iii. Junior Technical staff

Administrative Staff

Senior Staff

1. Secretary to the Department
2. Senior/Chief Typist

Junior Staff

1. Typist
2. Store Attendant
3. Messenger
4. Cleaner

2.8.13 **Academic Physical Space (Physical Facilities)**
The minimum requirements are as follows:

i. **Office Accommodation**

Head of Department, Secretary to Head of Department, Professors/Readers, Senior Lecturers, Lecturers, Admin staff, General Office/Store,Postgraduate Students.

Classroom Space

At least 3 No. classrooms would be required for the undergraduate programme in surveying and Geoinformatics.

iii. **Seminar Space**

One Seminar space for the Department or Faculty is considered adequate and could also accommodate other departments in the faculty.

iv. **Laboratory Space**

The following Laboratories are required in a surveying and Geoinformatics Department:

Photogrammetry Laboratory, Cartographic/Drawing office (for students and staff), Geoinformatics/computer lab., Geodesy and Hydrographic surveying lab., Remote sensing lab., Equipment store-room.

2.8.14 **Equipment**

(a) **Teaching And Research Equipment**

Since the discipline is practicals-oriented, the Department must stock equipment in good number and variety, adequate for the use of students. As much as possible student should be exposed to the types of equipment they will meet in the industry. Each department should endeavour to acquire the necessary equipment to be able to teach the courses listed in section 7.3. Prominent among these are: digital theodolites, total station instruments, computers, printers, scanners, UPS, digitizers (raster and vector), pen plotters, stereoplotters, digital levels, GPS equipment, sounding equipment, etc.

(b) **Office Equipment**

There should be adequate office equipment such as computers, typewriters, photocopying machines, file cabinets, desks and chairs, etc.

(c) **Transportation**

There should be available 1 saloon car, a bus four-wheel vehicles for field work.

2.8.15 **Library and Information Resources**

In addition to the University general library, each department should have a library to stock textbooks, journals and other information providing materials.

2.8.16 **Attainment Levels**

The following criteria are suggested as indicators of different levels of attainment:

(a) **First Class (Honours)**

A first class student should show outstanding conceptual understanding. He is expected have a CGPA of at least 4.50 on a 5-point scale, i.e. he must make at least a B-grade in most aspects of theoretical, laboratory, and field assignments. He is expected to be exemplary in conduct and behaviour. He is also expected to work with minimum supervision and not to have a resit in any examinations at all levels of the programme. His performance in trsansferable skills should be generally very good.

(b) **Second Class (Honours)**

A student is expected to obtain a CGPA of at least 3.50 and 2.4 for second class (honours) upper division and second class (honours) lower division respectively on a 5-point scale, i.e. he must make at least a C-grade in most aspects of theoretical, laboratory, and field assignments. He should be of acceptable character. Performance in transferable skills should be sound and show no significant deficiencies.

(c) **Third Class (Honours)**

A student is expected to obtain a CGPA of at least 1.50 on a 5-point scale, i.e. he must make at least a D-grade in most aspects of theoretical, laboratory, and field assignments. He should be of good behaviour. Performance in transferable skills should be fairly sound.

(d) **Pass Degree**

A student in this category is expected to make a CGPA of at least 1.0 on a 5-point scale, i.e. he must make at least an E-grade in most aspects of theoretical, laboratory, and field assignments. He should be of good behaviour. Transferable skills are at a basic level.

2.8.17 **Maintenance of Curriculum Relevance**

The maintenance and evaluation of the curriculum relevance can be effected by feedback systems relating to student and employer evaluation. Lecturers should visit students at their attachment points during SIWES with a view to evaluating their on-the job performance and student-employer relationship curricular should be reviewed every five years so as to incorporate innovations resulting from changes in the state-of-the-art.

2.8.18 **Performance Evaluation Criteria**

Evidence on which the assessment of students achievement is based should include:

- Formal examinations
- Laboratory reports
- Problem solving exercises
- Oral presentation
- Planning, conduct and reporting of project work.

Specifically, evaluation of students performance in each course should be by continuous assessment of both lectures and practical/laboratory assignments. In addition, the external examinership system should be retained to moderate final year examination papers and scripts.

Continuous Assessment

The continuous assessment should cover at least 30% and at most 60% of the grade for each course.

End of Semesters Examination

The examination of the student at the end of the semester should cover 40-70% of the total grade, to complement the figure for the continuous assessment. The examination will normally take the form of written and/or oral examination as appropriate.

2.8.19 **External Examination System**

External examiners shall be appointed once each year at the and of each session to moderate examination papers and scripts, for those line the final year.

APPENDIX 9.0

COURSE DISTRIBUTION

TABLE 9.0

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (SURVEYING AND GEOINFORMATICS)

FIRS SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Physics		3	1	0	4
	Mathematics		3	1	0	4
	Basic Surveying		1	0	3	2
	Cartography		1	0	3	3
	Use of English		2	0	0	2
	Technical Drawing		1	0	4	2
	Computer Appreciation		2	0	0	2
	TOTAL		13	2	10	19

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 9.1

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (SURVEYING AND GEOINFORMATICS)

SECOND SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Physics (Optics)		2	0	0	2
	Mathematics		3	1	0	4
	Engineering Surveying		1	0	3	2
	Map Projections		1	1	0	2
	Physics (Mechanics)		2	0	0	2
	Practical Physics		0	0	4	1
	Use of English		2	0	0	2
	Workshop Practice		0	0	4	1
	Computer Applications I		1	0	3	2
	TOTAL		12	2	14	18

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 9.2

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (SURVEYING AND GEOINFORMATICS)

FIRST SEMESTER YEAR II

Code	Course Title	Pre-requisite	L	T	P	U
	Topographic Surveying		2	0	3	3
	Elem. Of Photogr. And Remote		2	0	3	3
	Sensing		2	0	3	3
	Cadastral Surveying I		2	0	3	3
	Field Astronomy		2	0	0	2
	Adjustment computations I		1	0	4	2
	Computer Application to Surveying		2	0	0	2
	Electronics Engineering		2	0	0	2
	G.S. (Logic and philosophy)					
	TOTAL		15	0	16	20

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 9.3

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (SURVEYING AND GEOINFORMATICS)

SECOND SEMESTER YEAR II

Code	Course Title	Pre-requisite	L	T	P	U
	Geodetic Surveying		2	0	4	3
	Geometric Photogrammetry		2	0	0	2
	Cadastral Surveying II		2	0	0	2
	Geodetic Astronomy		2	0	3	3
	Electronic Surveying		2	0	4	3
	Basic Elements of Planning		1	0	3	2
	G.S (Nigeria Peoples and Culture)		2	0	0	2
	Environmental Education and Awareness		2	0	0	2
	TOTAL		15	0	14	20

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 9.4

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (SURVEYING AND GEOINFORMATICS)
FIRST SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Mining and Special Survey I		2	0	4	3
	Analogue Photogrammetry		2	0	3	3
	Remote Sensing I		2	-	3	3
	Numerical Methods		2	1	0	3
	Geographic Information System (GIS)		1	0	4	2
	Principles of Law		2	0	0	2
	SUB-TOTAL		11	1	14	16
	4 Units of Elective from below					4
	Grand Total					20
	Swimming and Safety		0	0	4	1
	Potential Theory and Spherical Harmonics		2	1	0	3
	Foreign Language (Technical)		2	0	0	2
	Principles of Economics and Accounting		2	0	0	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 9.5

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (SURVEYING AND GEOINFORMATICS)
SECOND SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Statistics		2	1	0	3
	Cadastral Surveying III		2	1	0	3
	Mining and Special Survey II		2	1	0	3
	Remote Sensing II		2	0	4	3
	Entrepreneurship Studies II		2	0	0	2
	SUB-TOTAL		**10**	**3**	**4**	**14**
	Plus 6 units of electives from below					6
	Grand Total					**20**
	Land Law I		2	0	0	2
	Principles of Economics & Accounting		2	0	0	2
	Industrial Management		2	0	0	2
	Technical Communications		1	0	0	1

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 9.6

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (SURVEYING AND GEOINFORMATICS)
FIRST SEMESTER YEAR IV

Code	Course Title	Pre-requisite	L	T	P	U
	Hydrographic Surveying I		2	0	4	3
	Adjustment computations I		1	1	0	2
	Marine Surveying		2	0	0	2
	Entrepreneurship Studies II		2	0	0	2
	Analytical Photogrammetry		1	0	4	2
	Environmental Law		2	0	0	2
	Environmental Management		2	0	0	2
	Physical Geodesy		2	1	0	3
	SUB-TOTAL		**14**	**2**	**8**	**18**
	4 Units of electives from below					4
	Grand Total					**22**
	Swimming and Safety II		0	0	4	1
	Technical Foreign Language		2	0	0	2
	Introduction to Geology		2	0	0	2
	Fundamentals of Electrical		2	0	0	2
	Engineering		1	0	0	1
	Technical Communication					

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 9.7

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (SURVEYING AND GEOINFORMATICS)
FIRST SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Adjustment comp II		2	0	0	2
	Aerial Triangulation		2	0	4	3
	Geometric Geodesy		2	1	0	3
	Hydrographic Surv. II		1	0	4	2
	Project I		0	0	12	3
	SUB-TOTAL		**7**	**1**	**20**	**13**
	Plus 6 units of electives from below					6
	Total		**0**	**0**	**0**	**18**
	Technical Foreign Language		2	0	0	2
	Geophysics		2	0	0	2
	Potential Theory and Spherical		2	1	0	3
	Harmonies		2	1	0	3
	Applied Town Planning					

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 9.8

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (SURVEYING AND GEOINFORMATICS)
SECOND SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Cadastral Survey IV		2	0	0	2
	Computational Photogrammetry		2	0	3	3
	Satellite Geodesy		2	0	0	2
	Computer Application to Surveying II		1	0	3	2
	Project II		0	0	12	3
	SUB-TOTAL		**7**	**0**	**18**	**12**
	Plus 8 units of electives from below					8
	Total					**20**
	Geophysics		2	0	0	2
	Applied Geophysics		2	0	0	2
	Electronics Surveying		2	0	0	2
	Applied Town Planning		2	0	0	2
	Economics and Accounting		2	0	0	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

APPENDIX 9.1: COURSES SYNOPSIS

Basic Surveying

General History of Surveying. Use and care of Surveying Instruments. Design and adjustment of Surveying instruments. Chain surveying. Theodolite and Compass traversing. Levelling, Techneometry. Subtense bar and its uses. Preparation of large scale plans; Contouring.l Plane tabling for large scale plans.

Cartography

Design of maps. Drawing methods and techniques. Typography and lettering. Map compilation and classification map reproduction techniques. Draughting for colour separation. Litho-drawing Photo-litho processes. Photomaps and orthophotomaps. Depiction of relief. Organization of map production. Cartographic revision processes. Map reading and interpretation.

Engineering Surveying

Location and seting out of works. Curve ranging and setting out. Super-elevation. Vertical curves. Sectioning. Areas and Volumes. Earthworks. Basic Photogrammetry and practical uses of aerial photographs.

Map Projections

Historical Development of maps. Geometry of ellipsoid, Gaussain Fundamental Quantities. Theory of distortions. Various projections – conic, cylinderic, azimuthal, etc.

Transverse and Universal transverse Mercator System. Nigerian modified system. Concept of conformal projections. Generalised mapping equations. General theory of projection from ellipsoid to sphere and to plane.

Topographic Surveying

Definition and use of Topo Maps. Methods of obtaining field Data for topo mapping. Planning of control Surveys. Field procedures and observations. Plane tabling for small scale mapping Map drafting, man scales and production of topo maps.

Element of Phogrammetry and Remote Sensing

Historical development: Aerial Photography Optics for photogrammetry Metric cameras. Ground coverage and resolution. Image co-ordinate measurement and reduction mapping from single photographs. Rectifier, Mosaics and orthophotos. Electromagnetic radiation and spectrum. Reflectance. Photographic materials and processing, properties of Aerial photographs. Introduction to photo interpretation.

Cadastral Surveying I

Field methods and office preparations for property surveys. Principles of subdivisions of properties, Layouts. Origins, re-establishment of becons. Cadastral Survey Records. Boundaries, control surveys, Location of sequence conveyances and reversion right. Mining claims and mining surveys.

Field Astronomy

Nature of Universe and solar system. Celestial sphere. Solution of Astronomical Triangle. Astro co-ordinates systems. Time systems. Star Catalogues and charts. Use of Star. Almanac. Solar and steller observations. Corrections to observe altitudes and azimuths. Determination of azimuth, latitude and longitude. Position line method. Practical determinations and computations.

Adjustment Computation I

Matrix Algebra. Theory of Errors. Least squares method. Basic and matrix approaches. Condition and observation equations. Statistical Analysis Application in surveying and Photogrammetry.

Geodetic Surveying

Higher order Surveying instruments: Use, Care, accuracy, Control Surveys. Design of 1^{st} and 2^{nd} order control systems. Positioning methods. Precise leveling. Computations of geodetic positions. Semi-rigorous and rigorous adjustment of control networks.

Geometric Photogrammetry

Stereoscopy and Parallax Relative and Absolute Orientation. Projective equations for the line, plane and space. Rotation equations. Co linearity and Co planarity condition equations. Projective transformation equations. Single Photo resection.

Cadastral Surveying II

History and methods of dealing in land tenure systems in Nigeria. Customary land tenure systems in Nigeria. Customary land tenure system. Rights and interests in land. Deads and Title Registration. Defeats of Deeds Registration. Title Registration, registered Land Act and land Use Act 1978. comparative cadastral Systems. Organisation and procedure for Cadastral Surveys.

Geodetic Astronomy

Celestial co-ordinate systems and their variations. Star position reduction. Time systems. Time conversions and variations. Determination of 1^{st} and 2^{nd} order Astro position and Azimuth. Reducation of observations. Laplace equation and stations. Geodetic uses of Astro Positions. Astrogeodetic geoids.

Electronic Surveying

History or electronic surveying. Properties of electromagnetic waves. Group velocity. Transmiters, Receivers and Antennal E.D.M. Equipment Systems. Errors – instrumental and atmospheric. Interferometric methods of baseline measurements.

Analogue Photogrammetry

Projective Relations in Phogrammetry. Differential formulae. Relative and Absolute Orientation. Model Deformations. Plotting of stereo Model. Stereo Plotting Insturments. Ground Control in Photogrammetry. Analogue aeral Triangulation.

Remote sensing I

Single lens, multi lens, strip and panoramic cameras. Aircraft and space remote sensing platforms. Space shuttle. Scanning systems. Retura Beam Vidicon. Image transmission for space digital Imagery, Minimum discrete area pixel methods in land use classification.

Computer applications in surveying

Review of computer programming. Flowcharts, Algorithms, basic language, Fortran language. Development of simple software's and routine for basic surveying operation. – traversing, leveling, triangulation, etc. Development of fortran programmes for least Squares solution of Photogrammetric, Geodetic and Hydrographic problems.

Mining and Special Surveys

Definitions. Mining and underground surveying Techniques. Design of underground survey networks. Mine orientation, mechanical and optical shaft pumbing gyroscopic methods, laser etc, Accuracies. The gyrotheodolite. Sources of errors. Volume determination. Erosion problems, Crustal movements. Survey for subsidence and stability of large structures.

