COVENANT UNIVERSITY

ACADEMIC HANDBOOK
(UNDERGRADUATE)

COLLEGE OF SCIENCE AND TECHNOLOGY (CST)

2014 – 2017

COVENANT UNIVERSITY

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TABLE OF CONTENTS

CHANCELLOR AND CHAIRMAN, BOARD OF REGENTS

David Oyedepo, *Ph.D, FNAE*

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WELCOME MESSAGE FROM THE CHANCELLOR

Raising A New Generation Of Leaders

"Seest thou a man diligent in his business? he shall stand before kings; he shall not stand before mean men". (Proverbs 22:29 - KJV)

Covenant University is a Royal Academy birthed on the platform of a compelling vision to raise a new generation of leaders, especially for the Continent of Africa. It is indeed the birth place of "kings and queens". I do believe that the greatest need of the 21st Century is that of Leadership, whereas leadership is not an endowment, it is a commitment to the future that makes a leader.

Our mission at Covenant University is to develop the man who will in turn develop his world. We see character as the anchor of leadership. Ability makes a manager but integrity makes a leader.

Our experience over the last twelve years strongly indicates the great potential we have as a University in instituting a world class learning context that is rich in educational opportunities, research and scholarship. The heart-warming positive feedback from employers on the excellent and exemplary conducts of our graduates is indeed, one of the many concrete validations of the University's unique vision. We are however, looking ahead to the future we envision in driving excellence across all our programmes by ensuring that the stage is well anchored to actualize our set vision of raising a new generation of leaders.

Only a serious approach guarantees a glorious result. There is no short cut to any place worth going. Edmund Hilary, the first man that conquered Mount Everest, said, "It is not the mountain that we conquered but ourselves". Covenant University is indeed a place where you are taught how to conquer yourself as part of the process of becoming outstanding in life. Therefore, if leadership and excellence are your goals, then Covenant University is the right place for you.

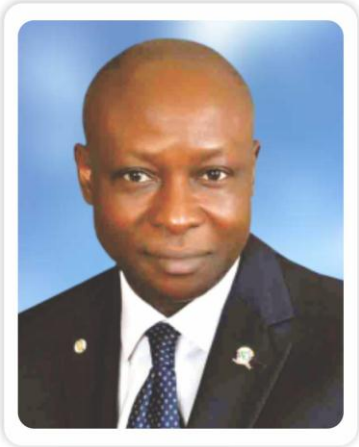
Starting from the 2013/2014 Academic Session, every student of the University shall be made to undertake at least a Certificate/Diploma Course in Leadership in addition to his/her major discipline.

Therefore, the currency of the curriculum and the inclusion of Leadership Certificate will be one of the unique selling points.

You are welcome to Covenant University, a Royal Academy, a Leadership Training Varsity.

Dr. David O. Oyedepo
Chancellor, Covenant University

FROM THE VICE-CHANCELLOR'S DESK



On assumption of Office as the third substantive Vice-Chancellor of Covenant University, coming up immediately after the 10th Anniversary of the University, my team was given the mandate to get the University listed as one of the best ten Universities in the world within the next ten years. This mandate is presented as Vision 10:1022 and christened (1 of 10 in 10).

The mandate is a very ambitious one, but looking through the accomplishments of the University within the first ten years of existence, the various awards and laurels, the radical changes brought on board, the curricula of the University system in terms of Entrepreneurial Development Studies, Information and Communication Engineering amongst others, we are convinced beyond reasonable doubt that the feat is attainable. Using the testimony of David when he confronted Goliath, he said: "Your servant slew both the lion and the bear; and this uncircumcised Philistine shall be as one of them, ..." (I Sam, 17:36 KJV). By God's Grace, this vision shall be actualized.

In order to successfully accomplish this feat, Management instituted a number of measures, which include: Review of curricula, improved research products and collaboration, improved scholarly publications in recognized outlets, improved teaching facilities, improved teaching and learning environment to attract international faculty and students as well as internationalization of our operations.

The revised curricula are aimed at improving global relevance, employability of our graduates as well as making them major contributors to the fulfillment of Vision 10:2022 and the Millennium Development Goals (MDGs).

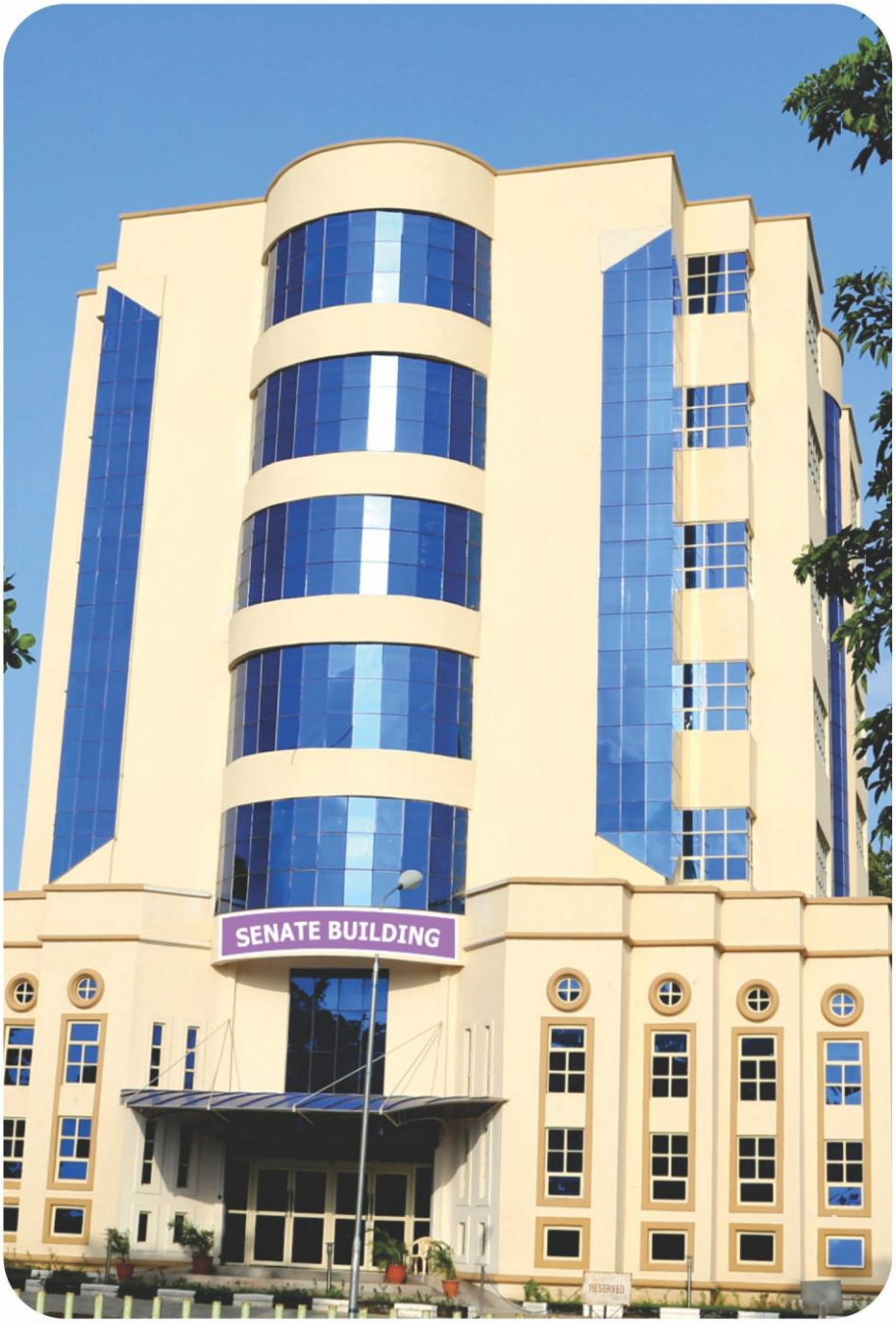
What a privilege to have this crop of students benefit from this revised edition. Congratulations!

Vision 10:2022 (1 of 10 in 10) - A Prophetic Verdict

Professor Charles K. Ayo
Vice-Chancellor, Covenant University

Covenant University Gate

Covenant University Centre for Learning Resources



Senate Building

CHAPTER ONE
INTRODUCTION

1.0 THE NAME: COVENANT UNIVERSITY (CU)

All over Africa, and Nigeria in particular, a great significance is attached to names. They portray meanings and convey important messages. Names reflect circumstances of birth or events. The word "Covenant" was chosen as an expression of the University's total commitment and vow to make a Total Man of her students. It reflects the intention of the proprietors of the University to uphold a binding agreement with students to deliver their desires for excellence and career exploits by offering them the best in educational attainment and by offering their parents/guardians the best value for their investment. It is also common knowledge that every covenant is ratified by blood and, as a church-sponsored University, we consider the blood of Jesus Christ, which is the blood of the everlasting covenant, as our stronghold in the fulfilment of this awesome obligation. Covenant University vows to make of her graduates expert thinkers, leader-managers, and hyper-resourceful technocrats in all fields of human endeavour.

1.1 OUR VISION

To be a leading World-Class University, committed to raising a new generation of leaders in all fields of human endeavour.

1.2 OUR MISSION

To create knowledge and restore man's dignity through a Human Development concept of the Total Man, employing innovative, leading-edge, teaching and learning methods.

Application of research that promotes integrated, life-transforming values through Science, Technology and Human Capacity Building.

On October 21, 2002, the African educational landscape was radically altered by the formal entry of Covenant University (CU) into the Higher Education context. The University is located at Canaanland, Ota, Ogun State, Nigeria. The University is a growing, dynamic vision-birthed and

vision-driven University, founded on a Christian mission ethos and committed to pioneering excellence at the cutting edge of learning.

The University's specific mandate can be stated as follows:

"Raising a new generation of leaders through a qualitative and life-applicable training system that focuses on value and skill development".
"Raising a new generation of leaders through a broad-based qualitative education built on sound biblical principles culminating in the birth of path-finders, pace-setters and trail-blazers".

"Raising a new generation of leaders who shall redeem the battered image of the black race and restore her lost glory as this trained army of reformers begins to build the old wastes, repair the wasted cities and raise the desolation of many generations".

1.3 OUR FOUNDING PHILOSOPHY

In response to the global demand for a departure from dogmatism to dynamism in the existing educational system, Covenant University is built on the following philosophical platform:

- a departure from form to skill
- a departure from knowledge to empowerment
- a departure from figures to future-building
- a departure from legalism to realism
- a departure from mathe-matics to life-matics.

This is reflected in our motto: "Raising a New Generation of Leaders".

1.4 OUR OBJECTIVES

The objectives of the University are to:

i. provide facilities for learning and give instructions and training in such areas of knowledge that will produce sound and mentally equipped graduates, who will provide intellectual leadership in academic institutions, industry and the public sector through the Total Man Concept approach;

ii. develop and offer academic and professional programmes leading to the award of diplomas, first degrees and higher degrees, which emphasize planning, adaptive and technological maintenance, developmental and productive skills;
iii. promote by research and other means, the advancement of knowledge and its practical application to social, cultural, economic, scientific and technological problems;
iv. encourage and promote scholarship and conduct research in all fields of learning and human endeavour;
v. disseminate scientific and technological knowledge among scientists, researchers, industries, trade services and other bodies; and
vi. relate its activities to the technological, scientific and socio-economic needs of the people of Nigeria and to undertake other activities appropriate for a University of the highest standard.

1.5 OUR CORE VALUES

Our Core Values as a University are the defining components of the Covenant University Vision and they reflect our beliefs in the encrypted truths that firmly define our purpose and the underlining ethos of our existence as a University.

As a University, we strongly uphold the practices embedded in our Core Values and strive to integrate these Values into all facets of our functions and operations as a University. We expect that students of Covenant University will visibly demonstrate and integrate the virtues embedded in these Core Values in their daily conduct as students who are being raised along the Vision lines of raising a New Generation of Leaders for the Continent of Africa on the Total Man Concept-driven developmental platform. All students are expected to adhere strictly to the University's Core Values in their day-to-day activities within or outside the University.

The Covenant University Core Values are: Spirituality, Possibility Mentality, Capacity Building, Integrity, Responsibility, Diligence and Sacrifice.

Spirituality

This forms the bedrock of our existence as a University and defines every aspect of our operations and context. The Christian ethos underlies our activities and conducts at all times, and every student of Covenant University is expected to exhibit the character traits and dispositions of a Jesus-centred heritage. The Jesus - factor centred approach to all issues is non-negotiable and central in the pursuit of our mandate in raising a New Generation of leaders. To this end, therefore, students are to be committed to maintaining a high level of spirituality and act in such a manner as to facilitate their spiritual growth. Attendance at Chapel Services, which every student is expected to attend with a Bible, notebook and pen, are a compulsory and essential part of students' spiritual development. Students is also expected to demonstrate a deep reverence for God at all times.

Possibility Mentality

Students of Covenant University are expected to exhibit a royal carriage, attitude, habit and character, exuding self-confidence and dignity at all levels of interaction and in general conduct. They are expected to see themselves as persons of worth and value, taking pride in their uniqueness as individuals with a positive mind-set devoid of any trace of inferiority.

Capacity Building

This is related to commitment to a lifestyle of continuous academic and personal development, striving to be continuously relevant to the overall vision requirement of the University as well as her core mission, goals and objectives. Students are encouraged to constantly seek paths for self-improvement. Openness to learning new skills and taking on board new information is a trait expected of Covenant University students in order to have robustness and depth in the quality of their output.

Integrity

Students of Covenant University are expected to demonstrate traits of honesty, uprightness and trustworthiness at all times. They must ensure

that they are accountable, transparent and open in all their dealings. They shall flag truth as a virtue at all times, particularly in conduct during examinations, obeying the rules and regulations of the University, being spiritually sound, morally upright and having a good conscience.

Responsibility

We are committed to inculcating a sense of responsibility in our students. We believe in the place of discipline for effective leadership. We expect our students to respond to issues as demanded, not as convenient. Here at Covenant University, our students are not permitted to do what they like but what is right. Punctuality at lectures, as well as prompt response to assignments as demanded, is a desired trait of responsibility.

Diligence

Students of Covenant University are expected to be deeply committed to their assignments. We expect that they will extol the virtues of hard work and constantly strive towards excellent attainment in all they do.

Sacrifice

Sacrifice is the ultimate price for outstanding leadership. It is the quality of sacrifice that defines great leadership. We therefore expect students of Covenant University to go the extra-mile and pay the extra- price in the attainment of their set goals. Raising an altar of sacrifice in pursuit of their dreams is what must distinguish and define the Covenant University student.

1.6 THE TOTAL MAN CONCEPT

The Total Man Concept (TMC) is Covenant University's custom-built Programme that constitutes the core concept of her academic programmes.

This concept centres on “developing the man that will develop his world.” It is designed to make the student become intelligently conscious of his environment and thus be able to maximize his potential.

The programmes of the University are first directed at "the person" before his profession. In this way, the University will raise a generation of experts who possess the capacity to face and manage challenges.
The TMC Programme centres on three components of the human personality: the spirit, the mind, and the body.

The Spiritual Man

Spiritual development is to us a major force for the evolvement of the Total Man, as mental excellence and understanding are generated through the vital force in man, which is the Spirit of God and the Spirit of Intelligence. As a University sponsored by a Christian Mission, character formation is considered as a spiritual issue that is instilled by self-discipline and commitment to the principles enunciated by our Lord Jesus Christ.
Covenant University provides opportunities for spiritual development through various avenues, including spiritual formation programmes and counselling, and also by creating leadership opportunities.

The Intellectual Man

Covenant University students enjoy the highest standards of excellence through the institution of academic programmes that are innovative, creative and functional. Covenant University also encourages students to be inquisitive, bold and forthright in asking questions and facing the challenges of academic leadership. The Total Man concept is also promoted through the introduction of a system of compulsory, theoretical and practical courses, all of which must be passed before one can be considered for a degree from the University. In addition to normal General Studies courses, we have included our own specially-designed courses in areas such as: biographical studies, entrepreneurship, family life, human development process, leadership development, mental development, success concepts, work ethics and Towards the Total Graduate (TTG) Programme.

The Physical Man

The body is a vital component of the Total Man. Covenant University is committed to providing avenues for sound physical development via recreational activities that engage the body and also enhance personality development, stimulating the cultivation of lifestyles that are conducive to healthy living. We thus encourage students to participate in sporting activities.

1.7 THE TOTAL GRADUATE

The Covenant University graduate will be mentally resourceful, intellectually reinforced, enterprisingly self-dependent, futuristically visionary and responsibility-sensitive to the changes demanded for the leadership role or dominion nature he is made for. He shall be a Total Man.

OUR CAMPUS

- Serene, safe, secure, pleasant and empowering ICT driven teaching and learning environment.
- Academic programmes free of strikes, shut-downs and union face-offs.
- Well-stocked libraries and laboratories, as well as unrestricted access to the Internet for study and research purposes.
- CU pioneered the introduction of:

- Entrepreneurial Development Studies (EDS) aimed at preparing the Student for self-employment; and
- The Total Man Concept (TMC) aimed at developing the Total Man –Spirit, Soul and Body

- Our graduates have additional certificate in Leadership upon completion of their studies.

Covenant University Landscape

CHAPTER TWO

ADMINISTRATION AND CONTROL

Covenant University was established by the World Mission Agency (WMA), an arm of the Living Faith Church Worldwide Inc. The Board of Trustees of the Agency appoints the members of Board of Regents, which is the apex ruling body for the University. In his capacity as the *visioner* of the University, Dr. David Oyedepo serves as the life Chancellor of the University and the Chairman of the Board of Trustees of World Mission Agency.

The University's Vision of raising a new generation of leaders has necessitated the development of a unique approach to governance and management of the institution. Its founding philosophy is to specifically and emphatically promote change against the status quo, which had stagnated growth and development in the nation and in the African continent. The University is committed to a visionary resolution of these issues.

The other organs by means of which the University administration is carried out include: the Senate, and Management Board. Other statutory and academic Boards are as explained.

2.0 BOARD OF REGENTS

The Board of Regents is the Governing Council of the University. The Board serves as the apex ruling body of the University and exercises final authority and power in all policy, legal, administrative and financial matters of the University. It has the overall responsibility for the policies and operations of the University.

2.1 THE CHANCELLOR

The unique founding philosophy of change, which was birthed from the visionary base of the University, as well as the adopted strategies for its accomplishments, was considered crucial to the general and specific

objectives of the University. The visionary direction and guidance had compelled the executive presence of the Chancellor who conceived the vision of the University. Consequently, the vision as well as its governance imperatives is shared with the faculty, staff and students at regular intervals. This has permitted and continues to permit stable formation not only of the organizational structure but also of the management culture, as well as helping to inculcate the values and ethos of the University into members of the University community. The Chancellor of the University is the Chief Executive Officer of the University. He also serves as the Chairman of the Board of Regents.

2.2 THE VICE-CHANCELLOR

The Vice-Chancellor is the Chief Academic Officer of the University. In this capacity, he/she is the Chief Responsibility Officer for the University's operations. Academic administration is planted firmly in the highest academic authority of the University, which is the Senate. The Vice- Chancellor is the Chairman of University Senate and exercises all powers granted him/her in the law that established the University in respect of guiding and directing the University's academic activities. He/she holds in trust the Chancellor's executive responsibilities and authority in all areas where the Chancellor so delegates.

2.3 THE DEPUTY VICE-CHANCELLOR

The Deputy Vice-Chancellor is responsible to the Vice-Chancellor. The Deputy Vice-Chancellor assists the Vice-Chancellor in providing administrative leadership to the University, and giving support to driving academic excellence in areas so assigned.

2.4 THE REGISTRAR

He is the Chief Administrative Officer of the University and oversees the administrative efficiency of the University, engaging historical records and regulations. The Registrar chairs the University's Administrative Board, which serves as the University's apex administrative organ and clearance house for all operational issues. He monitors rules, regulations and

policies as well as make recommendations on policies to Senate and Board of Regents.

2.5 OTHER OFFICERS OF THE UNIVERSITY

(a) THE DEANS OF COLLEGES AND SCHOOL OF POSTGRADUATE STUDIES

Our Colleges were established to provide teaching, research and community service activities in Departments/Programmes approved for them by the Senate. A College Management Board and College Academic Boards are established for each College to determine direction and supervise the conduct and grading of examinations and other academic responsibilities and they make recommendations to Senate on any academic matter, including curriculum development and examination results through the Deans. The Dean is the Chief Academic Officer of the College/School. He is the Chairman of the College Management Board and he coordinates and regulates the teaching responsibilities and the conduct of examinations within the available facility and specified guidelines. He is also responsible for co-coordinating the day-to-day administration of the College, including the organization of students' admission, registration, matriculation and examinations.

b) THE DEPUTY DEANS OF SCHOOLS

Each College in the University is divided into three administrative units called Schools and a Deputy Dean heads each of them. The Deputy Deans oversee the coordination of activities of the School as they relate to the Colleges' Vision and Goals to ensure their foremost growth and development. They provide leadership and oversight for all the academic programmes of the Schools. They oversee strategic planning matters of the Schools and ensure that they are in tandem with the Vision of the University; continuous improvement of programmes and curriculum; promotion of community service activities; ensuring efficient teaching and quality delivery and monitoring of class attendance, student evaluation reports as they relate to the Schools' context, teaching and learning environment among others.

c) THE DIRECTOR, PHYSICAL PLANNING AND DEVELOPMENT

The overall development of Covenant University involves the provision of buildings, equipment, furniture, roads, water, electricity, healthcare facilities, educational facilities for the children of the staff and accommodation for staff and students. The Director of Physical Planning and Development is responsible to the Vice-Chancellor for the physical development as well as maintenance and care of the University estate. Officers of the unit are divided into three main groups: maintenance and services; rehabilitation; and development of new facilities.

d) THE DIRECTOR, CENTRE FOR LEARNING RESOURCES

The Centre for Learning Resources (CLR) is the academic heart of the University system. Its basic purpose is to provide students and all academic members of the community with materials, assistance and an environment that facilitate teaching, learning and research. Covenant University's Centre for Learning Resources is being continuously equipped, as a fundamental requirement for academic excellence. The Director of CLR is the head of the University Library, and he is responsible to the Vice-Chancellor in growing and developing the University Library system. This includes the main Library, College Libraries and the departmental reading rooms.

e) THE DIRECTOR, FINANCIAL SERVICES

The Director, Financial Services Department, is responsible for ensuring financial prudence in the allocation and utilization of the financial resources of the institution. This involves coordination, control and periodic evaluation of the financial system of the University, including the internal audit with a proactive audit strategy extending beyond compliance, probability and systems audit, to a value-for-money audit. The Director ensures that financial regulations are made, published in a Manual of Financial Procedures and followed through to ensure the efficient use of funds allocated to, or generated by the University.

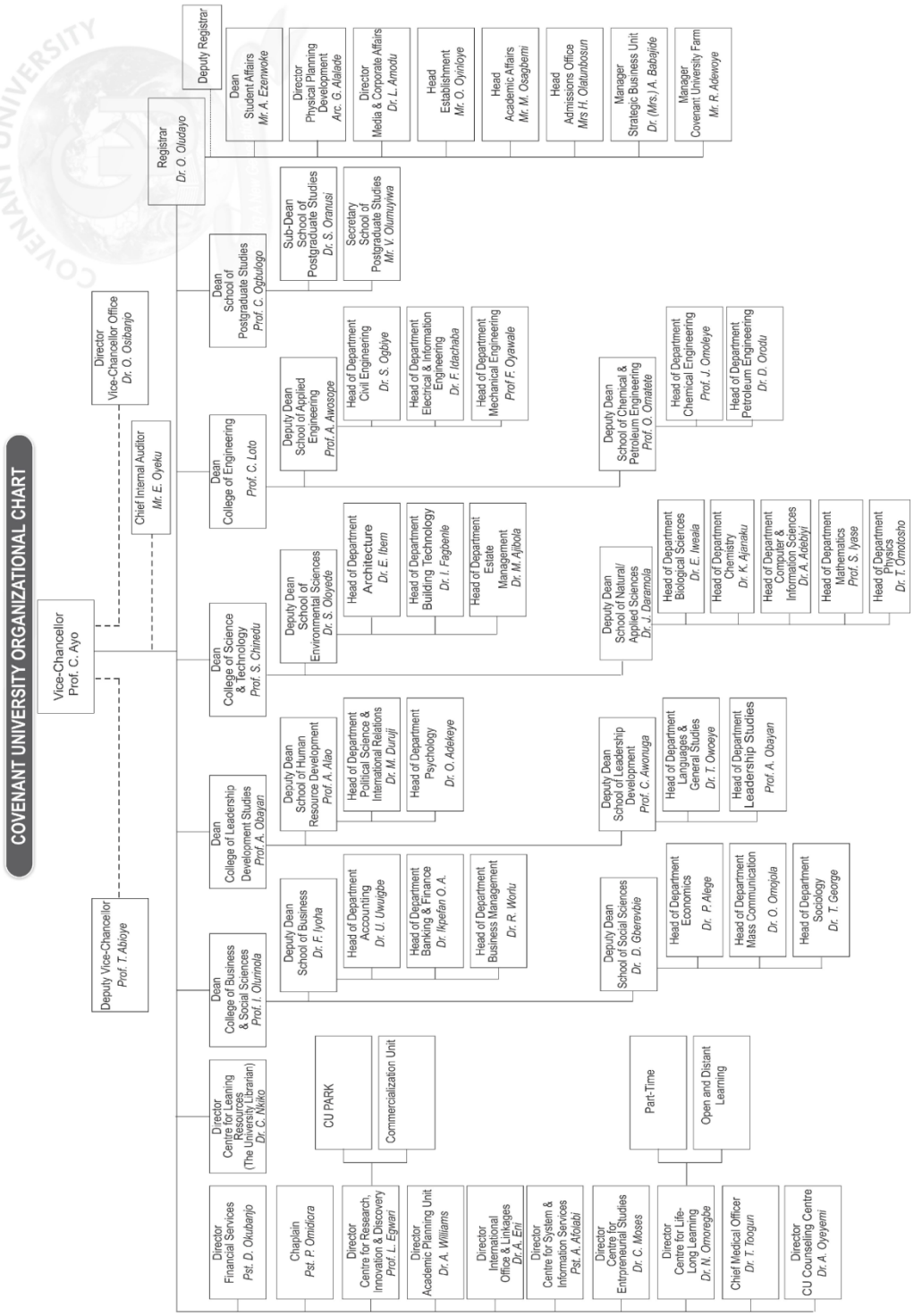
f) THE DIRECTOR, CENTRE FOR SYSTEM & INFORMATION SERVICES (CSIS)

The Director manages the information system, provides technical support for portal administration, internet and intranet services, training and deployment of systems.CSIS generates and manages data from various sources including candidates' admission, students' registration and examination processes for management decisions at various levels.

g) THE DIRECTOR, ACADEMIC PLANNING UNIT

The Director, Academic Planning Unit (DAPU) is saddled with the responsibility of collating, managing and interpreting data to guide the academic development of the University; and ensuring compliance with government policies, notably, the National Universities Commission (NUC) Benchmark Minimum Academic Standard (BMAS), the University status as they relate to academic matters and other academic requirements of Senate.

African Leadeship Development Centre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Deputy Vice-Chancellor
Prof. T. Abioye
Director
Vice-Chancellor Office
Dr. O. Osibanjo
Chief Internal Auditor
Mr. E. Oyeku
Registrar
Dr. O. Oludayo
Deputy Registrar
Dean
Student Affairs
Mr. A. Ezenwoke
Director
Physical Planning
Development
Arc. G. Alalade
Director
Media & Corporate Affairs
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Dean
College of Leadership
Development Studies
Prof. A. Obayan
Deputy Dean
School of Human
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Prof. A. Alao
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Political Science &
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Dr. M. Duruji
Head of Department
Psychology
Dr. O. Adekeye
Deputy Dean
School of Leadership
Development
Prof. C. Awonuga
Head of Department
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Mass Communication
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Head of Department
Sociology
Dr. T. George
Director
Centre for Learning
Resources
(The University Librarian)
Dr. C. Nkiko
CU PARK
Commercialization Unit
Part-Time
Open and Distant
Learning
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Financial Services
Pst. D. Okubanjo
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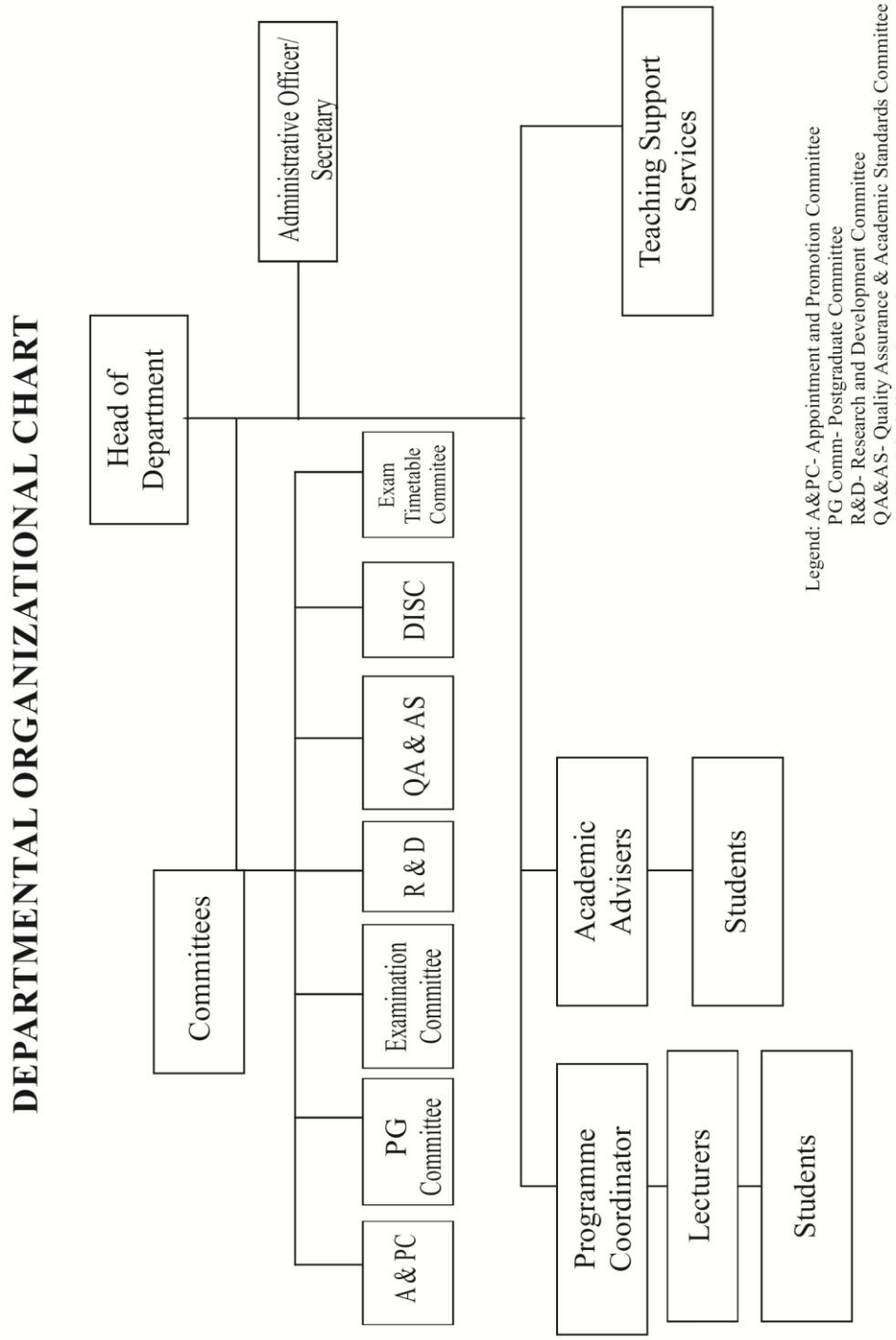
Long Learning
Dr. N. Omoregbe
Chief Medical Officer
Dr. T. Togun
Director
CU Counselling Centre
Dr. A. Oyeyemi

(Top & Down) Members of the Board of Regents in academic procession during a Convocation Ceremony


DEPARTMENTAL ORGANIZATIONAL CHART
Head of Department
Administrative Officer/ Secretary
Committees
A & PC
PG Committee
Examination Committee
R & D
QA & AS
DISC
Exam Timetable Committee
Programme Coordinator
Lecturers
Students
Academic Advisers
Students
Teaching Support Services
Legend: A&PC- Appointment and Promotion Committee
PG Comm- Postgraduate Committee
R&D- Research and Development Committee
QA&AS- Quality Assurance & Academic Standards Committee
DISC- Disciplinary Committee

Students Matriculation Procession

Students Convocation Procession

CHAPTER THREE

STUDENTS' ADMISSION AND GRADUATION POLICY

3.0 ADMISSION POLICY

"To admit young, single, disciplined and vision-driven candidates, who will be ready to accept full responsibility for the revolution being entrusted to them."