Cadastral Surveying III

Property Law. Nigeria survey laws and Regulations. Chapter 194 of the laws of the Federation and other relevant survey Legislations decrees and their amendments. Survey Laws in mining Surveys. Rights of way. Town Planning Laws etc. Land Use Act. Land Information Systems.

Adjustment Computation II

Linear least squares estimation. Non-linear least squares estimation. Matrices, Digonalisation. Partitioning of matrices, condition, and observation equations. Combined method. Weight estimations. Applications in Surveying and Photogrammetry.

Geometric Geodesy

Historical development and aims of Geodesy. Geometry of an ellipse.Latitudes. space-rectangular coordinates. Radii of curvature. Lengths, and areas on ellipsoid. Curves on the ellipeoid. Normal Sections and Geodesics. Direct and inverse Problems on sphere and ellipsoid. Geodetic datum, and ellipsoid as reference surface. Data transformation from one datum to another.

Hydrographic Surveying II

Sounding Wave propagation. Acoustic waves. Sweeping, side – looking sonar. Multibeam sonar. Electronic sweeping. Elements of Oceanography. Tides and currents. Temperature, Salinity, sedimentation and beach erosion modern techniques.

Marine Surveying

Coastal engineering. Situation and erosion. Coastal zone Management. Demarcation of Harbour limits shipping and habours laws. Position Fixing. Large scale surveys Dredging. Effects of wind and wave on sea bed. Oceanographic equipment. Tidal current Measurement.

Cadastral Surveying IV

Professional Practice. Professional body. Control of the profession. Code of ethics. Costing of Cadastral, topographical Engineering and Hydrographic Surveys. Costing of mapping projects.

Analytical Photogrammetry

Refinement of comparator measurements. Calibration of the Camera, the comparator and the stereoplotter. Colinearity Equations. Coplanarity condition equations, Errors, Weights.

Physical Geodesy

The Earth and its gravity field. Potentials. Gravity anomalies. Geoidal undulations, and deflections of the vertical Height systems. The earth, its size and shape. Geoid as figure of the earth. Other approximations. Stoke's and Vening-Meinesz's formulas. Disturbing potential in spherical harmonics. Gravity observations and reductions. Absolute and relative gravity measurements.

Satellite Geodesy

The geometrical and dynamical applications of artificial satellites to position and earth's figure and gravity field determination.

Computational Photogrammetry

Review of least squares application in photogrammetry. Collinearity and Coplanarity concepts and least squares methods in relative orientation. Bundle adjustment. Systematic effects in photogrammetry. Computer applications.

Applied Geophysics

Field observations, evaluation and analyses of geophysical data as applicable in seismology and gravimetry. Electrical methods. IP resistivity and magnetism.

Hydrographic Surveying I

Hydrography. Z-dimensional positioning at sea and on water. Depth determination. Positioning Accuracies. Measurement systems. Sources of errors. Introduction to satellite. Navigation and positioning Tides and Tidal Streams. Chart and sounding datums. Mean sea level determination. Tide guage and poles.

Remote Sensing II

Photographic, electro-optic and microwave imaging systems. Rada Ear orbiting remote-sensing statelites – landsat, Spot. Temperature, depth and aerial estimation by remote sensing. Manual and automated image interpretation and classification. Accuracy of classification. Presentation of remote sensing data.

Adjustment Computation III

Generalised leastsquares model. Linear, and non-linear models. Solution of Normal Equations Treatment of large geodetic networks. Addition of observations and parameters. Removal of observations. Application of constraints. Statistical Analysis. Error ellipse and error ellipsoid. Applications in surveying and photogrammetry.

Aerial Triangulation

Analogue Aerotriangulation. Strip formation. Strip and Block adjustment. Perspective Centre determination. Independent model aerotriangulations. Multiple photo resection. Bundle Adjustment of photographs. Flight Planning.

2.9 Benchmark – Style Minimum Standards for Landscape Architecture Degree Programme

2.9.1 Introduction

The benchmark statement for Landscape Architecture is to provide a guideline for the description and the characteristics of the degree programme and to articulate the abilities and skills expected of graduates of Landscape Architecture.

In the context of Nigerian Universities, a five-year degree leading to a professional Bachelor's degree is being recommended. This statement provides a guide for designing the Bachelor's degree programme.

The benchmark statement takes into consideration, current development in the environmental design discipline in general and in Landscape Architecture in particular. Body of knowledge in the areas of Environmental Impact Assessment, Pollution control, Entrepreneurship, Information Technology and Facilities Management have been incorporated to cater for these developments.

Nomenclature:	Landscape Architecture (LAA)
Degree in View:	Bachelor of Science (B.Sc. LAA) Bachelor of Technology (B.Tech. LAA) Bachelor of Landscape Architecture (BLA) Bachelor of Environmental Sciences (B.E.S. LAA)

2.9.2 Admission Requirements

Admission into the Architectural programmes may be through any of the following modes:

* **Normal Admission**: Candidates who have successfully completed the Senior Secondary School or its equivalent obtained five credits in Mathematics, English Language, Biology and two other subjects from the following list will be eligible for admission; Chemistry, Physics, Technical Drawing, Fine Arts, Geography, Economics, Building Construction, Land Surveying and Agriculture.

* Advance Standing Admission: Candidates who fulfils above requirements and who have obtained G.C.E Advanced Level, HSC/IJMB or equivalent passes in Biology and Physics, or Mathematics or Physics, or Geography and any other subject noted above may be admitted at the 200 level of the programme. Observed deficiencies must be remedied.

* **Special Admission**: A candidate who fulfils normal admission requirements and in addition holds an ND or HND certificate in Architecture, Urban Planning, Building, Estate Management, Land

Survey or Fine Arts at Credit Level can be considered for Admission into the programme at the appropriate level. Any deficiencies in their background should be rectified by taking appropriate courses.

Transfer Cases: Candidates wishing to transfer from one programme of Landscape Architecture to another for some good reason may be considered for absorption at the appropriate level. Any deficiencies in their background should be rectified by taking appropriate courses.

2.9.3 Expected Duration

Landscape is expected to last a minimum of 10 semester's duration leading to a registrable degree. A minimum of six months of Work Experience shall be incorporated in the programme.

2.9.4 Purpose, Aims and Objectives of the Minimum Academic Standard (MAS) Benchmark Statements

The purpose of the MAS Benchmark Statement is to:

Assist Universities and upcoming departments of Landscape Architecture in designing and approving programmes of study.

Assist professional bodies in their accreditation and review of programmes relating to professional competence.

Assist Students, Employers, International Organizations etc when seeking information about Landscape Architectural Education in Nigeria.

2.9.5 Statement of Components of Benchmark Statements

The benchmark statement is made up of four major component part as follows:

i) The objectives and purpose of the Bachelor Degree in Landscape Architecture

ii) The essential courses expected to be covered in the programme leading to the award of the degree.

The competencies abilities and skills expected of a graduate of Landscape Architecture.

Assessment procedures and criteria for evaluating the body of knowledge covered and different levels of abilities and skills attained.

2.9.6 Statement of Intended Use of the Benchmark

The benchmark statements are intended to provide a broad framework within which educators can develop appropriate and challenging Landscape Architecture programme that respond to the needs of the student, changing

nature of the discipline, as well as, new developments in Technology. The benchmarks are not intended as straight-jackets that would stifle innovation in programme development and in the designing of Bachelors degree students at the end of their programme and to maintain the standard of Landscape Architecture Degree.

2.9.7 Philosophy and Objectives

Description

The Bachelor of Landscape Architecture is a 5-year academic degree for undergraduates. It is focused on the development of knowledge and skills in landscape design, planning and management.

The degree should be accredited by the Nigerian Institute of Landscape Architects, with recognition worldwide through the International Federation of Landscape Architects.

A particular feature of the programme should be its emphasis upon studio. The design studios provide both a physical location and an educational philosophy, in which design is learned through undertaking a series of real world projects. While design application is critical, so also are ideas and critique.

Career Opportunities

Career prospects for talented landscape architects are good, with worldwide opportunities in consultancy, private practice, the landscape industry, local government and central government agencies. The range of career opportunities for talented landscape graduates is wide and still growing.

Landscape architects often work in teams which other disciplines. In site planning and design, they work closely with architects, engineers and horticulturalists. On a broader scale, they work with resource managers and planners. The distinctive approach that a landscape architect brings to a project is a combination of creativity, critique and problem solving skills which are integrated with a broad understanding of the natural and cultural environment.

Professional Involvement

Landscape architects contribute to a wide range of projects for private, institutional and government clients. These include civic developments, urban design, tourism development, residential and lifestyle subdivision, and commercial, institutional and industrial projects. There is also opportunity to work on parks, highways, heritage conservation, ecological restoration and re-vegetation, city or rural planning and resource policy.

The practice of landscape architecture involves:- landscape assessment and resource consent applications, site design and master planning, contract

documentation and landscape management. Landscape architects may be engaged in a range of roles, including presenting evidence to the Environment Court, managing projects for developers, supervising site works or education.

Landscape architecture has a strong ethical dimension and landscape architects aim to design in a socially and environmentally responsible manner, whether working for a public or private client.

On graduating, the Landscape Architect can early commence private practice and generate employment – raising of nursery, industry and city beautification projects.

General Philosophy Landscape Architectural Education

The overall national philosophy in Landscape Architectural Education can be state in general terms as follows:

The range of exposure and scope of the programmes in a department of Landscape Architecture should produce a competent, skilled and versatile individual capable of facing a broad spectrum of challenges of the environment for human and other activities.

Every school should aim at exploring the rich cultural and local landscape architectural resources in the country in general and within its immediate environment in particular Landscape Architecture departments should inculcate the understanding of the environmental problems of the community and make efforts towards evolving solutions to these problems.

A graduate of Landscape Architecture is therefore trained in the art and science of planning, design, erection, commissioning, maintenance, management and co-ordination of allied professional inputs in the development of Landscape. There should be flexibility in the development of courses to allow for the changing needs of education arising from changing social, economic, psychological and technological environment.

2.9.8 **Aims and Objectives of Landscape Architectural Education Programmes**

A Landscape Architectural Education programme should be committed to:

A high-quality of professional education aimed at producing Landscape Architects capable of understanding and solving complex technical and environmental problems, as well as, applying the knowledge to tackle and co-ordinate other related professional inputs in the development of the environment. The focus is on development of knowledge and skills in landscape design, planning implementation and management.

The infusion in the student of an understanding of the context of the design and construction in physical, cultural, social, economic and technological terms.

Equipping the student with adequate knowledge, creativity, specialized skills and leadership capabilities that will enable the graduate to coordinate and control and design and implementation processes and inputs thereto by allied professionals and executors.

Producing Professional Landscape Architect, cap-able of undertaking the whole range of design activities from schematic design through working and drawing to construction detailing and planting programmes.

Providing the student with the knowledge and skills to undertake a wide range of management activities such as coordinating site meeting, site management, facilities management, post construction evaluation, in the area of Landscape development.

Providing the student with the knowledge and skill base from which he/she can proceed to further studies in Landscape Architecture or allied areas.

Provide the student with entrepreneurial knowledge and skills to enable him/her to be self-reliant, and provide jobs for others.

Provide the student with skills in computers and Information Technology to enable him fit in the current global professional arena.

2.9.9 **Learning Outcome**

Regime of Subject Knowledge:

Each department of Landscape Architecture can fashion its actual course context, nature and organization of its course or modules to reflect its peculiarities. Furthermore, a Landscape Architecture programme can be domiciled as an option with the departments of Architecture, Urban and Regional Planning, Estate Management etc as an option. Whatever the approach adopted by a given School of Environmental Sciences, it is expected that the Landscape Architecture programme will select course from the following six instruction modules:

i) Landscape Architectural Design and Graphic Communication Skills
ii) Art and Humanities
iii) History and Theoretical Studies
iv) Construction Technology and Environmental Services
v) Physical Sciences and Information Technology
vi) Management and Entrepreneurial Studies

Core of the Programme:

The core of any Landscape Architectural Education is the emphasis upon studio and practical application. The Design Studio should provide both physical location and an education philosophy in which design is learned through undertaking a series of practical real world projects. Communication

skills as well as Theory and Historical/Critique courses are essential component of this core. Similarly, Landscape construction techniques and services provide the skills needed in dealing with hard landscape elements, while courses from the Natural Sciences and Environmental Sciences modules provide the student with basic tools of understanding manipulating, preserving and managing soft Landscape elements at various scales.

This core of the programme should Account for at least 60% of the total credit load in the Landscape Architectural programme.

Cognate and Elective Courses:

These groups of courses should account for 30% to 40% of the total credit load of the programme. These courses are also chosen from the six modules out lined about but the selection is aimed at providing each Landscape Architectural programme the opportunity to play a unique and identifiable role in the Landscape development of the country and the region. For example:

A programme domiciled in a University of Technology may have more of the Construction, Environmental Services, Information Technology and related courses in its selection.

A programme domiciled in a regular University and closely related to Urban Planning and Agriculture may have more of the Natural Sciences, Environmental Sciences, Ecology and Criticism and general History and Theory of the Landscape Architecture in its cognates and electives.

At the other end a programme domiciled in an academic environment where Art and Industrial Design programmes are available may emphasis cognates in the area of humanities, arts, painting, sculpture artistic materials and aesthetics consideration.

In addition, the electives enable a student to further identify areas of special interests and skills he would like to acquire to enhance his career prospects and education background.

Competencies and Skills:

The main abilities and skills (Cognitive, Architectural and General). The modules are expected to inculcate in the students are as follow:

(a) **Landscape Architectural Design and Communication Skills (Module A)**

Students commonly take an introductory course in drafting (LDA 21) followed by a three-dimensional design course. The three-dimensional course is typically taken in Art or through Design 125 in our department. Other art courses are also available and encouraged. Drafting covers basic skills in graphic delineation of site analyses, site plans, section elevation, and perspective views, and color illustrations. Following this course, students take

LDA 22, an advanced graphics course oriented toward rendering and hand-developed presentation graphics. LDA 22 is followed by LDA 23, the introductory, mackintosh-based computer graphics course. These courses are typically completed by the end of second year. In the junior year, students may take LDA 120, the advance computer graphics course, which features CAD, GIS, and animation for landscape planning and design. All students also must take LDA 122, which concentrates on more advanced professional communication topics such as report, brochure and resume design, oral presentations, audio-visual and multimedia/video presentations. The complete graphic presentation sequence superbly prepares students for the communication challenges of the project and for subsequent professional practice.

The studio sequence in landscape architectural design consists of seven sequential courses. LDA – 11 is the first studio, and is taken in the second year. It introduces students to the landscape analysis and design process and provides introductory studio experiences at all physical scales and many land-use types. LDA-111 is the fall junior studio which emphasizes site analysis, site planning, the sitting of structures and the design of circulation systems. Emphasis is also placed on energy and water conservation methods in site design. LDA-112 follows in the winter quarter of the junior year, with emphasis on the role of creativity in the design process. LDA-112 emphasizes form, space, and artful expression in the landscape. Typical projects are those where form and symbolic content are paramount (as in the design of civic art plazas, memorials, etc.). The final studio in the junior year is LDA-113, which emphasizes regional-scale land planning and design issues and features more sophisticated land, resource, and community analysis techniques, user/user and user/resource conflict resolution, and large-scale master planning. Typical projects might include the planning of linear park and trail systems in cities, the adaptive re-use of surplus or decommissioned military bases, or the planning of large, mixed-use land developments.

To develop the skills and techniques in problem recognition, information gathering, solution, synthesis, evaluation and design.

To undertake design exercises varying in magnitude from relatively simple requirement, through to urban planning and landscape design problems that need specialized skills and knowledge.

To be able to grapple with technical, social, environmental, aesthetic, as well as financial aspects of landscape problems during these exercises.

To be able to handle landscape planning and constructional technology and detailing at certain levels of the skills acquisition process within this module.

To develop imaginative and creative faculties of the student so as to gain confidence in working processes requiring communication skills.

To undertake diverse exercises in studios or workshops focusing on the application of art and design, texture, proportion, light and shade in design of landscape.

(b) **Landscape History and Theoretical Studies (Module B)**

This sequence begins with the primary introductory lecture in landscape architecture, LDA 40, which is open to all students with no prerequisites. Taken early on in the curriculum, it is a foundation course covering history, theory, process and applications of landscape architecture and is a primary vehicle for attracting new students into the major. LDA 140, History of Landscape Architecture, is required for landscape Architecture students but is also a General Education course and is quite popular on campus. Enrolment in this lecture course sometimes exceeds 300 students. Landscape Architecture students must also complete three repetitions of the one-unit professional seminar, LDA-190, also open to non-majors, which features quest speakers on the widest possible range of landscape architecture and closely related topics. This course is called the "pro-seminar", and also serves as a means for attracting talented and motivated students into the major.

To develop an understanding of the history and theory of Landscape Architecture both western and non-western aimed at clarifying the scale of values and concepts within which landscape architecture is created.

To examine landscape globally aimed at stimulating students to the recognition of the existence of conceptual resources in various landscape traditions in the world.

To develop the necessary framework upon which the student bases his creative work.

(c) **Arts and Humanities (Module C)**

Students are required to take six General Education courses selected from a list published in the General Catalog. General education requirements emphasize broad social and environmental issues, critical thinking, and writing skills. Students are also able to take least 24 units of electives with no restriction whatsoever. However, students may choose to use some of these units within the Landscape Architecture, or for directed group study or independent study projects with specific professors. All the required general course prescribed by the University.

To expose the student of landscape architecture to the general cultural, historical, psychological and sociological context within which Landscape Architecture is created.

To clarify some practical implications of design decision from the point of view of the users, the client and the public at large.

To expose the students to the legal, political and economic framework within which he is expected to operate as a Landscape Architect.

(d) ***Landscape construction Technology and Environmental Services (Module D)***

A course in general mathematics begins this sequence followed by a recommended but optional course in surveying. It is followed by a mandatory four-course sequence in landscape construction. LDA 131 is the course which utilizes the lecture and laboratory format to introduce the processes and materials of landscape construction. LDA 132, Site Engineering, follows and covers topography, grading, drainage, and road alignment. Next comes LDA 133, which emphasizes the design of "hard" construction details and technical systems in the landscape and teaches methods of preparing technical drawings of details. LDA 134 combines professional practice and project management with the preparation of construction drawings and documents for a complex, site-scale landscape project. LDA 132, 133 and 134 are all "technical" studio format courses. Computer graphics is introduced early in the sequence and becomes mandatory for part or all of the construction documents course outputs.

To develop the understanding of hard elements of landscape, the structure and he process involved in putting them together to complement the natural elements.

To expose the student to environmental services such as plumbing drainage, electrical, lighting, vertical transport systems, security systems and landscape development.

To develop an understanding of implementation, cost implication, managerial, as well as, various processes that go into realizing designer's concept.

To acquire knowledge to be able to determine space requirements and to integrate services within the fabric of landscape.

(e) **Physical Sciences and Information Technology (Module E)**

Students are required to take an introductory biology course followed by either introductory botany or plant science. Also required is one introductory course in geology, physical geography or soil science which deals with the land as a physical substance. Once these lower division courses are completed, students must take one upper division course in ecology and two upper division courses each focusing on a renewable natural resource, such as atmospheric science, forestry, native plant communities, solar energy, water science, or wildlife biology. This sequence builds competence for upper division studio work in planning and landscape ecology (LDA 181 and LDA 183).

Landscape architecture students begin their exposure to horticulture with the second year level course ENH 6, Introduction to Environmental Plants, which covers basic plant identification and characteristics of commonly used

landscape plants. ENH 105, Taxonomy and Ecology of Environmental Plants, follows, covering more genera and species as well as advanced taxonomic and ecological principles. Arboriculture, ENH 133, comes next and covers the principles of establishment and management of woody plants. Students have the option of taking LDA 155, a General Education course in the cultural uses of plants in the environment. This course is open to non-majors as well and is often taken by prospective landscape architecture students. This course emphasizes the choice of plant material for such uses as erosion control, wildlife habitat improvement, water conservation, fire control, urban forestry, solar access and solar control, as well as cultural phenomena such as plant fads, aesthetic styles in planting design, simulated plants, Native American medicinal plant uses, etc. The final course in this sequence is LDA 156, Landscape Planting Design. This course provides students with skill and experience in the composition of planted landscapes where aesthetic, spatial, ecological, and formal properties are critical. The course emphasizes projects such as botanical gardens, arboreta, etc, where plant material selection and composition is the primary design variable considered.

Computers are an integral component of the curriculum in landscape architecture. The philosophy of the faculty is to "mainstream" computers, incorporating computer applications into a variety of courses and offering the student a choice of traditional as well as computerized media. Multiple computer work stations are now located in all studios. Students are first introduced graphics in the sophomore year, primarily through the Computer Graphics course (LDA 23), but also in the introductory graphics and studio courses (LDA 11, 21). In the Advance Communications course (LDA 122) students learn to use advanced interactive computer/video software programs in preparing professional quality presentations. A new, optional course in advanced computer graphics (LDA 120) was offered last summer and will become a regular course offering this academic year. In this course students learn advanced multi-media applications, such as CAD, GIS, solid modeling, simulation, and real-time multi-media animation. Computer-aided grading, drainage and cut/fill calculations are introduced in the landscape technology courses in the Junior and Senior years, while most students now produce much or all of their required construction documents in LDA 134 on the computer. Computerized plant selection is also introduced in the planting design studio (LDA 156).

To master the basic techniques, skills and principles of physical sciences as it relates to the building industry.

To acquire the knowledge and skills in Information Technology and application of computes to the landscape Construction.

To acquire proficiency in Computer Aided Design, Word processing, Data processing and Internet.

(f) **Management and Entrepreneurial Studies (Module F)**

LDA 190, or Pro-seminar in Landscape Architecture, is a one-unit seminar meeting once per week for each quarter during the year. It is open to majors and non-majors alike. Students are required to take a total of three units. The seminar consists of lecturers and discussions led by invited guests who are either practicing landscape architects or allied professionals or scholars. In many ways the Pro-seminar, informally known as "Lunch bag Lectures" because of their Friday noon-time period, is our most stimulating course. It is frequently the center of lively debate and attracts large numbers of prospective students to the major. It also serves as a major contribution of landscape architecture to the general academic climate of the campus.

To equip the student with management tools required for the coordination, control, administration and management of project execution.

To expose the students to basic principles of law, professional practice and contract administration and management.

To develop entrepreneurship skills that enables the student to be resourceful and self-reliant.

The Student Industrial Work Experience (SIWES) is to expose the student to:

Competence in the execution of practical landscape Architectural projects.

Skills for observation, recording and documentation on construction sites.

Skills in safe handling of equipment and avoidance of hazards associated with them.

Landscape office practice and development is an office practice in a real environment.

Behavioural Attributes:

Graduates of Landscape Architecture are governed by their Code of Professional Conduct of the professional body (Nigerian Association of Landscape Architects).

These attributes relate to:

The ability to discharge professional obligations to members of the public
Display of professional integrity
Competence with General Ethics
Compliance with the Regulation of Society
Participation in Professional Landscape Architecture

2.9.10 **Resource Requirements for Teaching and Learning in the Programme**

Academic Staff:

The academic staff requirement is a staff/student ratio of 1:15. The academic staff should be made up of:

Assistant Lecturer
Lecturer II
Lecturer I
Senior Lecturer
Reader/Associate Professor
Professor

The point of entry for each of the positions shall reflect academic qualification, teaching experience and practical professional experience as detailed in the general benchmark statement for environmental studies.

In addition to the regular academic staff, Landscape Architecture should be able to benefit from the wealth of experience of professionals from the field who could join the teaching staff:

Studio Senior Lecturer	Must be a Registered Landscape Architect with a minimum of 15 years relevant field experience.
Studio Associate Fellows	Must be a Registered Landscape Architect with a minimum of 20 years relevant field experience, subject to peer review.
Studio Fellows	Must be a Registered Landscape Architect and Fellow of Nigeria Institute of Landscape Architects or its equivalent with a minimum of 25 years relevant field experience.

Non-Academic Staff:

(a) **Senior Technical Staff:**

Considering the technological bias of Landscape architectural Education, the ratio of Senior Technical Staff is 1:5. The specialization of the technical staff may vary depending on the situation of the particular school. Schools that exist within institutions or faculties where technical staff from Building Departments, Engineering and physics Department can make input, need not recruit technical staff in all specialization required in Architectural programmmes. Requisite specialization can range from modeling, Reprographics, Architectural Technology, Laboratory Technology,
Presentation Techniques to Electrical installation, Building Technology and Plumbing. Computer Aided Design specialists Data Analysis.

(b) **Senior Administrative Staff**:

The ratio of Senior Administrative staff should be minimal in view of the technical nature of the programme.

(c) **Junior Staff**:

An overall ratio of Junior Staff is to be minimal. Two categories of Junior Staff are needed in a Landscape Architecture: Junior Technical Staff and Junior Non-Technical Staff: The distribution between these two categories should be roughly 2:1.

i. **Junior Technical Staff can include:**

Draughtsmen, Carpenters, Modelists, Masons, Painters, Horticulturists, Photographers, Drivers/Mechanics, Storekeepers, and Computer graphist.

ii. **Non-Technical Staff include:**

Clerical Officers, Typists, Cleaners, Studio Attendants, Messengers, Gardeners, Library Attendants, Data Analysis, Word processing Managers and so on.

2.9.11 **Academic Physical Spaces:**

Office accommodation for academic, non-academic staff and students per capital should be based on the following guidelines:

MINIMUM SPACE ALLOWANCE:

NO	SPACE	USE	MINIMUM (m)
1	Professors Office	Academic	24
2	Head of Department	Administration	24
3	Senior Lecturer	Academic	20
4	Lecturer	Academic	46
5	Assistant lecturer	Academic	12
6	Senior Technical Staff	Technical	12
7	Senior Administrative Staff	Administration	12
8	Junior Technical Staff	Technical	6
9	Junior Administrative Staff	Administration	4
10	Studio Space	Students	3
11	Lecturer Space	Students	0.5
12	Seminar Space	Students	0.5
13	Laboratory Space	Students	2
14	Library	Students	2
15	Social Space	Students	0.5
16	Storage Space	Students	0.5

2.9.12 **Equipment:**

Equipment needed for the running of Landscape Architecture programme fall into four categories:

i) Research and Teaching Equipment
ii) Drawing and Reprographic Equipment
iii) Office Equipment
iv) Vehicles

Research and Technical Equipment:

Most Landscape Architecture depends on engineering Faculties for most Material testing equipment for both staff and students. Physics, Building, Survey and Electronic Departments also provide input in Landscape Architecture programmes and their equipment and facilities should be available for use.

It is important in the area of equipment for teaching research to ascertain that:

a. A Landscape Architecture is associated with departments, faculties or institutions which can provide the wide range of equipment and facilities required for the proper training of the landscape Architects.

b. Facilities and equipment required for the effective teaching of any particular course on its curriculum are readily available and are used in the education process.

Drawing and Reproduction Equipment:

Reprographic technology is developing so fast and the rate of obsolescence is so high that any attempt to be specific in this area is fruitless. However, certain categories of equipment can be identified:

a. T-square, Set-square, I-square and Drawing Boards;
b. Various types of drawing instrument used by staff and students, which are usually owned by them;
c. Plan printing machines, Trimming machines and light tables for reading drawings;
d. Cameras and essential equipment for photographic work should also be considered essential digital;
e. Slide projectors, Overhead projectors and Epidiascopes can also be included as essential
equipment digitizer'
f. Computers, Printers Scanners, UPS, Digitizer, Plotter, Multi-media project.

Office Equipment:

These include filing cabinets and photocopiers, duplicating machines, scanning machines and so on, Computer, Printers.

Vehicles:

One 40 Seater bus for site visits
One Car for department use (Station Wagon)

2.9.13 **Library and Information Resources:**

In addition to the University central library, each Landscape Architecture should have a library/data room well stocked with current journals, textbooks and reference materials for the use of staff and students. The library should be linked with internet for information sourcing.

2.9.14 **Attainment Levels**

The current five point grading level is recommended as follows:

Marks	Grades	Points
70-100	A	5
60-69	B	4
50-59	C	3
45-49	D	2
Below 45	F	0

The classification for the overall performance of each student shall be based on Cumulative Grade Point Average (CGPA) where grade average is the summation of the product of the credit unit and the score rating divided by the total number of units carried by the students. The degree would be awarded with the following classifications.

Class of Degree	CGPA
1st Class	4.50-5.00
2nd Class Upper Division	3.50-4.49
2nd Class Upper Division	2.40-3.39
3rd Class	1.50-2.39

To qualify for a degree, each student should have completed and passed all the required courses and be able to attain the following achievement levels for each of the class of degree.

Students who are awarded a bachelor's degree in Landscape Architecture are expected to demonstrate knowledge and skills corresponding to at least attainment level C before they can be allowed to proceed to the professional Master's degree programme.

2.9.15 **Course Evaluation**

In the evaluation of courses offered in Landscape Architecture, the relationship between theory subjects and studios based subjects have to be taken into account. A pass in a core subject at a lower level is pre-requisite for registration for that subject at a higher level.

Assessment of Theory Subjects:

Assessment used for theory subjects should include continuous motoring of student's progress by subject lecturers through course work evaluation. Continuous assessment may involve class tests, tutorial assignments, seminar presentations, and reports on fieldwork, class attendance and so on. These should carry between 30% and 50% of the total weighting for any subject. The final examination of the end of the semester should account for the balance of 50% to 70% of the overall marks for the subjects.

Assessment of Studio Work:

In the case of Studio Work a jury is the normal practice. A jury consisting of a number of competent persons examine the work of a student in a given studio assignment and award marks arriving at a consensus grade.

2.9.16 **Expectations of the Graduates of Landscape Architecture**:

a. Ability to analyze design and environmental development problems, synthesize the various
elements and provide appropriate solutions.

b. Ability to understand the needs of his client and users of the built environment and to cater for these.

c. The ability to produce appropriate and imaginative solutions that are technologically sound, economically feasible, environmentally friendly and aesthetically pleasing.

d. The ability to analyse the feasibility, legal implication, and impact of design schemes on users and the public at large.

e. The ability to understand and assess the impact of development schemes on the environment.

f. The ability to communicate his proposals in the appropriate medium to his client, the public, and members of the building profession and construction team, and;

g. The ability to integrate and coordinate the inputs of other professionals in the environmental design team to achieve the objectives of the project(s).

2.9.17 **Maintenance of Curriculum Relevance**

The following actions are recommended:

i) To review Benchmark Statements every 5 years
ii) Periodic visitations to Landscape Architecture
iii) Universities to routinely request for feedback from employers of their graduates.