3.1 ADMISSION REQUIREMENTS

Jamb Pre-Requisite

Candidates applying to Covenant University are required to sit for the University Matriculation Examination (UME) of the Joint Admissions and Matriculation Board (JAMB) and attain the prescribed cut-off marks. In addition to the above, the University conducts aptitude and character-screening exercises for all candidates seeking admission into the University.

General Requirements

The minimum entry requirements for admission into Covenant University are credit level passes in 5 subjects at the SSCE/GCE O'Level/NECO/NABTEB or its equivalent obtained at not more than two sittings. The subjects passed must include English Language, Mathematics and one relevant Science subject, selected from the following group: Biology, Health/General Science, Food and Nutrition Science, Agricultural Science, Physics and Chemistry. Candidates are also to note that there are other requirements that may be specific to a College and/or a Programme.

3.2 GENERAL REGULATIONS FOR AWARD OF FIRST DEGREES

1. To be eligible for admission to a Bachelor's Degree programme in one of the Colleges of the University, a candidate must have:
   (a) satisfied the general requirements for admission into the University;

(b) satisfied the College or Departments' requirements for admission;
(c) followed the approved course of study for the prescribed period;
(d) passed the required examinations;
(e) paid all the prescribed fees; and
(f) complied with such other regulations and requirements as may be prescribed.

2. Before registering for a course, the student must meet the pre-requisites as prescribed for that course. Each student must complete the registration for each Semester within the period prescribed for registration.
3. Approved courses of study and syllabuses of courses for the examinations under these regulations and the number of papers in each course are those approved by Senate. Approved courses shall also include such lectures, tutorials, seminars, laboratory classes, fieldwork, as prescribed by departmental regulations, and such written work as the Department concerned shall require.
4. A candidate for a first degree must pass the prescribed examinations in the General Studies Programme. Each student will be required to take and pass courses in Entrepreneurial Development Studies and Total Man Concept. He must, in addition, complete all compulsory courses as prescribed in his/her programme.
5. A student shall be registered as a full-time student and enrol in any one semester for a minimum of 15 and a maximum of 25 units.
6. A candidate shall not be deemed to have followed any approved programme of study unless the Head of Department concerned certifies that his attendance and performance have been satisfactory.
7. Student Workload
   (a) Workload is defined in terms of course units.
   (b) One unit represents one hour of lecture or one hour of tutorial, or 3 hours of practical work per week throughout a Semester of fifteen weeks.

(c) All courses shall run for one Semester.

8. A candidate whose work or progress is considered unsatisfactory may be required by Senate, on the recommendation of the appropriate College to be on probation or withdraw from the University. Failure in an examination is regarded as evidence of unsatisfactory progress.
9. The duration of courses of study for a first degree shall normally not be less than four academic years. A student may be permitted to extend the period of study prescribed for a degree on condonable grounds as approved by Senate.
10. Candidate for examinations must register for these examinations at the prescribed times and in accordance with the conditions prescribed by the regulations for examinations.

3.3 GRADING SYSTEM

Class Test/Assignments	=	20 marks	30%
Mid-Semester Test	=	10 marks	

Examination

End of Semester Examination	=	70 marks	70%
			100%

Interpretation of Grade	Points
A = 70 and above	5
B = 60 – 69	4
C = 50 – 59	3
D = 45 – 49	2
F = Below 45	0

3.4 GRADE POINT AND GRADE POINT AVERAGE

A Grade Point (GP) is the product of the Course Credit Unit (CU) and the Point Score (PS) in each course. {i.e. GP = CU x PS}. The sum of all Grade Points for the semester is the Total Grade Point (TGP). {i.e. TGP = ∑GP}. The Grade Point Average (GPA) is the TGP divided by the Total Credit Units (TCU). {i.e. GPA = TGP/TCU}. The following example illustrates how to calculate the GPA.

Example: A student registered for five courses and scored the marks shown in the Examination.

Course	Credit Unit (CU)	Score (%)	Grade	Point Score (PS)	Grade Point (GP)
BCH429	6	62	B	4.0	24
BCH421	3	48	D	2.0	6
BCH427	3	54	C	3.0	9
BCH329	6	72	A	5.0	30
GST221	2	60	B	4.0	8
TOTAL	**20**				**77**

TGP = 6 x 4 + 3 x 2 + 3 x 3 + 6 x 5 + 2 x 4 = 77

TCU = 6 + 3 + 3 + 6 + 2 = 20

GPA = TGP/TCU = 77/20 = 3.85

The highest GPA that can be earned is 5.0 and the lowest is 0 (zero)
The Cumulative Grade Point Average (CGPA) is the summation of the TGP for all semesters divided by the summation of TCU's for the said semesters. Like the GPA, the CGPA obtainable ranges from 0 to 5. The CGPA is calculated for all courses taken from the 1st semester (Alpha Semester) of the first year of entry (i.e. 100 levels) to the current semester.

The final award and class of the degree shall be based on the cumulative grade point average obtained by each candidate in all the prescribed courses and approved electives taken at the University. A candidate who has satisfactorily completed all requirements for the degree with an overall Grade Point Average of not less than 1.50 shall be awarded the Honours Degree.

3.5 DEGREE CLASSIFICATION

Classes of degree are to be awarded depending on the cumulative GPA obtained. The classes of degree that may be awarded are First Class Honours, Second Class Honours (Upper Division), Second Class Honours (Lower Division) and Third Class Honours.

CGPA	CLASS OF DEGREE
4.50 – 5.00	First Class
3.50 – 4.49	Second Class (Upper Division)
2.40 – 3.49	Second Class (Lower Division)
1.50 – 2.39	Third Class
Less than 1.5	Fail

3.6 ADMISSION TO DEGREES

After Senate has approved the report of the examiners, successful candidates shall be admitted to the Bachelors Degree at the Graduation Ceremony for the award of degrees. No Pass Degree is awarded in Covenant University.

Students signing Matriculation register

CHAPTER FOUR

COLLEGES, SCHOOLS AND DEPARTMENTS

There are presently four (4) Colleges in Covenant University – College of Business and Social Sciences (CBSS), College of Leadership Development Studies (CLDS), College of Engineering (CoE) and College of Science and Technology (CST). Each College is made up of two Schools. The Schools consists of Departments which run specific academic programmes.

The Colleges, Schools, Departments and Programmes offered in Covenant University are shown in the Table below:

College	School	Department	Programme	Option	Degree
College of Business and Social Sciences	School of Business	Accounting	Accounting		B.Sc
		Banking and Finance	Banking and Finance		B.Sc
		Business Management	Business Administration		B.Sc
			Industrial Relations and Human Resource Management		B.Sc
			Marketing		B.Sc
			Entrepreneurship		B.Sc
	School of Social Sciences	Economics	Demography and Social Statistics		B.Sc
			Economics		B.Sc
		Mass Communication	Mass Communication		B.Sc
		Sociology	Sociology		B.Sc
College of Leadership Development Studies	School of Human Resource Development	Political Science and International Relations	International Relations		B.Sc
			Policy and Strategic Studies		B.Sc
			Political Science		B.Sc
		Psychology	Psychology		B.Sc
	School of Leadership Development	Languages and General Studies	English		B.A
		Leadership Studies	Leadership		Certificate/ Diploma

College of Engineering	School of Applied Engineering	Civil Engineering	Civil Engineering		B.Eng
		Electrical and Information Engineering	Computer Engineering		B.Eng
			Electrical and Electronics Engineering		B.Eng
			Information and Communication Engineering		B.Eng
		Mechanical Engineering	Mechanical Engineering		B.Eng
	School of Chemical and Petroleum Engineering	Chemical Engineering	Petroleum Engineering		B.Eng
		Petroleum Engineering	Chemical Engineering		B.Eng
College of Science and Technology	School of Environmental Sciences	Architecture	Architecture		B.Sc
		Building Technology	Building Technology		B.Sc
		Estate Management	Estate Management		B.Sc
	School of Natural and Applied Sciences	Biological Sciences	Applied Biology and Biotechnology		B.Sc
			Biochemistry		B.Sc
			Microbiology		B.Sc
		Chemistry	Chemistry	Industrial Chemistry	B.Sc
				Analytical/ Environmental Chemistry	B.Sc
				Materials/Polymer Chemistry	B.Sc
		Computer and Information Sciences	Computer Science		B.Sc
			Management Information System		B.Sc
		Mathematics	Industrial Mathematics		B.Sc
		Physics	Industrial Physics	Applied Geophysics	B.Sc
				Electronics and IT Applications	B.Sc
				Renewable Energy	B.Sc

THE COLLEGE OF SCIENCE AND TECHNOLOGY (CST)

4.0 DEAN'S WELCOME NOTE

It is with great delight and gratitude to God that I welcome you to the College of Science and Technology (CST). The College has two Schools, namely:

- The School of Environmental Sciences (SES) comprising Departments of Architecture, Building Technology and Estate Management and
- The School of Natural and Applied Sciences (SNAS) consisting of Departments of Biological Sciences, Chemistry, Computer and Information Sciences, Mathematics, and Physics.

Each of the Departments has articulated its specific mission and objectives as well as the specifics of its academic programmes in line with the vision and mission of the College. A total of eleven academic programmes are offered by the eight Departments in the College. All the programmes were crafted with a view to producing job-ready graduates in science and technology with appropriate IT skills and capacity for independent thinking, creativeness and resourcefulness. The curricula of the programmes are unique, robust, current and comparable to the best in the world. They are designed not only to meet and surpass the basic academic standards prescribed by regulatory authorities in Nigeria but also to make our students spiritually buoyant, intellectually resourceful and physically fit to emerge as leaders in their chosen disciplines and solution providers in areas of their future endeavours.

We have modern ICT-driven and interactive teaching/learning facilities, state-of-the-art laboratories and workshops, and a rare crop of eminent scholars, committed and highly motivated faculty and staff. These, coupled with the unique serene and green environment of Covenant

University, will certainly make learning in the College a pleasurable experience.

This Academic Handbook contains details of prescribed courses and other specific requirements for all programmes offered in the College at the undergraduate level. It is intended to provide precise information to students, parents and everyone interested in the academic programmes of the College of Science and Technology.

Professor Shalom Nwodo Chinedu
Dean, College of Science & Technology

4.1 OVERVIEW OF THE COLLEGE OF SCIENCE AND TECHNOLOGY

At the inception of Covenant University in 2002 and up till 2009, there were three Colleges: College of Business Studies (CBS), College of Human Development (CHD) and College of Science and Technology (CST). In 2009/2010 academic session, the number of Colleges in the University was reduced to two with the merging of the College of Business Studies and the College of Human Development to form the College of Development Studies (CDS). Six Schools were created, three in each of the Colleges. The Schools in the College of Science and Technology were the School of Engineering and Technology (SET), School of Environmental Sciences (SES) and School of Natural and Applied Sciences (SNAS). In the 2014/2015 academic session, the number of Colleges was increased to four with each College having two Schools. The four Colleges are the College of Business and Social Sciences (CBSS), College of Leadership Development Studies (CLDS), College of Engineering (CoE) and College of Science and Technology (CST).

SCHOOLS, DEPARTMENTS AND PROGRAMMES

The College of Science and Technology presently consists of two Schools: School of Environmental Sciences (SES) and School of Natural and Applied Sciences (SNAS). The College is headed by a Dean while the Schools are headed by Deputy Deans.

There are eight (8) Departments and eleven (11) programmes in the College. The Departments are Architecture, Building Technology, Estate Management, Biological Sciences, Chemistry, Computer and Information Sciences, Mathematics and Physics. The Department of Architecture runs programme in Architecture while the Department of Building Technology offers programme in Building Technology. The Department of Estate Management runs programme in Estate Management. The Department of Biological Sciences runs programmes in Applied Biology and Biotechnology, Biochemistry and Molecular Biology, and Microbiology. The Department of Chemistry runs programme in

Chemistry with options in Industrial Chemistry, Analytical/Environmental Chemistry and Materials/Polymer Chemistry. The Department of Computer and Information Sciences offers programmes in Computer Science and Management Information System. The Department of Mathematics runs programme in Industrial Mathematics while Department of Physics offers programme in Industrial Physics with options in Applied Geophysics, Electronics and IT Applications, and Renewable Energy. All the programmes are accredited by the National Universities Commission (NUC) and relevant professional bodies.

Vision

To be a leading, world class centre of excellence for teaching, research and innovation in all fields of Science and Technology.

Mission

To provide, through innovative teaching and research, science and technology education aimed at producing a new generation of highly motivated, competent, skilful and innovative professionals and scientists with a burning desire to tackle Africa's developmental challenges. Consequently, the College strives to generate and provide high quality and high-tech knowledge in a student-friendly environment for the purpose of producing well-prepared leaders of tomorrow.

Philosophy

The philosophy of the College derives from the fact that today's knowledge economy requires a multi-disciplinary, IT-driven approach with scientists and professionals from different disciplines connecting and collaborating in the deployment of a wide range of skills and knowledge to provide solutions to societal problems. Situated in a Christian mission University, the College is committed to the goals of learning and faith – learning as both the means to and the result of dogged scholarship; and faith as the personal appropriation of truth for godly living.

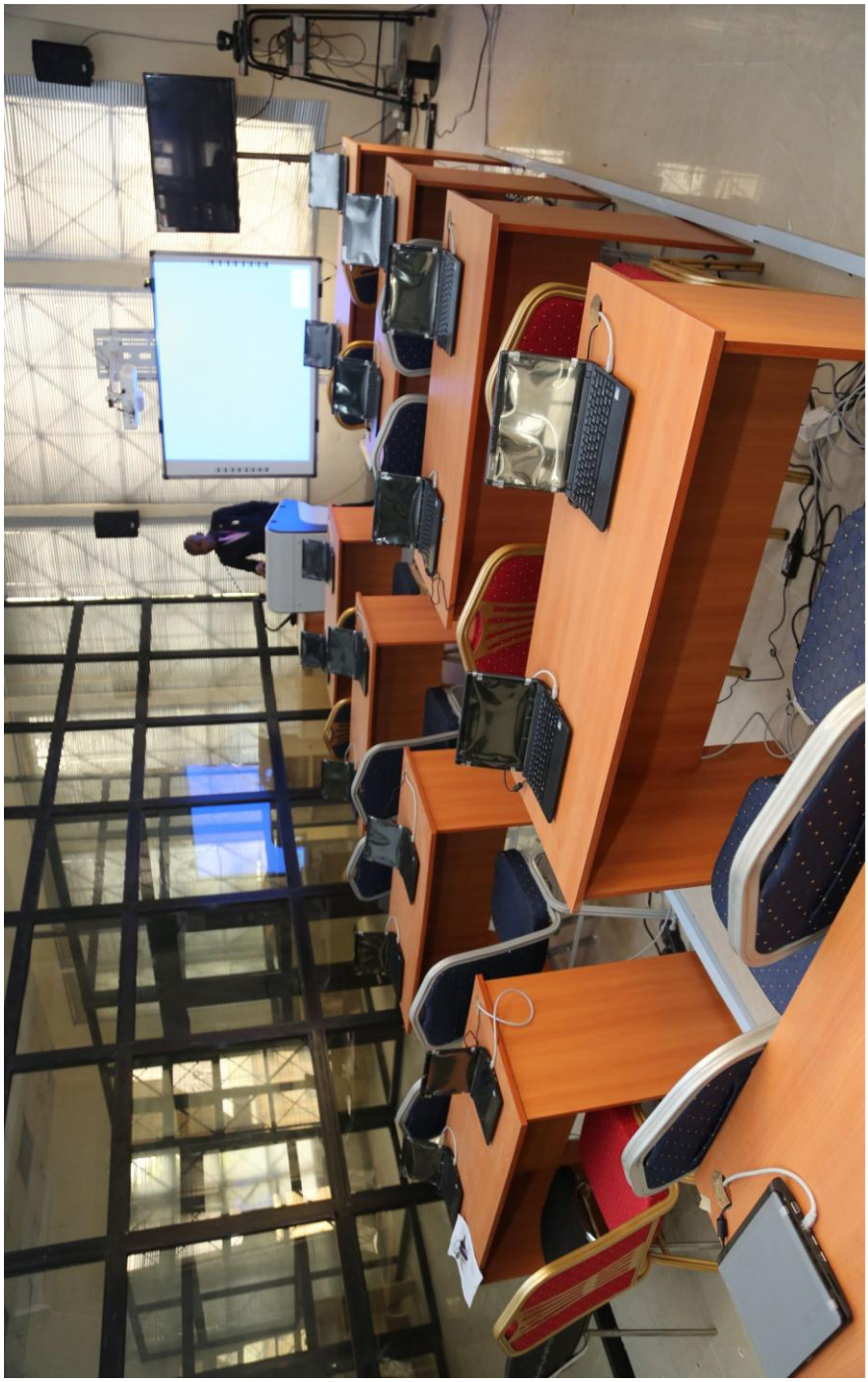
Professor Shalom Chinedu is the current Dean of the College of Science and Technology. Former Deans of the College include the pioneer Dean,

Professor S. T. Ibiyemi (October, 2002 - September 2005), Professor E. A. Adeyemi, the renowned architect and former Vice-Chancellor of Federal University of Technology, Akure (October, 2005 – September, 2006) and Professor James Katende (September, 2006 – September 27, 2010). Others are Professor Frederick Hymore (September, 2010 – September, 2012), Professor Cleophas Loto (September, 2012 – August, 2014) and Professor Olubukanlain Okusanya (August 8, 2014 – September 5, 2014).

A cross section of faculty in the School of Environmental Sciences during the visit of the Vice-Chancellor, Professor Charles K. Ayo to the School

A cross section of faculty in the School of Natural and Applied Sciences during the visit of the Vice-Chancellor, Professor Charles K. Ayo to the School


COLLEGE OF
SCIENCE &
TECHNOLOGY



E-Learning facility at the Centre for Learning Resources (Library)

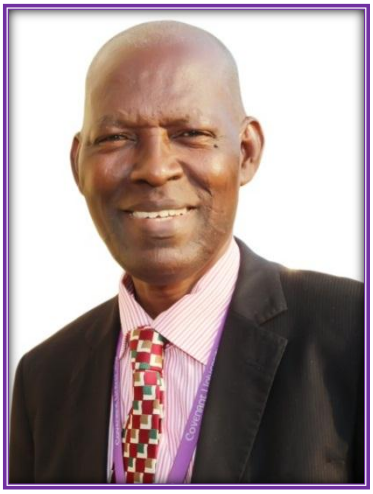
Professor E. A. Adeyemi in a mentoring session with some of his students in Architecture Department, Covenant University

Induction of Architecture graduates into NIA and ARCON

CHAPTER FIVE

SCHOOL OF ENVIRONMENTAL SCIENCES

5.0 DEPUTY DEAN'S WELCOME MESSAGE



It is with great pleasure that I welcome you to the School of Environmental Sciences of Covenant University. The School was established in the College of Science and Technology to facilitate proper coordination of sound academic learning in the University. The School has a rare crop of diligent, supportive and caring members of the teaching and non-teaching staff. Presently, the school has three Departments, namely: (a) Architecture (b) Building Technology and (c) Estate Management. These programmes are available at the undergraduate and postgraduate levels.

Vision

The vision of the School of Environmental Sciences is totally connected to the overall vision of the institution to be one of the best ten leading World-Class Universities (1 of 10 in 10) by the year 2022. To achieve this goal, the School is committed to quality research and teaching with a view to raising a new generation of leaders in all fields of human endeavour in the environmental disciplines for overall national development.

Mission

The mission of the School of Environmental Sciences is to pursue relentlessly best practices in all academic activities for the realization of sound knowledge capable of enhancing the individual's contribution towards poverty reduction through sound academic discipline for personal development to achieve the Millennium Development Goals (MDGs) in Nigeria.

Philosophy

The underlining philosophy of the School of Environmental Sciences is anchored on producing competent and self-reliant graduates with analytical mind, intellectually sound in their various disciplines and capable of making meaningful contribution to the underdevelopment challenges of Nigeria in the real estate world.

My door is always open to you. I am also favourably disposed to new ideas that will take the School of Environmental Sciences to greater heights.

Dr. Samuel A. Oloyede
Associate Professor & Deputy Dean

5.1 DEPARTMENT OF ARCHITECTURE

OVERVIEW OF THE DEPARTMENT

The Department of Architecture offers a 4-year Programme leading to the award of the B.Sc. Degree in Architecture. The Department of Architecture was established to provide training in knowledge acquisition and skill development in the Art and Science of Architecture. The Department was established in September, 2002 in the College of Science and Technology (CST) of Covenant University and began offering the of B.Sc (Hons) Architecture Programme (4 Sessions), and later the M.Sc Architecture (2 Sessions). Dr. S.A. Daramola was the first Head of the Department in 2002, and Professor E.A. Adeyemi became the second Head of Department in the 2005-2008 academic session. In 2009, Professor O. Solanke succeeded Professor E.A. Adeyemi as the third Head of Department while, from 2012, Dr. A.B. Adeboye became the Head of Department. Dr. E. O. Ibem took over as the Head of Department in 2014.

Vision

The Vision of the Department of Architecture is to be globally recognized for its innovative contributions to specific architectural undertakings.

Mission

The Mission of the Department of Architecture is to produce a new breed of Professional Architects who are competent, creative, and capable of leading the Building Industry. The Department plans to attain the set goals through "system innovation", quality teaching, investigative research and specialized mentorship and to create a conducive environment for the training of all categories of Architects.

Philosophy

The Department of Architecture is absolutely committed to effective creative "design which is tailored to meet the cultural hopes and aspirations of the people". Students' education is focused on the development of their capabilities through problem analysis and evolution

of Architectural solutions. The Department is also committed to the goals of "faith as the personal appropriation of truth for living".

Objectives

The objectives of the programme of Architecture are to produce Architects who are responsive to the critical needs of the people. The products of the Department are expected to be able to provide decent accommodations for people and take responsibilities for their actions. "Appropriate IT skills" are expected to be part of the tools for the attainment of the set goals.

Goal-Attainment Strategies

The Department of Architecture appreciates the fact that conducive learning environment has to be created. The components of the ideal environment include Curriculum, Right Man Resources, Qualified students & Learning Facilities. With the right environment, the curriculum is structured to produce professionals capable of producing appropriate and imaginative solutions that are not only technically proficient and contemporary but also economically feasible and relevant in all their ramifications. Students are guided by the right human resources, procedures and conducive learning environment. Studio work and its supervision are structured to enable students acquire the knowledge and skills for the practice of the profession.

LIST OF ACADEMIC STAFF IN THE DEPARTMENT

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Dr. E. O. Ibem	• B.Sc (Arch) 1998 • M.Sc (Arch) 2001 • Ph.D (Arch) 2011 M/ 2483 F/ 2474	Senior Lecturer/ HOD	Architecture
2.	Prof. E. A. Adeyemi	• B.Arch (ABU) 1963 • MS (Columbia) 1965 • M. Urban Planning • Ph.D (New York) 1974 • Medical Facilities Architecture Specialization Urban Planning M/32 FNIA/22 F/18	Professor	Architecture
3.	Dr. A. B. Adeboye	• ND (Arch) 1979 • HND (Arch) 1981 • B.Sc (Arch) 1988 • M.Sc (Arch) 1990 • Ph.D (Arch) 2009 M/2413 F/2422	Senior Lecturer	Architecture
4.	Dr. C. O. Adeokun	• B.Sc (Arch) 1987 • M.Sc (Arch) 1989 • M.Arch (Urban Building Specialization) 1993 • Ph.D (Arch) (Domestic Space) 2007 • RIBA Part 3 – 2000 ARB Reg. No: 064696B	Senior Lecturer	Architecture
5.	Dr. A. A. Oluwatayo	• B.Sc (Arch) 1998 • M.Sc (Arch) 2001 • Ph.D (Arch) 2009 M/ 2294 F/ 2226	Senior Lecturer	Architecture
6.	Dr. A. P. Opoko	• B.Arch • M.Sc (Construction Management) • M.A in Architecture (Housing Studies) M/805 F/622	Senior Lecturer	Architecture

7.	Dr. O. A. Alagbe	• B.Sc (Arch) 1998 • M.Sc (Arch) 2000 • Ph.D (Arch) 2009 M/2659 F/2775	Lecturer I	Architecture
8.	Arc. I. C. Ezema	• B.Sc (Arch) 1984 • M.Sc (Arch) 1986 M/1110 F/1122	Lecturer I	Architecture
9.	Dr. E. B. Aduwo	• B.Sc (Arch) 1997 • M.Sc (Arch) 1999 • Ph.D (Arch) 2011 Associate Member of NIA	Lecturer I	Architecture
10.	Dr. P. A. Aderonmu	• OND (Arch) 1994 • B.Sc (Arch) 1999 • M.Sc (Arch) 2001 • M/2804 F/ 2742	Lecturer I	Architecture
11.	Dr. O. A. Dare-Abel	• B.Arch 1998, • M.Sc (Arch) • Ph.D (Arch) 2013 M/ 2023 F/ 1966	Lecturer II	Architecture
12.	Arc. O. D. Babalola	• B.Sc (Arch) 1983, • M.Sc (Arch) 1985 M/ 1264 F/ 1221	Lecturer II	Architecture
13.	Arc. O. A. Fulani	• B.Sc. (Arch) 2000 • M.Sc. (Arch) 2002 M2996 F/2737	Lecturer II	Architecture
14.	Dr. B. A. Adewale	• B.Sc.(Arch)1998 • M.Sc. (Arch) 2000 • Ph.D (Arch) M/ 2336 F/ 2461	Lecturer II	Architecture
15.	Dr. O. E. Ekhaese	• B.Sc (Arch) 2000 • M.Sc (Arch) 2002 • Ph.D (Arch) 2011 Associate Member of NIA	Lecturer II	Architecture
16.	Arc. O. U. Uwakonye	• B.Sc (Arch) 1994 • M.Sc (Arch) 1997 M/ 2957	Lecturer II	Architecture
17.	Arc. O. Izobo-Martins	• B.Tech (Arch) 2002 • M.Tech (Arch). 2006 M/ 2703 F/ 2738	Lecturer II	Architecture

18.	Arc. O.F. Jegede	• B.Tech (Arch.) 2000 • M.Tech (Arch.) 2001 • M/2986	Lecturer II	Architecture
19.	Alalade, G.M.	• B.Sc (Arch) 2006 • M.Sc (Arch) 2008 Registered with NIA	Lecturer II	Architecture
20.	O. J. Ediae	• B.Sc (Arch) 1995 • M.Sc (Arch) 1997 Associate Member of NIA	Assistant Lecturer	Architecture

VISITING LECTURERS

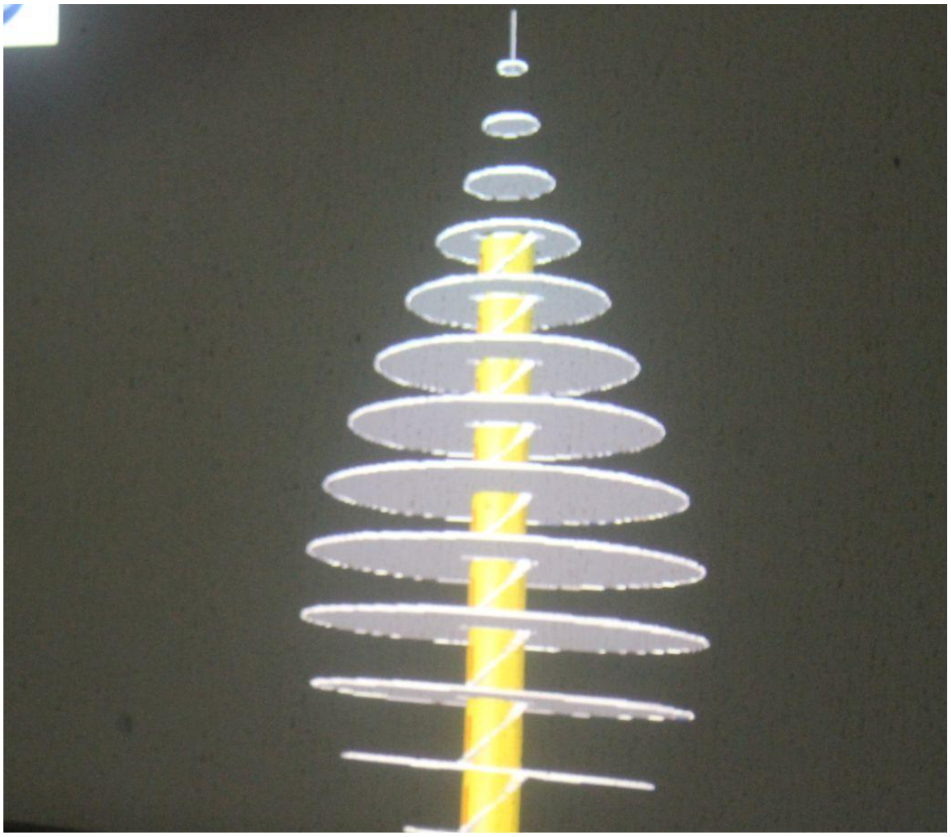
S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Prof. O. A. Olotuah	• B.Sc (Arch) • M.Sc (Arch) • Ph.D (Arch)	Professor	Architecture
2.	Arc. Ayo Vaughan	• B.Sc (Arch. & Urban Planning) 1982 • M.Sc (Arch) 1986 • M/ 1777 F/ 925	Senior Lecturer	Architecture
3.	Arc R.O. Adedire	• B.Sc (Arch) • M.Sc (Arch)	Lecturer 1	Architecture

TECHNOLOGIST

S/N	NAME	QUALIFICATION	STATUS
1.	Mr. O. A. Howells	HND (Architecture)	Technologist

ADMINISTRATIVE STAFF

S/N	NAME	QUALIFICATION	STATUS
1.	Mr. R. O. Ibidoja	HND (Statistics/Mathematics)	Administrative Officer
2.	Miss A. T. Adebayo	OND (Insurance)	Secretary



Architectural design using Water drop

5.1.1 ARCHITECTURE PROGRAMME

PROGRAMME: Architecture

DEGREE AWARDED: B.Sc (Honours) Architecture

DURATION: 4 Years (8 Semesters)

ADMISSION REQUIREMENTS

A candidate who has successfully completed the Senior Secondary Certificate of the 6-3-3-4 system and passed at credit level in Mathematics, English Language, Physics and two other subjects from the following list, Chemistry, Technical Drawing, Fine-Arts, Geography, Economics, Building Construction and Land Surveying, will be eligible to apply for admission. However, the candidate must pass Unified Matriculation Examination of the Joint Admission and Matriculation Board (JAMB) with a score above the cutoff point and also meet the requirements of the Covenant University Scholastic Aptitude Screening (CUSAS) to quality for admission. Candidates so admitted should commence their studies at the 100-level of the Programme.