2.9.18 **Performance Evaluation Criteria**

Periodic visitations to Landscape Architecture by the Professional Organizations

Appointment of external examiners who should include people in professional practice.

Evaluation of academic staff performance by students through questionnaires.

APPENDIX 10.0: COURSE DISTRIBUTION

TABLE 9.0: SUMMARY OF REQUIRED COURSES FOR BACHELOR OF SCIENCE IN LANDSCAPE ARCHITECTURE

100 LEVEL: TWO SEMESTERS

LAA	-	Use of English----------	2
LAA	-	Materials Science ----------	3
LAA	-	General Studies ----------	2
LAA	-	Freehand Sketching ----------	3
LAA	-	Biology ----------	3
LAA	-	Botany I ----------	3
LAA	-	Horticulture----------	4
LAA	-	Information Tech. I----------	3
LAA	-	Mathematics ----------	3
LAA	-	Building Design I ----------	3
LAA	-	Physics ----------	3
LAA	-	Chemistry ----------	3
LAA	-	Construction Technology I ----------	2
LAA	-	Fine and Applied Arts----------	2
LAA	-	Nigerian Peoples & Culture ----------	2
		TOTAL	**42**

200 LEVEL: TWO SEMESTERS

LAA	-	Building Design II ----------	3
LAA	-	Site Analysis/Presentation ----------	2
LAA	-	Information Technology II ----------	3
LAA	-	Principles of Landscape Architecture ----------	3
LAA	-	CAD Landform Modeling ----------	3
LAA	-	Landscape Architecture History ----------	2
LAA	-	Theories of Landscape Architecture ----------	3
LAA	-	Construction Technology II ----------	3
LAA	-	Planting Design Studio ----------	2
LAA	-	Entrepreneurial Studies I ----------	3
LAA	-	Psychology ----------	2
LAA	-	General Principles of Law ----------	2
LAA	-	Law of Contract ----------	2
LAA	-	Statistics I ----------	3
LAA	-	Botany II----------	4
		TOTAL	**40**

300 LEVEL: TWO SEMESTERS

CODE		COURSE TITLE	CREDIT UNIT
LAA	-	Information Technology III ----------	3
LAA	-	Construction Technology III ----------	3
LAA	-	Building Design III ----------	3
LAA	-	Residential Planting Design ----------	3
LAA	-	Landscape Management ----------	3
LAA	-	Ornamental Plants ----------	3
LAA	-	Botany III----------	3
LAA	-	Professional Practice & Procedure ----------	3
LAA	-	Entrepreneurial Studies II ----------	3
LAA	-	Forestry I ----------	4
LAA	-	Environmental Law & Practice ----------	3
LAA	-	Wildlife & Conservation I ----------	3
LAA	-	Statistics II ----------	3
		TOTAL	**40**

400 LEVEL: TWO SEMESTERS

CODE		COURSE TITLE	CREDIT UNIT
LAA	-	Landscape Architecture Internship – SIWES ----------	16
LAA	-	Building Design IV ----------	3
LAA	-	African Landscape Architecture Studio ----------	2
LAA	-	Urban Design Studio ----------	2
LAA	-	Research Methodology ----------	2
LAA	-	Information Technology IV ----------	2
LAA	-	Environmental Planning and Design Studio ---------	3
LAA	-	Environmental Impact Assessment----------	2
LAA	-	Recreation and Park Planning ----------	3
LAA	-	Entrepreneurial Studies III ----------	3
LAA	-	Forestry II ----------	2
LAA	-	Wildlife & Conservation II ----------	2
		TOTAL	**42**

500 LEVEL: TWO SEMESTERS

CODE		COURSE TITLE	CREDIT UNIT
LAA	-	Special Studies----------	3
LAA	-	Topics in Tropical Design ----------	2
LAA	-	Gardens of the World ----------	3
LAA	-	Extended landscape Architecture Internship ---------	3
LAA	-	Landscape Architecture Theory ----------	3
LAA	-	Landscape Architecture Criticism ----------	3
LAA	-	Project Seminars ----------	4
LAA	-	Forestry III ----------	2
LAA	-	Dissertation ----------	6
LAA	-	Wildlife & Conservation II ----------	2
TOTAL			**32**

APPENDIX 10.1: COURSE SYNOPSES FOR LANDSCAPE ARCHITECTURE

100 LEVEL COURSE SYNOPSIS
B.Sc. in Landscape Architecture

Use of English - 2 Credit Units (Dept. of English) for 100 Level first semester courses on *The Use of English*.

Materials Science 3 Credit Unit

General studies underlying the properties of various building materials such as metals, plastics, steel, aluminum and paint Laboratory testing procedures, certification for fitness. Introduction into Agreement Rules, Nigerian Standards Organization. Recording and classification of data of various materials.

General Studies 2 Credit Units

As provided by the General Studies Department for 100 Level first semester courses on *the teaching of* General Studies.

100 Level Courses

Free-hand Sketching 3 Credit Units

As provided by the Department of Architecture for 100 Level first semester courses on *freehand Sketching*.

Biology 3 Credit Units

As provided by the Department of Biology or Faculty of Science for 100 Level Biology.

Botany 3 Credit Units

As provided by the Department of Botany or Faculty of Science for 100 Level Botany.

Horticulture 4 Credit Units

General principles of horticulture Studies of various types of horticultural pants – domestic and wild. Methods of planting, culturing, transfers, management and harvesting. The use of irrigation, dry season farming, transportation, preservation and conservation aspects. Diseases/causes and prevention Industrial plants and farm machinery for horticulture. Horticulture practices in different regions of the world. Horticulture in Landscaping.

INFORMATION TECHNOLOGY 1 3 Credit Units

Introduction to the principles and practices of computers. The method of data input into computers. The collation, classification, coding and storage of data. Computer Aided Design – principles and practice. Different types of computers – the make, parts, limitations Computers in Landscape designs.

MATHEMATICS 3 Credit Units

As provided by the Department of Mathematics for 100 Level Mathematics course in Mathematics.

BUILDING DESIGN I 3 Credit Units

The general principles of building design with special consideration to ventilation, space requirements, building regulations, health and safety, escape routes consideration for roof, windows, doors, finishing, foundation, electricity and mechanical services. Landscaping of the building environment.

PHYSICS 3 Credit Units

As provided by the Department of Physics for 100 Level Physics course in Physics.

CHEMISTRY 3 Credit Units

As provided by the Department of Chemistry for 100 Level course in Chemistry.

CONSTRUCTION TECHNOLOGY I 2 Credit Units

Setting out of construction works – introduction to simple survey methods using chain and dumpy levels. The positioning of temporary sheds for plants. Labour, materials and site administration. Provision of temporary lighting, water, heating and security services on construction sites. Access routes to sites, maintenance of facilities in sites. Accident prevention and control on construction sites.

100 & 200 LEVEL COURSES

FINE AND APPLIED ARTS 2 Credit Units

Visual communication in art, line, shape, form, colour texture, proportion, high and shade etc. Diverse exercises in studies or workshops focusing on the application of art to general architectural design with particular emphasis on landscape architecture.

NIGERIAN PEOPLES AND CULTURE 2 Credit Units

As provided by the General Studies Department for 100 Level courses in Nigerian Peoples and Culture.

200 LEVEL COURSE - SYNOPSIS

ENTREPRENEURIAL STUDIES I ----------3 Credit Units

As provided by the general university syllabus on entrepreneurial studies.

PSYCHOLOGY----------2 Credit Units

The general principles of psychology. Psychology and the society. Different types of measurements and assessments employed by professional psychologists landscaping approaches to environmental psychology collection, collation, analysis and dissemination of data for psychological analysis. Introduction to various types of psychology: industrial, clinic etc. Psychology and the environment.

GENERAL PRINCIPLES OF LAW----------2 Credit Units

The Nigerian Judicial systems: Magistrate, High Court, Court of Appeal,. The Supreme Court, Principles of Legislation General principles of the law of Court and of Tort. The Executive, the legislative and the Judiciary. Byelaws and regulations, Acts of Parliament, Equity and justice Definitions of various legal terminologies. The Native Court system.

LAW OF CONTRACT ----------2 Credit Units

Formation of contract, parties to contract, contractual documents, technicalities in contract formulation, documentation and implementation. Repudiation of contract, frustration of contract, various forms of contract, introduction to arbitration and settlement of disputes.

STATISTICS I----------3 Credit Units

Averages, mean, mode, range, percentages, standard deviation, chi-square, introduction to simple regression, different types of statistical errors. Interpretation and presentation of statistical data.

BUILDING DESIGN II----------3 Credit Units

Studio practice on the drawing and detailing of simple examples of domestic, office and institutional buildings – elevations, plans and sections. Preparation of schedules for windows, doors, and painting. The positioning of building components in buildings. Preparing of reports on sketches and drafts. Appreciation of building designs with criticisms. Landscaping of buildings.

SITE ANALYSIS/PRESENTATION----------2 Credit Units

Site location, encumbrances – right to light etc urban and rural considerations, city and urban centres, market and business districts, transportation, pollution problems' air, noise and waste considerations. Urban growth, market values of buildings, estate value considerations, demolition and alteration, land formations/valleys, rivers and streams, government regulations on city development, forecast of likely city and rural situations. Introduction to the principles of feasibility/viability studies.

INFORMATION TECHNOLOGY II----------3 Credit Units

Studio practice in the use of computers of various types. The use of computers for landscape design. Appreciation and criticisms of prepared landscape designs.

PRINCIPLES OF LANDSCAPE ARCHITECTURE…… 3Credit Units

A study of the organization procedures for landscape architectural planning. Collection and processing of data, management of data, portfolio analysis, costing of projects, professional assessment of clients requirements, Environmental Impact Assessment, the use of remote sensing in landscape architectural designs, professional ethiques as provided by the Institute of Landscape Architecture. Methods of report writing and criticisms. Liason with other professionals eg. Architecture, urban planners and city administrators. Preparation and examination of landscape budgets.

CAD LANDFORM MODELING …… **3 Credit Units**

The use of different computer packages to formulate various types of landscaping models in relation with changes in climate, whether, geographical position, rainfall patterns, desertification and erosion threats, flooding and landslides. Adjustments with suitable data inputs to reflect new situations appreciation and criticisms of landform models. Studies of cost implications of developed models. The use of remote sensing and GIS information in landscaping modeling presentation and assessment of professional reports in approved models.

LANDSCAPE ARCHITECTURE HISTORY…….2 Credit Units

Historical development of landscape architecture in Europe, the United States, Asia and Oceania.

The development of important world gardens. The commencement and continuous use of landscape architectural technique to fight desert encroachment, landslides, erosion, flooding historical account of the development and expansion of botanical gardens. The Africa concept of landscaping the place of landscaping techniques for the control of the Nigerian environment.

THEORIES OF LANDSCAPE ARCHITECTURE…….3 Credit Units

Conceptual design of landscape design; philosophical development of landscape theories as obtained in Europe, the U.S, Asia and the Oceania. The psychology and social s\aspects of landscape planning as applied to modern environmental improvement. Remote sensing theory applied to landscape design, modern management theories applied to landscape formulation policy-supply and demand, foreign exchange and international trade principles. International exchange of data on landscaping for control purposes for the control of desertification, afforestation, landslides, flooding, water hyacinth, valley, hill and mountain development. Recent forestry theories applied to landscape theories.

CONSTRUCTION TECHNOLOGY II…….. 3 Credit Units

In-situ and pre-cast construction of various building components: foundation, columns, walls, windows and doors, roofs electrical services, plumbing. The use of paint and finishings. The construction of buildings using concrete, sted, aluminum, timber. The construction of gutters, stream water drainage, waste drainage, gardens and tree layouts in building and city environments.

The use of free hand sketches to provide details of building component using elevations and sketches.

PLANTING DESIGN STUDIO…….. 2 Credit Units

Studio practice on the planning and formulation of various types of planting exercises for housing, city and rural development, general afforestation, control desertification, landslide, erosion, flooding and general environmental conservation

BOTANY II …….. 4 Credit Units

As per 200 level Botany, Faculty of Science designed course suitable for Landscaping.

300 LEVEL COURSE SYNOPSIS

INFORMATION TECHNOLOGY III ……. 3 Credit Units

Advanced studio practice on the use of computers for landscape designs peculiar for different packages for: planting, forestry, desertification flood control GIS and global warming information studies of IT and remote sensing techniques.

CONSTRUCTION TECHNOLOGY III …….. 3 Credit Units

Study of mechanical plants used in construction of buildings, civil and heavy engineering projects: cranes, bulldozers, scrapers, concrete mixers. Safety and health in plant useage. The design of sky-scrapers and how they affect the environment, urban improvement. The costing of constructing of projects. Demolition and alterations. A broad study of building regulations. Landscape design integrated into building designs.

BUILDING DESIGN III…… 3 Credit Units

Studio designs of selected projects on domestic, office, institutional buildings, with reports on the design concepts, theory and procedures, criticism of completed building designs.

RESIDENTIAL PLANTING DESIGN…… 3 Credit Units

Analysis of clients briefs, selection procedures, purchase consideration, plant nursery, liaison with forest authorities, building regulation constraints on planting, the use of

compost, fertilizers and manures. Care for ventilation, sit-out requirements management of plants. Studio practices and presentation on various residential planting design for royalty, the wealthy and the poor.

LANDSCAPE MANAGEMENT…… 3 Credit Units

Applying general principles of management to landscape architecture. Division of labour, optimization of inputs, leadership, zoning principles, a good knowledge of labour and labour unionism, strikes and disputes, settlement of disputes. Storage of plants ands other inputs; recording principles. Finance in landscaping consideration of material, mechanical plants and electronic equipment, repairs and replacement. Introduction to range management. The replanting of various flowers and trees. Seasonal management of crops and trees. Enforcement of forest bye-laws.

BOTANY III……. 3 Credit Units

As designed by Department of Botany/Faculty of Science suitable for 300 Level Botany Studies.

ORNAMENTAL PLANTS…… 4 Credit Units

Various types of ornamental plants with their associated botanical names, planting and harvesting methodology, culturing and relevant agricultural practices for the raising of some special plants. Ornamental plants existing in Europe, Asia, Oceania and Africa. Adaptation of foreign ornamental plants for landscaping in the tropics. The pathological problems associated with ornamental plants.

Studio practices using computer packages to produces ornamental design formattings for various environmental requirements.

PROFESSIONAL PRACTICE AND PROCEDURES……. 3Credits Units

A study of standard form of contract for landscape work. Professional roles of Landscape Architect, professional charges for consultancy, liason and membership of the Institute of Landscape Architects. The provisions of Landscape Architects Registration laws. Professional ethics; the good practice procedure. Accounting properly to clients. Providing evidence during Arbitration.

300 LEVEL

ENTREPRENEURAL STUDIES II……. 3 Credit Units

Refer to general university syllables for entrepreneurial Studies II.

FORESTRY I……. 4 Credit Units

General principles of forestry: forestry species, planting nursery, management. Tropical forestry characteristics. Forestry in Europe and temperate lands. Forestry in arid climates. The culturing of trees. The harvesting of forestry products. Fire

control in forestry. Forestry as a landscaping tool: afforestation, desertification, flood control and landslide control studio practice using IT and computers to present forestry plans for varying environment.

ENVIRONMENTAL LAW AND PRACTICE…… 3 Credit Units

Recent national and international laws on the control of the environment. Enussion of gases, global warming, waste discharge and treatment. International laws and protocols on the environment. Development and history of environmental laws, committee and court procedures, fines and sanctions. The role of landscaping in environmental control. Provision of evidence in courts and arbitration assessment and proposals of local regulations for environmental control.

WILDLIFE AND CONSERVATION I…… 3 Credit Units

A study of animals and zoological requirements and contents of various games reserves in Africa, Europe, Asia and the Oceania. An introduction to rang management checking and control of poaching. Selective preservation of threatened species- the role of veterinary services. The use of remote sensing for monitoring of dangerous animals and birds-locust control and monitoring.

The conservation of threatened species of trees.

STATISTICS II……..….. 3 Credit Units

Introduction to multiple regression analysis, ANOVA and MANOVA other forms of statistical interpretation. Using the computers to analyse statistical data. The plotting of graphs, pie charts and other forms of diagrams.

Application of statistics to landscape planning and execution-plant forestry and landscape inputs.

400 LEVEL COURSE SYNOPSIS

BUILDING DESIGN IV……..3 Credit Units

Studio design of various types of buildings residential, office etc. various elevations and section, analysis and presentation of portfolio requirements.

Integrating landscaping aspects into the building design portfolio.

AFRICAN LANDSCAPE ARCHITECTURE STUDIO_…… 4 Credit Units

Preparing studio proposals of varying environmental situations for Africa, principally for desertification, flood control and erosion control. Presentation of appreciation and criticisms of submitted designs. Preparation of cost implications of proposals.

URBAN DESIGN STUDIO…… 4 Credit Units

Rural and urban designs showing layouts, social facilities, parks and gardens, schools hospitals, transportation system, electrical and waste disposal layouts. Integrating landscape design proposals to rural and urban designs for overall environmental control. Assessment of submitted designs, reviews of Environmental impact Assessment.

400 LEVEL

RESEARCH METHODOLOGY……2 Credit Units

The preparation and presentation of research thesis. Writing of Abstract, Introduction, Pilot Surveys, Hypothesis, Literature Review, Collection and Analyses of Data, Inferences, making of Conclusions, Recommendations and Implementation Guidelines. Reference styles according to APA or Harvard formats; the preparation of appendices.

INFORMATION TECHNOLOGY IV……. 2 Credit Units

The advanced use of IT to formulate landscape proposals for the control of: erosion, desertification, gulleys, landscape and water hycinth.

ENVIRONMENTAL PLANNING AND DESIGN STUDIO…….. 3 Credit Units

Studio exercises on selected topics of the environment practically integrating various environment with special usage of landscaping theory to inculcate salient issues on sociology, economics, politics and technology to solve some peculiar problems in the Nigerian environment such as erosion, flood control, water hyacinth, desertification and general protection of wild life.

Students are expected to provide scientific bases for their proposals.

ENVIRONMENTAL IMPACT ASSESSMENT…….. 2 Credit Units

Listing of various factor that may affect a project. Reviewing the possible social, economic, legal political, technological and scientific changes to be encountered in the process. Assignment of possible financial implications to selected prime factors.

RECREATION AND PLANNING…… 3 Credit Units

The need for public and private recreation in rural and urban areas. History of village life in African Societies, open village spaces for dancing and wrestling. Modern sports-football, hockey, volleyball etc. The need for recreation ground plans. Regulations governing play ground areas eg. FIFA stipulations. The development of orchards and rest areas, children playground. Landscaping rules and formation for

Parks and Gardens for; (a) rural abodes, (b) city centre locations. Costing of construction of recreation and parks. Relaxation centres in parks and gardens.

ENTREPRENEURAL STUDIES III…… 3 Credit Unit

As provided by the general university course outline on entrepreneurial studies III.

FORESTRY II - the Forest laws of Nigeria, Broad Studies of Forest Laws of the UK, the USA, Canada and the European Union. Studies of industrial processing methodology of forest and timber particularly in Canada. International treaties and conferences on forestry. The management of forest reserves, the conservation of trees,
Abroad study of protected trees, plantation layout principles. The role of forestry in soil conservation and the eco-system. Types of forest belt layout for combating desertification in Northern Nigeria. Forestry impact on gulley and erosion sites in Southern Nigeria.

WILDLIFE AND CONSERVATION II……. 2 Credit Units

Practical studies on at least one Natural Park in Nigeria eg. Obudu, Yankari and Kwara. Case studies of management problems associated with Wildlife management in Nigeria, East Africa, Central African and South Africa. International case studies on Wildlife management. The role of wildlife management in World Tourism, the Conservation of threatened species of animal and plants, grassland planning as part of landscaping for wildlife. Extension services of Veterinary Medicine, the training of Wildlife guards and forest guards, preparing budgets for Wildlife and Tourism outfits.

500 LEVEL COURSE SYNOPSIS

SPECIAL STUDIES…….. ……. 3 Credit Units

Students should select an area for study covering combinations of various aspects of studies undertaken from 100 to 400 level Areas for possible studies are the application of landscaping theories and principles to solve environmental problems: desertification,
landslides gulley erosion, costal erosion and flooding.

TOPICAL DESIGN…….. 2 Credit Units

Review of tropical landscape design drum loaded from the internet. Tropical landscape approaches along America, Africa, Asia and the Oceania. Comparative analysis of various problems encountered in various tropical regions.

GARDENS OF THE WORLD…… 3 Credit Units

Studies of various outstanding and historic gardens f the world located in Europe, Asia Oceania and the Americas, Archeological information on hidden and forgotten gardens comparative reviews of characters exhibited by different flowers and fauna in different world locations.

EXTENDED LANDSCAPE ARCHITECTURE INTERNSHIP…… 3 Credit Units

Students shall have 21/2 months attachment to professionally registered landscape architectural firms. They will be expected to design and supervise projects under the supervision of the principal partner of the firm. At the end of the internship professional reports countersigned by the principal consultant, shall be presented to the Department for Assessment.

LANDSCAPE ARCHITECTURE THEORY……. Credit Units

Advanced theories and development of philosophical concepts on landscape planning with reference to: tourism potentials, wildlife management and ecological control, contemporary world issues on landscape planning and management. Tropical landscaping in ECOWAS sub-region. The future of landscaping in Nigerian urban and rural development. Proposing legislations for Nigerian landscaping programmes. The future roles of Federal, State and Local Governments as well as NGOS' in landscape development.

LANDSCAPE ARCHITECTURE CRITICISM…….. 3 Credit Units

Assessment of submitted landscape projects concentrating on cost appraisals, location, environmental impact assessment, feasibility/viability, presentation format pictorial presentation, report writing, data collection and analysis, conclusions, recommendation and suggested implementation strategies. Assessment of the quality and quantum of literature reviews, orderliness in presentation of information.

PROJECT SEMINARS…… 4 Credit Units

Statements will be expected to present suitable seminars on at least 2 areas of interest on the role of landscape in solving on eg. Soil erosion, wildlife management, desert encroachment gulley erosion, park and recreational managements.

FORESTRY III

Special topics on forestry with special emphasis on exotic trees, tropical trees, sub-tropical trees and temperate trees. International conventions on trees, control of lumbering general principles of forest management, forest products, forest in national economy, forest and fire services control. The transportation of forest products, paper manufacture, tree planting and current trends in forest nursery development, disease control in forestry. Elements of forestry pathology.

DISSERTATION……. 6 Credit Units

Students are expected to present a research dissertation with a good depth of academic input. The dissertation should be commenced on or before the 500 Level and should cover any areas of interest that should have academic inclination. It should be presented at the end of the second semester, there must be adequate data collected, the data must be well analysed using known statistical/mathematical

techniques. Conclusions and recommendations must be provided, as well there should be a reasonable literature coverage with references arranged in APA of Harvard formats area of study should be in landscaping, forestry, wildlife management, park and recreational land management, desertification etc.

WILDLIFE AND CONSERVATION III…… Credit Units

Wildlife in the tropics, wildlife management in selected African countries endangered animal and forests in Africa and the ECOWAS sub-region planning and costing of wildlife programmes. Assessment of consultants reports on wildlife and conservation programmes, case studies of wildlife management in Nigeria. The use of remote sensing in assessing the population of animals and wild forest aerial surveys of wildlife parks international conferences on wildlife and conservation, the political approach to wildlife an the European Union on wildlife and conservation.

2.10 Benchmark-Style Minimum Academic Standard for Quantity Surveying Decree Programme

2.10.1 Introduction:

Quantity Surveying which migrated in the UK in the late 1940s had specialised on cost control of buildings. However, in recent times, its role has extended to civil, heavy and environmental engineering on the face of introduction and innovations in Information Technology. A need therefore arises for a complete mission of the syllabi.

Nomenclature:

The nomenclature of degree is Quantity Surveying (QS)

The degree in view is first degree in Quantity Surveying:

- B.Sc (Quantity Surveying)
- B.Tech. (Quantity Surveying)
- BQS (Bachelor of Quantity Surveying) (recommended)

2.10.2 Basic Admission Requirements:

The entry requirement for course in Quantity Surveying discipline should be success in Senior Secondary School Certificate (SSSC) or its approved equivalent.

The entry requirement is five subjects at credit level in not more than two sittings and should include English Language, Mathematics and Physics and any other two subjects from the following:

- Building Construction
- Technical Drawing
- Economics
- Geography
- Chemistry
- Biology
- Commerce

Admission into 200 and 300 levels should have OND and HND respectively in Building, Architecture and Allied professions in addition to satisfying the requirement of normal university admission.

2.10.3 Course Duration

The duration of the course should be a minimum of five (5) years including a supervised Student industrial Work Experience (SIWES) of a minimum period of six (6) months.

2.10.4 **Purpose, Aims and Objectives of the MAS Benchmark Statement:**

To assist Departments of Quantity Surveying in suitably formulating appropriate syllabi
To assist external examiners in assessments
To assist professional bodies in training and accreditation.

Statement on Component of The Benchmark Statements

To produce graduate Quantity Surveyors who would be adaptable to tackle contemporary cost aspect of constructional activities of National importance and be able to generate employment.

Flexibility And Autonomy Of Individual Universities

The Benchmark Statement is a Minimum Academic Standard for studies at each university but particularising on the solution into the problems of their immediate environment.

2.10.5 **Philosophy, Aims and Objectives of the Degree Programme**

The Philosophy, major aims and objectives of the degree programme of Bachelor of Quantity Surveying is as follows:

-To produce graduates with a theoretical base and practical skills that would be able to effectively plan and control project funds with particular reference to accountability and probity in developmental projects.

Aims:

The main aims of Bachelor's degree in Quantity surveying programme are to:

- Produce Quantity Surveyors with sound academic background that will equip the graduate with the necessary knowledge to fit into evolving technological advancements.

- Produce graduates that will be able to provide Technical, managerial and financial services to Building, Civil, Highways, Heavy engineering, Petrol-chemical, Manufacturing Industries and the Public Service.

- Produce graduates that will be able to handle complex problems of the Environment such as forestation, desertification, Erosion and pollution control and coastal protection.

- Produce graduate that will be able to proceed to specialised areas of Quantity Surveying that will lead to teaching, research and development.

Objectives:

The objectives are to produce graduates that can:

- Provide cost control and management services on diversified projects in the public and private sector.

- Provide sound contract planning and Administration contract Auditing and project management.

2.10.6 **Learning Outcomes:**

Regime of Subject Knowledge

The graduate of QS should be well versed in the following subject areas:

- Construction Technology
- Measurement Convention and Systems
- Budgeting and Control
- Information Technology
- Professional Practice and Procedures
- Contract Administration
- Environmental Problems and Solutions
- Highway Engineering
- Heavy/Industrial Engineering

Competencies And Skills:

Cognitive Abilities and Skills:

The design of student projects that would expose them to problem solving using modern techniques such as operational research mathematics and information technology tools.

Practical Skills:

Designing students projects with inputs from the industries that would expose students to the theoretical knowledge gained and the practical experience of the industry.

General Skills:

To develop a wide range of different knowledge and skills that will expose students to specific competencies in communication skills, marketing skills, problem-solving skills, organisational skills, information technology skills, interpersonal skills and study skills needed for continuing professional development.

Behavioural Attributes:

The teaching of the professional practice and ethics will ensure the inclusion of the qualities of integrity, honesty, and objectivity openness and accountability through management services, students will be able to exercise independent judgement fearlessly and impartially in an efforts to sustain transparency and accountability in developmental projects.

2.10.7 **Resource Requirement for Teaching and Learning:**

Staff-Student Ratio of 1:15 is recommended.

Academic Staff:

Ph.D. holders in QS and related studies with professional registration

M.Sc. holders in QS and related studies with professional registration

B.Sc. holders being trained for M.Sc. and also being prepared for professional registration

Qualified staff with Ph.D., M.Sc. from other department in the university offering common courses.

Non-Academic Staff:

This should include the following:

Senior Tech. Officer
Higher Tech. Officer (HND)

Chief Tech. Officer (HND)
Tech. Officer (HND)
Asst. Tech. Officer OND
Secretary
Office Assistant

Academic Physical Spaces:

The space requirement is as per NUC standard on page 15.

Space allocation for offices, classrooms, studios, seminar rooms etc, are as per NUC guidelines.

Such space covers the following:

office accommodation
classroom space
drawing office space
laboratory space

workshop space
computing/seminar space

2.10.8 **Equipment**

The department of Building in a Faculty of Environmental Sciences normally provides the essential workshops and technical facilities which are used not only by its students but also by students from other departments in the Faculty. Also the technical support staff are similarly attached to this department.

Under normal conditions students are grouped for experiments, workshop practices and other demonstration projects to reflect the amount of time allocated for practical classes in the curricula of studies. The equipment listed would be located in either the laboratories or the workshops described elsewhere below:

Essential Technical Equipment

(1 No. Each Except where Stated)

Wood/Timber Equipment
Woodworking machinery all-purpose
Woodmaking hand tools
Protective cover equipment
Circular Saw
Drilling Machine
Lathe Machine
Electric blower
Portable bracing machine
Dimension bench
Finishers
Portable cross out saw
Materials/Structures Equipment
Hand operated compression machine
Automatic compression machine with load paper
Flexural/Tensile Testing Apparatus - 4 Nos.
Compaction Factor Apparatus - 4 Nos.
Attorberg limit apparatus - 4 Nos.
Schmidt testing set - 2 Nos.
Bituminous plastic flow tester
Penetrometer - 2 Nos.
Vicat apparatus - 2 Nos.
Consistometer - 4 Nos.
Oven - Heating and Drying - 2 Nos.
Motar Capping Apparatus
Drying Shrinkage and Moisture movement Apparatus - 2
Aggregate Impact Value Apparatus
Aggregate Compression Machine
Curing Tanks - 2 Nos.
Riffle Boxes - 2 Nos.

Balances	- 4 Nos.
Slump test apparatus	- 4 Nos.
Void measurement apparatus	- 2 Nos.
Moulds of all types	- 2 sets of each
Set of Sieves	- 2 sets
Flow table	
Sieve Shaker	- 2 Nos.
Speedy Moisture tester	
Concrete Test Hammer	
Stone/Concrete Cutter	

Service Laboratory Equipment

Welding Apparatus	
Electric Blower	- 2 Nos.
Hand Drill	
Electric heater	
Soldering kit/apparatus	
Acetylene regulator	
Spark lighter	
Lead pot	
Sanitary Appliances and fittings	- 2 sets
Water heater	
Pipe Cutter	
Portable Copper tube bending	
Bench pipe vice	
Cylinders	- 2 Nos
Forging Machine	
Plumbing and drainage pipe and fittings (assorted)	
Sets of Tool Boxes	- 2 Nos.