GRADUATION REQUIREMENTS

To graduate from the 4-year Bachelor of Science Degree Programme in Architecture, a student must have successfully completed a minimum of 171 Credit Units as shown below:

SUMMARY OF GRADUATION REQUIREMENTS

Level	100	200	300	400	TOTAL
Compulsory Courses	30	32	35	36	133
Electives	0	0	3	1	4
SWEP/SIWES	0	0	0	0	0
College Courses	0	0	0	0	0
University Courses	4	4	4	4	16
NUC Courses	10	6	2	0	18
Total	44	42	44	41	171

Prototype of CU Senate Building designed by Architecture Student

COURSE STRUCTURE

100 Level Architecture						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	ARC111	Graphics and Descriptive Geometry I	C	3		α
	ARC112	Visual Communication I	C	2		α
	ARC113	Introduction to Architecture	C	2		α
	MAT111	Mathematics I: Algebra	C	3		α
	MAT112	Mathematics II: Trigonometry and Geometry	C	2		α
	PHY111	Mechanics and Properties of Matter	C	2		α
	PHY119	Physics Practicals IA	C	1		α
	ARC121	Graphics and Descriptive Geometry II	C	3		Ω
	ARC122	Visual Communication II	C	2		Ω
	ARC123	Basic Elements of Urban Planning and Environmental Sciences	C	2		Ω
	MAT121	Mathematics V: Calculus	C	3		Ω
	MAT122	Mathematics VI: Vector Algebra	C	2		Ω
	PHY121	Electricity and Magnetism I	C	2		Ω
	PHY129	Physics Practicals IB	C	1		Ω
University Courses	EDS111	Entrepreneurial Development Studies I	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept - Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	CST111	Use of Library, Study Skills and Information Communication Technology I	U	2		α
	GST111	Communication in English I	U	2		α
	CST121	Use of Library, Study Skills and Information Communication Technology II	U	2	CST111	Ω
	GST121	Communication in English II	U	2	GST111	Ω
	GST122	Communication in French	U	2		Ω
			α =21 Ω = 23 Total = 44 Units			

200 Level Architecture						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	ARC211	Architectural Design I	C	4		α
	ARC213	History of Architecture I	C	2		α
	ARC214	Architectural Graphics I	C	2		α
	ARC215	Building Structures I	C	2		α
	ARC216	Building Components and Methods I	C	3		α
	SES211	Land Surveying I	C	2		α
	ARC221	Architectural Design II	C	4		Ω
	ARC223	History of Architecture II	C	2		Ω
	ARC224	Architectural Graphics II	C	2		Ω
	ARC225	Building Structures II	C	2		Ω
	ARC226	Building Components and Methods II	C	3		Ω
	ARC229	Building Climatology and Environmental Sciences	C	2		Ω
	SES221	Land Surveying II	C	2		Ω
University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept - Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept - Sports	V	0		Ω
NUC General Courses	GST211	Logic, Philosophy and Human Existence	U	2		α
	GST221	Nigerian People and Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution	U	2		Ω
			α =19 Ω = 23 Total = 42 Units			

300 Level Architecture						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	ARC311	Architectural Design III	C	4	ARC 211 & 221	α
	ARC313	History of Modern Architecture I	C	2		α
	ARC314	Urban Planning and Design I	C	3	-	α
	ARC315	Building Structures III	C	2	ARC 215, 225	α
	ARC316	Building Components and Methods III	C	3	ARC 216, 226	α
	ARC317	Building Services I	C	2		α
	ARC319	Introduction to AUTOCAD	C	1		α
	ARC320	SIWES	S	0		Ω
	ARC321	Architectural Design IV	C	4	ARC 211, 221	Ω
	ARC322	Interior Design (Seminar Based)	C	2		Ω
	ARC323	History of Modern Architecture II	C	2		Ω
	ARC324	Urban Planning and Design II	C	2		Ω
	ARC325	Building Structures IV	C	2	ARC 215, 225	Ω
	ARC326	Building Components and Methods IV	C	3	ARC 216, 226	Ω
	ARC327	Building Services II	C	2		Ω
	ARC329	AUTOCAD – 3D	C	1		Ω
Electives	***Note:*** *Select* ***ALL*** *Electives*					
	ARC312	Community Development and Initiatives	E	1		α
	PSY326	Basic Environmental Psychology	E	2		Ω
University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
	EDS321	Entrepreneurial Development Studies VI	V	1		Ω
	TMC321	Total Man Concept VI	V	1		Ω
	TMC322	Total Man Concept – Sports	V	0		Ω
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =22 Ω = 22 Total = 44 Units			

400 Level Architecture						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	ARC411	Architectural Design V	C	4	ARC 311, 321	α
	ARC412	Research Methods	C	2		α
	ARC413	Building Economics, Quantities and Estimating	C	3		α
	ARC414	Architecture of Towns and Cities	C	2		α
	ARC415	Building Structures V	C	3	ARC315, 325	α
	ARC416	Building Components and Methods V (Working drawings and detailing)	C	3	ARC316, 326	α
	ARC419	Building Information Modelling I	C	1		α
	ARC421	Architectural Design VI	C	4	ARC411	Ω
	ARC422	Research Essay/Project	C	3		Ω
	ARC423	Law of Contract and Tort	C	2		Ω
	ARC425	Building Structures VI	C	3	ARC415	Ω
	ARC426	Building Components and Methods VI (Working drawings and detailing)	C	3	ARC416	Ω
	ARC427	Introduction to Professional Practice	C	2		Ω
	ARC429	Building Information Modelling II	C	1	ARC419	Ω
Electives	ARC417	History of Traditional Architecture	E	1		α
	ARC418	Nigerian Architects in Practice (Seminar Based)	E	1		α
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α =21 Ω = 20 Total = 41 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

ARC111 - Graphics and Descriptive Geometry I (3 Units)
The Course introduces the students to the basic elements of architectural graphics. The course objectives are to equip the student with the knowledge of the correct use of drawing instruments, equipment and materials; and also empower them to construct basic angles and plane geometry.MODULE 1: Introduction to Drawing Instruments, Equipment and Materials- Descriptions, Uses and Care of drawing instruments, equipment and materials; Use of Scale Rules and Set Squares. MODULE 2: Points and Lines-Definition of Points, Line Types, Uses, Dimensioning types.MODULE 3: Architectural Presentation Formats-Letterings, Common Errors, Title Blocks, Presentation Formats, Paper Sizes. MODULE 4 Areas and Perimeters of Plane Shapes- Rectangles, Triangles, Squares, Circles, Polygons, Trapeziums. (Constructions given different data), Circles (The Parts, Inscribing/Escribing, and Internal).MODULE 5:Plane Geometry- Lines (Bisection, Perpendiculars, Equal and Proportional Divisions), Angles (Different types, bisections and basic construction), Triangles (Different types and various External Tangents),Quadrilaterals (Types, Constructions given different data), Polygons (Types, Constructions, and General Construction Methods), Ellipses (Constructions using different methods),Scales (Construction of Plain and Diagonal scales).Basic Principles of Orthographic Projection: (Conversion of Pictorial to Orthography), First and Third Angle Projections, Exercises

ARC112 - Visual Communication I (2 Units)
The course is basically free hand sketching and illustrations using dry media such as pencils crayon, charcoal, etc. It aims at developing students' ability and enhancing their level of creativity. MODULE 1: Tools and Materials Used in Free hand Sketching- Paper sizes and

presentation formats, sketching principles (straight lines, curves, circles and spirals), Drawing of simple Objects (flat and rectangular objects). MODULE 2:Introduction to Tones and Textures- Hatching and Cross hatching techniques, The use of lines and dots, creating 3-dimensional objects using light and shades, drawing cylindrical and spherical objects. MODULE 3: Compositions- Methods of Scaling Objects, Drawing of Combination of Objects, Drawing of Life and Still Life Objects, Drawing of Nature and Human Figures.

ARC113 - Introduction to Architecture (2 Units)

This is an introductory course to Architecture as a discipline, profession and vocation. MODULE 1: The Definition and Terminologyof Architecture -Definition of Architecture as a Discipline, Profession and Vocation. MODULE 2: Architecture and the Building Industry- The Role of the Architect as a Team Leader and his relationship with other professionals in the Building Industry, Distinct roles of other professionals (engineers, planners, builders, estate surveyors, quantity surveyors, sociologists, psychologists and others) in the building industry. MODULE 3: Architectural Design Process-Extraction of brief from clients, Programming, Schematic Design, Production/Working Drawings; Factors Influencing Architectural Design Process (e.g clients' budget, technology, users' and environment requirements, etc). MODULE 4: Introduction to Climate and Architecture -Climate Change, Sustainable Architecture.MODULE 5: Study, Practice and Prospects of Architecture-Architects in Practice, Education, Banking and Financial Sector, Building Materials Manufacturing, Furniture Industry, Research Institutes and others. MODULE 6: Prominent Architects and their Works- Significant Buildings and their Architects in Nigeria and other countries.

MAT111 – Mathematics 1: Algebra (3 Units)

Algebra of set theory: Definition of concepts, laws of algebra of sets, Venn diagram and application. Real Number: Rational numbers, theory of surd, sequences and series (including AGP), binomial theorem, theory of quadratic, cubic and quadratic equations, indices and logarithms, mathematical induction, partial fractions, theory of equations, inequalities

and polynomials (including factor and remainder theorems). Complex Numbers: Algebra of complex numbers, Argand diagram, multiplication and division of numbers in polar form, n^{th} root of unity, and Demoivre's theorem, expansion of Sin nØ, Cos nØ, Tan nØ.

MAT112 - Mathematics 1I: Trigonometry and Geometry (2 Units)

Trigonometry and analytic geometry in (2-D & 3-D): Elements of trigonometry, circular measure, elementary treatment of circles, coordinate geometry: straight lines in (2B-D); plans. Functions and relations: permutation and algebra of functions, Binary operations, Permutation and combination, elementary treatment of logic.

PHY111 - Mechanics and Properties of Matter (2 Units)

Units and dimensions, Scalar and vectors, Particle kinematics, Newtons laws, Friction, Work, Energy, Centre of mass, Simple harmonic motion, Rigid body dynamics, Kepler's laws, Pressure in fluids, Intermolecular forces, Hooke's law, Young modulus, Fluid flow Streamline turbulence, Strooke's law surface tension.

PHY119 - Physics Practicals I (1 Unit)

Simple experiments illustrating the topics covered in PHY111 and PHY112.

Omega Semester

ARC121 - Graphics and Descriptive Geometry II (3 Units)

This is a continuation of ARC111 and it is aimed at equipping the students with the basic skill required to visualize and produce objects in three-dimensional drawings. MODULE 1: Introduction to Pictorial Drawings- Parallel Pictorial Drawings (Introduction to Isometric, Oblique, and Axonometric). MODULE 2: Introduction to Surface Development- Surface Development of Hollow Objects; Location of Joint lines. MODULE 3: Building Drawings-Introduction to Building Components (walls, doors, windows, lintels, building materials etc. and

their graphical representations. Types of Drawings and Symbols (Architectural, Surveying, Cityscape etc). MODULE 4: Production of Architectural Drawings- Plans, Elevations and Sections of small and simple buildings. MODULE 5: Introduction to Perspective Drawings- Basic Terminologies in Perspective Drawings, Uses and Types of Perspective Drawings.

ARC122 - Visual Communication II (2 Units)

Visual Communication II is Advanced Free Hand Sketching. MODULE 1: Perspective of Drawing of Indoor and Outdoor Spaces. MODULE 2:Introduction to Colour Theory and its Application -Primary, Secondary and Tertiary Colours,Practice on Colour hues and tones,Colour Application in simple design .Creating Illustration of 3-dimension using Primary & Secondary Colours. Effects of Colours on Human Perception.MUDULE 3: Composition- Methods of Scaling of objects, Drawings of Combination of Objects in colour, Impressionism on Nature and Human figures. Naturalistic expression of the environment in colour.

ARC123 - Basic Elements of Urban Planning and Environmental Sciences (2 Units)

The course is to provide students with an overview of the general content of the discipline of Urban and Regional Planning as it relates to Architecture. It exposes the students to the inductor aspects of the planning and management of the built environment. MODULE 1: Basic Elements of Human Settlements-Origin and Classifications of Human Settlements (rural and urban settlements). Components of Urban Physical forms (e.g. buildings, transportation & communication, utilities, open spaces). MODULE 2: Urban Land Use Classifications-Residential, Commercial, Industrial, Recreational etc). MODULE 3: The Concept of Physical Planning -Definition, Origin, and Elements of Physical Planning; MODULE 4: Planning Legislations in Nigeria -Historical Development of Planning Legislation, Levels of Planning Legislations in Nigeria; Application of Planning Laws to Physical Development Proposals (building setbacks, easements etc). MODULE 5: Types/Levels of Planning: Structure Plan; Subject Plan; Local Plan, Own Plan; Rural Plan; Sub-regional Plan, Regional Plan; National Physical

Development Plan. MODULE 6: Man-Environment Interactions- Impacts of Man's Activities on the Environment (climate change, sustainable environment, conservation, environmental degradation, urbanization etc).

MAT121 - Mathematics V: Calculus (3 Units)

Functions: Concept and notation. Polynimial and rational functions. Idea of limits; technique of finding limits. Derivatives: definition and calculation from first principles. Derivatives of constants, power, sums, products, quotients. Composite functions, circular functions, logarithmic/exponential function. Higher order derivatives; applications, small increments, approximations and errors. Extrema; integration of sum/scalar multiple of functions with applications; integration of circular functions. Definite integrals: general properties of definite integrals, some applications to geometry, mechanics, Biology and Social Sciences. Derivatives of hyperbolic functions; inverse circular/hyperbolic functions. Method of taking the logarithm before differentiating; successive differentiation of implicit functions and of functions like $e^{-at}\sin(bt + c)$. Hard Integration: Further techniques. Evaluation of integrals of the form $\int \frac{dt}{t^2+a^2}$. Integration of irrational functions, integration by substitutions, integration by parts. Reduction Formula.

MAT122 - Mathematics VI: Vector Algebra (2 Units)

3-Dimensional cartesian coordinate systems. Definition and representation of vectors. Elementary vector algebra. Multiplication of a vector by a scalar; addition of vectors; scalar products of two vectors; vector products; triple vector products. Direction cosines. Solution of vector equations. Calculus of vector functions. Differentiation of vector function. Plane curves and space curves. Serret-Frenet's formulae. Differential definition of grad, div and curl and their simple applications. Integration of vector function.

PHY121 - Electricity and Magnetism I (2 Units)

Electrostatics, Coulomb's law, capacitors, Ohm's law, conductivity, Kirchhoff's laws, electrical energy, DC bridges, Wheatstone bridge,

potentiometer, magnetic effect of current, electromagnetic induction, moving coil galvanometers, multi-meters, DC and AC motors, generators, power in AC circuits, rectification.

PHY129 - Physics Practicals II (1 Unit)

A selection of experiments to illustrate the principles covered in PHY121 and PHY122.

200 Level

Alpha Semester

ARC211 - Architectural Design I (4 Units)

The course is expected to introduce the students to the basic principles of architectural design using drawing equipment and materials. Some of the architectural design principle the students are expose to in this course include: Introduction to architectural Forms, Elements of Design: Proportion, Rhythm, Harmony, Contrast, Texture, Massing and Volume. The students are exposed to underlying principles in ordering of spaces, interior and furniture design, Anthropometrics, Lettering, and Documentation of small spaces. Architectural Design Process, Site Investigation and Analysis, as well as Space and Functional Relationships are introduced to the students.

ARC213 - History of Architecture I (2 Units)

The course presents introductory knowledge to the ancient architectural approaches of the Egyptians, Greeks and Romans. The aim of the course is to acquaint students with architectural innovations and shortcomings of the past civilizations, and thus using this knowledge as a spring board to forging a better understanding of the present challenges and their solutions. MODULE 1: General Overview of History of Architecture from Ancient to Modern. Module 2: Egyptian Architecture. Module 3: Greek Architecture. Module 4: Roman Architecture. Emphasis is on Architectural Influences, Character, Typologies. Case Studies of ancient

monumental buildings highlighting their applications in contemporary architectural practice.

ARC214 - Architectural Graphics I (2 Units)

The course is a continuation of ARC121. It comprises the following modules: MODULE 1: Introduction to Tones and Texture. MODULE 2: Presentation Techniques in of Floors Plans and Elevations. MODULE 3: Construction of Light, Shades and Shadows on Building façade. MODULE 4: Representation of Building Materials and Finishes on Spaces; Elevation renderings in Pencil, Pen and Ink, Water Colours, and Pastel. MODULE 5: Construction of Perspectives- 1, 2 and 3 point Perspectives.

ARC215 - Building Structures I (2 Units)

This is an introductory course to building structures. It deals mainly with the basic concepts in building structures and prepares the student for further studies in the field. Basic concepts of elastic behavior of materials, basic structural elements and the concept of applied loads are covered in this course. MODULE 1: Review of Forces, Moments and Couples as applied to Building structures - The concept of Force, Moments, Couples, Statics and Static Equilibrium and their applications to Building Structures. MODULE 2: Building as a key Component of The Built Environment- Components of Building, Theory of Structures, Structural Modeling and its Application; Forces as loads on Structures. MODULE 3: Basic Structural Elements- Beams, Columns, Arches, Trusses, Shells, Plates and Slabs their Properties and Applications. MODULE 4: Structural Systems in Buildings – Historical Evolution and Applications of Structural systems, Contributions of Ancient Egyptians, Greeks, Romans, Industrial Revolution and others to the Evolution of structural Systems. MODULE 5: Simple Support Systems- Characteristics and Applications of Roller, Pinned and Fixed supports; Classification of Beams base support systems (Statically Determinate and Indeterminate Beams). MODULE 6: Types of Simple Structures- Characteristics and Applications of Solid, Skeletal, Cables, Arches, Shells, Pneumatic structures.

ARC216 - Building Components and Methods 1 (3 Units)

This is an introductory course to components of buildings, the materials they are made of, and techniques of fixing them. Emphasis is on practical applications to the Nigerian context. MODULE 1: General Overview of Principles of Building Construction-Types of Construction (e.g. load bearing construction, framed construction, pre-fabrication and off-site production construction, timber framed construction and alternative approach etc.); Different Participants in Building Construction. Choice and Sources of Information in Construction (i.e. building regulation and code, British (BS), European (CEN) and International (ISO) standards, (ISO), Standard Organization of Nigeria (SON); National Building Code 2006); Trade Associations Technical Literature, Technical Reports in Journals and The trade press etc). MODULE 2: Organization of Construction Site-Preliminary Site Investigations;Site Analysis; Site Set-up; Soil Investigation; Construction Equipments and Machineries Identification and Physical Location of Services on Site. MODULE 3: Site Preparation- Statutory Requirements, Site Security, Bringing Services to Construction Site; Site Office. MODULE 3:Leveling and Setting Out of Construction Works- Leveling and Setting Out, Setting out for Excavations and Construction, Writing site Report and Structure of Report. MODULE 4: Foundations- Foundation Types, Design, Strength and Stability, Foundation Construction, Material used for Foundation, Soil Topography, Concrete Mixes and Ratio for Foundations.

SES211 - Land Surveying I (2 Units)

This introduces the students to the principles of land surveying and calculations of irregular areas; The practical aspects of this subject should be emphasized; measurement and quantification need to be stressed rather than those aspects of theory more appropriate to the specialist land surveyor; Students must understand not only the form and use of equipment but also how to test its accuracy and the means of making temporary adjustments. The syllabus entails the following: Basic principles and objects of land surveying, Types of survey. Relative accuracy and the effect on the method of surveying, Use and interpretation of ordinance survey, maps and plans, Scales, Enlargement

and reduction of plans, An appreciation of current land survey practice, including tachometry and aerial photogrammetry, Chain and tape surveying. Equipment, procedures, including plotting, Negotiating obstacles

Omega Semester

ARC221 - Architectural Design II (4 Units)

This is an advancement over ARC211, with the students being exposed to design exercises involving small scale projects like simple residential buildings, kiosks, day care centre, village market, village healthcare facilities, etc. The principle of design of mix-use development is also introduced. Areas of emphasis include site analysis, zoning, functional relationship, the use of bubble diagrams, design requirements and consideration. Others are spatial analysis, functional flow, architectural programming and site plan.

ARC223 - History of Architecture II (2 Units)

The course is a continuation in the series of courses aimed at exposing students to the study of the chronological record of architectural events as they affect a nation and its people. This is based on a critical examination of architectural source of material and usually presenting explanations of causes from ancient periods to the present day. Emphasis is on the study of the impact of the monotheist religion of Christianity and Islam on the development of Architecture during the Medieval period. MODULE 1: Early Christian Architecture. Architecture. MODULE 3: Western Christian (Roman Catholic) Architecture. MODULE 4: Romanesque Architecture. MODULE 5: Gothic Architecture. MODULE 6: Islamic Architecture.

ARC - 224 Architectural Graphics II (2 Units)

This is a continuation of ARC214, but also the introduction of other media for drawing. MODULE 1: Perspective Renderings- The use of Pencil, Pen and ink, water colours and pastel in perspective rendering.

MODULE 2: Working Drawings and Details-Plans, Elevations, Sections, Details and Schedules. Submission of portfolio of a simple project showing perspective, architectural model and working drawings is a compulsory requirement of this course.

ARC225 - Building Structures II (2 Units)

This course is a continuation of ARC215 and it is aimed at advancing students understanding on the behavior of structural members and the material they are made of. MODULE 1: Load on Structures-Stress, Strain and Shear as applied to Structures. Hooke's Law; Young Modulus; stress-Strain Curve and its applications. Mechanical Properties of Materials (Elasticity, Plasticity, Ductility; Brittleness, Resilience, Hardness, Toughness). MODULE 2: Properties of Cross-Sections of Structural Elements-Centre of Gravity, Centriod and Moment of Areas. MODULE 3: Beam as a simple Structural Element-Statically determinant and Indeterminate Beams; Stress in Beams, The Concept and importance of Critical Sections of Beams, Shear and Bending Stresses in Critical Sections of beams. Determination of Shear and Bending Moments in Beams using Bending Moment and Shear force Diagrams.

ARC226 - Building Components and Methods 1I (3 Units)

The course is a continuation of ARC216, but with particular focus on design consideration for international components of the building. MODULE 1: Floors- Types of Floors; Design and Functional Requirements of Floors (i.e. ground supported, concrete, slab, hardcore, blinding layers, damp proof membrane (DPM), damp proof course (DPC), material used for floors, floor screeds, floor joist, wall plate, floor finishes, floor ventilation, thermal insulation of floors, notches and holes. MODULE 2: Internal Elements-Columns; Beams, Slabs; Stairs (Types of Stairs and Design Requirements); Design of Ramps. MODULE 3: Doors and Windows- Functional Requirements, Types, Frames and Linings, Glass and Glazing, Ironmongery , Window Cills, Roof lights fire resistant properties, integrity properties, daylight effect, penetrations, factors, calculations, quality, glare.

ARC229 - Building Climatology and Environmental Sciences (2 Units)

The goal of this course is to introduce the students to the basic concept of the Physical and Built Environment as it relates to Architecture. MODULE 1: The Concept and Components of Environment-Natural and Built Environment, The Philosophy of Environmental Sciences as applied to Planning, Design, Construction and Management of Natural and the Built Environment. MODULE 2: Man and the Built Environment- Processes, Challenges and Prospects of Urbanization in the Global and Nigerian Contexts. MOULE 3: The Concept of Sustainable Development- Origin and Conceptual Definitions of Sustainable Development, Environmental, Economic and Social Aspects of Sustainable Development, Sustainable Development and Human Settlements. MODULE 4: Building Climatology -Climate and its Components. Climate and Buildings. Ventilation and Lighting in Buildings. Solar Radiation and Moisture Control in Buildings. Influence of Climate on Architectural Design in Nigeria.

SES221 - Land Surveying II (2 Units)

The intention here is to widen the knowledge of the students the more in Land surveying and mensuration having opened the way under Land Surveying I. Areas to be covered; anchored on teaching and practical include: Measurement of existing buildings, Setting out of boundaries, roads, and simple curves, Setting out for new construction works, Levelling; equipment; procedures, booking, readings, reducing and plotting, Sections and contours, Setting out for embankments, cuttings and drains, The theodolite and its uses. Principles of traversing, Calculation of co-ordinates of stations and areas enclosed by traverses, Applied measuration. Measurement and calculation of lengths, girths, areas and volumes, both regular and irregular from drawings or survey data. Note that while familiarity with the theodolite is required, an extensive knowledge of this instrument and its use will not be expected. Methods of ensuring the accuracy of data and calculation should be emphasized.

300 Level

Alpha Semester

ARC311 - Architectural Design III (4 Units)
This course is a continuation of ARC221 and it introduces the student to higher level of architectural design. Students are to be exposed to inter-disciplinary aspect of architectural design principles, where constraints like site, climate, landscape, structure are expected to influence the final design decisions. Design projects are drawn from key areas comprising Architecture of Buildings (Individual and groups of Buildings) and Architecture of Towns and Cities (Housing and Industrial Developments, Neighbourhood Design, Urban Renewal/Regeneration, Transportation, Commercial and Recreational Facilities etc).

ARC312 - Community Development and Initiatives (1 Unit)
This course seeks to develop the ability of the student to critically explore a neighbourhood or community with a view to identifying critical environmental needs in terms of physical and infrastructural development and proffering design solutions to them. Students are expected to understand how to carry out evaluation of a neighbourhood or community in terms of architectural spaces in order to identify the shortcomings, with a view to re-planning the spaces. Activities undertaken by the students are: Introductory Lecture on Community Development Initiatives; physical examination of the areas linking the hostels to the library, chapel and academic areas; questionnaire administration to assess the perception of staff and students on the problems associated with the present layout; Circulation and safety of pedestrians in Educational facilities. Others are Case study of circulation and safety in higher institutions. Preliminary project report (size of sheets-A4) Outline re-design scheme, Final design proposal (size of sheets-A3) Perspective or model of proposal: Defense of final design proposal.

ARC313 - History of Modern Architecture I (2 Units)

This is an introductory course reviewing the development of 20th century architecture in form of lectures and illustrations and discussion where appropriate. It is basically a course on architecture and architects of the 20th century and their impact on the development of the International Style.MODULE 1: The idea of Modern Architecture in the 20th Century-A discussion of approaches; The historical process leading to the creation of the modern movement in architecture, The first theorist of a modern architecture; Historical prototypes and the rationalist approach; abstract view of history and other ingredients in the formulation of modern architecture. MODULE 2: The Search for New Forms-The precursors of contemporary architecture; The art Nouveau and its practitioners – Victor Aorta, Henry van der Velde, Antoni Gaudi Rennie Mackintosh.; Brussels as Centre of Contemporary Art; H.P. Berlage, Otto Wagner, Adolf Loos, Josef Hoffman. MODULE 3: New Conceptions of Space-Review of various paths to Vocabularies of Architectural Design; Influence of cubism and Abstract art, the avante-garde and the De Stijl Movement. MODULE 4: The International Style: Theme and Variations-The spread of modern architecture in the developing counties; Africa and Latin America particularly Nigeria.The spread of modern architecture continued. MODULE 5: Form and Content in the Woks of Pioneers of Modern Architecture-Study of selected Pioneers; FL Wright, Le Corbusier, Walter Gropius, Mies van der Rohe;Study of selected Pioneers continued. MODULE 6: Independent Investigation-Independent Investigation by students begins, Independent Investigation by students continued; Presentation by students using multimedia projectors of results of investigation. Field Trip.

ARC314 - Urban Planning and Design I (3 Units)

This is an introductory course to urban planning and design as applied to architecture. It exposes students to 3-Dimensional aspects of urban planning and design, with emphasis on the role of architecture in ordering urban forms and landscape designing. MODULE 1: The Concept of Urban Planning and Design- Definitions, Goals and Objectives of Urban Planning and Design; History of Urban Planning and Design (Nigerian

and Global Context); Theories in Urban Planning and Design. MODULE 2: Classifications and Functions of Urban Spaces (socio-economic functions of private and public spaces). MODULE 3: Key Participants in Urban Planning and Design- Professionals, Government, Communities etc and their Roles in Urban Planning and Design. MODULE 4: Urban Land Use-Criteria and Determinants of Urban Land Use Pattern; Urban Design and Planning Principles with respects to Housing; Facilities, Services, Transportation and Open Spaces; MODULE 5: Urban Circulation Systems- Definition of Urban Circulation Systems; Types of Urban Circulation Systems; Urban Road Network System. (Hierarchy and Characteristics of Road Networks); Designing and Planning of Urban Roads (Design standards) ; Street Furniture (Planning and Design of Street Furniture).

ARC315 - Building Structures III (2 Units)

A continuation of ARC225, but with emphasis on determination of loads on building structures using different analytical Methods. MODULE 1: Statically Determinate and Indeterminate Structures.-Determination of Loads on Structures. MODULE 2: Introduction to FrameStructures and their Applications- Pin Jointed Frame Structures. Analysis of Trusses. MODULE 3: Introduction to Slope and Deflection of Prismatic Beams-Analysis of determinate beams using formula method and Method of Superposition. MODULE 4: Statically Determinate Beams: Analysis of Statically indeterminate Beams using methods of Superposition, Three Moment Theorem and Moment Distribution.

ARC316 - Building Components and Methods III (3 Units)

This course exposes students to details of floor and wall constructions. MODULE 1: Flooring Details- Construction Processes, Techniques and Methods of Flooring, Detailed illustrations of sections through different types of floors, Skinning, Dado, Floor Tiles. MODULE 2: Walling Details: Introduction to Walling, Functional Requirements, Types of Walling with emphasis on illustrations and practical construction process, openings (arches, lintels etc.), Choice of Walls, Walling Materials, Dowels, Cements Joggles, Cramps. Introduction to Bricks and Brick

Walls, Types, Classifications, Properties, Walling Materials, Bonding, Types of Bonding. Rendering, Weather Resistant Walls, Insulation in Walls (e.g Types of Insulation, Types of fixing, Vapour Check, Wall Finishes.

ARC317 - Building Services I (2 Units)

This course basically exposes the students to the principles of water and power supply to and waste disposal from the building. Students are expected to understand contemporary needs for utilities in a Building and how to make provision for these at both the design and construction stages. MODULE 1: Water Supply in building: Water supply and sources of water supply. Water treatment and purity of water. Cold water supply system. Hot water supply system. MODULE 2: Sanitary Appliances: Characteristics and Materials of Sanitary appliances. MODULE 3: Plumbing System in building: The function and services of plumbing. Guidelines for Plumbing system. Module 4: Power Supply in Buildings: Electrical Installations. Space planning guidelines for electrical (power) equipment in buildings, Alternative Power Supply (Solar panels) MODULE 4: Drainage system and Waste disposal. Types of drainage channel. Methods of drainage system and Waste disposal.

ARC319 – Introduction to AUTOCAD (1 Unit)

Students are introduced to the use of computer software package-AUTOCAD in architectural design. It is a practical course, and it is aimed at developing students' skills in the use of AUTOCAD. MODULE 1: STARTING TO DRAW .Opening a Drawing. Using Commands .Specifying Coordinates, Setting up a Drawing. MODULE 2: DRAWING IN TWO DIMENSIONS. Drawing Simple Lines .Drawing Curves and Point Objects. Viewing Your Drawing. Editing Your Drawing: Basic Tools. Editing your Drawing: Advanced Tools. Organising Drawings with Layers, Colours, Line types, and Line weights. Getting Information from your Drawing. Creating Text Creating Dimension Styles. Drawing Dimensions. MODULE 3: Creating Additional Drawing Objects. Drawing Complex Objects. MODULE 4: Working With Reusable Content: Working with Blocks and Attributes. MODULE 5:

Working With Data: Referencing Other Drawings. Working with External Databases. MODULE 6: Layouts and Plotting: Plotting and Printing your Drawings.

Omega Semester

ARC321 - Architectural Design IV (4 Units)

This course is a continuation of ARC311 and it introduces the student to higher level of architectural design. Students are to be exposed to inter-disciplinary aspect of architectural design principles, where constraints like site, climate, landscape, structure are expected to influence the final design decisions. Design projects are drawn from key areas comprising Architecture of Buildings (Individual and groups of Buildings) and Architecture of Towns and Cities (Housing and Industrial Developments, Neighbourhood Design, Urban Renewal/Regeneration, Transportation, Commercial and Recreational Facilities etc.).

ARC322 - Interior Design (2 Units)

This is a seminar-based course that exposes the students to contemporary design and practice principles in interior design. Resource persons from the industry are invited to deliver lectures to the students. These are complimented by seminar presentation by students on different aspects of this course as would be identified by the lecturers.

ARC323 - History of Modern Architecture II (2 Units)

A Study of predisposing causes and strands of idea leading to the development of modern architecture. The crystallisation of modern architecture. Study of architects having profound impact on modern architecture development in Europe and America and the eventual dissemination in developing countries since 1960. Critiques of the modern movement and a general review of modern architecture as it affects the society. MODULE 1: The Formative Strands of Modern Architecture- Rationalism, the Engineering tradition and the use of Reinforced concrete; The Arts and Crafts Ideals. Responses to

Mechanisation: The Deutscher Werkbund and the Futurism of Antonio Sant' Elia; Frank Lloyd Wright and the Prairie tradition. MODULE 2: The Crystallisation of Modern Architecture 1940 – 1965-A genealogy for contemporary architecture. Themes and variations in the works of Le Corbusier, Walter Gropius, Richard Neutra, Mies van de Rohe, etc;Themes and variations in the works of cotemporary Architects continued. MODULE 3 Modern Architecture in Developing Countries Since 1960-The spread of modern architecture in Nigeria before and since independence. Study tour of architecture of significance in Lagos and environs. Students' Independent Investigation. MODULE 4: Critique of the Modern Movement-A class interaction: Critique of the Modern Movement in Nigeria:Modernity, Tradition and the Way Forward. Socio-cultural issues in Modern Design.

ARC324 - Urban Planning and Design II (2 Units)

This is a continuation of ARC314. However, emphasis is on Urban Landscape Design, Planning and Management Techniques. MODULE 1: Introduction to Urban Design and Planning –Origin, Goals and Components of Urban Planning and Design; Neighbourhood and Site Environmental Planning. MODULE 2: Urban Planning Models and Processes- City Models and Structures (e.g. Neighbourhood Concepts, Bands and Villages); Planning Process; Urban Revolution, Rehabilitation and Renewal. MODULE 3: Urban Landscape Design-ComponentElements of Urban Landscape; Fundamental Issues in Urban Landscape Design; Landscape Planning, Design and Management; Basic Principles of Urban Landscape Design, Functional Urban Landscape Design Elements. Urban Landscape Design Process (Order and Circulation in Landscape design). A field study of Urban Design and Planning Principles in any Nigerian city shall be carried out by students.

ARC325 - Building Structures IV (2 Units)

The course introduces the student to the design of reinforced concrete design. MODULE 1: Introduction to Reinforced Concrete Design-Reinforced Concrete design methods. MODULE 2: Properties and Structural Behavior of Concrete and Steel- Tensile, Compressive, Shear,

Fire Resistant Properties etc. MODULE 3: Limit State Design According to BS8110.- Concepts and Terminologies used in Reinforced Concrete Design according to BS8110. MODULE 4: Design of Reinforced Concrete Beams- Singly and Doubly Reinforced Beams, Design of Bending and Shear reinforcements; Design of Continuous Beams.

ARC326 - Building Components and Methods IV (3 Units)

This course deals with concrete as a key construction materials. Students are expected to understand key aspects of concreting. MODULE 1: Concrete and Concreting- Overview of Historical Development of Concrete as a construction material; Components of Concrete (cement, aggregate, water, admixtures), Concrete Mixes; Curing, Testing, Finishing, Reinforcement, Site Production, Pre-stressed Concrete, Pre-cast Concrete, Concrete materials. MODULE 2: Formwork and Scaffolding- Construction, types, use, reason, purpose etc.

ARC327 - Building Services II (2 Units)

This is a concluding aspect of ARC317, and focuses on movements, fire safety and ventilation in buildings. General Introduction to Building Services II. Module 1: Movement in Building-Paternoster, Lift system and Escalators in buildings. Module 3: Fire safety and protection. Providing for fire safety during the schematic design phase. Fire behaviour and active system used to control fire in buildings. Module 4: Ventilation in Buildings. Ventilation principles of air movement. Ventilation requirements. Mechanical ventilation devices-life & Extractor Fans Electrically Powered Security Systems in Buildings.

ARC329 AUTOCAD – 3D (1 Unit)

This course is a continuation of ARC319. It aims at further exposing students to the use of AUTOCAD in creating drawings in 3-D format. MODULE 1:Specifying 3-D Coordinate: Working with 3D Coordinates. Using Elevation and Thickness .Working with the User Coordinate System. MODULE 2: Veing 3D Drawings: Working with the Standard viewpoints. Using DDVPOINT. Working with the Tripod an Compass. Getting a Quick plan View. Shading Your Drawing Using 3D Orbit.

Using Tiled View ports. Defining a perspective View. Laying Out 3D Drawings. MODULE 3: Creating 3D Surfaces: Drawing Surfaces with 3DFACE. Drawing Surfaces with PFACE. Creating Polygon Meshes with 3DMESH. Drawing Standard 3D Shapes. Drawing a Revolved surface. Drawing an Extruded Surface. Drawing Ruled Surfaces. Drawing Edge Surface. MODULE 4: Creating Solids and Editing in 3D: Drawing Standard Shapes .Creating Extruded Solids. Drawing Revolved Surfaces. Creating Complex Solids. Sectioning and Slicing Solids. Using Editing Commands in 3D. Editing Solids. Listing Solid Properties. MODULE 5: Rendering in 3D: Understanding Rendering. Creating Lights Creating Scenes. Working with Materials. Using Backgrounds. Doing the Final Render. MODULE 6: Keeping Control Of Your Drawings. Accessing Drawing Components with the Design Center. Accessing Drawing Content with Tool Palettes. Setting Standards for Drawings. Organizing Your Drawings. Maintaining Security. Keeping Track of Referenced Files. Handling Errors and Crashes. Managing Drawings from Prior AutoCAD Releases.MODULE 7: Working with Other Applications: Importing and Exporting other File Formats. Working with Raster Images.Pasting, Linking, and Embedding Objects. MODULE 8: Getting on the Internet: Drawing Surfaces with 3DFACE/Drawing Surfaces with PFACE.Creating Polygon Meshes with 3DMESH.Drawing Standard 3D Shapes. Drawing a Revolved surface. Drawing an Extruded Surface.Drawing Ruled Surfaces.Drawing Edge Surface.

PSY326 - Basic Environmental Psychology (2 Units)

This course concentrates on the understanding and basic concept / definition of environmental psychology; How psychology is applied to the notion of environment; History of environmental psychology; Why psychology in environment; Concept of ecosystems; Territoriality – experimental studies of territory, personal space and privacy; Man in his environment and factors that influence and aid man to put his environment under control and which enhance his human status; Simple interpretation of mains environmental challenges; man – environment relations and human responses to and impact on the environment; Spatial and functional relationships of settlements; Psychological analysis

of noise, and air pollution. Psychological effect of industrial waste of the environment; Human behaviour on the environment.

ARC320 - Student Industrial Work Experience-SIWES (0 Unit)

This is an assessment of students' industrial work experience report from the industry based supervisor(s). Aside the logbook, students are expected to submit a detailed typed report of the experience acquired and relevance to their studies.

400 Level

Alpha Semester

ARC411 - Architectural Design V (4 Units)

This course is a continuation of ARC321 and it introduces the student to complex architectural design projects. Students are to be expected to undertake design tasks in key areas of Architecture of Buildings (Individual and groups of Buildings) and Architecture of Towns and Cities (Housing and Industrial Developments, Neighbourhood Design, Urban Renewal/Regeneration, Transportation, Commercial and Recreational Facilities etc.). Difficult terrain would be suitable for the design projects to enable students display a clear understanding of how to maximize the opportunities and constraints provided by such topography.

ARC412 - Research Methods (2 Units)

Understanding the philosophical bases of research. Research Defined. Types of research. Elements of the research process. Literature review as an essential ingredient of research. Developing Research Skills. Data gathering and analysis. The application of statistical methods. Preparing a Research Proposal. Presentation and evaluation of students' individual research proposal. The aim of the course is to introduce the student to basic research in architecture. It will explain the theoretical approaches to research as well as teach the skills of dong research

MODULE 1: Introduction-Introduction; An overview of research. Research defined. Characteristics of research; Areas of architectural research concerns; General concepts of research techniques. MODULE 2:Fundamentals of Research -The fundamentals of research; Classification of systems of inquiry; Positivism, naturalism and critical approaches to research; Classification of systems of inquiry continued; Formulation of hypotheses. Inductive and deductive reasoning. The place of theory, conceptual frameworks and hypotheses in deductive reasoning; Selected Definitions. MODULE 3:Types of Research-Purposes of research; Types of research: survey, historical, qualitative; case-study/ multiple methods approach. MODULE 4: Research Design and Problem Definition-Research design introduced; Analogies with architectural design; Major components of research design.The research problem: where do they come from? Framing the research problem; Defining sub problems. MODULE 5: Review of Literature-Sources of literature; Writing the review of literature; Tools of Research. MODULE 6: Data and Sampling- Data and Method; Nature and types of data; Data for survey research; Survey designs; Sampling and sampling designs. MODULE 7: Writing Research Proposal-The research proposal; Components of a good research proposal; Structure of a proposal; Guidelines and tips. MODULE 8: Collecting and Analyzing Data-Field work and data collection; Analyzing data; Software for analyzing data; Statistical analysis for survey designs. MODULE 9: Writing the Dissertation-Writing the final dissertation report; Guidelines for preparing report; Structure of the report; References, endnotes and appendices.

ARC413 - Building Economics, Quantities and Estimating (3 Units)

The students are to be introduced to the concept of building economics, quantities and estimating their meaning and its implication for the architect. It underscores the place of research and data gathering in building economics and estimating. MODULE 1: Building Economics and Related Cost Terminologies- Cost Plan, Cost Planning, Cost Control, Cost Check, Cost Analysis, Cost Evaluation, Cost Study, Cost Research, Cost Limit, Cost Target, Cost-in-use, Value, Cost,

Element, Approximate Estimating, Building Process, Design Team; Historical Development of Cost Control Processes MODULE 2: The Concept of Cost Control in Building Process- Cost Control Procedure; Cost Planning Techniques; The Building Process And The Building Contract Cycle.; Plan of Work for a Building Project; MODULE 3: Factors Influencing the Cost of Building- Design Factors: Cost Implication of Design; Factors Influencing Cost of Building during Construction Stage. MODULE 4: Cost and Value Assessment- Methods of Assessment of Cost to Client at Design Stage : Approximate Estimating- Unit, Cubic, Floor-Area , Storey Enclosure Methods and Bill of quantities.Method of Evaluation of Executed Work; Preparing Valuation for Interim Certificates and Related Terminology. MODULE 5: Types of Building Contract and Tendering Procedure – Types of Contracts, Tendering Procedures; Negotiated Contracts; Submission and Opening of Tenders. MODULE 6: Cost Estimates for Buildings.

ARC414 - Architecture of Towns and Cities (2 Units)

The course exposes the student to the fundamentals of the design of towns and cities. Students are expected to understand urban structure with specific reference to the design of different land use and the underpinning legislations in Nigeria. Module 1: Planning Legislation-Historical Development of Planning Legislation; Current URP Law – Decree 88 of 1992; Application of Planning Law to Development Proposals. MODULE 2: The Concept of Urban Settlement- TheOrigin andclassification of Urban Settlements (Towns, Cities, Metropolis; Megalopolis, Megacities etc). MODULE 3: Components of Urban Form-Residential, Commercial, Industrial, Recreational; Transportation (Circulation), Commercial, Educational and Open Spaces etc; Criteria and Determinants of Urban Land Use Patterns. MODULE 4: Urban Services- Transportation Systems (Road, Rail, Water and Air Ways; Traffic Analysis and Design for effective Traffic Circulation in Cities). Water and Power Supply; Sewerage; Drainage Systems. MODULE 5: Design of Urban Neighbourhoods- Application of different Models in the Design of Urban Neighbourhoods.

ARC415 - Building Structures V (3 Units)

This is the concluding part of Reinforced Concrete Design. MODULE 1: Reinforced Concrete Slabs- Design of reinforced concrete slabs. MODULE 2: Foundations- Design of reinforced Concrete Pad Foundation. MODULE 3: Design of Reinforced Concrete Columns. MODULE 4: Introduction to principle of design of Retaining Walls. Design of Structural drawings of simple Buildings.

ARC416 - Building Components and Methods V (3 Units)

The course builds on the knowledge students have acquired in the lower level. Emphasis is on Roofing. MODULE 1: Introduction to Roof and Roofing- Types of Roofing, Functional Requirements (properties/features), Parts of the Roof (ridge/board, wall plates, purlins, rafters, Strut, Hipped End, Valley, Eaves, Dormer Windows, Verge etc) MODULE 2: Different Roofing Materials- (corrugated iron sheets;aluminum roofing sheets, roofing tiles etc) Drip, Felting, Types of felting, Practical Sections through the roof members. MODULE 3: Ceilings-Functional Requirements; Types and Installation of Ceilings.

ARC 417 - History of Traditional Nigerian Architecture (1 Unit)

The Course equips the students with the basic information and knowledge on Traditional Nigerian Architecture. Students to identify key themes and features of Traditional Nigerian Architecture. MODEL: The Concept of Traditional/ Vernacular Architecture- The Nigerian Architecture; Factors that influenced the evolution of Nigerian. MODULE 2: Features of Nigerian Architecture-Traditional Architecture of Major and Minor Ethnic Groups in Nigeria (Hausa-Fulani, Igbo, Yoruba, Bini etc); Values Derived from Traditional Nigerian Architecture (Privacy, Security, Territoriality, Authority etc). MODULE 3: Colonialization and Traditional Architecture in Nigeria-Influence of Colonialism on Traditional Nigerian Architecture

ARC418 - Nigerian Architects in Practice (1 Unit)

This is a seminar- based course that is expected to bring to closer contact between successful architects in Nigeria and the students for the purpose

of sharing experience on contemporary architectural practice in Nigeria. The students shall be exposed the basic knowledge on what it takes to practice architecture in Nigeria. The resource persons are expected to discuss with the students the practice environment and their outstanding completed and/or ongoing projects.

ARC419 - Building Information Modelling 1 (1 Unit)

This is a practical course that introduces the students to the use of Autodesk Revit Building as a tool for Building Information Modelling. It provided the students with the techniques of developing a building model. It covers the basics of presenting the Building Model and working in teams using Auto desk Revit Building.

Omega Semester

ARC421 - Architectural Design VI (4 Units)

This course is a continuation of ARC321 and it introduces the student to complex architectural design projects. Students are to be expected to undertake design tasks in key areas of Architecture of Buildings (Individual and groups of Buildings) and Architecture of Towns and Cities (Housing and Industrial Developments, Neighbourhood Design, Urban Renewal/Regeneration, Transportation, Commercial and Recreational Facilities etc.). Difficult terrain would be suitable for the design projects to enable students display a clear understanding of how to maximize the opportunities and constraints provided by such topography.

ARC422 - Research Essay/Project (3 Units)

This is an individual study chosen by the student with the approval of the Head of the Department. The study may be in the field of Design Theories and Methods, History and Philosophy of Architecture, Environment, Housing, Behavioral Studies, Building Material, Architectural Education and any other area that is relevant to architecture. The work would be supervised by members of the academic staff. The report must be between 10,000 and 15,000 words (inclusive of notes, but

excluding appendices). It should be on A4 size paper, typewritten and double spaced using 12 point fond in The New Times Romans and bound. Examination is by oral presentation (project defense) by the students.

ARC423 - Law of Contract and Tort (2 Units)

The course introduces students to the basic s of law of contract as it applies to architectural practice and specifically in contract administration. MODULE 1: Elements of Law- Sources of Law; Nigerian Customary Law and Statute Law, Common Law and Equity. MODULE 2: The Major Divisions of Law- Distinctions between Contract, Tort, Crime and Property Law; Federal and State Legislation and Legislative Powers; Subordinate Legislation (by-Laws), Case Law and Doctrine of Precedent. MODULE 3: The Nature of the Judicial Process.-General Principles of Equity; The organization and jurisdiction of the Courts and Tribunals in Nigeria. MODULE 4: Elements of Law of Contracts-Formation of Contract, Capacity of Parties, Mistakes, Misrepresentation, Duties, Non-disclosure, Fraud, Illegality, Remedies for Breach of Contract, Privity of Contract, Assignment and Negotiability, Agency, Discharge of Contract, Contract of Employment.

ARC425 - Building Structures VI (3 Units)

The design of structural Steel and Timber Elements are taught in this course. MODULE 1: Design of Structural Steel Elements- Design of Steel Beams and Joists. MODULE 2: Design of Structural Timber Elements- Design of Timber Columns, Beams and Studs.

ARC426 - Building Components and Methods VI (3 Units)

The course dwells on Finishes and External works. MODULE 1: Finishes- Materials used as finishes (e.g glass, Timber, Steel; paint, Tiles, PVC strips etc) MODULE 2: GLASS- Glaze and Glazing, Types of Glass Products, Process of Manufacturing Glass Products, Characteristics of Glass. MODULE 3: Paints and Other Finishes - Painting, Types and components of Paints; Defects of Paints. Cement Mortar Rendering (Types of rendering, dashes, process of rendering) Silts and silting, Types

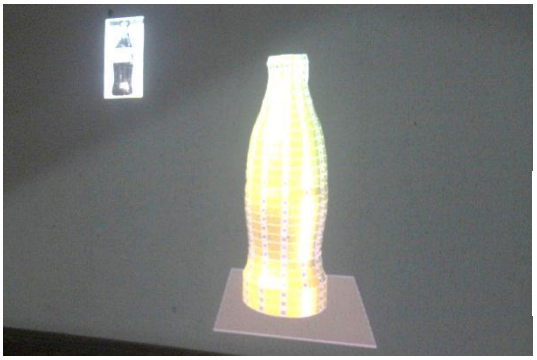
of Silting. Tiles and Tiling; Skirting etc. Visit to site, field trips and excursions.

ARC427 - Introduction to Professional Practice (2 Units)

This course is an introductory class to the practice of Architectural Profession. Emphasis shall be placed on client management, architect's office administration, project administration, professional ethics, building regulations and building contract administration.MODULE1: Professional Practice-General Introduction; Concept of Professional Practice/ Aspects of Professions; Development of Architectural Practice in Nigeria. Module 2: Client Management- Procedures for Managing Clients; Business Development for Architects. Module 3: Organization of Architectural Practice- Employment Opportunities for Architects; Types of Architectural Firms; Setting up and Management of Architectural Offices. Module 4: Project Administration-Professional Services; Pricing of Architectural Services; Project delivery Systems. Module 5: Regulations and Guidelines-The professional Code of Conduct; Building Regulations. Module 6: Building Contract Administration-Forms of Building Contracts; Contract Administration Team; Site Meetings, Records, Inspection; Architect's Certificates; Other issues during Contract Administration; The NIA Contract Agreement.

ARC429 - Building Information Modelling 1I (1 Unit)

The course builds on the concepts introduced in the Building Information Modelling I. The modules are: MODULE 1: Site Design. MODULE 2: Advanced Rendering Techniques; MODULE 3: Phasing and Design Options- Creating families of Custom Components. MODULE 4: Collaboration on Design Project.



Architecturally designed Coke bottle

4-Bedroom Duplex in Covenant University

Construction site of Covenant University Secondary School

5.2 DEPARTMENT OF BUILDING TECHNOLOGY

OVERVIEW OF THE DEPARTMENT

On 21st October, 2002 at the take-off of the College of Science and Technology, all the academic programmes in the College were grouped into two Departments, namely:

(i) Department of Computer and Information Technology
(ii) Department of Environmental Science

The Department of Environmental Sciences started with the following Degree Programmes:

(i) B. Sc. Architecture (4 years)
(ii) B.Sc. Estate Management (5 years)

At the beginning of the 2004/2005 academic session, more Engineering and Applied Sciences Programmes were added. The Department of Architecture was created and the Building Technology Programme came under the Department of Architecture and was headed by Professor E. A. Adeyemi. The Department of Building Technology was created at the beginning of the 2006/2007 academic session to take care of Building Technology Programme and Professor T. O. Mosaku became the pioneer Head of the Department.

Vision

Our Vision is to be a leading Department of Building Technology committed to raising quality leaders in the fields of Construction Management, Building Structures, Construction Technology, Building Services Engineering, Building Maintenance and Construction Economics.

Mission

Our Mission is in consonance with the University's Mission of training students who will be mentally resourceful and entrepreneurially self-dependent with emphasis on the development of the Total Man.

Philosophy

The Philosophy of the Department of Building Technology complements the overall Mission of developing the total man via the vehicle of education. In other words, it is intended to raise a new generation of leaders. The building industry plays a unique and vital role in the development of a nation. Unfortunately, this is an industry still being run by a group of untrained people. Therefore, the development of the total man is a pertinent issue for the total emancipation of this important industry. The Building Technology Programme, therefore, is required to be richer and deeper in content than has hitherto been the case. A new approach to information dissemination needs to be found to prepare students to excel in practice as construction project managers, building project planners and construction activities programmers, good project cost estimators and human relations managers. All of these require integrity, posibility mental capacity and diligence.

Objectives

The Programme aims at providing efficient and effective manpower for the building industry. The aim will be achieved using the following objectives:

i. to provide a conducive environment for lectures, tutorials and practical work for the building students;
ii. to develop their skills and broaden their experiences through exposure to real life project situations;
iii. to guide students in providing solutions to real challenges on construction sites by using up-to-date practical and theoretical tools;
iv. to support the students' technical ability with appropriate management and moral background information for optimum performance in practice. Building Maintenance/facilities managers;
v. to produce graduates that can be registered by the appropriate professional bodies after the completion of their course as professional builders for the construction industry; and
vi. to increase their proficiency and enhance their performance in their core professional areas.

The academic and practical contents of the Building Programme have also been designed to achieve a standard acceptable for registration with Council of Registered Builders of Nigeria (CORBON) and other allied professional bodies in and outside Nigeria. The Department of Building Technology therefore produces a general professional builder within the period of undergraduate programme who at the time of graduation will be able to:

i. create a consultancy link consultant with the architect, structural engineer and quantity surveyor in advisory capacity or consultant on the use of materials and technology within given cost limits on building construction projects;
ii. create/undertake the organisation and execution of building projects;
iii. work effectively and efficiently in government establishments, design organisations and on construction sites as site manager, project builder, construction manager, project manager, cost estimator, project planner, contract manager, Building Maintenance/Facilities Manager, etc;
iv. work in research institutes as researcher; and
v. work as a lecturer in higher institutions of learning, among others.

LIST OF ACADEMIC STAFF IN THE DEPARTMENT

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Dr. O. I. Fagbenle	B.Sc, M.Sc, Ph.D, MNIOB, ANIST C.Bldr	Associate Professor/HOD	Construction Management Materials Technology, Project Management
2.	Prof. T. O. Mosaku	B.Sc, M.Sc, Ph.D, FNIOB, ANIQS, C.Bldr, RQS	Professor	Construction Management, Project Management, Quantity Surveying
3.	Dr. J. O. Ameh	B.Sc, M.Sc, Ph.D, MNIOB, C.Bldr	Senior Lecturer	Construction Technology, Materials Science and Construction Project Management
4.	Dr. J. D. Owolabi	B.Sc, M.Sc, Ph.D	Senior Lecturer	Construction Management, Project Management
5.	Dr. E. A. Olanipekun	B.Sc, M.Sc, Ph.D, MNIOB, C.Bldr	Lecturer I	Building Services and Energy Conservation, Building Production Management

6.	Dr. E. Ikpe	B.Sc, M.Sc, Ph.D	Lecturer I	Construction Management, Materials Technology, Project Management
7.	Dr. L. M. Amusan	B.Sc, M.Sc, Ph.D, MNIOB, C.Bldr	Lecturer I	Construction Management, Project Management
8.	Dr. A. O. Ogunde	B.Sc, M.Sc, Ph.D, MNIOB, C.Bldr	Lecturer I	Construction Management, Construction Technology and Building Services
9.	Mr. O. Joshua	B.Sc, M.Sc, MNIOB, C.Bldr	Lecturer I	Building Structures and Construction Technology
10.	Mr. I. O. Omuh	B.Sc, M.Sc, MNIOB	Lecturer II	Building Structures and Construction Technology
11.	Mrs. F. P. Tunji-Olayeni	B.Sc, M.Sc, ANIQS, R.QS.	Lecturer II	Quantity Surveying, Construction Management
12.	Mr. A. O. Afolabi	B.Sc, M.Sc	Assistant Lecturer	Construction Management and Construction Technology.
13	Mr. R. A. Ojelabi	B.Sc, M.Sc	Assistant Lecturer	Construction Management, Materials Technology

TECHNOLOGISTS

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Babalola Benjamin	HND Building Tech	Technologist I	Building Construction, Materials and Structures
2.	Ajao Adekunle	HND Building Tech	Technologist I	Structures Materials Technology
3.	Ogunbayo Babatunde Fatai	HND Building Tech	Technologist I	Structures Materials Technology
4.	Ogundipe Kunle Elizah	HND Building Tech	Technologist II	Structures Materials Technology
5.	Jonah David	SSCE	Laboratory Attendant	

ADMINISTRATIVE STAFF

S/N	NAME	QUALIFICATION	STATUS
1.	Oluwalana Ayodeji I.	B.Sc (Environment Management)	Administrative Officer

5.2.1 BUILDING TECHNOLOGY PROGRAMME

PROGRAMME: Building Technology

DEGREE AWARDED: B.Sc (Honours) Building Technology

DURATION: 5 Years

ADMISSION REQUIREMENTS

To be eligible for admission into the B.Sc (Honours) Building Technology Degree programme, candidates must pass the SSCE Examination or its equivalent at credit level in five (5) subjects at not more than two sittings; the subjects must include English Language, Mathematics, Physics, and Chemistry/Economics and any other from the following subjects: Technical Drawing, Fine Arts, Geography, Land Surveying or Building Construction. In any case, at least a pass in Chemistry is required. Other equivalent qualifications may be accepted based on their merit.

GRADUATION REQUIREMENTS

To be qualified for graduation a student must meet the following requirements:

Level	100	200	300	400	500	Total
Core/Compulsory Courses	31	28	33	17	36	145
Electives						0
SWEP		1				1
Industrial Training (SIWES)				6		6
College Courses						0
University Courses	4	4	4	2	4	18
NUC Courses	10	6	2			18
Total	45	39	39	25	40	188

COURSE STRUCTURE

100 Level Building Technology						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	BLD111	Introduction to Building I	C	2		α
	BLD112	Technical Drawing for Builders I	C	3		α
	CHM111	General Physical Chemistry	C	3		α
	CHM119	General Chemistry Practical I	C	1		α
	MAT111	Mathematics I: Algebra	C	3		α
	MAT112	Mathematics II: Trigonometry and Geometry	C	2		α
	PHY111	Mechanics and Properties of Matter	C	2		α
	PHY119	Physics Practicals IA	C	1		α
	BLD121	Introduction to Building II	C	2		Ω
	BLD 122	Technical Drawing for Builders II	C	3		Ω
	CHM122	General Inorganic Chemistry	C	2		Ω
	MAT121	Mathematics V: Calculus	C	3		Ω
	MAT122	Mathematics VI: Vector Algebra	C	2		Ω
	PHY121	Electricity and Magnetism I	C	2		Ω
University Courses	EDS111	Entrepreneurial Development Studies II	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept – Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	CST111	Use of Library, Study Skills and Information Communication Technology I	U	2		α
	GST111	Communication in English I	U	2		α
	CST121	Use of Library, Study Skills and Information Communication Technology II	U	2		Ω
	GST121	Communication in English II	U	2		Ω
	GST122	Communication in French	U	2		Ω
			α =23 Ω = 22 Total = 45 Units			

200 Level Building Technology						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	BLD211	Concrete Technology and Workshop Practice I	C	1	BLD111	α
	BLD212	Building Construction Practice 1	C	3	BLD121	α
	BLD213	Building Science I	C	2		α
	BLD214	Applied Mechanics for Builders	C	2		α
	BLD216	Statistics for Builders	C	2		α
	SES211	Land Surveying I	C	2		α
	BLD218	Building Drawing I	C	2		α
	CIS215	Use of software Packages I	C	1		α
	BLD221	Construction Workshop Practice II	C	1	BLD211	Ω
	BLD222	Building Construction Practice II	C	3	BLD212	Ω
	BLD223	Building Science II	C	2		Ω
	BLD224	Structural Theory and Strength of Materials II	C	2		Ω
	SES221	Land Surveying II	C	2		Ω
	BLD228	Building Drawing II	C	2		Ω
	CIS225	Use of software Packages II	C	1		Ω
General University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept – Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept – Sports	V	0		Ω
NUC General Courses	BLD229	SWEP	S	1		Ω
	GST211	Logic, Philosophy and Human Existence	U	2		α
	GST221	Nigerian People and Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution	U	2		Ω
			α =19 Ω = 20 Total = 39 Units			

300 Level Building Technology						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	BLD311	Construction Technology I	C	3		α
	BLD313	Building Materials Science	C	2		α
	BLD314	Building Thermodynamics	C	2		α
	BLD315	Structural Analysis	C	3		α
	BLD316	Building Services 1	C	2		α
	BLD317	Principles of Measurement and Description of Building Works 1	C	2		α
	BLD318	Building Maintenance Management I	C	2		α
	BLD321	Construction Technology II	C	3	BLD311	Ω
	BLD323	Design of Reinforced Concrete Structures I	C	2		Ω
	BLD324	Soil Mechanics	C	2		Ω
	BLD325	Introduction to Building Project Planning and Control	C	2		Ω
	BLD326	Building Services II	C	2	BLD316	Ω
	BLD327	Principles of Measurement and Description of Building Works 1I	C	2	BLD317	Ω
	BLD328	Building Maintenance Management II	C	2	BLD318	Ω
	BLD329	Tendering and Estimating	C	2		Ω
General University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
	EDS321	Entrepreneurial Development Studies VI	V	1		Ω
	TMC321	Total Man Concept VI	V	1		Ω
	TMC322	Total Man Concept – Sports	V	0		Ω
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =20 Ω = 19 Total = 39 Units			

400 Level Building Technology						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	BLD411	Advanced Structural Analysis	C	2	BLD323	α
	BLD412	Design of Reinforced Concrete Structures II	C	2		α
	BLD413	Principles of Construction Management	C	2		α
	BLD414	Integrated Studio Project	C	3		α
	BLD415	Research Methods	C	2		α
	BLD416	Economic Analysis of Building Prices & Estimating	C	2	BLD327 BLD329	α
	BLD417	Foundation Engineering	C	2		α
	BLD418	Building Contract Law and Arbitration I	C	2		α
SIWES	BLD 420	Student Industrial Work Experience Scheme (SIWES)	S	6		Ω
General University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
			α =19 Ω = 6 Total = 25 Units			

500 Level Building Technology						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	BLD511	Advanced Construction Technology I	C	3		α
	BLD512	Project Reports I	C	3		α
	BLD513	Advanced Project Management	C	2	BLD413	α
	BLD514	Professional Ethics, Practice and Procedures	C	2		α
	BLD515	Construction Budgeting and Finance	C	2		α
	BLD516	Building Materials Development	C	2	BLD313	α
	BLD517	Building Contract Law and Arbitration II	C	2	BLD418	α
	BLD518	Advanced Concrete Design	C	2	BLD412	α
	BLD519	Lean Construction	C	2		α
	BLD521	Advanced Construction Technology, Plants and Equipment II	C	3	BLD511	Ω
	BLD522	Project Reports II	C	3		Ω
	BLD523	Miscellaneous Structures Design	C	2		Ω
	BLD524	Specification Writing	C	2	BLD518	Ω
	BLD525	Highway Engineering Construction and Maintenance	C	2		Ω
	BLD526	Design of Steel Structures	C	2		Ω
	BLD527	Operations Research	C	2	BLD415	Ω
University General Courses	EDS511	Entrepreneurial Development Studies IX	V	1		α
	TMC511	Total Man Concept IX	V	1		α
	TMC512	Total Man Concept – Sports	V	0		α
	EDS521	Entrepreneurial Development Studies X	V	1		Ω
	TMC521	Total Man Concept X	V	1		Ω
	TMC522	Total Man Concept – Sports	V	0		Ω
			α =19 Ω = 21 Total = 40 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

BLD111 - Introduction to Building I (2 Units)
The Environment; Types of Environment; Definition of Building; History of Buildings; Functions of a Building; Types of Building; Building construction practice, the Construction industry; The Professional Builder - Definition: scope of duties; future prospects; relationships with other professionals in the Construction Industry Analysis of the various options available in the Building Profession – Construction, Building Services, Construction Management, Building Maintenance and Building Structures. Nature of construction Industry; construction stakeholders; site production team; Site operation and construction personnel; Site Investigation and Site preparation processes; Clearing of Bushes & Shrubs & Trees, Removal topsoil: Site Organization and Layout. Visit to construction sites.