Drawing Office Equipment

1. T-Squares and drawing tables (120)
2. Enlargement and Reducing Machine (Faculty access)
3. Guillotine
4. Photocopier
5. Duplicating machine
6. Slide projector
7. Scanner

Typewriters (3)

Transportation

The training Building undergraduates involves a lot of outside work for practicals and demonstrations, visits to historic sites, building sites, etc. The following should be provided:

1 No. Land-rover
1 No. Station Wagon

Construction Equipment

2 Nos. Concrete Mixer (1 small and 1 large)
1 No. Dumper
10 Nos. Vibration Poker
1 No Crain
4 Nos. Rammer
4 Nos. Shovels
4 Nos. Diggers

Surveying equipment (Faculty resources)

10 Nos. Theodolites
10 Nos. Quick set level
10 Nos. Chains
2 0 Nos. Tapes
20 Nos. Ranging Rods
3 Nos. 100 metres Tapes

Computer Laboratory

Internet connectivity
Minimum of 20 Desk Top computers
1 No. Printer
1 No. Plotter
1 No. Digitizer
1 No. Scanner
1 No. Overhead projector

2.10.9 **Library And Information Resources:**

- the function of a departmental library
- acquisition 2 professional body and journals
- acquisition 2 special professional bodies relevant to the department
- link up with the information services of the Nigerian Institute of Quantity Surveyors and of other professional bodies.
- link up with the university central library and MIS Units.
- connection to further net services

2.10.10 **Attainment Levels:**

Statements on the minimum levels of attainment is as reflected in the general Benchmark statement for Environmental studies. However, cognitive and skill competence should be aligned to universities clarification of degrees eg. 1st class, 2nd class (Upper & Lower), and 3rd class.

2.10.11 **Maintenance of Curricula Relevance**

- Department to hold annual meetings with lecturers specifically to discuss possible changes in curriculum.
- Department to have accreditation exercise from the NUC, regularly.
- Department to have periodic student and employer evaluation.
- A general review is to be conducted every five (5) years.

APPENDIX 11.0

COURSE DISTRIBUTION

TABLE 11.0

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (QUANTITY SURVEYING)

FIRST SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Use of English		2	0	0	2
	Mathematical Methods I		2	1	0	3
	Construction Measurement I		2	0	0	2
	Physics		1	0	3	2
	Nature of Environmental Science		1	0	3	2
	Building construction and Material		1	0	3	2
	I		1	0	3	2
	Technical Drawing		0	0	3	1
	Workshop Practice		0	0	12	4
	Architectural Design Studio					
	TOTAL		**10**	**1**	**27**	**20**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 11.1

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (QUANTITY SURVEYING)

SECOND SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Statistics I		2	0	0	2
	Building Construction and Materials II		1	0	3	2
	Construction Measurement II		2	0	3	3
	Physics		1	0	3	2
	Mathematical Methods II		2	1	0	3
	Land Surveying I		1	0	3	2
	Introduction to Valuation		2	0	0	2
	Architectural Design Studio II		0	0	12	4
	Use of English		2	0	0	2
	TOTAL		**13**	**1**	**24**	**22**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 11.2

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (QUANTITY SURVEYING)

FIRST SEMESTER YEAR II

Code	Course Title	Pre-requisite	L	T	P	U
	Building Construction and Material III		1	0	2	2
	Structural Mechanics I		1	0	3	2
	Principles of Estimating		1	0	3	2
	Construction Measurement III		1	1	0	2
	Principles of Economics I		2	0	0	2
	Introduction to Computer Science		1	0	4	2
	Basic Elements of Planning		1	0	3	2
	Statistics II		2	0	0	2
	Architectural Design Studio III		0	0	12	4
	General Studies (Logic and Philosophy)		2	0	0	2
	TOTAL		**12**	**1**	**27**	**22**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 11.3

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (QUANTITY SURVEYING)

SECOND SEMESTER YEAR II

Code	Course Title	Pre-requisite	L	T	P	U
	Building Construction and Materials IV		1	1	3	3
	Construction Measurement IV		1	1	0	2
	Statistics III		1	0	3	2
	Structural Mechanics II		2	1	0	2
	Building Services I		2	0	0	2
	Applied Economics		2	0	0	2
	Environmental Education and Awareness		2	0	0	2
	General Studies (Nigerian People and Culture		2	0	0	2
	Computer Applications		1	0	3	2
	TOTAL		**14**	**2**	**9**	**19**

L = Lectures P = Practicals
T = Tutorials U =Credit Units

TABLE 11.4

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (QUANTITY SURVEYING)

FIRST SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Construction Measurement V		2	0	0	2
	Building Construction V		2	0	0	2
	Building Services II		2	0	0	2
	Estimation and Price Analysis I		2	1	0	3
	Statistics IV		1	1	0	2
	Introduction to Law		2	0	0	2
	Building Maintenance		2	0	0	2
	Sub-Total		**13**	**2**	**0**	**15**
	4 Units of Elective to be taken from below					4
	Total					**19**
	Environmental Management		2	0	0	2
	Principle of Valuation		1	1	0	2
	Urban Economics		2	0	0	2

L = Lectures P = Practicals
T = Tutorials U =Credit Units

TABLE 11.5

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (QUANTITY SURVEYING)

SECOND SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Construction Measurement VI		2	0	0	2
	Building Construction VI		2	0	0	2
	Estimating and price Analysis II		2	0	0	2
	Research Methods II		1	1	0	2
	Structural Theory and Design		1	0	3	2
	Entrepreneurship Studies I		2	0	0	2
	Law of contract II		2	0	0	2
	Sub-Total		**12**	**1**	**3**	**14**
	4 Units of Electives to be taken from below					4
	Total					**18**
	Theory and Techniques of Administrative Management.		2	0	0	2
	Water Resource Development		2	0	0	2
	Commercial Law		2	0	0	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 11.6

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (QUANTITY SURVEYING)

FIRST SEMESTER YEAR IV

Code	Course Title	Pre-requisite	L	T	P	U
	Building Economics II		2	0	0	2
	Measurement of Civil Engineering Construction		2	1	0	3
	Heavy Engineering/Measurement		1	1	3	3
	Entrepreneurship Studies		2	0	0	2
	Specification Writing		2	0	0	2
	Sub-Total		**9**	**2**	**3**	**12**
	4 Units of Electives to be taken from below					4
	Grand Total					**16**
	Personnel Management and Industrial Relations		2	0	0	2
	Highway Engineering		1	1	0	2
	Project Planning and Control II		1	0	3	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 11.7

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (QUANTITY SURVEYING)

FIRST SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Construction Measurement VII		2	0	0	2
	Project Management		2	0	0	2
	Cost Control I		3	0	0	3
	Professional Practice and Procedure		2	1	0	3
	Computer Application to Quantity		1	0	3	2
	Surveying		2	0	0	2
	Construction Management					
	Sub-Total		**12**	**1**	**3**	**14**
	4 Units of Electives taken from below					4
	Total					**18**
	Reinforced Concrete Structure		1	0	2	2
	Building and Development Economics		1	1	0	2
	Information Technology		2	0	0	2
	Development Problems in the Third world					

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 11.8

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (QUANTITY SURVEYING)

SECOND SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Construction Measurement VIII		2	1	0	2
	Professional Practice and Procedure		2	1	0	2
	Cost Control II		3	0	0	3
	Project Dissertation		0	0	18	6
	Building Contracts Law and Arbitration		2	0	0	2
	Sub-Total		**9**	**2**	**18**	**15**
	4 Units of Electives to be taken from below					4
	Grand Total					**19**
	Designs of Steel Structure		1	0	2	2
	Economics and Social Development		2	0	0	2
	Accounting II		2	0	0	2
	Cost Accounting		2	0	0	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

APPENDIX 11.1

SYNOPSES OF ALL COURSES

Mathematical Method I

This course includes set and vector theories and linear algebra in addition to first and second order differential equations. Dynamics of particles and static's; and rectilinear motion will also be covered.

General Physics

This covers fundamental principles of mechanics and elementary thermodynamics.

Nature of Environmental Science

Origins and growth of settlements, factors affecting the sitting and development of villages and town; the effects of advances in science, technology, medicine and public hygiene, system of land tenure and land use, the philosophy of physical planning and new or ideal towns; the social and economic forces and their effects on a demand for shelter and means of movement, the assessment of demand, the control of development and the maintenance and improvement of the environment.

Building Construction and Materials I

General introduction to basic building construction techniques and materials involving excavation, foundation, floors and walls, Building Materials include timber, stones, brick and cement blocks, concrete and reinforced concrete, mortar and rendering.

Structural Mechanics I

Introduction to Mechanics and design of building structures, including concurrent and non-concurrent coplanar forces, Movement of forces and properties of structural sections and kinematics of particles in various co-ordinate systems will also be considered.

Land Surveying I

Introduction and historical review of the development of survey methods and instruments. The theoretical and practical use and adjustment of advanced survey equipment in leveling, plotting and contouring.

Workshop Practice

Students will be exposed to practical work in the following area:
Carpentry, bricklaying, plumbing, interior and exterior decorations. In addition, students will also be involved with actual construction sites on the campus.

Techniques of Drawings and Design

The aim of this course is to introduce the student to three dimensional awareness, through graphic communication using freehand drawing exercises to develop accurate observation and skill in graphic representation. Other aspect will involve linear light shadow, detail and perspective renderings of varied subject matter, control of line, value colours, texture and form, using pencil, pen and brush.

Building Construction and Materials II

This course is a follow up to Building Construction and Materials I. It involves advanced detailing of elements of the building and functional requirements such as roofs, walls, floors, doors and window in relation to layout, nature of subsoil, bearing pressures, subsidence and movement. Consideration will also be given to building design with respect to substructure and superstructure.

Introduction to Quantity Surveying

This course is involved with the historical aspects of quantity surveying, Purpose of bills of quantities and principles of measurement, introduction to estimating and costing methods.

Basic Elements of Planning

The basic aim of the course is to study the process of generating and transforming urban and regional structure, such as city structures and systems. Descriptive models in existence will be examined as they relate to the needs of man. Development and modification of land form and structure.

Mathematical Methods II

This course involves the application of theoretical principles and methods in Mathematical Methods I to more complex situations. Advanced calculus including differentiation, Rolle's mean value and Taylor's theorems. Parametric differentiation with applications to plane covers. Series, convergence of a series, powers series, Taylor and Maclaurin series.

Land Surveying II

This course involves horizontal and vertical angle measurement using theologies. Differential profile leveling and application and calculation of areas and volume. Principles of photographic and aerial surveying.

Structural Mechanics II

Advanced treatment of the Kinematics of rigid bodies and engineering systems. A general expression for the distribution of sharing stress in beams. Design of columns and beams.

Building Construction and Materials III

Advanced study of building materials and their characteristics. Asbestos cement products, Asphalt and bituminous felts, glass, paints and their application in modern buildings.

Structural Theory and Design I

Elements and systems of constructions. Structural forms, design and materials. Theory of stress analysis of trusses; Frames structures. Development of the three moment equation.

Building and Architectural Science

Introduction to the science of environmental physics involving heat, light and sound. Principles of propagation and control. Thermal characteristics of building material and some elements of construction. Study of traditional building in varying climatic zones.

Principles of Measurement and Description I

This course is an introduction into the mechanics of measuring building works. Functions of bills of quantities. Principles of maturating, Taking-off, Abstracting and Billing.

Principles of Economics I

Outline of economic theory related to economic activities. Output and prices and their effect on prices of construction work. Price and market mechanism. The construction industry and its role in the National economy. Sources of Finance for construction works.

Statistical Methods and Sources I

The nature of statistical methods, frequency distribution, measures of central tendencies, mean, median, mode, etc. Elementary probability theory. Tests of hypothesis; small sample test-t-tests A2 and F tests.

Introduction to Valuation

The economic foundation of property values. Principal types of landed property and existing interests; introduction to methods of valuation compound interest theory. Calculations involving assessment of present value, etc. Construction of valuation Tables.

Building Construction and Materials IV

This course deals with the advanced study of the following functional elements:
Stair cases and ramps
Elevators and lifts
Ceilings and roof lights
Industrialised building systems
Principles of pneumatic structures

Principles of Measurement and Description II

This course deals with more practical examples of the measurements of building work related to simple building:

Work below ground level
Superstructure work
Finishes
External Works

Structural Theory and Design II

Stress analysis of statistically indeterminate space frames. Longspan structure, such as bridges and roof trusees. Arches and analysis. General cable theorem and its applications.

Statistical Methods and Sources II:

Time series and regression analysis. Index numbers, linear programming and transportation problems. Sampling theory and sources of statistical data in Nigeria.

Principles of Economics II

National income Accounting and analysis. Money and the Monetary System in Nigeria. The elements of Public Finance, International Trade and Economic Order. Import and Export trade financing in Nigeria.

Principles of Valuations

This course deals with the demand and supply for land and landed properties, principles of investment. In general it considers the characteristics, functions and operation of the property market and advanced method of valuations.

Advanced Measurement and Descriptions I

It is the first detailed study of the sections of the standard method of measurement of building works; by considering a complete measurement of simple buildings and complex sub structural work.

Building Economics I

The course is an introduction to cost planning processes including a review of measurements of building works and estimating within professional offices. Other aspects are construction economy, research and development. Cost control procedures and design economics. Cost implications of construction methods.

Estimating and Price Analysis I

The course deals with detailed analysis showing the basis upon which prices of Bills of Quantities items are compiled. It also includes contractors estimates and analysis of contractor's tenders.

Advanced Construction Technology I

The course deals with complex contemporary buildings and construction problems. It exceeds the knowledge gained in both building construction and materials and evaluation of traditional solution with prefabrication and industrialization.

Introduction to Law

The nature, course and classification of law. The Nigerian Legal and Judicial system. The sources of law, common law, national statutory law. Law of tort.

Building Maintenance I

This course deals with building maintenance technology, including agencies causing decay and changes in appearance of building materials. Structural survey of dwellings and schedule of dilapidations. Alternations, conversions, extensions and improvement of buildings.

Building Services I

This course deals with the various services in connection with building construction such as water supply, electricity and sewage disposal. It treats specifically cold and hot water services, network distribution, construction materials including regulating and codes of practices.

Population, Resources and Environment

Dynamics of rural land use, demographic and ecological change; the concept of global population density, food resources and land use; technological change, land resources and environmental conservation. Development strategies.

Urbanization

The evolution of a spatial system of cities, relationships between spatial organization and city formation, the process of urbanization, theories and techniques for studying urban growth. Urban-rural relations. Urban planning, urban systems and national integration.

Advanced Measurement and Description II

This is using realistic examples that will enable the student to rapidly integrate in a professional office or contractors office. Areas covered include: Complex concrete framed buildings, building services, finishes and preliminaries.

Building Economics II

Course contents includes: cost planning as a design tool. Cost criteria, cost plans, cost checks and reconciliation. Others are cost analysis, Indices and data and research. Practical application of cost control techniques during the construction process.

Estimating and Price Analysis II

Sources of information for pricing. Approximate method of estimating and introduction to standard schedule of prices. Build up of labour rates. Estimating for complex buildings.

Advanced Construction Technology II

The course deals with special topics in construction technology with emphasis on industrial processes and the engineering services required for effective functioning. These include mechanical plant and equipment, stability, natural influence on design and construction costs; large basement, dams, retaining walls and piling system. Others are large space roof systems and refuse disposal systems.

Building Maintenance II

The course will cover the management aspect of building maintenance. Topics include: maintenance cycles and profiles, maintenance standards, statutory requirements. Planning maintenance work and cost control of maintenance operations, organization of maintenance departments.

Building Services II

This emphasize selection and choice of circulation systems such as lifts, escalators, etc. Fire regulations and the British Standard and Codes of Practice. Gas and electrical services; installation and sizing. Examples of overall system design with calculations.

Theory and Techniques of Administrative Management

The nature of management, management of personnel, systems analysis and improvement, modern management techniques applied to Nigerian Local Government Administration and refers programme. Administrative implications of Federal – State – Local Government Relations in Nigeria. Case Studies in Management.

Water Resources Development

Definition and scope of water resources development. Occurrence, uses, supply and demand. Method of increasing availability. Flood control, navigation, water power, irrigation, water supply and recreation. Design, construction, operations and maintenance of dams and reservoirs.

Commercial Law

This course deals with the law relating to Agency, Sale of Goods and Hire Purchase. Creation of agency, definition and nature of contract of sale of goods. Nature and creation of hire-purchase contracts. The Hire Purchase Act 1965.

Measurement of Civil Engineering Works I

This course is an introduction to the measurement of Civil Engineering Works as a follow-up to the measurement of building works. Concept of measuration in civil works such as earthwork and excavation, will be illustrated with simple structures. It is also geared towards highlighting the differences between building and civil works.

Cost Control I

This course deals with advance cost planning techniques as means of optimizing the resources of the building industry. Other aspects of work to be covered is the theory of cost in use studies and its application to design alternatives.

Specification Writing

This course is designed to give student a practical approach in specifying building materials and components. The course contents include purpose and form of specification, principles standard method of measurements.

Project Dissertation I & II

Each student is expected to work on an independent project. The purpose is to develop the capacity to investigate an aspect of the discipline both in detail and depth and make an appraisal of his findings in a precise and coherent manner.

Construction Management I

The principles of management, setting objectives, planning and control; the organization and control of design work, the functions and activities of the design professionals; the integration of their separate skills, the sequence by which a client's brief is translated into drawings and specifications; the role of the contractor in design; supervision of construction works. The responsibilities and duties of persons involved in design and execution; form and method of communications, reports; monitoring progress and expenditure during execution.

Reinforced Concrete Structure

Introduction to reinforced concrete structures, bending, shear and torsion properties. Structural applications of reinforced concrete, and the use of CP 114. Introduction to design of prestressed concrete structures.

Highway Engineering

This course deals with the basic elements of highway design and construction. Planning requirement and layout, site investigation and surveys. Road design and construction including construction materials.

Information Storage and Retrieval

Structure, analysis, organization, storage searching and retrieval of information. Procedures for automated information dissemination systems and methods.

Transportation and assignment problems. Network analysis, critical path analysis, a simplex methods and queving theory.

Development Problems in the Third World

Economic, political and social changes in less developed countries. Problems of measurement, control and explanation of economic development and interrelated political administrative change. Internal and external pressures on development.

Measurement of Civil Engineering Works II

It deals with more complex structure such as Airports, Roads, Jetties, Dams and Bridges.

Cost Control II

This course involves a comprehensive review of cost control techniques and financial appraisal of development projects, feasibility studies, cost benefit analysis, etc. Economics of industrialized buildings.

Professional Practice and Procedure

The course deals with the principles of good practice for quantity surveyors in both public and private sectors. Preparation of Tender documents; tendering procedures and contractual arrangements. Preparation and Valuation, etc. Variations, and presentation. Final account. Rules for Professional Conduct and Practice.

Building Contract Law and Arbitration

Formation of building contracts, distinction between tendering procedures and contractual arrangements. Types of contract-lump sum schedule, contractor's obligations, quality control and protection of employer. Bankruptcy and insolvency, arbitration procedure and practices.

Construction Management II

The course deals with the sequence, organization and control of projects and their inter-relationships in contractor's office. Building management procedures from conception to completion. Co-ordination, control and supervision of single and multiple contracts. Introduction to work study, productivity studies. Financing of capital projects, working capital projects, working capital and flow of funds. Contract claims and settlements. Cost reporting.

Economics and Social Development

The link between development and ideology, self reliance and self-sustaining. A review of National Development programme in Nigeria. Source of finance and capital accumulation. Urban and rural development administration.

Principles of Accounting

The nature of Business Transactions and Transactors; Definition of accounting, the scope and function of financial accounting. Types of business organization. The accounting equation, the theory of double entry book-keeping, partnership accounts, interests on capital, interest on drawings and partners salaries. Dissolution of partnership.

Cost Accounting

Elements of cost and cost behaviour. Accounting for labour, material, plant and overheads. Stock Valuation. Job order costing and contract account. Budgeting, standard costing, etc.

Personnel Management and Industrial Relations

General Historical background of trade unions (industrial unions) with particular reference to Nigeria. Nigeria labour laws and codes, influence of trade unions on industrial management in Nigeria, nature and scope of collective bargaining. Roles of government and other bodies in grievance resolution.

2.11 Benchmark Minimum Academic Standard for Urban and Regional Planning Degree Programme

2.11.1 Introduction:

Urban and Regional Planning Programme is a professional discipline in its own right. It is the art and Science of ordering and managing land uses, environment, based on detailed understanding and analysis of societal needs, within the socio-economic, environmental management framework.

It is concerned with the information, design implementation and monitoring of land use plans, policies at the Local, Urban and Regional levels, and environmental management through information technology and entrepreneurship for effective development.

It is a broad-based discipline, requiring a multi-disciplinary approach and knowledge, therefore requires a comprehensive education and training in the planning, design and management of the total environment.

Degree in view:

The degree is:

(i) Bachelor of Urban & Regional Planning (BURP)
(ii) Bachelor of Science (Urban Planning and Regional Planning
(iii) Bachelor of Technology (Urban Planning and Physical Planning) (in the University of Science and Technology).

Admission Requirements

Admission requirements into the programme will definitely change with the introduction of the 6-3-3-4 educational programme. In the interim admission requirements that caters for the transitional period is taken care of.

Admission to Part I

Under the new 6-3-3-4 education programme, the entry requirements for urban and regional planning should be 5 credit at the Senior Secondary School Certificate (SSSC). The subjects should include English language, Mathematics and Geography, and any two from the following: Physics, chemistry, Technical Drawing, Fine Arts and Surveying after obtaining acceptable pass in the JME. For WASC/GCE "O" Level candidates the five subjects to be passed at credit level should include English Language, Mathematics, Geography and two other subjects taken from Biology, Physics, chemistry, Technical Drawing and Fine Arts.

Special Admissions

Candidates with the following qualification should be admitted into part II of the programme:

(a) Holders of Ordinary National diploma (OND) either in Town Planning or related disciplines in environmental Sciences who fulfill the following conditions:

(i) Satisfied minimum Ordinary Level subjects as stated above;
(ii) Score not less than 60 percent in any subject offered in the OND courses.

(b) Holders of General Certificate of Education at advanced level with passes in Mathematics, Geography and one subject from the following: economics, Physics, Chemistry, Biology, Technical Drawing and Fine Arts with two other subjects passed at credit level in the WAEC/GCE or equivalent as listed for Admission to part I.

(c) In special cases holders of HND and its equivalent and those transferring from other Universities/Institutions may be admitted into appropriate part of the programme.

2.11.2 **Duration:**

The duration of the programme is expected to be minimum of ten semesters and the maximum of 15 semesters.

2.11.3 **Aims And Objectives**

(a) **Aims:**

The Objectives of Urban and Regional Programme are to:

i) provide a broad based education and training which will assist in developing students intellectual and professional capacities to a high standard.

ii) provide a sound professional planner, who can operate effectively in the Urban and Regional Planning in general and in Nigeria in particular.

iii) produce planners who can operate effectively in the environmental management using Urban and Regional Planning methods and principles.

(b) (i) develop the key concept and principles of Urban and Regional Planning.

(ii) teach students basic theories, methods and management of land use activities and the environment.

(iii) assist the students to acquire constructive developmental understanding of the social, economics technological and legal framework of the society.

iv) develop in students entrepreneurial skills of value in self employment.

v) inculcate in students the use of information technology on the effective management of environment, land use, etc.

2.11.4 **Learning Outcomes: Regime of Subject Knowledge:**

Students are expected to develop a wide range of different abilities and skills in planning theory, land use planning, Environmental Management, Planning design.

Students are expected to be skilled in the preparation of master plans, traffic plans, Layout preparation.

Students are expected to have skill in Transportation Planning Urban Renewal techniques, Recreational Planning, Environmental Impact assessment,

Students are expected to develop abilities in studio design, Modelling of Town Plans, use of computers for effective management of environment.

Student are expected to develop skills for industrial development planning, Population and Urbanization processes

Students are expected to be conversant with skills for development control and settlement disputes.

Knowledge in planning legal aspects, Quantitative techniques and evaluation of planning projects.

Competencies and Skills

(i) Ability to demonstrate knowledge and understanding essential facts, concepts, principles and theories land use planning, Master Plans, Environmental management.

(ii) Ability to apply such knowledge and understanding to the solution of qualitative and quantitative problems of a familiar and unfamiliar nature of planning.

(iii) Ability to recognise and analyse planning problems and plan strategies for their planning solution.

Skills in presenting materials and arguments clearly to a range of audiences.

Ability to compute data relating to information management in planning practices

Ability to inculcate collaborative team work.

Ability to use acquired skills in planning to develop entrepreneurial skills for self planning employment.

Behavioural Attributes

Skills required for the conduct of standard studio procedures involved in design
and modelling of planning practice.

Skills in the monitoring, by observation and measurement of environmental events or changes of environmental events or changes

Skills in recording and documentation of reliable information in planning.

(i) Academic staff/student Ratio = 1:8

(ii) Academic Physical Spaces:

1.	Professor office	24 m2
2.	Head of Department	24 m2
3.	Senior Lecturer	16 m2
4.	Lecturer	12 m2
5.	Assist Lecturer	8 m2
6.	Senior Tech. Staff	12 m2
7.	Senior Adm.	12 m2
8.	Junior Tech. Staff	5 m2

* **Studies** = 4 m2

* Seminar space = 0.5 m2
* Laboratory space = 0.5 m2
* Library and information resource. The Department should organize Departmental Library aside from the Institutions Library.

General Skills:

Communication skills, covering both written, graphic, modelling, and oral communication skills.

Problem-solving skills, relating to quantitative and evaluations have to be made on the basis of limited information, e.g. traffic flow, population.

Information–retrieval skills in relation to primary and secondary information sources, including information retrieval through on-line computer searches in population growth, housing, traffic plans etc.

Information – technology skills such as word-processing, and spreadsheets use, data- logging and storage, Internet communication in planning .

Interpersonal skills, relating to the ability to interact with other people and to engage in team work in planning.

Time management and organisational skills in planning projects, as evidenced by the ability to plan and implement effective and efficient planning programme.

2.11.5 **Resource Requirements for Teaching and Learning in the Programme**

(i) Academic Staff: There should be enough academic staff for the required staff – student ratio of 1:15 in planning

2.11.6 **Attainment Levels**

A – Students in this category are expected to demonstrate high standard of knowledge, abilities, skills acquired and must be identified through performances of the students.

This is an indication that the student has conceptual understanding, with accuracy in problem solving procedures in planning. It also means that his performance in transferable skills is very good.

The award of different classes of degrees depends on individual performance, and competencies.

2.11.7 **Maintenance of Curriculum Relevance:**

There should be a student/teacher evaluation in individual institutions. The Department of Urban and Regional Planning should periodically review the curricular. Courses relevant to different areas where the planning programme is mounted should be encouraged to solve such problems of the area (e.g. coastal planning or environmental planning).

2.11.8 **Performance Evaluation Criteria**

Where there is a planning programme for the award of degree;

There should be enough qualified Lecturers
Provision of space for studios, model rooms
Equipment (Some can be shared where there are many Departments in the Faculty).
Lecturers spaces
Vehicles for both students/staff use

Curriculum (up-date).

* **Credit Units:**

  180 Credit Units in the 5 years programme.

  A minimum of 18 credit units per semester is envisaged

* **Course Evaluation**

  Candidates for the examinations shall satisfactorily complete course work set in each subject in the form of term papers, continuous assessments, short quizes, short tests, a compulsory residential field trip and industrial attachment programme.

Assessments shall be between 40% - 60% and the semester examinations which carries 60% - 70%

2.11.9 **Course Requirements**

Below are key areas of planning discipline.

Planning Theory
Land Use Studies
Planning Techniques
Planning Design
Planning Studies
Professional Practice
Planning Research and Seminar
Applied Sciences and Humanities

The different courses are distributed according to their importance as core courses and electives.

Key Areas in Urban and Regional Planning Theory

Introduction to Environmental Design and Management
Basic Elements of Planning
Urban Development Planning
Rural Development Planning
Planning theory
History of Planning
Population and Urbanisation
Advance Regional Planning

Land Use Studies
Housing Studies

Transportation Planning I and II

Public Utilities and Services
Urban Renewal Techniques
Land Use and Management Theory I and II
Industrial Development Planning
Recreation Planning
Land Economics I and II

Planning Techniques

Quantitative Techniques in Planning
Project Planning and Evaluation
Land Surveying
Environmental Impact Assessment
Principles of Valuation I
Application of computer to Planning I and II
Introduction to Measurements and Description

Planning Design

Site Selection and Planning
Building Design and Construction
Urban Design
Landscape Design
Planning Design
Planning studios
Planning Studios I _ VII

Professional Practice

Professional Practice I and II
Management and Planning
Planning Land procedures
Development control and Settlement of disputes
Oral Examination

Planning Research and Seminar

Research Techniques in Planning
Project Dissertation
Planning Seminars
Independent Projects

Applied Science And Humanities

General Studies
Principles of economics
Sociology for Planners
The Governing of Man
Introduction to Psychology
Statistical Sources and Methods I

Mathematical Methods I
Land Law
Law of Contract
Ecology and Natural Resources

Special Topics

1. Environmental Engineering
2. National Economic Development Planning
3. Political Economy of Nigeria
4. Applications of Operations Research in Planning
5. Metropolitan Planning
6. Computer Aided Design
7. Applications of GIS/LS in Planning
8. Technical Writing
9. Planning Model Making
10. Comprehensive Development Planning
11. Evolution of Planning thought
12. Community Development Planning
13. Technology, Human Settlement and Development

APPENDIX 12.0: DISTRIBUTION OF COURSES

TABLE 12.0

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (URBAN AND REGIONAL PLANNING)

FIRST SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Mathematical Methods I		2	1	0	3
	Nature of Environmental Sciences		1	0	3	2
	Principles of Economics		2	0	0	2
	History of Planning		2	1	0	3
	Introduction of sociology		2	0	0	2
	Fundamentals of Geography		1	1	0	2
	The Governing of Man		1	1	0	2
	Use of English		2	0	0	2
	TOTAL		**16**	**1**	**6**	**18**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 12.1

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (URBAN AND REGIONAL PLANNING)