BLD112 – Technical Drawing for Builders I (3 Units)
Basic Principles of Orthographic Projections, first and third angle projections, points lines (including skew lines) planes of geometrical solids in orthograhoic projections, auxilliary planes and transformation on designated planes and the application of this concept to true shapes and true dimnesions and other projections; introduction of conversion of orthographic or pictorial drawings, isometric, oblique, axonometric, etc. Intersection of lines with planes.

CHM111 - General Physical Chemistry (3 Units)
Historical development of the atom: definition of atoms, Dalton's atomic theory, relative atomic masses. Fundamental particles of the atom and atomic structure. Modern electronic theory of atoms; electronic configuration of the elements. Periodicity of the elements. Radioactivity: Stoichiometry: mole concept, chemical formulas, equations and

calculations. States of matter: gas – empirical gas laws, Ideal Gas Equation of State, qualitative treatment of kinetic theory of gases, real gases and deviations from ideal gas laws; liquid, – macroscopic properties of liquids, evaporation, vapour pressure and its variation with temperature, boiling point, heat of vaporization, Clausius-Clapeyron equation, freezing point, melting point and phase diagrams of simple systems; solids – types of solids and their properties, ionic solids and lattice energy, crystalline solids. Chemical Energetic: definition of some thermodynamic terms, heat, work, internal energy, enthalpy, pressure-volume work. Relationship between internal energy and enthalpy. First law of thermodynamics and its applications. Chemical Kinetics: rate of reaction, factors affecting reaction, order of reaction and how to determine it for zero order and first order reaction, rate of equation and temperature, reaction mechanisms and rate equation for simple reactions. Chemical Equilibrium: reversible reactions and chemical equilibrium, equilibrium constant, factors affecting equilibrium. Le Chatelier's Principle. Effect of temperature on equilibrium constant. Relationship between equilibrium constant and standard Gibbs Free Energy, ΔG°. ionic equilibrium. Electrochemistry: types of conductors, classification of compounds, electrolysis, Faraday's laws of electrolysis. Application of electrolysis. Introduction to electrochemical cells.

CHM119 - General Chemistry Practical I (1 Unit)

Practice in weighing and measurement of volume, preparations of standard solutions. Titrimetry: acid-base, oxidation-reduction, precipitation and complex metric titrations; gravimetric analysis.

MAT111 – Mathematics 1: Algebra (3 Units)

Algebra of set theory: Definition of concepts, laws of algebra of sets, Venn diagram and application. Real Number: Rational numbers, theory of surd, sequences and series (including AGP), binomial theorem, theory of quadratic, cubic and quadratic equations, indices and logarithms, mathematical induction, partial fractions, theory of equations, inequalities and polynomials (including factor and remainder theorems). Complex Numbers: Algebra of complex numbers, Argand diagram, multiplication

and division of numbers in polar form, n^{th} root of unity, and Demoivre's theorem, expansion of Sin nØ, Cos nØ, Tan nØ.

MAT112 - Mathematics 1I: Trigonometry and Geometry (2 Units)

Trigonometry and analytic geometry in (2-D & 3-D): Elements of trigonometry, circular measure, elementary treatment of circles, coordinate geometry: straight lines in (2B-D); plans. Functions and relations: permutation and algebra of functions, Binary operations, Permutation and combination, elementary treatment of logic.

PHY111 - Mechanics and Properties of Matter (2 Units)

Units and dimensions, Scalar and vectors, Particle kinematics, Newtons laws, Friction, Work, Energy, Centre of mass, Simple harmonic motion, Rigid body dynamics, Kepler's laws, Pressure in fluids, Intermolecular forces, Hooke's law, Young modulus, Fluid flow Streamline turbulence, Strooke's law surface tension.

PHY119 - Physics Practicals I (1 Unit)

Simple experiments illustrating the topics covered in PHY111 and PHY112.

Omega Semester

BLD121 - Introduction to Building II (2 Units)

Deals with the functions and illustrates of various building elements and components. Site leveling and Setting out; Foundations; Types of foundation; Walls- Load-bearing and Non load-bearing; materials used for Walls construction - timber walling, concrete, blocks/brick, steel/aluminium, plastics/fibre, stone walling. Bonding, mortar mixes, DPC Opening in walls. Doors, Windows, Lintels, beams and columns, Arches. Stairs and fittings. Visit to construction sites

BLD122 – Technical Drawing for Builders II (3 Units)

This is deals with geometrical solids, construction of simple geomteric forms, n-sided polygon in a given circle, n-sided polygon with a given side; construction of curves, circle, ellipse, parabola, hyperbola, involutes to a square, circle, cycloid and Archimedean spiral, locus of a point, link mechnaics, inetrsections of geometric forms, developments of surface of solid, geometrical figures before and after intersection. Perspective drawings.

CHM122 - General Inorganic Chemistry (2 Units)

Chemical bonding and structure: ionic, covalent, coordinate covalent (dative), metallic, hydrogen bonding. General properties of compounds formed by the different types of bonding. Influence of bonding on size, shape and structure. Main Group Chemistry (Groups IA – VIIIA): trends in the properties of elements (structure, ionization energies, physical and chemical properties). Properties of selected types of compounds.

PHY121 - Electricity and Magnetism (3 Units)

Electricity, coulomb's law, Ohm's law. Gauss's theorem, Capacitors, Kirchoffs laws, Electrical energy, DC, Bridges potentiometer, Magnetic effect of current, Electromagnetic induction, Moving coil and ballistic galvanometers, Multimeters, DC and AC motors, and generators, Hysteresis, Power in AC circuits, Semi conductors, Conductivity and Mobility, Rectification.

MAT121 – Mathematics V: Calculus (3 Units)

Functions of real-variables: Graph, limits, and concepts of continuity. Techniques of differentiation of algebraic and trigonometric functions, higher order derivatives, maxima and minima, Liebnitz rule, application of differentiation. Integration as inverse of differentiation, methods of integration, definite integral. Application to areas, volume, moment of inertia. Approximate integration: Trapezoidal and Simpson's rule. Taylor's and Maclaurin's theorems, partial differentiation and implicit differentiation.

MAT122 - Mathematics VI: Vector Algebra (2 Units)

3-D Cartesian coordinate systems. Definition and representation of vectors; Algebra of vectors: multiplication of a vector by a scalar, addition of vectors, scalar product of two vectors, vector product of two vectors, direction cosines, calculus of vector function: differentiation of vector function, integration of vector function; conic: circles, parabola, ellipse and hyperbola; kinematics of a Particle: basic concepts, motion under constant acceleration, motion under variable acceleration: rectilinear motion, motion in a plane. Force.

200 Level

Alpha Semester

BLD211 - Concrete Technology and Workshop Practice I (1 Unit)

Introduction to the laboratory & Workshop; Health & Safety precautions in the lab.; Safety wares; Lab. & workshop tools, plants and equipment; types and uses. Introduction to production materials e.g. aggregates, cement, sand, admixtures & water; Types of aggregates, Cement and Simple tests; Types of Cement, Factors affecting good concrete practice. Mix design; types of concrete. Practical works e.g. Site Setting-out for regular shaped building Accidents on sites, their effects and prevention

BLD212 - Building Construction Practice I (3 Units)

Excavations – soil classification, methods of excavation (manual/mechanical). Tools for manual excavation. Problems of excavation; de-watering; timbering to excavations; Floors– solid ground floors, Raised/Upper timber floors, Solid upper floors; Timber Roof and roof covering; Finishes– floors and walls; tiling; plastering; rendering; tyrolean; painting etc. study on current trends in Construction technology – Environmental pollutions; Green construction; Lean construction; sustainable construction; Globalization; Impact of ICT in the construction industry.

BLD213 - Building Science I (2 Units)

Environmental Physics – heat, light, sound; Psychophysics; Thermal design; Ventilation and Air Conditioning; Lighting System light and illumination; Daylight in building; Noise and Building. Acoustics, sound, Reverberation and Sound Insulation.

BLD214 - Applied Mechanics for Builders (2 Units)

Forces, moments, couples; Equilibrium of simple structures; First and second moments of area; centroids; Kinematics of rigid bodies in plane motion; Applications of Newton's laws of motion; Kinetic energy and momentum analysis; Hooke's law, stresses and strains due to loading and temperature; The stress circle, deflection, deflection of beams; Shear forces and bending moments, analytical and graphical methods for structures; Design and analysis of communication towers, standards, and regulations.

BLD216 - Statistics for Builders (2 Units)

Nature of statistical methods, frequency distribution, Measures of central tendencies and dispersion, probability theory, Discrete and continuous data, Binomial, Normal and Poisson distribution, Test of Hypotheses, Elementary analysis of time series and trends; index numbers, correlation, and regression; Analysis of Variance.

SES211 - Land Surveying I (2 Units)

This introduces the students to the principles of land surveying and calculations of irregular areas; The practical aspects of this subject should be emphasized; measurement and quantification need to be stressed rather than those aspects of theory more appropriate to the specialist land surveyor; Students must understand not only the form and use of equipment but also how to test its accuracy and the means of making temporary adjustments. The syllabus entails the following: Basic principles and objects of land surveying. Types of survey. Relative accuracy and the effect on the method of surveying. Use and interpretation of ordinance survey, maps and plans. Scales. Enlargement and reduction of plans. An appreciation of current land survey practice,

including tachometry and aerial photogrammetry. Chain and tape surveying. Equipment, procedures, including plotting. Negotiating obstacles

BLD218 - Building Drawing I (2 Units)

Basic Principles of Orthographic Projections, first angle and third angle projection, Points Lines (including skew lines) planes of geometrical solids in orthographic projections, auxiliary planes) and transformation on designated planes and the application of this concept to true shapes, true dimensions etc and other projections; Introduction of conversion of orthographic or pictorial drawings, isometric, oblique, axonometric etc. Intersection of lines with planes, planes with solids. Standard scales: putting the sketch into proper scale drawings; Developing elevations, Difference between presentation drawings and working drawings.

CSC215 - Mathematical Method I (3 Units)

Sequences of real numbers, Monotone sequence, Convergence, Absolute and conditional convergence, Infinite series, Convergence tests, Addition and multiplication of series. Power series, Radius of convergence, Taylor and Maclaurin series and their applications, Taylor polynomials and Taylor's formula, The binomial theorem and binomial series. Matrices and linear transformations, Matrix operations, Solutions of linear systems by matrices, Rank and inverse, eigenvalues and eigenvectors, canonical forms, Jordan form, generalized inverse of a matrix. Complex numbers and their properties, complex numbers as vectors, The complex plane, Complex algebra, Functions of a complex variable.

Omega Semester

BLD221 - Concrete Technology and Workshop Practice II (1 Unit)

Setting out of physical structures, including buildings, estate roads, highway drains, curves, irregular shaped buildings etc. (To be carried out as practical on site and workshop). Construction Workshop Practical

works in concreting; tiling; carpentry; Block laying; plumbing works; interior and exterior decoration; Electrical Services; Accidents on sites, their effects and prevention.

BLD222 - Building Construction Practice II (3 Units)

Roofs and ceilings; Roof and wall felting; Drainage; External Works – Soakaway pit, Septic Tank, Inspection Chamber; manhole; Landscaping; Fences, Gates and Gate House; Generator House; Kerbs; Access roads, Landscaping. Preparation of Architectural and Construction Drawings of simple building up to one-storey building; Modelling of building elements and components; marine construction- caisson; cofferdam; quays; sea-breakers; Foundations to include subsoil; tunnels; Stone pitching; study on current trends in Construction technology – Environmental pollutions; Green construction; Lean construction; sustainable construction; intelligent buildings; phenomenon of building collapse; challenges of the construction industry in developing economies.

BLD223 - Building Science II (2 Units)

Basic electrical theory and terms. Generation, transmission and, distribution of electricity. Supply to industrial building: supply to small and residential buildings. Supply controls and protection of installation:- fuse and circuit breakers, switches and outlets. Cables and conduit: cable type, conductor/cable rating, cable sizing. Circuits: - sizes, rating and voltage drop, earthing Electricity distribution in small buildings, distribution in large tall buildings. Electricity supply regulation. Economics of supply: - tariffs, load factor, power factor, and power factor correction.

BLD224 - Structural Theory and Strength of Materials II (2 Units)

Shearing and Stresses, Analysis of Stress and Strain (3 dimensional), Longitudinal Stresses in Beams, Shearing Stresses in Beams, Beams of Two Materials, Combined Bending/Direct Stresses, Torsion, The Principles of Virtual Work and their Applications, Strain Energy/Complementary Energy and Applications; Deflection of Statically

Determinate Beams using different approaches; Elastic Buckling of Columns and Beams; Vibration in Beams.

SES221 - Land Surveying II (2 Units)

The intention here is to widen the knowledge of the students the more in Land surveying and mensuration having opened the way under Land Surveying I. Areas to be covered; anchored on teaching and practical include: Measurement of existing buildings. Setting out of boundaries, roads, and simple curves. Setting out for new construction works. Levelling; equipment; procedures, booking, readings, reducing and plotting. Sections and contours. Setting out for embankments, cuttings and drains. The theodolite and its uses. Principles of traversing. Calculation of co-ordinates of stations and areas enclosed by traverses. Applied measuration. Measurement and calculation of lengths, girths, areas and volumes, both regular and irregular from drawings or survey data. Note that while familiarity with the theodolite is required, an extensive knowledge of this instrument and its use will not be expected. Methods of ensuring the accuracy of data and calculation should be emphasized.

BLD228 - Building Drawing II (2 Units)

Graphics and Descriptive Geometry: Exercises to include simple solids with solids, simple geometrical solids, construction of simple geometric forms, n-sided polygon in a given circle, n-sided polygon with a given side; construction of curves, circle, ellipse, parabola and hyperbola, involutes to a square, circle, cycloid and Archimedean spiral, locus of a point, link mechanisms, intersections of more complicated geometric forms, developments of surface of solid, geometrical figures before and after intersection; Perspective drawings; Geometric constructions including paths of points, simple mechanism; Projections and lines; surfaces and solids in space; Orthographic projections in first and third angles Applications of principles of orthographic projections including Planes, Orthographic views of simple objects isometric and oblique projections. Exercise on simple building elements like steps, doors etc.

CIS225 - Operating System (3 Units)

Overview of O/S: Role & Purpose, Functionality Mechanisms to support Client-server models, handheld devices, Design Issues influences of Security, networking, multimedia, Windows. O/S Principle: Structuring methods Abstraction, processes and resources, Concepts of APIS Device organization interrupts. Concurrency: States & State diagrams Structures, Dispatching and Context Switching; interrupts; Concurrent execution; Mutual exclusion problem and some solutions Deadlock; Models and mechanisms (Semaphones, monitors etc.). Producer-Consumer Problems and Synchronization. Multiprocessor issues. Scheduling & Dispatching Memory Management: Overlays, Swapping and Partitions, Paging & Segmentations Placement & replacement policies, working sets and Trashing, Caching.

300 Level

Alpha Semester

BLD311 - Construction Technology I (3 Units)

Multi-storey Structures:–the frame and load bearing wall, choice of appropriate structure. Framed Structures: – Steel frame, Reinforced Concrete (In-Situ and Pre-cast) Frame, RC wall, Pre-stressed Concrete, Movement Control:- Floor Structures – Upper floors – choice and construction, Movement control:- Vertical Circulations – stairs, ramps and ladders. Roof Structures – Beams, trusses and girders, rigid/portal frames, shells, folded slabs, space frames, single-layer grids, double layer grids, folded lattice plates, barrel vaults, domes tension structures, etc, Movement Control Structures, etc, Movement control. Underground and space Surveys. Astronomy, temporary Supports – Formworks, Seal folding, Integration of Structures with services and equipment, Communication in Building. Introduction to hydrology and photographic surveys; Mass haulage diagram, and the associated quantities.

BLD313 - Building Materials Science (2 Units)

Detailed study of materials and their performance in construction including clay, concrete, stones, timber, plastics, bricks, paints, metals and alloys, glass, bitumen, synthetic and reinforced polymer products etc. Production, processing, evaluation and testing method; utilization in construction and associated problems; Advances in composite tropical materials including terracretes etc. Clay in buildings: Clay products in buildings – foundation, floors, walls, ceilings, roofs, finishes; performance in buildings; Maintenance problems. Maintenance aspects and associated problems; Plastic in buildings: Technology and manufacture; utilization in buildings; Performance in buildings, maintenance problems; Glass in buildings: Technology and manufacture; utilization in buildings; A critique of glass as external curtain, maintenance aspects problems. Timber in buildings: - timber products in buildings; performance in buildings, maintenance problems.

BLD314 - Building Thermodynamics (2 Units)

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.

BLD315 - Structural Analysis (3 Units)

Deflection analysis of statically indeterminate structures (beams and trusses); Analysis of statically indeterminate trusses – application of energy methods; Analysis of statically indeterminate beams and frames using three moment equations, slope deflection equations and Hardy Cross method of moment distribution; Cantilever and Portal Methods of Moment Distribution; Column Analogy: Influence Lines applied to statically indeterminate structures.

BLD316 - Building Services I (2 Units)

Covers the following areas: Hydrology, water and waste water management; Water Supply; prospecting purification, storage and township boreholes; dams; network analysis; pipe sizing etc, distribution to communities, and domestic, industrial and commercial application of fluid dynamics for solving practical problems, needs, and statutory provisions and the bye-Law requirements; cold and hot water storage and distribution in buildings; foul, surface water and real drainage, solid waste management, (refuse disposal, etc); Sewage treatment/disposal. Detailed measurement of mechanical installations, drainage and external works; related project work/examples of overall system design with calculations.

BLD317 – Principles of Measurement and Description of Building Works I (2 Units)

The history of quantity surveying profession; the functions of the quantity surveyor, Purpose and format of bills of quantities, Evolution of the codes of measurement used in the industry. Mensuration of regular and irregular lines, surfaces and solids either directly or by reference to drawings, Techniques of taking off including setting out and order of dimensions, side notes, waste calculations, Principles of the use of schedules. Application of measurement principles to simple building forms; introduction to standard phraseologies and library of descriptions; principles and procedures relating to the manual processing of data; the arrangement and preparation of bills of quantities of different formats; an introduction to preliminary and preamble clauses; preparation and use of schedules during the pre-contract stage for the communication of project data.

BLD318 - Building Maintenance Management I (2 Units)

This course deals with building maintenance technology. Decay of buildings and agencies involved; alterations, conversion, extension, and improvements of buildings; dimensional consideration, design defects and remedies. Structural survey of buildings, specification writing and schedule of dilapidations to include:- measurement of maintenance works, maintenance of mechanical and electrical services in buildings.

Omega Semester

BLD321 - Construction Technology II (3 Units)
Building regulations and bye-law requirements; fire protection of buildings; safety in building and on building site. Temporary supports; formwork scaffolding. Proprietary building systems:- walls, ceiling, roofs/roof-light, patent roof jacking, curtain walling etc. Requirements for expansion joints and special insulation folded slab.

BLD323 - Design of Reinforced Concrete Structures I (2 Units)
Properties of Steel and Concrete. Design philosophies, Limit State Design. Introduction to BS 8110 and relevant Eurocodes. Analysis of concrete sections. design and detailing of one-way spanning slabs, two-way spanning slabs, stairs, beams, axially and uniaxially loaded columns. General principles of structural detailing..

BLD324 - Soil Mechanics (2 Units)
Introduction to soil theory. Properties of Soils, their classification, behaviour etc. Soil water, Permeability and Flow Seepage Problems. Strength and Deformation of Soils. Stability of Slopes, Earth Pressure. Soil Stresses, Settlements and Movements due to Loading. Bearing Capacity of Soils, Foundation Settlement. Geo-technical investigation and tests. Soil Strengthening and stabilization lowering ground water. Binding agents and their effects/properties soil exploration.

BLD325 - Introduction to Building Project Planning and Control (2 Units)
The course deals with the sequence, organization and control of projects and the interrelationship between various professional groups involved in the development of capital projects. The meaning of management, and its role in construction, The nature of capital projects – client, consultants and contractors, Management tools/techniques, Tender analysis, Building management procedures from inception to completion. Co-ordination, control and supervision of simple and multiple contracts, site layout, report for management, Financing of capital projects: working capital flow

of funds. Legal implication of building contracts, Regional organization of typical professional offices.

BLD326 - Building Services II (2 Units)

Analysis, and theoretical/practical design, of Lifts, Escalators, Hoists, etc; Gas: Production, township distribution and installation within buildings etc, application of gas law and other relevant equations for solving practical problems. Fire: Analysis, causes, designs, prevention and control, etc, principles of fire fighting and associated equipment, bye-law, regulations, codes affecting fire services etc. Site Visits for practical appreciation of the theoretical frame-works, Design of live projects.

BLD327 – Principles Measurement and Description of Building Works II (2 Units)

The history of quantity surveying profession; the functions of the quantity surveyor, purpose and format of bills of quantities, evolution of the codes of measurement used in the industry. Measuration of regular and irregular lines, surfaces and solidseitgher directly or by reference to drawings, techniques of taking off including setting out and order of dimensions, side notes, waste calculations, principles of the use of schedules. Application of measurement principles to simple building forms; introduction to standard phraseologies and library of descriptions; principles and procedures relating to the manual processing of data; the arrangement and preparation of bills of quantities of different formats; an introduction to preliminary and preamble clauses; preparation and use of schedules during the pre-contract stage for the communication of project data.

BLD328 - Building Maintenance Management II (2 Units)

The course deals with the management aspects of building maintenance. Maintenance cycles for different types of buildings, standard expected of buildings. Maintenance strategies, repair/replacement theory, sensitivity analysis, Planning maintenance:– Resources required, programs execution, appraisal policy guidelines, Application of other Operation Research and other General Management Techniques to Building

Maintenance, landlord/Tenant relationship and other legal matters. Maintenance, improvement and modernization of buildings, maintenance surveys, maintenance administration, life cycle costing, rehabilitation and relevant aspects of planning, budgeting and finance procedures.

BLD329 - Tendering and Estimating (2 Units)

Outline of the contractor's procedures prior to the submission of a tender, Constituents of unit rates - material, labour, plant, profit and overhead; Build-up of unit rates; materials wastage; Tendering procedure and contractual arrangement; Preliminaries, P.C. sum; Provisional sum; build-up of dayworks; Excavation and earthworks, concrete work, block-work, woodwork and roofing.

400 Level

Alpha Semester

BLD411 - Advanced Structural Analysis (2 Units)

Introduction to Kani's method of moment distribution; Matrix methods of structural analysis: stiffness and flexibility Applications to beams, plane frames, trusses and grillage/grid (plane and space) structures, Plastic method of analysis. Computer application in matrix methods of structural analysis; Introduction to finite element methods; Formulation of the solution of the elasticity problem; Theory of plates and shells; Buckling of structures.

BLD412 - Design of Reinforced Concrete Structures II (2 Units)

Design and Detailing of columns subject to Moments including Biaxial Bending; Slender columns; Designs of Plain and Reinforced Concrete Walls; Design and Detailing of Ribbed/Waffle Slabs (solid or hollow blocks or voids), flat slabs; Design and Detailing of foundations; Pad (axially and concentrically loaded); Wall, strip and combined Raft, Pile, Retaining walls (gravity, Counter fort and Cantilever); Design and Detailing of water – retaining and precast concrete structures (swimming

pools, underground, surface, and elevated tanks); Torsion in Reinforced concrete. Introduction to the design of pre-stressed concrete structures. Term Projects: (1) Complete Design and Detailing of a Multi-Storey. Reinforced concrete framed building (including design for ties). (2) Design and Detailing of a water-retaining structure.

BLD413 - Principles of Construction Management (2 Units)

The course deals with management principles and practice generally, management science, organization theory, their application to building projects; Personnel Management - Communication and Communicating Systems, Introduction to decision theory, Financial and Cost Accounting; Financial Cost Management, Appraisal and control of capital project from inception to completion; Planning: Pre-tender planning, method statement; short-term and long-term planning and scheduling techniques; Materials supply; Purchasing allocation and Scheduling; Cost optimization, cost control and site work; Safety on Construction site and quality management; Site meetings; Site records. Technique of project management. Clients, consultants and contractors. Managerial staff relations. Co-ordination of effort of designers, sub-contractors etc with the construction process. The role of mechanical plant in construction project management.

BLD414 - Integrated Studio Project (3 Units)

This is essentially a studio work to unify all the courses offered by the main stream students. Solutions to set assignments (architectural, structural, services design, preparation of estimates and quantities) with adequate clarity and against a time frame (maintenance surveys, materials and structural testing). It also treats the role of technical report in building, projects fundamental principles of technical writings. Format of different types of reports – outlines, scope and purposes, technical discussion and details. Role of appendix, functions of diagrams, tables and illustrations, nature of recommendations and conclusions; Writing of memorandum, business letter; formal and informal reports.

BLD415 - Research Methods (2 Units)

Introduction to research method; definition; nature of research; Type of research design; Identifying research needs and problem. Writing and Evaluation of research proposals. Developing research questions or hypotheses, How to conduct literature search – looking for materials primary and secondary sources, purpose of literature review, outlining, critical review, Data collection methods – questionnaire interview, observations, experiments and records sampling techniques reliability and validity, Data presentation and analysis – Statistical test, testing of hypotheses, drawing inference, table and figures. Writing research report – mechanics of presenting a report, evaluation of research report.

BLD416 - Economic Analysis of Building Prices and Estimating (2 Units)

The course is a continuation of Estimating and Tendering I. Approximate estimating; Methods of approximate estimating, Sources of cost information, Pro-rata rates. Build up of unit rates for Metalwork – doors & windows, handrails, balustrades, Finishes – floor & wall tiling, plastering, wardrobe units; plumbing pipes and sanitary wares; Glazing, Painting and Decorating, Contractor's bidding strategies and analysis of bidding performance, Seminar on current estimating practice in Nigeria. Cost analysis, choice of elements and categorization, preparation and interpretation and analysis of price levels and market conditions; Preliminary investigation to establish price levels and other factors influencing cost of proposed projects; Cost planning principles and presentation of cost plans, cost limits and cost indices, prediction of future price levels; Systems setting elemental targets based on cost analysis data and systems based on estimating principles; comparative cost solutions; Cost advice and checking procedures during preparation of drawings; Planning efficiency, use of floor area, effect on cost of size, shape, number of storeys, function and other design variables; Costs-in-use and application to choice of materials, forms of construction and services installations; Recording and analysis of maintenance and running costs; Method of monitoring and cost control during construction process; Financial reports, valuations, settlement of final accounts, including claims.

BLD417 - Foundation Engineering (2 Units)

Review of Site Investigation Processes, Soil Tests and General Principles of Foundation Design (as taught in BLD315), Preliminary Operations in Foundation Construction, Spread of Foundations. Buoyancy Rafts and Basements (Box foundation), Pier and Caisson Foundations. Pilled Foundations – Driving equipment and construction methods; Geo-technical processes; Shoring and underpinning. Protection of Foundation structures against attack by soils and ground water. Walls – solid masonry, plain monolithic concrete, cross wall construction, reinforced masonry, diaphragm and fin walls, panel walls, party and separating walls. External facings and claddings, movement controls.

BLD418 - Building Contracts Law and Arbitration I (2 Units)

Law of contract, nature classification, formation, and essentials of contracts. Capacity of parties, void, voidable and illegal contracts. Discharge, enforcement, assignment, remedies for breach. Limitation Acts. An outline of special contracts, agency. Contract of employment, features, termination, relationships and duties of parties. Third party rights and responsibilities, enforcement, remedies. Industrial legislation concerned with incapacity or injury, working conditions, wages, redundancy. Trade unions, structure, rights and liabilities. Settlement of industrial disputes.

500Level

Alpha Semester

BLD511 - Advanced Construction Technology I (3 Units)

The course deals with complex contemporary buildings and specialized topics in construction technology. Construction in shallow and deep water. Construction of Tunnels and Railway Tracks, Retaining walls and Applications including Swimming pools – Jetties and Harbour works. Anchorage, Embankment stabilization and Cofferdam construction. Evaluation of alternative forms, performance of structural systems and

building envelope. Industrialized systems building versus traditional solution. Standardization, quality control and dimensional accuracies in buildings. Proprietary system in buildings.

BLD512 - Project Reports I (3 Units)

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 will last a whole session.

BLD513 - Advanced Project Management (2 Units)

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 feasibility analysis, design, execution and management of building projects including management technology, financial appraisal and use of scarce resources, CPM PERT etc. Marketing of Construction and Construction products. Construction Risk Management. Quantitative Management and Applications. Resources Management and Inventory.

BLD514 - Professional Ethics, Practice and Procedures (2 Units)

Duties of a Professional Builder. Clear understanding of a professional; Ethics; practice; procedures; 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 (builder in society). The NIOB rules of Professional practice. The Registration Board (CORBON) and its regulations; procedure for registration with NIOB and CORBON; Compulsory continuous professional development (CCPD) - seminars, conferences, workshops, postgraduate studies, etc. Professional conduct and misconduct; Joint consultative council. SWEP and SIWES programs. Business opportunities for the builder as - Sole proprietorship, Builder as an entrepreneur; builder & Partnership, consortia and limited liability companies; Design & Build; Builder in real estate business; Tendering and bidding strategies (adjudication). Consultancy practices and their regulations; Quality control & assurance, identifying with various codes of

practice in operation e.g. National Building Code; Building Regulation; Building Control laws; Land Use Act; Occupational Health & Safety at Workplace Act; Public Procurement Act; Fire safety & Protection Regulations; Workman Compensation Act; Federal Environmental Protection Act, etc. Nigeria Standard Organization (NIS); Standard Organization of Nigeria (SON); International Standard Organization (ISO). The challenges and future of the professional builder.

BLD515 - Construction Budgeting and Finance (2 Units)

Introduction to form of Business Organization and Accounting requirement. Accounting Theory, Cost Accounting and Purpose of Accounting. Budgeting, control systems and capital budgeting cost control. Working Capital. Profitability Case Studies.

BLD516 - Building Materials Development (2 Units)

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

BLD517 - Building Contract Law and Arbitration II (2 Units)

A detailed and comparative knowledge of the standard forms of building contracts and related sub-contracts and their interpretation and application. Principal statutes and case law relating to construction contracts. The Arbitration Acts. Statutory arbitrations. Nature of arbitration, alternative dispute resolution methods. Arbitrators, appointment and duties. Umpires, referees. Provision for arbitration in contracts. Preparation of cases, the award, cost, fees, evidence, witnesses, valuations, points of claim and defense, particulars. Procedures prior to, and at, the hearing, procedure subsequent to the award. Proofs of evidence for use in legal disputes relevant to building matters.

BLD518 - Advanced Concrete Design (2 Units)

Detailed Treatment of Yield line theory. Yield Line theory, Basic Johnansen Theorems Equilibrium and Energy Methods; Isotropic and Orthotropic slabs – Affine and Ultra Affine Method; Strip Method of Design. Design and Detailing of Roof Slabs (Pitched and Folded Plate); Shell (Barrel Vault, Dome), Hyperbolic paraboloid (Normal, inverted). Design and Detailing of Compiled Stairs (Cantilever, Jack knife, open spiral, spins beam with open risers, precast flights to in-situ landings), columns including treatment of Junction details). Design and Detailing of Tall buildings(Design and Analysis considerations; Planar lateral – load-resisting elements – rigid frames, shear and lift walls, coupled shear walls, shear walls connected to columns, wall frames; interaction between bents; three-dimensional structures – classification and computer modeling, non-planar shear walls, framed tube structures. C.R.P. Laminates and Sandwich Panels. Design of Frameworks – Portal frames; water tower support, H and A frames. For precast wall units, Box frames for elevated corridors. Introduction to Bridge Design. Term projects– To cover the major divisions of the syllabus & encourage the use of Computer Aided Design (CAD).

BLD519 - Lean Construction (2 Units)

Lean Practices and Principles is an introductory class to Lean in the construction industry. The class starts with an understanding of the origins of Lean Construction and its connection to the Toyota Production System. The class is focused around understanding the term "Value" and the difference between value adding activities and non-value adding activities. The contrast to value is waste and understanding how to identify and eliminate waste. The other main objectives of the class include understanding the term "Pull" and why focusing on pull will produce higher level of team collaboration than is common in the construction industry, today and how the integrated Project Delivery agreements provide the appropriate incentives, understand the value of cost being an input to design rather than a reaction to design and the use of a Target Cost Approach to project management ad appreciating the use of BIM as

a fundamental communication tool in achieving deep collaboration and Lean project delivery.

Omega Semester

BLD521 - Advanced Construction Technology, Plants and Equipment II (3 Units)

The course deals with specialized topics in construction technology, including industrial processes and engineering services required for effective functions. Mechanical Plant and Equipment. Large open roof systems (as applicable in large-open roof design and construction e.g. in amphitheatres etc). Piling systems. Dam Construction. Construction of Bridges and Roads. Introduction to Civil Engineering measurements. Case Studies on building failures.

BLD522 - Project Reports II (3 Units)

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 will last a whole session..

BLD523 - Miscellaneous Structures Design (2 Units)

Introduction of structural timber. History of timber houses; beams, roof construction, etc. Properties of timber and wood based materials. Timber preservation and fire retardant treatments. Timber structures manufacturing and assembly procedures. Forms of timber and wood-based materials. Structural forms and Design; Introduction to CP 112 and BS.8110. Design of solid timber laminated sections, trusses and girders, portal frames and arches. Spatial structures, Surface structures. Joints in Structural timber: Classification of joints, structural jointing by adhesives. Jointing by nails or stapes.

BLD524 - Specification Writing (2 Units)

This course is designed to give the students not only a good practice in specifying building materials and components, but also in judicious choice of same to satisfy a particular design objectives for example cost wise: Purpose and form of the specification. Principles of specification writing in line with the sections in the latest standard methods of measurement of building works (BESMM).

BLD525 - Highway Engineering Construction and Maintenance (2 Units)

The course deals with the basic elements of highway design and Construction as primary infrastructures. Planning requirement and layout. Traffic surveys. Road design, construction and maintenance. Highway structures. Low cost roads, footpath and giver ways. Location of services.

BLD526 - Design of Steel Structures (2 Units)

Introduction to steel structures; production and properties of steel and steel systems. Specification of strength and yield stresses of steels; other properties. Basic structural steel sections, traditional hot rolled sections, cased sections, and composite sections steel cables. Corrosion protection of steel structures. Fire protection. Introduction to BS 449 and BS 5950 (Parts 1 & 2). Structural forms of steel work. Design of basic structural elements i.e. axially loaded members, beams and columns. Simple truss design. Design of connections – bolting, riveting & welding. Rigid and Semi-Rigid Connections. Column Connections to Foundations. Web bucking, web crushing and lateral torsional buckling. Design of Plate Girders. Design of Industrial Buildings. Plastic, Design of Steel Structures. Composite construction. Web buckling, web crushing & lateral torsional buckling. Design of Vierendeel Girders. Multi-storey Steel Structures and Framing methods. Introduction to design of steel bridges. Tensile Structures – stressed skin, suspended cables, arches.

BLD527 - Operations Research (2 Units)

The course deals with the application of operational research to problems of planning in industry and business with particular reference to the building industry. Nature of operational research; resources, and

optimization. Cost models, fixed and marginal costs. Prevention and breakdown costs. Present worth technique and application to decision making in the building Industry; Optimum replacement period. Critical path: - network analysis and logic. Project control by critical paths, Time variation and estimated project times. Linear Programming: scheduling, allocation and distribution examples Application of probability theory to systems reliability.

3-Bedroom Buildings in Covenant University

Centre for Learning Resources (Library)

Estate Management students in class

Accreditation Team of Estate Surveyors & Valuers Registration Board of Nigeria with Covenant University Management during their visit to the University

5.3 DEPARTMENT OF ESTATE MANAGEMENT

OVERVIEW OF THE DEPARTMENT

The Department of Estate Management offers a Bachelor of Science (B.Sc.) Honours Degree in Estate Management. The Department was established at the inception of Covenant University in 2002 because the founding fathers of the University realized that a developing country like Nigeria needs estate surveyors and valuers to assist in providing, managing and carrying out improvements on buildings and infrastructure on the one hand, and in expanding urban property markets on the other hand. Secondly, that only few Universities in Nigeria offered the Estate Management Programme while many young graduates of Estate Management are mainly interested in practice. Thirdly, there is a need to create an atmosphere for the development of the total man, via the vehicle of education and pioneering mental productivity to produce a new generation of leaders and solution providers. Through this approach, the University has been able to raise leaders in the area of supervision, management and control of interests in landed property through education, training and research with total commitment to marketability, truthfulness, entrepreneurship and fear of God. This has been achieved through the inculcation of the seven Core Values of Covenant University in the students, thus enhancing the development of leadership qualities in the graduates.

Vision

To be a leading World-Class University, committed to raising a new generation of leaders in Estate Management.

Mission

To create knowledge and restore the dignity of the black man via a Human Development and Total Man Concept-driven curriculum employing innovative, cutting edge, teaching and learning methods, research and professional services that promote integrated, life-applicable, life-transforming education relevant to the context of Science, Technology and Human Capacity Building.

Philosophy

The Philosophy of the Department of Estate Management is drawn from the University's Vision which is the development of the Total Man via the vehicle of education, that is, to raising new generation of leaders and solution providers. The Programme is therefore designed to produce graduates who can serve as supervisors, managers and control interests in landed property through education, training and research with a total commitment to marketability, truthfulness, entrepreneurship and the fear of God.

Objectives

The objectives of the Estate Management programme are to:

i. train students to acquire skills in the constituent disciplines of Property Valuation, Property Development, Property and Facility Management and Maintenance. In order to support this specialization, students go through courses in Building Construction, Town Planning, Land Law, Economics, Land Economics, Land Surveying and Land Policy;
ii. equip students with cutting-edge and up-to-date analytical techniques in tackling complex economic, political and administrative questions on land use, development, and management as well as other issues facing the contemporary Nigerian built environment;
iii. introduce students to new dimensions of self reliance through two University wide courses, namely, Entrepreneurial Development Studies (EDS) and Total Man Concept (TMC). These would make the graduates job creators rather than job seekers and leaders fit spiritually, mentally balanced, emotionally stable and physically sound;
iv. produce graduates who are well suited for employment in the modern world through explicit emphasis on the interactions of the private and public sectors; and
v. infuse students with the seven Core Values of Covenant University: Spirituality, Integrity, Possibility Mentality, Responsibility, Diligence, Sacrifice and Capacity Building so as to equip the students with leadership qualities.

LIST OF ACADEMIC STAFF IN THE DEPARTMENT

S/N	NAME	ACADEMIC QUALIFICATION	PROFESSIONAL QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Dr. M.O. Ajibola	B. Sc, M. Sc, Ph.D	ANIVS, RSV, ARVA	HOD/ Senior Lecturer	Property and Environmental Valuation, Property Development Appraisal
2.	Dr. S. A. Oloyede	B. Sc, M. Sc, Ph.D	ANIVS, RSV	Associate Professor	Real Estate Finance, Property Management
3.	Dr. D. O. Durodola	Diploma in Surveying, B. Sc, M. Sc, MBA, Ph.D	ANIVS, RSV, MRICS,	Associate Professor	Property Management, Project Management, Facility Management
4.	Dr. C. A. Ayedun	B. Sc, M. Sc, Ph.D	ANIVS, RSV, ARVA	Senior Lecturer	Investment Valuation, Property Management, Property Development
5.	Dr. O. C. Iroham	B. Sc, M. Sc, Ph.D	ANIVS, RSV	Senior Lecturer	Behavioural Valuation, Property Finance and Development
6.	Dr. A. O. Oluwunmi	B. Sc, M. Sc, Ph.D	ANIVS, RSV	Lecturer I	Property Development Finance, Facility Management
7.	Mr. O. C. Oloke	B. Sc, M. Sc	ANIVS, RSV	Lecturer I	Housing Development & Finance
8.	Mr. A. S. Oni	B. Sc, M. Sc	ANIVS, RSV	Lecturer II	Urban and Regional Planning
9.	Mrs. N. J. Peter	B. Sc, M. Sc	ANIVS	Lecturer II	Facility Management
10.	Mr. O. A. Akinjare	B. Sc, M. Sc	-	Assistant Lecturer	Valuation and Property Management
11.	Mrs. O. A. Oluwatobi	B. Sc, M. Sc	-	Assistant Lecturer	Valuation and Property Management
12.	Mrs. S. O. Babajide	B. Sc, M. Sc	-	Assistant Lecturer	Property and Facility Management
13.	Mr. T. J. Alade	B. Sc, M. Sc	-	Assistant Lecturer	Investment Appraisal and ICT in Real Estate
14.	Miss. I. J. Emeghe	B. Sc, M. Sc	-	Assistant Lecturer	Property and Behavioural Valuation

VISITING LECTURERS

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Prof C. A. Ajayi	B.Sc, M.Sc, Ph.D	Professor	Development Appraisal, Investment Valuation

ADMINISTRATIVE STAFF

S/N	NAME	QUALIFICATION	STATUS
1.	Mrs. M. R. Ochim	HND (Estate Mgt)	Administrative Officer/Secretary

5.3.1 ESTATE MANAGEMENT PROGRAMME

PROGRAMME: Estate Management
DEGREE AWARDED: B. Sc (Honours) Estate Management
DURATION: 5 Years (10 Semesters)

ADMISSION REQUIREMENTS

Candidates seeking admission into the Programme must have obtained at least credit passes in five (5) subjects in the SSCE/GCE/NECO or their equivalent at not more than two sittings. The five (5) credit level passes must include English Language, Mathematics and Economics and any other two subjects, one of which must be a science subject selected from Physics, Chemistry, Biology, while the other subject must be Geography or Technical Drawing/Building Construction. Candidates are also expected to sit for the JAMB Examination and attain the prescribed cut-off marks.

In addition, Covenant University conducts a screening exercise for all candidates seeking admission into the University and applicants may not be admitted without fulfilling the demands of the screening exercise.

GRADUATION REQUIREMENTS

To graduate, a student must successfully complete a minimum of 185 credit units distributed over the five (5)-year period as shown in the Table below:

Graduating Required Units for B.Sc. Estate Management Programme

Level	100	200	300	400	500	Total
Core/ Compulsory Courses	28	28	34	17	30	137
Electives	-	-	-	2	4	6
SWEP	-	-	-	-	-	-
SIWES	-	-	-	6	-	6
College Courses	-	-	-	-	-	0
University Courses	4	4	4	2	4	18
NUC Courses	10	6	2	-	-	18
Total	42	38	40	27	38	185

COURSE STRUCTURE

100 Level Estate Management						
Course Grouping	Course Code	Course Title	Status	Credit Units	L -T -P in Hrs	Semester
Compulsory Courses	ESM111	Introduction to Estate Management I	C	2	20-10-0	α
	ESM112	Nature of Environmental Sciences	C	2	20-10-0	α
	ESM113	Basic Elements of Planning I	C	2	20-10-0	α
	ARC114	Graphics and Descriptive Geometry for Estate Management I	C	2	20-10-0	α
	ESM115	Principles of Accounting I	C	2	30-15-0	α
	CBS111	Mathematics for Business and Social Sciences	C	2	30-15-0	α
	ESM116	Introduction to Economics I	C	2	30-15-0	α
	ESM121	Introduction to Estate Management II	C	2	20-10-0	Ω
	ESM122	Principles of Land Economy	C	2	20-10-0	Ω
	ESM123	Basic Elements of Planning II	C	2	20-10-0	Ω
	ARC124	Graphics and Descriptive Geometry for Estate Management II	C	2	20-10-0	Ω
	ESM125	Principles of Accounting II	C	2	30-15-0	Ω
	CBS121	Statistics for Business and Social Sciences 1	C	2	30-15-0	Ω
	ESM126	Introduction to Economics II	C	2	30-15-0	Ω
General University	EDS111	Entrepreneurial Development Studies I	V	1	15-0-0	α
	TMC111	Total Man Concept I	V	1	0-0-45	α
	TMC112	Total Man Concept - Sports	V	0	15-0-0	α
	EDS121	Entrepreneurial Development Studies I	V	1	15-0-0	Ω
	TMC121	Total Man Concept I1	V	1	15-0-0	Ω
	TMC122	Total Man Concept - Sports	V	0	15-0-0	Ω
NUC Courses	CST111	Use of Library, Study Skills and Information Technology I	U	2	30-0-0	α
	CST121	Use of Library, Study Skills and Information Technology I1	U	2	30-0-0	Ω
	GST111	Communication in English I	U	2	30-0-0	α
	GST121	Communication in English I1	U	2	30-0-0	Ω
	GST122	Communication in French	U	2	30-0-0	Ω
				α =20 Ω = 22 Total = 42 Units		

200 Level Estate Management						
Course Grouping	Course Code	Course Title	Status	Credit Units	L-T-P in Hrs	Semester
Compulsory Courses	ESM211	Introduction to Valuation I	C	2	15-0-30	α
	ESM212	Land Economics 1	C	2	20-10-0	α
	ESM215	Law of Contract and Tort 1	C	2	20-10-0	α
	ESM216	Introduction to Measurement and Description I	C	2	20-10-0	α
	ESM217	Principles of Agricultural Economics 1	C	2	20-10-0	α
	ESM218	Building Components and Methods I	C	2	30-15-0	α
	SES211	Land Surveying I	C	2	15-0-30	α
	ESM221	Introduction to Valuation II	C	2	20-10-0	Ω
	ESM222	Land Economics 11	C	2	20-10-0	Ω
	ESM225	Law of Contract and Tort 11.	C	2	20-10-0	Ω
	ESM226	Introduction to Measurement and Description II	C	2	20-10-0	Ω
	ESM227	Principles of Agricultural Economics II	C	2	20-10-0	Ω
	ESM228	Building Components and Methods II	C	2	30-15-0	Ω
	SES221	Land Surveying II	C	2	15-0-30	Ω
General University Courses	EDS211	Entrepreneurial Development Studies III	V	1	15-0-0	α
	TMC211	Total Man Concept III	V	1	15-0-0	α
	TMC212	Total Man Concept - Sports	V	0	0-0-0	α
	EDS221	Entrepreneurial Development Studies IV	V	1	15-0-0	Ω
	TMC221	Total Man Concept IV	V	1	15-0-0	Ω
	TMC222	Total Man Concept - Sports	V	0	0-0-0	Ω
NUC General Courses	GST211	Logic, Philosophy and Human Existence	U	2	22-8-0	α
	GST221	Nigerian People and Culture	U	2	22-8-0	Ω
	GST222	Peace Studies and Conflict Resolution	U	2	22-8-0	Ω
			α =18 Ω = 20 Total = 38 Units			

300 Level Estate Management						
Course Grouping	Course Code	Course Title	Status	Credit Units	L -T -P. in Hrs	Semester
Compulsory Courses	ESM311	Principles of Valuation I	C	2	30-15-0	α
	ESM312	Rating and Taxation I	C	2	20-10-0	α
	ESM313	Principles of Town and Country Planning 1	C	2	20-10-0	α
	ESM314	Elements of Land Law I	C	2	20-10-0	α
	ESM316	Building Services and Maintenance 1	C	2	20-10-0	α
	ESM317	Arbitration and Awards	C	2	20-10-0	α
	ESM318	Building Economics 1	C	2	20-10-0	α
	ECN211	Principles of Economics I (Micro)	C	2	20-10-0	α
	ESM321	Principles of Valuation II	C	2	30-15-0	Ω
	ESM322	Rating and Taxation 11	C	2	20-10-0	Ω
	ESM323	Principles of Town and Country Planning II	C	2	20-10-0	Ω
	ESM324	Elements of Land Law II	C	2	20-10-0	Ω
	ESM325	Property Marketing	C	2	20-10-0	Ω
	ESM326	Building Services and Maintenance 11	C	2	20-10-0	Ω
	ESM327	Environmental Challenges and Management	C	2	20-10-0	Ω
	ESM328	Building Economics II	C	2	20-10-0	Ω
	ECN221	Principles of Economics III (Micro)	C	2	20-10-0	Ω
General University Courses	EDS311	Entrepreneurial Development Studies V	V	1	15-0-0	α
	TMC311	Total Man Concept V	V	1	15-0-0	α
	TMC312	Total Man Concept – Sports	V	0	0-0-0	α
	EDS321	Entrepreneurial Development Studies VI	V	1	15-0-0	Ω
	TMC321	Total Man Concept VI	V	1	15-0-0	Ω
	TMC322	Total Man Concept – Sports	V	0	0-0-0	Ω
NUC General Course	GST311	History and Philosophy of Science	U	2	30-0-0	α
			α =20 Ω = 20 Total = 40 Units			

400 Level Estate Management						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Credit Units**	**L-T-P in Hrs**	**Semester**
Compulsory Courses	ESM411	Principles of Property Management	C	2	30-15-0	α
	ESM412	Property Development and Financing	C	2	40-15-0	α
	ESM413	Comparative Land Policies	C	2	20-10-0	α
	ESM414	Research Methodology for Estate Management	C	3	30-15-0	α
	ESM415	Urban Land Economics	C	2	30-15-0	α
	ESM416	Project Planning and Control	C	2	30-15-0	α
	ESM417	Applied ICT in Estate Management	C	2	20-10-0	α
	ESM431	Geographic Information System	C	2	20-10-0	α
Electives	*Select from **these** electives*					
	ESM418	Public Health Engineering	E	2	20-10-0	α
	ESM419	Administrative Law	E	2	20-10-0	α
SIWES	ESM421	Student Industrial Work Experience (SIWES) (Industrial Training)	S	6		Ω
General University Courses	EDS411	Entrepreneurial Development Studies VII	V	1	15-0-0	α
	TMC411	Total Man Concept VII	V	1	15-0-0	α
	TMC412	Total Man Concept - Sports	V	0	0-0-0	α
			α =21 Ω = 6 Total = 27 Units			

500 Level Estate Management						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Credit Unit**	**L-T-P in Hrs**	**Semester**
Compulsory Courses	ESM511	Advanced Valuation I	C	3	30-15-0	α
	ESM512	Land Use and Resources Management I	C	2	20-10-0	α
	ESM513	Applied Property and Facilities Management I	C	2	20-10-0	α
	ESM514	Feasibility and Viability Appraisal Studies I	C	2	20-10-0	α
	ESM515	Project Dissertation I	C	3		α
	ESM516	Plant and Machinery Valuation I	C	2	20-10-0	α
	ESM519	Real Estate Portfolio Management	C	2	20-10-0	α
	ESM521	Advanced Valuation II	C	3	30-15-0	Ω
	ESM522	Land Use and Resources Management II	C	2	20-10-0	Ω
	ESM523	Applied Property and Facilities Management II	C	2	20-10-0	Ω
	ESM524	Feasibility and Viability Studies II	C	2	20-10-0	Ω
	ESM525	Project Dissertation II	C	3		Ω
	ESM529	Professional Practice and Code of Conduct	C	2	20-10-0	Ω
Electives	***Select One Elective Here***		E	2		
	ESM517	Environmental Impact Assessment	E	2	20-10-0	α
	ESM518	Applied Town and Country Planning I	E	2	20-10-0	α
	ESM 526	Plant and Machinery Valuation II	E	2	20-10-0	Ω
	ESM528	Applied Town and Country Planning II	E	2	20-10-0	Ω
General University Courses	EDS511	Entrepreneurial Development Studies VII	V	1	15-0-0	α
	TMC511	Total Man Concept 1X	V	1	15-0-0	α
	TMC512	Total Man Concept – Sports	V	0	0-0-0	α
	EDS521	Entrepreneurial Development Studies X	V	1	15-0-0	Ω
	TMC521	Total Man Concept X	V	1	15-0-0	Ω
	TMC522	Total Man Concept –Sports	V	0	0-0-0	Ω
			α =17 Ω =21 Total = 38 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

ESM111 - Introduction to Estate Management I (2 Units)
Introduction to Management principles, setting objectives, planning, coordinating and controlling, organizing and directing, management functions. The function of management in relation to estate management. Estate ownership and control. Estate Planning and Development. The meaning and concepts of land in Estate management. The Estate Management profession. Estate management and allied professions. Estate development and sources of finance. Careers in estate management. Estate management and land use. Agriculture and forestry in Estate Management

ESM112 - Nature of Environmental Sciences (2 Units)
The built versus the natural environments. The construction Industry in Nigeria. The property development process. Stages in the property development process (property layouts, purchase of land, architects' drawings, preparation of bill of quantities, feasibility and viability studies, appointment of contractors and subcontractors, construction, letting), actors in the development process (architects, structural engineer, land surveyor, quantity surveyor, builder, estate surveyor etc), Professional Institutions in the built environment and the procedure for qualification

ESM113 - Basic Elements of Planning I (2 Units)
Emergence, growth and decline of settlements. Evolution of historical and legislative context of Urban & Regional Planning, fall-out of congestion in cities. Emergence of Planning legislation and Control. The Utopians. Nature, scope and objectives of Urban & Regional Planning. Definitions, types of content etc). Urban and Regional Planning thoughts in Europe, America and Africa. Influence of the concepts of the Nineteenth and Twentieth centuries on modern planning.

ARC114 - Graphics and Descriptive Geometry for Estate Management I (2 Units)

Plane geometry: lines (bisection, perpendiculars, equal and proportional divisions); angles (different types, bisections and basic construction); triangles (different types and various constructions given different data).

ESM115 - Principles of Accounting I (2 Units)

This course introduces the students to basic bookkeeping and accounting. This foundation course in accounting aims at exposing the students to the basic techniques of classifying and recording the different types of costs and revenues associated with transactions and computing simple practical reports. Topic areas include; definition of accounting, and other terms, perspectives and branches of accounting, accounting data, accounting information, users and uses of accounting information, historical sketch of accounting, prospects for Accountants, Background of current Accounting Methods, Transactions. Nature, Purpose of Basic concept of Accounting, the accounting equation, measurement of income, costs, assets, equities. Subsidiary Books – Sales Day Book, Purchases Day Book, Returns Inward Journal, Returns Outward Journal and Journal Proper. Cash Book – Single Column, Double Column and Three Column Cash Book. Differences between capital and revenue, reserves and provisions, trade and cash discounts etc. accruals and prepayments capital and revenue expenditure. The Ledger and Trial Balance, uses. Bank Reconciliation Statements, types, causes of differences. Final Accounts of Sole Trader. Income measurement – end of year adjustments in final accounts.

ESM116 - Introduction to Economics I (2 Units)

Elementary theory of demand, supply and market price. Elasticity of demand and supply. The dynamic theory of price. The theory of costs. The equilibrium of a profit – maximizing firm. The theory of perfect competition. The theory of monopoly. Theories of imperfect competition. Monopoly versus competition. The demand for and supply of factors of production. The pricing of factors in competitive markets.

Wages and collective bargaining. Interest and return on capital. Money and banking. International trade.

CBS111 - Mathematics for Business and Social Sciences I (2 Units)

Logic, Sets, Linear equations and inequalities, quadratic equations, progression, surds and indices, permutations and combinations, sequences and infinite series, logarithms, interest and annuities, trigonometric ratios, differentiation and integrations. Emphasis will be on a deeper understanding of what is normally covered at the pre-university level.

Omega Semester

ESM121 - Introduction to Estate Management II (2 Units)

Functions of Estate Management, Interests in land; motives of ownership of land. Land tenure system in Nigeria, Management of private and public estate. Routine management function of an estate, maintenance, repairs, rent collection, tenant selection etc. A broad survey of the vista and philosophy of estate management. Economic, social, legal and technological dimensions of Estate management. Functions and decisions in relation to real estate development. Origin and theories of ownership. The function of estate management in the economy generally and real estate in particular.

ESM122 - Principles of Land Economics (2 Units)

Man's dependence on Land: Man/Land relationships within physical, economic and institutional frameworks. Importance and nature of decision-making: descriptive models of decision making units ("proprietary" and "social"} proprietary decisions (goals and motive, criteria for evaluation, constraints): other decisions (e.g. households' and firms' Location decision): development decision-making processes (landowners, developers planners): Finance for development - financial institutions. Cost/benefit analysis as an aid to land use decision –making. Outline of selected aspects of policies in Nigeria and elsewhere to

illustrate the variety of policy frameworks within which Land Use decisions are taken, including land policy and land reform. Analysis of Land Use decisions.

ESM123 - Basic Elements of Planning II (2 Units)

Historical background to Urban & Regional Planning in Nigeria. Emergence of planning legislation and control in Nigeria. Traditional planning concepts in Nigeria. Case studies of historic cities in Nigeria – Ibadan, Kano, Sokoto, Benin, Ife, Ogbomoso, Oyo etc. Introduction to Urban Planning theory and urban design. The urban structure (roads, residential commercial, industrial, open spaces, cultural, public/semi-public areas). The Central Business District (CBD) and its characteristics. City forms (organic, grid, concentric, liner, etc).

ARC124 - Graphics and Descriptive Geometry for Estate Management II (2 Units)

Architectural Drawings: Introduction to representation Building components like doors, windows, lintels, concrete, walls, building materials etc and their representations; and production of elementary plans, elevations and sections of simple buildings.

ESM125 – Principles of Accounting II (2 Units)

More detailed topics discussed in ACC111. Attention will be focused on the preparation and presentation of simple final accounts of sole traders, partnership and company. Topics covered include; Depreciation of fixed assets, methods and reasons of computing depreciation and treatment in financial statements. Definition and treatment of Bad debts and provision for bad and doubtful debts etc Self-balancing ledgers and their uses; Incomplete Records, Single and double entry book-keeping; Accounts of Non trading organizations e.g. Club and Charities, Manufacturing accounts; Types and correction of errors, and uses of suspense account. Inventory valuation; various adjustments of Bank reconciliation. Manual, mechanical and electronic bookkeeping system. Simple final accounts of sole traders and criticism.

ESM126 - Introduction to Economics II (2 Units)

This is essentially an introductory course on the macro-economic aspects of economic theory. The topics covered include definition and scope of macro economics, national income accounting including elementary models of income and employment, money and banking, employment and unemployment, public finance including government budgets, international trade, balance of payments and commercial policies, introduction to development planning

CBS121 - Statistics for Business and Social Sciences I (2 Units)

The nature, meaning and scope of statistics, statistical methods and the purposes. Types and sources of statistical data; Approximation, errors and accuracy in statistics. Presentations of data: frequency distribution, histogram, pre-charts, bar charts etc. Measures of central tendency, mean, mode, median etc. Measures of dispersion, Range, variance, standard deviation, co-efficient of variation. Simple measures of association; regression and correlation, co-efficient of determination. Index numbers

200 Level

Alpha Semester

ESM211 - Introduction to Valuation I (2 Units)

An appreciation of economic bases of property values: Nature and concept of value, Distinguish between price, cost and value. Define valuation; Purposes of Valuation; The Valuer: His functions and methods; The principal types of landed property and the interests subsisting therein; nature of real estate.; The determinants of land and property values; Investment generally, including real property and capital market investments; operations of the stock exchanges and the capital market generally; and real property market.; Rates of interest derived from property – accumulative and remunerative rates. Outgoings and the relationship between rental value and income.

ESM212 - Land Economics 1(2 Units)

Definition of land economics.Meaning of Land, concept of rent, land market, price determination, location theory. Land resources requirements comparative and complementary land uses. The demand for land local and its relationship to population and resources. The supply of land; Malthusian; Neoalthusian and other doctrines. The exploitation of land resources. The nature and concepts of land rent classical formulation of Rent Theories – Ricardan Von Thunen. Rent as an unearned increment, significance of land rent. Factors affecting supply and demand.

ESM215 - Law of Contract and Tort I (2 Units)

Elements of law, sources of law, Nigerian Customary Law and Statute Law, Common Law and Equity. The major divisions of law with particular reference to distinctions between Contract, Tort, Crime and Property. Federal and State Legislation and Legislative Powers. Subordinate Legislation (by-Laws), Case Law and Doctrine of Precedent. The nature of the judicial process. General principles of equity. The organization and jurisdiction of the Courts and Tribunals in Nigeria. Elements of law of contracts, formation of contract, capacity of parties, mistakes, misrepresentation, duties, non-disclosure, fraud, illegality, remedies for breach of contract, privity of contract, assignment and negotiability, Agency, discharge of contract, contract of employment.

ESM216 - Introduction to Measurement and Description I (2 Units)

Historical development of quantity surveying. Functions performed by the Quantity Surveyor in relation to construction works. Evolution of standard methods of measurement for construction works. The use of the bill of quantities in practice. Mensuration: purpose of measurement, principles of quantification; form and purpose of bills of quantities; Professional inter-relationship; relevance of quantity surveying to estate management. Theoretical processes of building contract from inception to completion; the interrelationship of the professional team; an introduction to the method of communication of data within the construction industry and their relationship to the design and construction process.

ESM217 - Principles of Agricultural Economics I (2 Units)

Introduction to agricultural organization in Nigeria. Nigerian agricultural policy; comparative agricultural policy, mechanized farming; problems inhibiting mechanized farming in Nigeria, cost of production; returns and marketing. Contemporary theory of production, consumption. Pricing and resource allocation. Basic economic tools and their applicability to agricultural problems. Structure of production units, capital and labour inputs. Forms of costing and estimating. Term budgets scales economics. The role of agriculture in economic development (case studies in selected countries).

ESM218 - Building Components and Methods I (2 Units)

The central focus is to teach the students the totality of building system including construction to ensure sound knowledge of the principles underlying the technology of construction and building services. Different Participants in Building Construction. Choice and sources of information in construction. Substructure works (Types of foundation, clearing and earthworks, setting out, construction). Superstructure (The frame and carcass, roofing system and suspended floors). Internal construction and finishes. Services (Electrical, mechanical, plumbing, sewage and airconditioning). External works including landscaping.