SECOND SEMESTER YEAR I

Code	Course Title	Pre-requisite	L	T	P	U
	Population & Urbanisation Studies		2	0	0	2
	Geomorphology		1	1	0	2
	Basic Elements of Planning		1	0	3	2
	Introduction to Architectural Design		0	0	9	3
	Introduction to Measurements &		1	0	3	2
	Descriptions		2	1	0	3
	Urban Development Planning		2	0	0	2
	Communication Skills		2	0	0	2
	Techniques of Drawing & Design					
	TOTAL		**11**	**2**	**15**	**18**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 12.2

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (URBAN AND REGIONAL PLANNING)

FIRST SEMESTER YEAR II

Code	Course Title	Pre-requisite	L	T	P	U
	Building Construction and Materials I		1	0	3	2
	Planning Studio I		0	0	9	3
	Site Selection and Planning		1	0	3	2
	Land Economics I		1	1	0	2
	Statistical Methods/Sources		2	1	0	3
	Land Surveying		1	0	3	2
	Introduction to Computer		1	0	4	2
	Appreciation		2	0	0	2
	General Studies (Logic and Philosophy)					
	TOTAL		**9**	**2**	**22**	**18**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 12.3

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (URBAN AND REGIONAL PLANNING)

SECOND SEMESTER YEAR II

Code	Course Title	Pre-requisite	L	T	P	U
	Regional Development Planning		1	1	0	2
	Planning Studio II		0	0	9	3
	Natural Resources and Environmental Planning		1	1	0	2
	Land Economics II		1	1	0	2
	Quantitative Technique and Research in Planning		1	1	3	3
	Building construction and Materials II		1	0	3	2
	Planning laws and Procedures		1	1	0	2
	General Studies (Nigerian People and Culture)		2	0	0	2
	Principles of Remote Sensing		2	0	0	2
	TOTAL		**10**	**5**	**11**	**21**

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 12.4

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (URBAN AND REGIONAL PLANNING)
FIRST SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Housing		2	1	0	3
	Computer application		0	0	8	2
	Planning Studio III		0	0	9	3
	Traffic and Transportation Planning I		1	1	0	2
	Principles of Valuation		1	1	0	2
	Land Use and Resources Management		1	0	3	2
	GIS		1	0	3	2
	Theory I					
	Sub-Total		**6**	**3**	**23**	**16**
	4 Units of Electives Selected from below					4
	Total					**20**
	Rural Development Planning		1	0	3	2
	Introduction to Operation Research		2	0	0	2
	Design Economics and cost planning		1	0	3	2
	Introduction to Psychology		2	0	0	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 12.5

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (URBAN AND REGIONAL PLANNING)

SECOND SEMESTER YEAR III

Code	Course Title	Pre-requisite	L	T	P	U
	Traffic and Transportation planning II		1	0	3	2
	Planning Studio IV		0	0	9	3
	Industrial Development Planning		1	1	0	2
	Landscape Design		2	0	3	3
	Land Use and Resource Management		1	1	0	2
	Theory I		2	0	3	3
	Entrepreneurial Studies I		2	0	0	2
	Elements of Land Law		2	0	0	3
	Project Planning and Evaluation					
	SUB-TOTAL		**9**	**2**	**18**	**20**
	3 Units of Electives chosen from below					3
	Grand Total					**23**
	Highway Engineering		1	0		2
	Introduction to Philosophy		1	1		2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 12.6

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (URBAN AND REGIONAL PLANNING)

FIRST SEMESTER YEAR IV

Code	Course Title	Pre-requisite	L	T	P	U
	Urban Design		1	0	3	2
	Management and Planning		1	1	0	2
	Law of Contract and Tort		2	1	0	3
	Planning Studio V		0	0	9	3
	Public Utilities and Services		1	0	3	2
	Human Settlement and Development		2	0	0	2
	Urban Renewal Techniques		2	0	3	3
	SUB-TOTAL		**9**	**2**	**18**	**17**
	3 Units of Electives taken from below					3
	Grand total					**18**
	Highway Engineering		2	0	3	3
	Theory and Techniques of		2	1	0	3
	Administrative Management		2	0	3	3
	Pollution Control and Management					

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 12.7

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (URBAN AND REGIONAL PLANNING)

FIRST SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Planning Studio VI		0	0	9	3
	Environmental Impact Assessment		2	0	3	3
	Independent Project on Nigeria		0	0	6	2
	Project Dissertation I		0	0	9	3
	Planning Seminars		0	2	0	2
	Professional Practice I		1	1	0	2
	Advanced Regional Planning		2	0	0	2
	SUB-TOTAL		**5**	**3**	**27**	**17**
	3 Units of Electives chosen from below					3
	Total					**18**
	Tourism Planning and Development		2	0	0	2
	Environmental Law		2	0	0	2

L = Lectures P = Practical
T = Tutorials U =Credit Units

TABLE 12.8

SUMMARY OF COURSE REQUIREMENTS FOR BACHELOR OF SCIENCE (URBAN AND REGIONAL PLANNING)

SECOND SEMESTER YEAR V

Code	Course Title	Pre-requisite	L	T	P	U
	Advance Planning theory Recreation Planning Professional Practice II Project Dissertation II Planning control and Settlement of disputes Planning Studio VII		2 1 1 0 1 0	1 0 1 0 1 0	0 3 0 9 0 9	3 2 2 3 2 3
	Sub-Total		**5**	**3**	**21**	**15**
	3 Units of Electives chosen from below					3
	Grand Total					**18**
	Advance Landscape Design Advanced Housing Studies Tourism Planning and Development		2 2 2	0 0 0	3 3 3	3 3 3

L = Lectures P = Practical
T = Tutorials U =Credit Units

APPENDIX 12.1: COURSE SYNOPSIS

Planning mathematical Methods I

Sequences and series
Calculus
Numerical Methods
Differential equation

Nature of Environmental Science

Introduction to theory of planning
Relationship of planning with other environmental disciplines
The Nature of planning as an activity
Planning Process
communication skills in Planning

Principles of economics

Introduction to economics, its scope and methodology
Micro-economic theory
Price theory
Demand and Supply, Elasticity, Consumer behaviour
Factors of production
National Income
International Trade

History of Planning

Historical evaluation of settlements
History of planning as statutory undertaken in developed and developing countries.
Case studies of towns in Nigeria both historic and contemporary ones

Introduction to Sociology

Social norms and behaviour
Social theory
Types of different societies
Sociology of planning

Building Construction and Materials I

Simple building principles
Building construction materials
Site preparation
Foundations
Builders Tools and Equipment
Nigerian Building Bye-law

Building construction and Materials II

This is to build on the first tier stage of this course. Students are to be exposed to practical aspects of typical design and constructional details e.g. foundation, walls, floors, -roofs, doors, window's, staircases, finishes.

Basic Theory of Planning

Theory and models of urban and rural land use
The rationale for town planning
Morphological structure of Nigerian cities
Planning models
The planning process

Planning Studio I

Graphic techniques
Study of Planning Problems of site
Land use survey and analysis of a local setting
Technical report writing

Urban Development Planning

Growth factors and forms of cities
Dimensioning urban land use problems
space allocation standards
Methods of study and projection of land use, demographic and economic data

Traffic and Transportation I

- The aims, roles, objectives of transportation planning
- Relationship of transportation to land use planning
- Transport Modes
- Transportation Planning process
- Methods of collection, analysis and projection of traffic data
- Transport system, traffic control measures and management.

Planning Studio II

- Project Planning at an urban scale
- Demonstration and application of the principles of planning to a range of interrelated urban land use problems.
- Technical Reporting

Planning Laws and procedures

- Concepts of Law and administrative procedures
- Introduction to general law
- Land law, conveyance

- Origin and sources of Nigeria Law
- Law of tort and contract
- Legal controls on statutory bodies
- Appeals and enforcements
- Case studies of application of planning laws to existing situation

Site Selection and Planning

- Definition and scope of site planning
- Principles and factors of site selection
- Site survey and analysis for purposeful design
- Site design brief, goals and objectives
- Site design process – outline and detailed design
- Site engineering and infrastructure
- Design standards and regulations

Land Economics I

- Land resources of Nigeria
- Land as factor of production
- Population growth and land use
- Land tenure system
- Land and property markets
- Legal controls on land use
- Economic basis of urbanization
- Urban structure and land use pattern

Statistical Sources and Methods I

- Nature of statistical methods
- Frequency distribution
- Measures of Central Tendencies and Dispersion
- Probability theory
- Bionomical, Normal and Poison Distribution
- Test of Hypothesis, Regression Analysis
- Analysis of Variance

Land Surveying

- Types of Surveys
- Survey Instruments
- Measurement of Distances
- Levelling
- Theodolite
- Introduction to remote sensing (Photogranometry)

Regional Development Planning

- Concept of a region
- Central place theory

- Theories and processes of regional development
- Regional Imbalance
- Strategies for regional planning

Planning Studio III

- Studies of a major land use problem at an urban scale e.g. transportation and the design of solution
- Technical reporting

Natural Resources and Environmental Planning

- The concept of ecology as applied to the natural environment
- Climatic conditions
- The use and abuse of natural resources e.g. water, air, land
- Extractive industries
- Environmental planning problems and solutions, e.g. pollution, soil erosion, desertification, etc.
- Conservation of natural resources

Land Economics II

- Effect of land value and land use on the operation of the price mechanism
- The land development process
- Financing of developments
- The economic rent concept
- The economic factors governing development and redevelopment
- Effect of taxation on landed property

Quantitative Techniques in Planning

- Simple analytical techniques for analyzing planning data
- Regression analysis
- Factor analysis
- Analysis of variance
- Forecast techniques
- Spatial interaction models
- Models in planning

Traffic and Transportation Planning II

- Traffic engineering and design
- Traffic management techniques
- Mass transit system
- Advance techniques for transportation planning
- Preparation and implementation of transportation planning

Principles of Valuation I

- Function of valuer
- Definition of value
- Types of landed property
- Demand and supply of land
- Investment market
- The property market
- Principles and methods of property valuation
- Case studies

Housing

- Concept of housing
- Housing types
- Housing Demand and supply
- Housing infrastructure
- Appraisal of existing housing policy
- Housing finance.

Planning Studio IV

- Studio project on assessing housing needs and problems and devising appropriate planning solution
- Technical reporting

Management and Planning

- Principles of management as applied to planning profession
- Methods of financing plans
- Methods of implementing and managing land use plans
- Personnel management in planning

Research Techniques in Planning

- Sources of information in planning
- Different techniques in planning
- Design a planning research
- Attributes of a planning research and problem area
- Review of research techniques in planning in Nigeria

Land Use and Management Theory I

- Functions of and forms of management techniques
- The process of land use change
- Theory of public control over private use

Land Law I

- Basic elements of land law
- Land tenure, ownership
- Rights in land, casement, right of way
- Riparian land owners
- Legal controls over land ownership

Environmental Impact assessment

- Different methods of assessing the impact of proposed development in the existing physical, social, economic and technological frameworks.

Urban Design

- Principles and methods of urban design
- Urban conservation
- Methods of restoration of historic landscapes and building
- Application of urban design principles to town centre redevelopment

Public Utilities and Services

- Planning consideration and design standards for public utilities and services such as drainage, water supply, electricity, telephones, sewage, etc.
- Methods of site investigation for planning for utilities
- Management principles for public utilities and services

Planning Studio V

- Project on city centre renewal and devising appropriate planning solution.
- Technical reporting

Industrial Development Planning

- Factors affecting the location of industry
- Assessment of land for industrial land use
- Design standards for industrial land use
- Management principles for industrial land use

Landscape Design

- Concepts in landscape design
- Basic elements of landscape
- Climate and landscape design
- Landscape design goals, processes and analytical methods
- Landscape construction materials and methods
- Planting design
- Management of landscape

Land use and Management Theory II

- Estate ownership and control
- Building of new and expanding towns
- Leasing of estates

Project Planning and Evaluation

- The nature and processes of project planning
- Public vs private projects
- Methods of evaluating projects

Law of Contract

- Introduction to Nigeria legal system
- Formation of contract
- Breach of contract and remedies
- Nature of tort
- Negligence
- Public nuisance
- The Rule in Raylands and Fletcher

Highway Engineering

- Road design and construction methods
- Road Geometry
- Highway construction materials
- Road Alignment principles and aesthetic considerations
- Road Furniture
- Maintenance of highway infrastructure

Planning Studio VI

- Studio project-city centre renewal
- Technical reporting

Urban Renewal Techniques

- Urban renewal as a technique for improving living conditions
- Cost and benefits of urban renewal schemes
- Economic and social consideration for urban renewal
- Management of urban renewal scheme
- Case studies of renewal scheme

Independent project on Nigerian Problem

Students are eligible to chose any topic of their choice for study in due consultation with their supervisors.

Planning Seminars

Every student is expected to present at least a seminar paper on a major planning issue. This may be related to either the topics of dissertation or independent project.

This is to test the candidates ability to present his ideas in a seminar paper of high academic and professional standards.

Professional Practice I

- Legal basis of planning
- The ethics of preparing land use master plans
- Principles of writing planning brief
- Pitfalls in planning communication, technical reporting and graphic techniques

Advanced Regional Planning

- Theories of regional planning
- Dimensioning regional planning problems in Nigeria
- Case studies and application of relevant regional planning theories to existing situation

Advanced Planning Theory

This Course is to build on the basic element of planning by developing it to a more advanced stage

- Theories of urban growth and structure
- Planning models and their relevance
- The strategic choice approach to planning
- Corporate planning

Recreation Planning

- Definition of recreation
- Assessment of supply and demand for recreational resources
- Recreation planning standard
- Recreation carrying capacity
- Management of recreation resources

Professional Practice II

- The NITP as compared with other professional bodies
- Code of professional practice
- Procedures for membership of NITP
- The NITP charter
- Planning and politics
- Planners and the elected representative
- Planners and the general public

Project Dissertation I & II

Every student will be required to choose a topic as a special area of study in the planning profession to demonstrate their ability to carry out an independent work with little guidance to a high academic and professional level. Students are to choose their subjects in due consultation with their supervisors.

Planning Control and Settlement of Disputes

- Development control measures
- Cases in planning
- Compulsory acquisition and compensation

Planning Studio VII

- Studio project on planning for new towns. This project will enable the student to demonstrate all the planning principles so far learnt and carry this to a finesse in the planning and design of a new town.
- Technical reporting

Introduction to Psychology

- Personal beliefs
- The nature of human behaviour in various societies
- Some Renown Philosophers
- Theories of personality and abnormal behaviour

Oral Examination

At the end of every semester, every candidate will be examined orally to develop their oral skills and build up their self confidence.

Advanced Landscape Design

This course is build-up on landscape design. It is in form of lectures and a major studio project. Practical work include detailed studies of landscape construction materials (both hard and software) and design exercises on major landscape projects such as housing, erosion, flooding, transportation, industry, public parks, forestry, beaches, land reclamation, landscape conservation techniques, landscape management techniques.

Advanced Housing

Course will advance earlier knowledge in basic course in housing and urban renewal techniques. Key concepts in housing provision, design, finance, construction and management will be studied in relation to typical housing areas.

Tourism Planning and Development

- Nature of Tourism and development
- Essentials of Tourism planning
- Tourism resources of Nigeria
- Consideration for design, construction and development of tourist resorts
- Tourism organization, Travel Agent and developers
- Impacts of Tourism
- Principles of Tourism management