SES211 - Land Surveying I (2 Units)

This introduces the students to the principles of land surveying and calculations of irregular areas; The practical aspects of this subjects should be emphasized; measurement and quantification need to be stressed rather than those aspects of theory more appropriate to the specialist land surveyor; Students must understand not only the form and use of equipment but also how to test its accuracy and the means of making temporary adjustment. The syllabus entails the following: Basic principles and objects of land surveying. Types of survey. Relative accuracy and the effects on the method of surveying. Use and interpretation of ordinance survey, maps and plans. Scales. Enlargement and reduction of plans. An appreciation of current land survey practice, including tachometry and

aerial photgrammetry. Chain and tape surveying, Equipment, procedures, including plotting. Negotiating obstacles.

Omega Semester

ESM221 - Introduction to Valuation II (2 Units)

Methods of Property Valuation; Concept of Years Purchase and construction of and use of valuation tables.; Rent Theories and their relevance to property valuation.; Analysis of sales and letting of freehold and leasehold properties; The Investment method of valuation; Freehold and leasehold valuations – valuations with vacant possession, term and reversion, varying rents etc.; Annual Equivalent, virtual/sitting rent, costs-in-use, etc; Landlord and tenant valuations – Premiums; surrenders and renewal of leases including marriage values. Treatment of capital receipts and expenditures in landlords and tenant valuation.

ESM222 - Land Economics II (2 Units)

Theories of consumption, Theories of Income, Employment and International Trade. Theories of interest and asset prices, Nature of land investment decisions and appraisal. Divergence of private and social costs and the problems of resource allocation. Conservation of land resources. Concepts of land use capacity. Concepts of Highest and Best use. Principles of comparative and Absolute Advantages and Application in allocation of resources. Organization and its effects on values. Reasons for urbanization. Economic advantages and disadvantages of urbanization. Urbanization and land use values patterns. Value determination- Accessibility and complementarity. General patterns of land use within urban areas.

ESM225 - Law of Contract and Tort II (2 Units)

Torts relating to land, general principles of the liability of torts, torts connected with the organization and occupation of land with special reference to notions of trespass, nuisance and negligence." Buyers beware" and "Subject to contract" syndrome

ESM226 - Introduction to Measurement and Description II (2 Units)
Analysis and classification of data; standards of practice; data flow related to design processes, communicating production information; describing part elements such as Bills of Quantities, processes of preparing BOQs, including taking off, working up, abstracting and billing. Types of bill formats and their uses. Applied measurement of linear, superficial and cubical forms, composite, repetitive and parallel measuring. Setting out of descriptive and quantitative information in taking-off. Dimension, abstracting and Billing sheets. Simple illustrated drawings to demonstrate the taking-off process. Standard libraries and phraseology of description.

ESM227 - Principles of Agricultural Economics II (2 Units)
Problems inhibiting agricultural production in Nigeria, agricultural laws and necessary reforms, land tenure system and impact on large scale agricultural practices; land and its uses, other environmental factors affecting agricultural production. An analysis of the role of agriculture in the national experience of Nigeria. The contribution of industries to urban development. Agricultural resources and farm management. Agricultural marketing. Capital and credit in agricultural land economics. Forestry, forest resources and the timber market in Nigeria. Use of timber as materials of construction. Timber classification. Timber grading and exportation. Tree planting and afforestation programme. Rural development programmes. Constraints associated with rural development. Rural infrastructure development. Rural estate management.

ESM228 - Building Components and Methods II (2 Units)
Emphasis shall be placed on building components and finishes and materials of construction. Windows and doors: casement in timber and metal. External and internal doors; Fire resisting doors. Ironmongery and glazing; Stairs in timber, straight flight, quarter and half turns, handrails and balustrades; Internal finishes and decorative treatment to walls, floors, and ceilings; Shelving and simple joinery fittings protection and decoration of timber and metal. A general knowledge of the properties of

the materials commonly used in construction namely: ferrous and non-ferrous metals, concrete, timber, glass, gypsum, plastic, aluminium, asbestos, upvc, stones, ceramics, block, brick, lime and cement. Concrete works.

SES221 - Land Surveying II (2 Units)

The intention here is to widen the knowledge of the students the more in Land surveying and measuration having opened the way under Land Surveying I. Areas to be covered; anchored on teaching and practical include: Measurement of existing buildings. Setting out of boundaries, road and simple curves. Setting out for new construction works. Leveling; equipment; procedures, booking, readings, reducing and plotting. Sections and contours. Setting out for embankments, cutting and drains. The theodolite and its uses. Principles of traversing. Calculations of co-ordinates of stations and areas enclosed by traverses. Applied measuration. Measurement and calculation of lengths, girths, areas and volumes, both regular and irregular from drawings or survey data. Note that while familiarity with the theodolite is required, and extensive knowledge of this instrument and its use will not be expected. Methods of ensuring the accuracy of data and calculation should emphasized.

300 Level

Alpha Semester

ESM311 - Principles of Valuation I (2 Units)

The use of valuation tables (revision); Analysis of sales and letting of freehold and leasehold properties. Effect of income tax on sinking fund and Years Purchase (Adjustment gross sinking fund yield to net yield and, vice-versa); Valuation of Gross funds and tax-paying investments; Valuation of leasehold interest with varying profit rents; Errors in reversionary leasehold interest and methods of correcting the errors; Valuation of freehold and terminable income: Conventional and contemporary valuation methods.

ESM312 - Rating and Taxation I (2 Units)
Income tax nature and incidents, allowances on deductions, assessment of owners and occupiers of landed property. Taxation of capital, Estate duty, Capital transfer tax etc. Elementary principles of national finance with particular reference to central and local government finance. Distinction between central government taxes and local taxes. The principles and canons of taxation. Taxation distinguished from other land burdens. Methods of taxation proprietary interests in land: income tax, inheritance tax, capital transfer tax, local rates and other statutory charges. National taxation policies relating to land.

ESM313 - Principles of Town and Country Planning I (2 Units)
Planning. Planning as a continuous process. Plan, policy, design or decision steps. Characteristics of plans and operational procedure. multi-disciplinary and term approaches to planning. Town planning and the implications of planning. Town planning as a profession in relation to Estate management. The necessity of planning, basic impulse and problems. The components of a city. Land use planning. Planning the areas devoted to residential, commercial, industrial, recreational and other uses. Housing development, industrial estates, shopping centres, parks and play grounds; their location, design and inter-relationship. The urban structure. The component of urban areas, urban roads, components of residential area. Techniques and procedures by which social control of land is achieved; including forecasting techniques, impact analysis; cost benefit analysis etc. Evaluation of alternative planning strategies.

ESM314 - Elements of Land Law I (2 Units)
Legal and equitable interests in land. Historical Introduction to the English and Nigerian Land Law. Doctrine of Estates, the concept of and types of interests in land and variations on the recognised Nigerian Land Law and in Common Law. The notion of servitudes and similar rights in common law and Nigerian Law. Ownership of land: communal, individual and government. The land Tenure law. The influence of the

land Use Act no 6 of 1978 on the land tenure system in Nigeria. Statutory and Customary rights of Occupancy.

ESM316 - Building Services and Maintenance I (2 Units)

The intention here is to expose student to the basic sciences and principles underlying building services and prepare them sufficiently for the courses in building services. The syllabus is as follows: -Fluids; hydrostatics; barometers; pressure gauges, forces on plane surface. Hydrodynamics;. Steady, unsteady, uniform, and non-uniform flow; conservation of momentum and energy; Bernoulli's theorem; friction formulae. Water supply: Characteristics of waters, chemical composition, impurities, temporary and permanent hardness. Sources and treatment of water. Lighting Introduction to lighting theory; natural lighting; lightning levels day light factors; illumination levels; glare. Acoustics Properties of waves. Sound and noise. External and internal sources of sound related to buildings. Transmission. Room acoustics. Moisture precipitation; snow, moisture migration through the fabric of building, condensation; dynamic condensation prediction. Note: It is desirable for these principles to be emphasized since this subject is the basis on which must be founded the studies concerned with buildings, the internal environment, and associated services. The concept of building maintenance, liability for defects in buildings, maintenance needs, nature of maintenance: rehabilitation, alterations and improvements, design and maintenance: concepts of tetro-technology in buildings – life cycle costing and appraisal techniques, building management, janitorial suppliers and staff organization. Inventories listing and administration, group and paved area, maintenance of drainage works, accounts for various bills – electricity, water etc, maintenance management: property management organizations and functions of maintenance; repairs obligations under tenancy agreements:

ESM317 - Arbitration and Awards (2 Units)

The nature of arbitration, its origin and application to valuation, the Arbitration Act. Reference to arbitration by consent. The concept of arbitration; Types of arbitration: Statutory and conventional; Advantages of Arbitration. Submission, parties and subject matters. Appointment of Arbitration – arbitrators and umpires principal rules of arbitrators – arguments for and against. Cost of arbitration Reference by order of Court Neutral and Tripartite panels. Procedure in arbitration awards. Proceedings subsequent to award and the costs on award. Expert evidence. Arbitration of real estate and related disputes in the construction `industry: particular skills required of a professional acting as arbitrators in the construction industry; Real estate documents and arbitration clauses; resolution of disputes by arbitration in the allied professions in the construction industry. Distinctions between Valuation, Arbitration and Action Methods of enforcing and impeaching an award.

ESM318 - Building Economics I (2 Units)

The students are to be introduced to the concept of building economics, its meaning and its implication for estate surveyor and valuer. Development of cost index and its application. The place of research and data gathering in building economics. The development process, cost control, approximate estimating including cost analysis. Analysis of contractor's rates, cost planning and cost-in-use studies. Tendering and contractual arrangement.

ECN211 - Principles of Economics I (Micro) (2 Units)

The course deals with a more in-depth treatment of ECN111. It also introduces the use of quantitative techniques in Micro-economic theory. Topics to be covered include: The subject matter of economics, positive and normative economics, common fallacies in economics, and basic economic question in all types of economics. Theories of demand and supply, equilibrium concept and possibility of disequilibrium with emphasis on cobweb theory; Theory of elasticity of demand and supply with applications. Theory of consumer's behaviour: The cardinalist approach, the indifference curve or ordinalist approach and the revealed

preference hypothesis. Theory of production: - Definition and types; factors of production, production functions and types; the short run and the long run analysis in production; output elasticity; The law of returns to scale. Theory of cost and revenue. Basic discussions of market structure and behaviour in perfect competition, monopoly and monopolistic competition. Pre-requisite is ECN111.

Omega Semester

ESM321 - Principles of Valuation II (2 Units)

Detailed treatment of valuation for different purposes including: sale, letting, purchase, rating, mortgage, balance sheet, insurance, compensation, taxation, privatization, etc.; Company Asset Valuation and income theory – concepts, purposes, bases, methods and procedure of valuation. Purposes of valuation to be covered should include, amongst others, privatization, mergers and takeovers, floatation of shares, etc particularly unitization and securitization of property assets of a company; Referencing, inventory and schedule compilation – valuation inspections; Report writing and proof of evidence; The estate surveyor and valuer as an expert witness before the lands rent tribunal and all other courts of competent jurisdiction in property-related/valuation matters.

ESM322 - Rating and Taxation II (2 Units)

The State of Local Government Finances in Nigeria: Urbanization and the Pressure on Urban Social Amenities, The 1976 Local Government Reform, Introduction to Local Taxation: Why local taxation? Historical Evolution of Property Rates, Origins in the UK, Nigerian Evolution, The Rating Process, Terms Usually Encountered in Rating and Rating Valuation. Occupation and hereditaments. Tone of the list The Concept of Rating: The Valuation list Characteristics of Property Rating, Cross Country Variations in Local Property Tax Systems, Requirements of a Good Rating system, Advantages of Property Rating, Disadvantages of Property Rating, Liability for Rates. Hereditaments/Tenements Liable for Rates, Liability for payment of rates. exemptions and reliefs. Tax Base,

Field Inspection Procedure, Assessment Ratios and Nominal Tax Rates: Tax Base, Unimproved Site Value, Improved Site Value, Net Annual value, Capital Value, Assessment Ratio, Nominal Tax Rates, The Methods of Valuation: Rental value, Contractors test, The profits method, Valuation for Rating (Worked Examples). Valuation assumptions, Vacant and to let exemptions. Adjustment of Gross Value to Net Annual Value Alterations and Appeals: Constituents of the valuation list, Legal provisions for alterations and appeals, The Valuation Court. Billing & Collection System: Local Property Tax reform.

ESM323 - Principles of Town and Country Planning II (2 Units)

Study of urban structure with specific reference to residential areas and city centers. The structure of residential areas density – its determinations and control. Town centers, the structure and components. Open space and leisure. National policies and Institutional procedures for planned control and management of land use. Definition and clarification of the principles of density, zoning, sub-division and development control. Introduction to planning methods, survey techniques, analysis and other procedures. Studio work

ESM324 - Elements of Land Law II (2 Units)

Sales and mortgages of land: the principles of alienation, sales, assignments, pledge and mortgage in common law, equity and Nigerian Law. Statute law dealing with land, e.g. land registration, land acquisition and administration. Landlord and tenant law: the conception and creation of leases, licenses and other rights. The principal features governing the relationship of parties. Rent acts and laws. Compensation Law: the compulsory purchase of land and property under statutory powers. Legal principles and statutory provision governing rights to compensation for :– bare land compulsorily acquired; un exhausted improvements on the land; Economic trees and cash crops etc; Land injuriously affected by the exercise of statutory powers and assessment of compensation; General procedure in the exercise of compulsory powers, rights and duties of acquiring authority and the owner. A review of Act. 38 of 1968, Act 33 of

1976 and Act 6 of 1978. Nigerian Case Law relating to compulsory acquisition and compensation.

ESM325 - Property Marketing (2 Units)

Concept of marketing and its relation to estate management. Marketing principles, the marketing mix, marketing strategies and market segmentation. The real estate product; the nature of product- tangible and intangible; service products, Products of the property industry (Detached and semi-detached buildings, terrace buildings, duplex buildings self contained, town houses etc.); estate agency business. Consumers and their influences; the buying decisions; stages in the buying decision; buying roles; organizations and the world of property. Service management: the nature service of product, client involvement; quality and the client based culture. Commercial property people and their products (Types of building and building elements), professional services; commercial property and investment. Marketing strategy: comparative advantage; strategic development; strategy operations; defense and options. Marketing tactics; medium of advertising; sales and sales management; market and marketing research, direct marketing and mailing. The marketing plan; contents, strategy and tactical management. Simple examples of marketing plans. Sales of land; procedures culminating in the contract; the contract; post contract procedures. Economic and financial crime in property marketing; advance fee fraud; auctioneering. Unethical issues in property marketing: topping up; undercutting, Gazumping, gazundering, multiple boards etc.

ESM326 - Building Services and Maintenance II (2 Units)

Maintenance management systems, planning for maintenance, maintenance policies, management information systems for building maintenance, concepts of tenants participation in maintenance and self help schemes in public housing management. Estimating maintenance budgets, executing of maintenance work (Direct Labour Organization or Contract Labour), contract administration and management. Job evaluation/feedback systems. Policy issues on alteration improvements (modernization) and conservation/disposal: motivation of mai8ntenace

workers. Purposes of structural surveys, preliminaries and report writing. Rules, presentations and nature of reports. Surveys of special properties, health and industrial buildings. Sanitation surveys; schedule of dilapidations, schedules of condition, interim and terminal schedules.

ESM327 - Environmental Challenges and Management (2 Units)
Environmental science and ecological principles. Population, economics and environmental health. Food, land and biological resources. Physical resources. Society and the environment. Ozone layer and the greenhouse effect. Climate change and implication for economic development. An Overview of Nigeria's Environmental Problems: solid waste disposal, Desertification and drought, industrial pollution, Inappropriate agricultural practices, the destruction of watersheds, and the opening up of river banks, Air and Marine Pollution, Energy Consumption, Carbon Emissions, Environmental Outlook. Sustainable development versus economic development. Health and other effects of pollutants, Federal Environmental Protection Agency's guidelines and standards for environmental pollution control in Nigeria.

ESM328 - Building Economics II (2 Units)
Practical implications of site development variables, developers' budget, project selection methods and investment appraisal, risk analysis in construction, financial engineering in construction, value management and value engineering, cost-benefit analysis and sensitivity analysis.

ECN221 - Principles of Economics III (Micro) (2 Units)
The course deals with macroeconomics aspect of Economic principles. Topics to be covered include: National income (accounting and determination); aggregate savings and expenditure in 2-sector and 4-sector models. Introductory treatments of Investment, employment, money supply, price level, and balance of payments. The course attempt to explain the determinants of the magnitudes of these aggregates and their rate of change over time. It looks at government's expenditure particularly in developing countries such as Nigeria (budget), taxation,

monetary policy in determining the general level of economic activity under static and dynamic equilibrium. Pre-requisite: ECN121.

400 Level

Alpha Semester

ESM411 - Principles of Property Management (2 Units)
Management theory as applied to property ownership. Aims and policies of landed property management. The proprietary land unit as an area of decision. The proprietary land structure in Nigeria. The leasehold system. Estate planning and supervision. The function of management in the economy generally and in relation to estate management in particular. Routine management function of an estate; maintenance, repair rent collection, tenant selection and letting. Land and housing policies of various governments in Nigeria and how they affect property management. Current legislation and their effects on property management. Management organizations and functions: the management surveyors role – marketing space, leasing advice; collection of rents, insurance, payment of disbursements, service charges, accounting, portfolio advice. The manager's role on behalf of users, staffing and general housekeeping matters. Specific problems relating to residential, commercial and industrial property including arbitration and rent reviews, valuing of property, taxation of income and capital compulsory purchase of property and disturbance compensation. Planning compensation on refusal revocation or modification of planning permission. Estate Agency – the relationship between principal and agent.

ESM412 - Property Development and Finance (2 Units)
A historical perspective of property Development. The development process. Development agencies. Site development. Negotiating a project from inception to completion. The construction process. Project co-ordination. Refurbishment development. Urban regeneration. Contract procurement and management methodology. Estate development and

investment decision. Acceptable Return, Timing, Finance, programme of Investment, Organization of operations. Sources of Finance. Internal funds, dissociate capital, short-term funds (bank and trade credit), Long-term funds (loan and share capital) – Building societies, Finance Institutions, property companies, other private sources, public sources, international funding sources. Mortgage Financing. Financial engineering. Sales and leaseback. Build Operate and transfer, cashflow generation, informal loan.

ESM413 - Comparative Land Policies (2 Units)

The nature of customary tenure in the economic and social structure of selected countries in West Africa. Social and legal theories of property. Proprietary land use analysis. The purpose of progress in national land reforms in selected countries. Implementation of land policies and specialized institutions of land policies and specialized institution of government and other bodies related to social relationships and land tenure. The classification of land tenure systems as a basis of comparative study. Principles of alienation and occupation of public land. A comparison of Rights of Occupancy system in Nigeria. The meaning of land reform. Classification of land reforms objectives and methods. National land policies.

ESM414 - Research Methodology for Estate Management (3 Units)

This course aims at giving the student an opportunity to develop research techniques and writing skills. The courses incorporates the use of elementary statistical analysis in problem solving. The nature, essence and types of scientific enquiry. Research concepts, problems, hypotheses, construct variables extraneous variables. Data sources and collection, questionnaires, observation, interviewing questionnaire and survey design. Sample frames, sample sizes, data collection instruments, general principles of questionnaire design. Response errors, control and measurement. Analysis of research data: frequency distributions, Regression methods, chi square tests, Students' t-test, Analysis of variance, time series data. Validity of experiments, statistical description,

Interpretation, Casual models, Index construction, the research reports. Harvard style referencing.

ESM415 - Urban Land Economics (2 Units)

Urban Economics as a field of study. The Nature of Urban Areas. Economic problems of urban Economy: Urban Land Use and Transportation, congestion, traffic and parking, Technology and the city spatial structure and growth. The Urban Economic Base. Pollution and Environmental Quality in Nigeria. An Overview of Environment-oriented policy measures in Nigeria. Urban Policy: The need for policy, arguments for and against urban policy formulation, antecedents and contemporary urban policy measures in Nigeria. New Town Development: public and private. Planning and the Compensation Betterment Problem.

ESM416 - Project Planning and Control (2 Units)

Principles of project planning, control and management. Control systems, project monitoring, Use and application of linear programming, PERT, CPM and other techniques.

ESM417 - Applied ICT in Estate Management (2 Units)

Information and communication technology in estate management. Use and understanding of the software for Project Management, Facilities Management, Valuation, Measurement, Property Management and Excel Spread Sheet. Application of Argus Real Estate Software – DEVELOPER, VALUATION DCF, and VALUATION CAPITALISATION.

ESM418 - Public Health Engineering (2 Units)

The course is meant to give students the basic elements of estate engineering with particular reference to primary infrastructure: Water supply system (impoundments, dams, weirs, deep wells, boreholes); Water storage systems
(underground system, overhead system, direct circulation). Water treatment system. Pipeline construction. Sewage disposal system (Septic

tanks and soak away system, central sewage system), drainage system and by-laws. Ventilation system. Health and safety at home and at work. Fire protection. Energy sources. Electricity generation, transmission and distribution. Refuse disposal.

ESM 419 – Administrative Law (2 Units)

Definition of Administrative Law with particular emphasis on the administrative process. Administrative institutions such as the civil service, public corporations, the police and other agencies of the executive; The legislature, administrative and judicial powers of the administration. The importance of the distinction between these powers; Delegated legislation: forms and types; legislative control; judicial control; publicity; consultation The judicial and quasi-judicial powers of the administration. Statutory enquiries and administrative tribunals. Compulsory acquisition Judicial control of the administration: judicial, legislative, extra legal, proceedings against the administration (tort, contract, other forms).

ESM431 - Geographical Information System (2 Units)

Principles of GIS, Components of GIS, GIS Applications, Land Information System, Utility Information System, Multiple Cadastre, Remote Sensing and GIS etc.

Omega Semester

ESM421 - Students Industrial Work Experience Scheme (SIWES) (6 Units)

For a whole semester, students will go on Industrial Training and are expected to submit a systematic logbook for assessment at the end of the training period.

500 Level

Alpha Semester

ESM511 - Advanced Valuation 1 (3 Units)
Errors of reversionary leasehold interests and methods of correcting errors. Conventional and contemporary valuation methods (equated yield models, rational models, real value models etc). The Valuation of property assets of a company going concern valuation, companies and partnerships, valuation of way leaves, royalties and goodwill. Environmental Valuations. Valuation of specialized properties: Hotels, motels and restaurants; filling stations including lubrication bays, tyres, batteries and accessories; public buildings – schools, community halls, government secretariats etc; wharfs and quays; breweries and licensed premises; stadia and other leisure properties; cemeteries, churches and mosques and other religious properties.

ESM512 - Land Use and Resources Management I (2 Units)
Land Resources, human settlement and land use in Nigeria. The evolution of growth structure and pattern of human settlement. The proprietary land capital and income; obsolescence and urban renewal. The relocation problems. An introduction to the economic forces that influences land uses, through succession of land uses and the competition between uses which evident in the operation of the land market. The economics of land uses in non-market societies. Urban Land Use and location. Development of the theory of location, economics of location, land uses and land values, patterns of urban land use. Man-land relationship. Economic and legal concepts of land. Population pressure and the supply and demand for land resources. Theory of highest and best Use, competition and competing uses. Economic returns to land resources.

ESM513 - Applied Property and Facilities Management I (2 Units)
Property management process – strategy of estate owners and choice of alternatives to achieve owner's objectives. Principles of estate

management applicable in the management of public and private estates, new towns, expanding towns, local authority redevelopment area, etc. The implications for estate management of legislation pertinent to the relationship between the landlord and tenant. Practical issues involved in managing commercial properties, estates and residential development.

ESM514 - Feasibility and Viability Appraisal Studies I (2 Units)

The nature of investment projects, identification and preparation, The Estate surveyors as an adviser on investments, Principles and techniques of investment appraisal and application to property Conceptual issues, Market analysis, Site Analysis, Market delineation and penetration, market capture. Effects of taxation and inflation. Property development schemes, property investment markets, etc. Procedure and methods of assessing the economic demand for a particular project. Risks and uncertainty in real estate development, development and redevelopment processes.

ESM515 - Project Dissertation I (3 Units)

At the end of his training, the student should be able to demonstrate an appreciation of and the capacity to recognize the integration and contribution of the various contributory subjects which give the discipline its distinctive and unique kernel. The student should also be able to apply the total body of knowledge acquired, especially in an independent and original way, to the solution of specific practical problems.

ESM516 - Plant and Machinery Valuation I (2 Units)

Definition of plants and machinery. Purpose of plant and machinery valuation – open market valuation insurance, sale, purchases; takeovers and mergers, privatization and commercialization, rating and taxation, mortgage balance sheet, compensation etc. Basics of plant and machinery valuation: existing use value, alternative use value, going concerns, etc. Methods of plant and machinery valuation: cost profit and comparison approaches. Valuation Process: Referencing: inventory and schedule compilation. Depreciation of plant and machinery for valuation purposes

methods, factors, procedure and problems. Knowledge content of plant and machinery valuation.

ESM517 - Environmental Impact Assessment (2 Units)

Review of the Nigerian Environmental Crisis. The concept of Environmental Impact Assessment (EIA). The Need for Assessment. Stage's in (EIA). Methodologies and Logic Requirements of EIA in Project Appraisal. Case studies of existing and Proposed Projects. The Environmental Impact Statement (EIS). The Nigerian Environmental Impact Assessment Decree (1992). EIA under the Nigerian Urban and Regional Planning Decree (1992)., EIA under the EIA Decree 1992. Public participation in EIA. Noise impacts, biological impacts, physico-chemical impacts, socio-cultural impacts etc.; Quantitative Techniques for identifying and predicting impacts in EIA: checklists, networks etc; Environmental management plans; mitigation measures for undesirable impacts; Post Commissioning, Environmental Auditing. Strategic Impact assessment.

ESM518 - Applied Town and Country Planning I (2 Units)

Planning standards, methods of collection, organization and selection of planning data preparation of surveys and analysis. Sources of information, Available statistical material, phasing and the time-scale. Applied planning powers, i.e. the administrative and executive resources available.

ESM519 - Real Estate Portfolio Management (2 Units)

The principal types of investment properties. Direct and indirect investment in property. Characteristics of property investment. The property investing institutions. Investment alternatives. Risk and return a review. Portfolio management process. The property perspective (balance of the portfolio, geographical spread, economic parameters of towns). Risk diversification (ownership type, tenure type, investment size, rent review patterns, refurbishment/redevelopment options, ransom plots). Property performance assessment (income yield on cost, income yield on value, capital appreciation, income appreciation, rental growth,

reversionary potential, time – weighted rate of return, money – weighted rate of return, internal rate of return, IPD Portfolio and market indices) Capital asset pricing model and arbitrage pricing theory.

Omega Semester

ESM521 - Advanced Valuation II (3 Units)

Development valuation. Site Analysis and site valuation. Capitalization of income from freehold interests in property including DCF approach. The capitalization of income from leasehold property-dual rate adjusted for tax single rate valuation of leasehold interests in property, categories of leasehold investment and valuation approaches. Mineral valuation. Valuation of leasehold investment involving variable profit rents. Market Area Analysis. The effect of planning, current economic conditions and legislation on value of property, Development Valuation. Capital, budgeting , cash flow. Residual techniques of valuation.

ESM522 - Land Use and Resources Management II (2 Units)

Property Market and Estate Investment, Estate Development, Public Control of land use, Land Reform, Classification of Land reform objectives and methods. Housing – The provision of shelter in human settlements. The influence of climate, topography social order and economic conditions upon housing. Housing policy-with particular reference to housing as a social need and private investment. The urban housing problem, nature of urban housing markets, urban renewal, housing markets and policy. Capital costs and rental income. Urban transportation: Problems involves in traffic congestion. Theories on road pricing. Transport-land use interaction. Public measures for controlling and guiding land use in Nigeria. Conservation of Land Resources. The role of the market in land resources allocation, estate investment and development. Real Estate Credit and Land Resources. Planning for more efficient land use. National Bland Policy – relative instruments and empirical studies. The use of economic criteria in public investment and planning.

ESM523 - Applied Property and Facilities Management II (2 Units)
A review of the concept of facilities management. Facilities management in comparison with maintenance and property management. Facilities management implementation tools. Elements of facilities management: Inventory management, requirements programming, master planning, data base management system, life cycle analysis, work space management, churn management and the place of research in facilities management. Infrastructure facilities and challenges of management in relation to the following: Health facilities, Sport facilities, recreational facilities, educational facilities, information and telecommunication facilities, water supply and sewage disposal facilities, refineries and petro-chemicals, power generation, transmission and distribution facilities. Support services analysis and management.

ESM524 - Feasibility and Viability Studies II (2 Units)
Application of modern appraisal techniques – Discounted cash flow, internal rate of return and net present value, profitability index, net terminal value, sensitivity analysis, cost-benefit analysis cost-benefit analysis. A thorough examination of the techniques of site valuation through the residual method of valuation followed by an assessment of viability once the site has been acquired. Development valuation, cash flow techniques. Risk in financial appraisals: Simple sensitivity and probability analysis, Risk adjusted discount rates, risk adjusted cash flows, simulation. Sources of information financial plans, feasibility studies. Project supervision and management, monitoring and evaluation. A demonstration of the relationship between capital return and development yield and a discussion of the sensitive nature of the residual methods..

ESM525 - Project Dissertation II (3 Units)
This is a continuation of ESM 515 started in the previous semester.

ESM526 - Plant and Machinery Valuation II (2 Units)
Materials and Processes in Manufacturing e.g. Textile Mill, Food and Meal canning industries in Nigeria e.g. cassava, etc. Nigeria Industrial

History and Economics – a wider appreciation of the impact of Nigerian Economic policies e.g. SAP, privatization and commercialization of government assets, on plant and machinery values. Valuation of obsolete plant and machinery; the impact of changing technology and economy policies. Detailed examination of plant and machinery valuations for insurance, balance sheet and rating, etc. in Nigeria. Examination of the application of the standards. Asset valuation practice (SAVP) – RICS ("The Red Book") Nigeria Institution of Estate Surveyors and Valuers (NIESV) Guidelines on plants and machinery valuation in Nigeria. An examination of Estate Surveyors and Valuers Registration Board of Nigeria (ESVRBN) Decree No. 23 of 1975, Council of Registered Engineers in Nigeria (COREN). Decree No. 55 of 1970, The Institute of Chartered Accountants Act No. 15 of 1965, Nigeria Companies and Allied Matters Amended up-to-date, etc. The state of the art in valuation of plant and machinery valuation in Nigeria (including issues and problems). The present and future demand for plant and machinery valuers in Nigeria. Preparation of Report and Proof of Evidence for plant and machinery valuations in Nigeria.

ESM528 - Applied Town and Country Planning II (2 Units)

Surface and sub-surface conditions. Utility services, right of way, the landscape. Accessibility and environmental standards. Functional requirements of building environment in citing buildings. Introduction of planning laws – machinery of planning control and planning application. The reconciliation of private and public objectives in planning the competition between long and short term objectives.

ESM529 - Professional Practice and Code of Conduct (2 Units)

This course is designed to provide a basic knowledge of how the Estate Surveyor and Valuer undertakes his work in a professional manner. Preparation of proposals for securing valuation briefs or jobs. The Professional Approach: Definitions and explanations. Rule of professional practice and code of conduct. The Nigerian Institution of Estate Surveyors and Valuers. The Estate Surveyors and Valuers Registration Board of Nigeria. Other professional bodies in Nigeria.

Professional Institutions and the Government. Professional firms, groups, partnerships and their organization and management. Office Procedure and Management: Organisation of personnel; job description; chain of Authority; Departmentalization; specialization; etc. Physical organization; office records. Communication and co-ordination. Office procedures; cash flow; Management, personnel. The roles of an Estate Surveyor and Valuer in the public and private sectors and relations with the other professional bodies. Professional Practice in Land Administration: Procedures of acquiring and allocating land. Preparation of letters of offer and Rights of Application. Double allocation. Revocation Estate Government versus Local Government in issues on land administration. Professional Practice in Valuation: Inspections. Report Writing – Basic structure; types of reports; covering letter, etc. Practical work; valuation for various purposes, e.g. Insurance, Balance Sheet; Rent Assessment; Mortgage; Sales etc.

The Vice-Chancellor, Professor Charles Ayo presenting plaque and cash prizes to the University's representatives at ARGUS software competition

A cross section of the faculty in the School of Natural and Applied Sciences

(Top & Down) Some of the equipment in Biological Sciences lab

CHAPTER SIX

SCHOOL OF NATURAL AND APPLIED SCIENCES

6.0 DEPUTY DEAN'S WELCOME MESSAGE

It is most fulfilling to welcome you to the School of Natural and Applied Sciences (SNAS) of Covenant University. The School is situated in the College of Science and Technology. SNAS consists of five Departments, which are Biological Sciences, Chemistry, Computer and Information Sciences, Mathematics and Physics. All these departments run academic programmes at both undergraduate and postgraduate levels.

Vision

The vision of the School of Natural and Applied Sciences is to produce well-rounded graduates who are excellent in knowledge, skill and character orientation, capable of making a difference in the diverse domain and sub-domain of the natural and applied sciences. This is in alignment with the umbrella vision of the University to become one of top ten leading universities in the world by the year 2022.

Mission

The mission of the School of Natural and Applied Sciences is to emerge as one of leading Schools of Science in the next eight years through the promotion of the highest teaching quality, learning effectiveness for our students, research excellence, and community development and innovation.

Philosophy

The philosophy of the School of Natural and Applied Sciences (SNAS) is *comprehensive excellence through visionary pursuits, discipline, and diligence*. This philosophy is the guiding principle for all operations of the School in the quest to raise a new generation of leaders, particularly in the various academic fields and sphere of professional applications that pertain to the five academic programmes of the School.

Once again, I warmly welcome you to the School of Natural and Applied Sciences

Dr. Justine Olawande Daramola
Associate Professor & Deputy Dean,
School of Natural and Applied Sciences

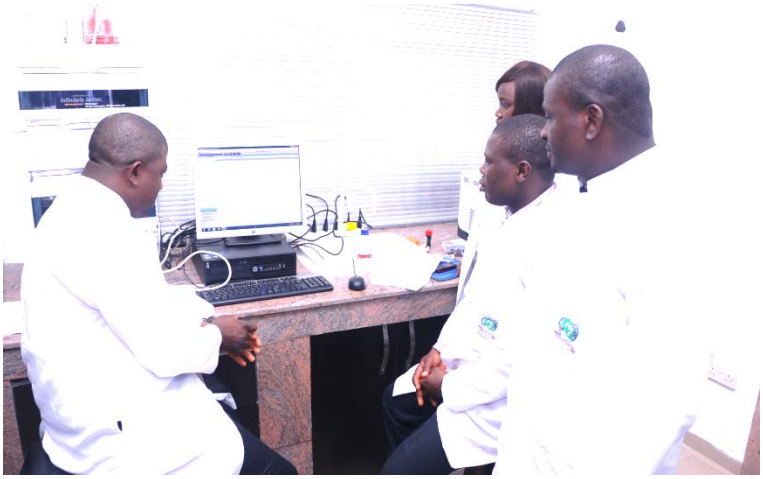
$86^{o}C$ Celcius Ultra Low Temperature Freezer and CO_2 Incubator in the Biological Science Department

Centrivap DNA Concentrator at Molecular Biology Research Lab

Polymerase Chain Reaction (PCR) Machines at Molecular Biology Research Lab

Flourescence Microscope at Molecular Biology Research Lab

Incubator Shaker at Molecular Biology Research Lab



Researchers working with the High Performance Liquid Chromatograph at the Molecular Biology Research Lab

Some of the Bilogical Science Products

6.1 DEPARTMENT OF BIOLOGICAL SCIENCES

OVERVIEW OF THE DEPARTMENT

The Department of Biological Sciences is a leading academic Department in the School of Natural and Applied Sciences of the College of Science and Technology. The Department was carved out of the former Department of Natural Sciences and runs three academic programmes in the Life Sciences - Applied Biology & Biotechnology (formerly Biology), Biochemistry, and Microbiology. All the programmes have full accreditation status of the National Universities Commission (NUC).

Biology, Biochemistry, and Microbiology Programmes were created under the Department of Applied Sciences in the 2004/2005 academic session. The Department's name was later changed to Natural Sciences in 2005/2006 academic session. In 2006/2007 session, the Department of Natural Sciences was split into four Departments namely Departments of Biological Sciences offering B.Sc Biology, B.Sc Microbiology and B.Sc Biochemistry programmes; Chemistry offering B.Sc Industrial Chemistry; Mathematics offering B.Sc. Industrial Mathematics and Physics offering B.Sc Industrial Physics.

Professor O. A. Otunola was the first Head of the Department of Biological Sciences when it was created in February, 2007. He was succeded later in the year by Dr. E.O. Fagade. In 2007/2008 academic year, Dr. O. A. Daini and afterwards, Professor B. O. Elemo served as Heads of the Department. Professor Louis O. Egwari became Head of the Department in 2008/2009 session and was succeeded by Dr. Shalom N. Chinedu in the 2009/2010 session. Professor Egwari again served as Head of the Department between 2010 and 2012. He was succeeded by Dr. Israel S. Afolabi in 2012. Dr. Emeka J. Iweala became the Head of Department at the inception of 2014/2015 Academic session.

Department of Biological Sciences is committed to raising new generation leaders in the Life Sciences by driving excellence in teaching, research and community development, in line with the Vision and Mission of Covenant University. The faculty and staff are highly motivated and dedicated to the delivery of quality education to the students through strict adherence to well-structured course compacts, lecture schedules, use of ICT-driven modes of Lecture delivery, tutorials, relevant laboratory experiments and field trips. Lecture attendance by students as well as *in-loco parentis* and mentorship role of faculty are vigorously driven. The curricula of the Programmes, lecture materials and practical manuals are regularly updated to make them current, robust, life-applicable and adequate to address contemporary issues on methodologies, product development, scientific and technological advances in food, agriculture, medicine, and allied industries. The laboratories are constantly furnished with modern scientific equipment and apparatuses for regular students' experiments, research and specialized laboratory services. Hence, the consistent production of well-trained graduates with in-depth theoretical knowledge and practical skills in their fields of study, thus providing the nation with dedicated and competent manpower, as envisaged by Vision 20: 2020. The Department produced the overall best graduating student of Covenant University in 2010 with a record CGPA of 4.99!

The Department pursues basic and applied research in all areas covered by the three academic disciplines. She is also making advances in the cutting-edge research and training in Molecular Biology and Biotechnology. Ongoing research projects in the Department include the ground-breaking research in bioresource utilization, product formulation and enhancement, waste bioconversion, environmental and pollution control, gene sequencing and molecular studies of protein sweetener plants, drug development and medicinal plant research, among others. The number of patents and articles published in reputable journals and/or presented in conferences annually by faculty in the Department reflect the research output of the Department. The Department hosts

Workshops on Molecular Biology and annual International Biotechnology Symposium (IBS).

Vision

To be a leading, world-class, academic Department committed to raising a new generation of leaders in the fields of Applied Biology, Biotechnology, Biochemistry, Microbiology and allied disciplines.

Mission

(a) To provide a wholesome, research-based, participatory and contemporary educational experience in the Life Sciences through a modern and vibrant education system as envisioned by Vision 10: 2022 of the University.
(b) To produce graduates in the Life Sciences who will be specialists in their chosen fields of study and thereby provide adequate and competent manpower for the nation in line with Vision 10: 2022 of the University.
(c) To train students in the Life Sciences using practical, interdisciplinary approach that is value-driven and life-applicable and capable of meeting societal needs, especially in the area of improved crop and animal varieties, development of new industrial products, effective drugs and vaccines, etc., thereby enhancing the people's living standards and life-expectancy.
(d) To produce world-class scientists equipped to lead the biological revolution that will transform the nation's agriculture, medicine, industry and the environment, and thereby eradicate poverty and hunger, combat diseases and ensure environmental sustainability in line with the Millennium Development Goals (MDGs).

Philosophy

The Department of Biological Sciences strives to achieve the University's set goal of developing the total man through instruction and mentorship, participatory basic and applied research as well as generating community-relevant information and technologies. The Programmes in the Department are designed to provide the students with a thorough, broad

and balanced foundation in their fields of study in order to prepare them for career opportunities or an environment whereby they could be creative, innovative and self-reliant in the growing and expanding disciplines.

Objectives

(a) Applied Biology and Biotechnology Programme

The Applied Biology and Biotechnology Programme is designed to equip the students with the practical uses of biological knowledge and to inculcate in the students an entrepreneurial and problem-solving ability. It emphasizes technologies and applications relevant to biology-based industries and institutions such as biomedical, pharmaceutical, biotechnological, food industries and the environment. The aim is to make the training relevant to the society, for example, in the conservation of natural habitats and endangered species or reducing the effects of environmental pollution.

The specific objectives of Applied Biology and Biotechnology Programme are as follows:

(i) to stimulate appreciation of the science of Biology and its diverse applications.

(ii) to provide the students with a broad, sound and balanced knowledge in a range of areas of basic Biology, Applied Biology and Biotechnology in a stimulating and supportive environment that is enriched by research.

(iii) to prepare the students for teaching in basic Biology and for post-graduate research work in Biology/Applied Biology/Biotechnology or other Biology-related disciplines.

(iv) to inculcate in the students the knowledge and skills needed for self -employment.

(b) Biochemistry Programme

The Biochemistry Programme is intended to introduce the students to the science of Biochemistry and its enormous contributions to the growth of medical science, agriculture, industry, molecular biology and biotechnology. The Programme is aimed at producing graduates with

sound theoretical knowledge, up-to-date analytical techniques and expertise in Biochemistry and its applications in medicine, agriculture, food processing, pharmaceutical, and chemical industries.

The specific objectives of Biochemistry Programme are as follows:

(i) to provide the students with a broad and balanced foundation for biochemical knowledge and techniques.
(ii) to impart to the students appropriate practical skills and abilities to resolve biochemical problems.
(iii) to inspire the students for a stimulating and satisfying learning experience in Biochemistry.
(iv) to create in the students an appreciation of the importance of Biochemistry in industrial, economic, environmental, technological and social development.
(v) to prepare the students for further studies in specialized areas of Biochemistry or in multi-disciplinary areas involving Biochemistry such as Molecular Biology and Biotechnology.
(vi) to inculcate in the students the knowledge and skills needed for self-employment.

(c) Microbiology Programme

The Microbiology Programme is designed to provide the students with a thorough, broad and balanced foundation in a growing and expanding field of Microbiology. The Programme is aimed at preparing students for career opportunities or an environment whereby they could be creative, innovative and self-reliant.

The specific objectives of Microbiology Programme are as follows:

(i) to provide the students with an intellectually stimulating and satisfying learning experience in this exciting subject.
(ii) to provide the students with appropriate laboratory skills and field experience.
(iii) to inculcate in the students an entrepreneurial and problem-solving attitude.
(iv) to provide the students with the knowledge and skills base from which they can proceed for further studies in the specialized areas

of Microbiology or multi-disciplinary areas involving Microbiology.

(v) to prepare the students for careers in agriculture, medical fields, environmental studies, research institutes, industries and even for self- employment.

Technologists at work at the Biochemistry Lab

The instrument room of the Biochemistry Lab.

LIST OF ACADEMIC STAFF IN THE DEPARTMENT

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Dr. E. E. J. Iweala	B.Sc, M.Sc, Ph.D	Associate Professor / HOD	Pharmaceutical and Nutritional Biochemistry
2.	Prof. S. N. Chinedu	B.Sc, M.Sc, Ph.D	Professor	Enzymology and Biotechnology
3.	Prof. L. O. Egwari	B.Sc, M.Sc, Ph.D	Professor	Medical Microbiology
4.	Prof. T. O. Okusanya	B.Sc, M.Sc, Ph.D	Professor	Plant Ecology
5.	Prof. De Nandita	B.Sc, M.Sc, Ph.D	Professor	Microbiology
6.	Prof. E. N. Maduagwu	B.Sc, M.Sc, Ph.D	Professor	Biochemistry, Toxicology
7.	Prof. O. O. Obembe	B.Sc, M.Sc, Ph.D	Professor	Plant Physiology and Biotechnology
8.	Dr. S. U. Oranusi	B.Sc, M.Sc, Ph.D, FMLSC, MIPAN	Associate Professor	Food and Industrial Microbiology
9.	Dr. A. A. Ajayi	B.Sc, M.Sc, Ph.D	Associate Professor	Microbial Physiology & Biotechnology
10.	Dr. R. A. Oloyo	B.Sc, M.Sc, Ph.D	Associate Professor	Food and Nutritional Biochemistry
11.	Dr. A. H. Adebayo	B.Sc, M.Sc, Ph.D	Associate Professor	Environmental Toxicology & Nutritional Biochemistry
12.	Dr. I. S. Afolabi	B.Sc, M.Sc, Ph.D	Senior Lecturer	Food and Nutritional Biochemistry
13.	Dr. J. B. Owolabi	B.Sc, M.Sc, MBA, Ph.D	Senior Lecturer	Molecular Genetics
14.	Dr. A. C. Omonhinmin	B.Sc, M.Sc, Ph.D	Senior Lecturer	Biosystematics (Molecular), Biostatistics, Environmental Risk Assessment
15.	Dr. O. C. Nwinyi	B.Sc, M.Sc, PhD	Senior Lecturer	Environmental Microbiology & Biotechnology
16.	Dr. A. O. Eni	B.Sc, M.Sc, Ph.D	Senior Lecturer	Virology
17.	Dr. G. I. Olasehinde	B.Sc, M.Sc, Ph.D	Senior Lecturer	Medical Microbiology and Parasitology

18.	Dr. O. O. Ogunlana	B.Sc, M.Sc, Ph. D	Lecturer I	Xenobiotic Metabolism & Toxicology
19.	Dr. S. O. Rotimi	B.Sc, M.Sc, Ph. D	Lecturer I	Alteration of Metabolisms of Nutrients in Health and diseases
20.	Dr. O. O. Ayepola	B.Sc, M.Sc, Ph.D	Lecturer I	Microbial Biotechnology
21.	Mr. O.I. Ayanda	B.Sc, M.Sc	Lecturer I	Zoology, Environmental Biology
22.	Dr. F. Y. Daramola	B.Sc, M.Sc, Ph.D	Lecturer II	Plant Pathology
23.	Dr. O. E. Omotosho	B.Sc, M.Sc, Ph.D	Lecturer II	Physical, Food & Nutritional Biochemistry, Biotechnology
24.	Mrs. I. P. Clement – Akomolafe	B.Sc, M.Sc	Lecturer II	Zoology/Biotechnology, Biomedical Genetics
25.	Mrs. T. M. Okuboyejo	B.Sc, M.Sc	Lecturer II	Pharmacology/ Chemotherapy
26.	Mr. J. O. Popoola	B.Sc, M.Sc	Lecturer II	Biotechnology Plant Genetics and Biosystematics
27.	Mrs. W. O. Iyanda-Joel	B.Sc, M.Sc	Assistant Lecturer	Clinical Biochemistry
28.	Mrs. B. K. Olopade	B.Sc, M.Sc	Assistant Lecturer	Food Microbiology
29.	Miss. M. O. Adedeji	B.Sc, M.Sc	Assistant Lecturer	Microbiology
30.	Mrs. O. A. Rotimi	B.Sc, M.Sc	Assistant Lecturer	Biochemistry
31.	Mrs. O. A. Bello	B.Sc, M.Sc	Assistant Lecturer	Plant Physiology
32.	Miss. M. I. Oniha	B.Sc, M.Sc	Assistant Lecturer	Microbiology
33.	Mr. A. S. Ejoh	B.Sc, M.Sc	Assistant Lecturer	Applied Biology & Biotechnology
34.	Miss O. F. Yakubu	B.Sc, M.Sc	Assistant Lecturer	Biochemistry
35.	Mr. O. S. Adegbite	B.Sc, M.Sc	Assistant Lecturer	Biochemistry
36.	Miss T. D. Bisi Adeniyi	B.Sc, M.Sc	Assistant Lecturer	Biochemistry

VISITING LECTURERS

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Prof. O. E. Okwumabua	B.Sc, M.Sc, Ph.D	Professor	Molecular Biology
2.	Prof. Esther Ofulue	B.Sc, M.Sc, Ph.D	Professor	Molecular Biology
3.	Dr. Ikhide G. Imumoria	B.Sc, M.Sc, Ph.D	Professor	Quantitative and Molecular Genetics
4.	Dr. Adewale J. Lambo	B.Sc, M.Sc, Ph.D	Senior Lecturer	Bioremediation & Environmental Biodegradation

TECHNICAL STAFF

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Mrs. J. O. Akinyele	B.Sc	Chief Technologist	Biochemistry
2.	Mr. O. S. Taiwo	HND, AISLT	Senior Technician I	Microbiology
3.	Mrs. D. K. Akinlabu	HND, AISLT	Technologist I	Biochemistry
4.	Mrs. B. T. Adekeye	HND, AISLT	Technologist I	Microbiology
5.	Mr. A. O. Adeyemi	HND, AISLT	Technologist I	Biochemistry
6.	Mr. S. J. Olorunshola	HND, AISLT	Technologist II	Microbiology
7.	Mrs. O. A. Awotoye	HND, AISLT	Technologist II	Microbiology
8.	Miss. A. D. Kuye	HND, AISLT	Technologist II	Microbiology
9.	Mrs. O. R. Afolabi	Certificate in Community Health	Snr. Lab. Assistant	
10.	Mrs. J. C. Nwabuenu	OND	Lab. Assistant I	
11.	Mrs. A. Amadi	GCE O'Level	Lab. Assistant II	
12.	Miss F. A. Daniel	GCE O'Level	Lab. Assistant II	
13.	Mr. O. M. Ezekiel	GCE O'Level	Lab. Assistant II	
14.	Mr. G. O. Akinlola	GCE O'Level	Lab. Assistant	

ADMINISTRATIVE STAFF

S/N	NAME	QUALIFICATION	STATUS
1.	Mrs. Itua Osayande	B.Sc	Administrative Officer

6.1.1 APPLIED BIOLOGY AND BIOTECHNOLOGY PROGRAMME

PROGRAMME: Applied Biology and Biotechnology

DEGREE AWARDED: B.Sc. (Honours) Applied Biology and Biotechnology

DURATION: 4 Years (8 Semesters)

Philosophy

The Applied Biology and Biotechnology Programme has been planned to equip students with practical application of biological knowledge as it emphasizes the relevance of biology-based knowledge and modern molecular skills to the functioning of the various industries such as research and product development, analysis and quality management, biomedical, clinical and biological laboratories, public health, pharmaceutics or healthcare, environmental practices, conservation, bio-resources management, water resources and aquatics etc.

Opportunities for graduates of Applied Biology and Biotechnology span a wide spectrum ranging from national institutions to regional bodies and global centres such as CGIAR, FAO, WHO and UNEP that deals on issues bordering on food, agriculture, water, environment, health, population, exploration, diseases management, conservation, petrochemicals, etc. The Programme is also designed to produce entrepreneurial-minded graduates relevant to almost every sector of the economy and society with the benefit of being able to create employment.

Objectives

The major objectives of the Programme are to:

(i) provide a sound understanding of the concepts and methodologies of modern Applied Biology and Molecular Biotechnology as it meets the immediate and future needs of society;

(ii) develop in the students the knowledge and transferable skills to solving theoretical and practical problems in the varied aspects of the industry where they might be engaged;

(iii) broadly educate the students and open them up for the broad spectrum of opportunities offered by the modern Applied Biology and Biotechnology industry at the professional level;

(iv) provide the students with a broad and balanced foundation knowledge and the practical skills required to meet the demands of these evolving areas;

(v) provide the students with a knowledge and skills base from which they can proceed to further studies in specialized or multi-disciplinary areas in Applied Biology and Biotechnology as well as related areas;

(vi) provide the students through training and orientation with inter- and multi- disciplinary solution- generation approaches to industrial, economic, environmental, technological and social developmental issues as well as the knowledge and skills to create employments in these areas; and

(vii) provide the students with the knowledge and skills to create employments in varied areas of Applied Biology and Biotechnology.

ADMISSION REQUIREMENTS

To qualify for admission into the Applied Biology and Biotechnology Programme, a candidate must possess at least five (5) credit passes in Senior secondary certificate examination - SSCE or NECO (O' Level), obtained at not more than two sittings, which must include: English Language, Mathematics and any other three subjects from the following: Biology, Chemistry, Physics, Agricultural Science and Geography. In addition, he/she must have an acceptable pass in the University Matriculation Examination (UTME) and fulfill all other admission requirements as prescribed by Covenant University.

GRADUATION REQUIREMENTS

To be eligible for the award of the B.Sc (Hons) Degree in Applied Biology and Biotechnology a student must register for and pass a minimum of 164 units as detailed in the Table below:

Required Units for Graduation: B.Sc Applied Biology and Biotechnology Programme

Level	Compulsory Courses	Elective Courses	SIWES	University General Courses	NUC General Courses	Total
100	25	5	0	4	10	44
200	31	4		4	6	45
300	21	0	6	2	2	31
400	36	4	0	4	0	44
Sub-Total	**113**	**13**	**6**	**14**	**18**	**164**

COURSE STRUCTURE

100 Level Applied Biology and Biotechnology						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	BLY111	Animal Diversity: Forms and Functions	C	3		α
	BLY112	Introductory Cell Biology	C	2		α
	CHM111	General Physical Chemistry	C	3		α
	CHM112	Chemistry and Society	C	1		α
	CHM119	General Chemistry Practical I	C	1		α
	PHY111	Mechanics and Properties of Matter	C	2		α
	PHY119	Practical Physics I	C	1		α
	BLY121	Plant Diversity: Forms and Functions	C	3		Ω
	BLY122	Introductory Ecology	C	2		Ω
	CHM121	General Organic Chemistry	C	2		Ω
	CHM122	General Inorganic Chemistry	C	2		Ω
	CHM129	General Chemistry Practical II	C	1		Ω
	CSC121	Introduction to Problem Solving	C	2		Ω
Electives	MAT111	Mathematics I: Algebra	E	3		α
	PHY121	Electricity and Magnetism I	E	2		Ω
University Courses	EDS111	Entrepreneurial Development Studies I	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept – Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	CST111	Use of Library, study skills and Information Communication Technology I	U	2	GST111	α
	GST111	Communication in English I	U	2		α
	CST121	Use of Library, study skills and Information Communication Technology II	U	2	GST121	Ω
	GST121	Communication in English II	U	2		Ω
	GST122	Communication in French	U	2		Ω
			α =22 Ω = 22 Total = 44 Units			

200 Level Applied Biology and Biotechnology						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	BLY211	Introductory Genetics and Evolution	C	2	BLY112	α
	BLY212	Animal Physiology	C	2	BLY111	α
	BLY213	Basic Biological Techniques	C	2		α
	BLY214	Fundamentals of Ecology	C	2	BLY122	α
	BLY217	Introduction to Biotechnology	C	2	BLY112	α
	BLY218	Biosystematics	C	3		α
	BCH211	Biomolecules I	C	2		α
	BCH213	General Practical Biochemistry 1	C	1		α
	BLY221	Basic Invertebrate Zoology	C	2	BLY111	Ω
	BLY222	Plant Physiology	C	2	BLY121	Ω
	BLY223	Basic Chordate Zoology	C	3	BLY111	Ω
	BLY225	Parasitology	C	3		Ω
	CHM221	Basic Organic Chemistry	C	2		Ω
	BCH221	Biomolecules II	C	2		Ω
	BCH225	General Practical Biochemistry II	C	1		Ω
Electives	MCB211	Bacteriology	E	3	MCB111 or BLY112	α
	CHM211	Basic Inorganic Chemistry	E	2		α
	MCB212	Mycology	E	3	MCB111 or BLY112	α
	CIS227	Use of Software Packages III	E	2		Ω
	BCH224	Introductory Molecular Biology	E	3		Ω
	BLY226	Natural Resource Sampling	E	2		Ω
University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept – Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept – Sports	V	0		Ω
NUC General Courses	GST211	Introduction to Philosophy and Logic	U	2		α
	GST221	Nigerian People and Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution	U	2		Ω
			α =22 Ω = 23 Total = 45 Units			

300 Level Applied Biology and Biotechnology						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	BLY311	Micro Techniques and Tissue Culture	C	3	BLY217	α
	BLY312	Agriculture and Pharmaceutical Biotechnology	C	2	BLY217	α
	BLY313	Pharmacology and Medicinal Chemistry	C	2	CHM221	α
	BLY314	Hydrobiology	C	2	BLY214	α
	BLY315	Developmental Biology	C	2		α
	BLY316	Ecotoxicology and Environmental Biology	C	2	BLY214	α
	BLY317	Recombinant DNA Technology	C	3	BLY217	α
	BLY318	Molecular Genetics and Forensic Science	C	3	BLY217	α
	BLY319	Biostatistics and Bioinformatics	C	2		α
SIWES (Industrial Training)	BLY329	Industrial Training	S	6		Ω
University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =25 Ω = 6 Total = 31 Units			

400 Level Applied Biology and Biotechnology						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	BLY411	Methods in Molecular Biology	C	2	BLY213, BLY217, BLY317, CHM221	α
	BLY412	Seminar	C	2		α
	BLY413	Applied Entomology	C	2	BLY111, BLY214	α
	BLY414	Principles of Plant and Animal Breeding.	C	2	BLY211, BLY217	α
	BLY415	Bioresources Management	C	2	BLY122, BLY214	α
	BLY416	Bioinformatics and Functional Genomics	C	2	BLY319	α
	MCB316	Immunology	C	3		α
	MCB416	Epidemiology and Public Health Microbiology	C	3		α
	BLY423	Industrial and Microbial Biotechnology	C	3	BLY217	Ω
	BLY424	Economic Botany	C	2		Ω
	BLY425	Bio-ethic, Bio-safety, Patents and Regulations in Biotechnology	C	2		Ω
	BLY426	Environmental Biotechnology	C	2	BLY217	Ω
	BLY427	Biotechnology in Sustainable Energy	C	3		Ω
	BLY429	Research Project	C	6		Ω
Electives	BLY410	Soil Ecology	E	2	BLY122, BLY214	α
	MCB414	Comparative Virology	E	3		α
	BLY422	Marine and Fisheries Biology	E	2	BLY214	Ω
	BLY428	Government Regulations and Food Industry	E	2		Ω
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α =22 Ω =22 Total = 44 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

BLY111 - Animal Diversity: Forms and Functions (3 Units)
Nomenclature and classification of animals. Diagnostic features of ten major animal phyla and their classes. Structure and functions of organs and organ systems in vertebrates e.g. rat.

BLY112 - Introductory Cell Biology (2 Units)
An overview of cells: origin, type, cells as experimental models (Prokaryotic and Eukaryotic cell types). Structure, organization and functions of plant and animal cell organelles. Cell Divisions and Cell Cycle: Amitosis, Mitosis and Meiosis and their Significance; Cancer, Ageing of Cells and Stem cell. Tools in cell biology studies: Light microscopy, phase contrast Microscopy, Scanning and Transmission Electron Microscopy, Flourescence Microscopy, Polarization Microscopy, Staining techniques. Chemistry of cells: Inorganic molecules, Organic molecules: Carbohydrates, Protein, Lipids, Nucleic acids. Bioenergetics and Metabolism.

CHM111 - General Physical Chemistry (3 Units)
Historical development of the atom: definition of atoms, Dalton's atomic theory, relative atomic masses. Fundamental particles of the atom and atomic structure. Modern electronic theory of atoms; electronic configuration of the elements. Periodicity of the elements. Radioactivity: Stoichiometry: mole concept, chemical formulas, equations and calculations. States of matter: gas – empirical gas laws, Ideal Gas Equation of State, qualitative treatment of kinetic theory of gases, real gases and deviations from ideal gas laws; liquid – macroscopic properties of liquids, evaporation, vapour pressure and its variation with temperature, boiling point, heat of vaporization, Clausius-Clapeyron equation, freezing point, melting point and phase diagrams of simple systems; solids – types of solids and their properties, ionic solids and

lattice energy, crystalline solids. Chemical Energetic: definition of some thermodynamic terms, heat, work, internal energy, enthalpy, pressure-volume work. Relationship between internal energy and enthalpy. First law of thermodynamics and its applications. Chemical Kinetics: rate of reaction, factors affecting reaction, order of reaction and how to determine it for zero order and first order reaction, rate of equation and temperature, reaction mechanisms and rate equation for simple reactions. Chemical Equilibrium: reversible reactions and chemical equilibrium, equilibrium constant, factors affecting equilibrium. Le Chatelier's Principle. Effect of temperature on equilibrium constant. Relationship between equilibrium constant and standard Gibbs Free Energy, ΔG°. ionic equilibrium. Electrochemistry: types of conductors, classification of compounds, electrolysis, Faraday's laws of electrolysis. Application of electrolysis. Introduction to electrochemical cells.

CHM112 - Chemistry and Society (1 Unit)

Energy sources: fossil fuels, hydroelectric, hydrodynamics, solar, nuclear. Renewable and non-renewable energy sources. Chemistry and environment; air pollution. Water pollution, solid waste. Pollution control.

CHM119 - General Chemistry Practical I (1 Unit)

Practice in weighing and measurement of volume, preparations of standard solutions Titrimetry: acid-base, oxidation-reduction, precipitation and complex metric titrations; gravimetric analysis.

PHY111 - Mechanics and Properties of Matter (2 Units)

Physical quantities; Units and dimensions. Scalars and vectors. Kinematics. Dynamics; Newton's laws of motion; particles; rigid bodies; simple harmonic motion. Friction.Work, energy and power. Centre of mass. Newton's law of universal gravitation; Kepler's laws. Pressure in fluids. Intermolecular forces. Surface tension. Hook's law, Young's modulus.

PHY119 - Practical Physics I (1 Unit)

Simple experiments illustrating the topics covered in PHY111.

MAT111 - Mathematics I: Algebra (3 Units)

Algebra of Sets; special sets ($\mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R} \subset \mathbb{C}$); theory of indices, law of logarithms, indical equations, surdic equations. Polynomials, the remainder and factor theorems; polynomial equations and inequalities-especially linear, quadratic and cubic. Solving quadratic equations and cubic equations with an integral root. Domain and zeroes of rational functions. Partial fractions. Permutations and combinations. The binomial theorem for any index and applications. Sequences and series of real numbers (including AP and GP). Algebra of complex numbers. Introduction to m x n matrices; elementary operations on matrices and applications to solution of linear equations. Elementary properties of determinants of at most 3 x 3 matrices; The Rule of Sarrus.

Omega Semester

BLY121 - Plant Diversity: Forms and Functions (3 Units)

Diversity, morphology, life cycle and general characteristics of Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms. Structure and functions of main organs in Angiosperms.

BLY122 - Introductory Ecology (2 Units)

Definitions and types of ecology. Basic units of ecology (populations, communities and ecosystems). Biotic and abiotic components as factors controlling the distribution of plants and animals in the ecosystem. Succession and climax. Ecological interactions. Man and environment.

CHM121 - General Organic Chemistry (2 Units)

Introduction to and importance of organic chemistry. Qualitative analysis of organic compounds. Isolation and purification of organic compounds. Quantitative analysis of organic compounds. Determination of structure of organic compounds; empirical, molecular and structural formulas. Hybridization; formation of sp^3, sp^2, sp orbital in carbon. Homologous

series and functional groups. Isomerism-structural and stereoisomerism. Aliphatic hydrocarbon chemistry: alkenes, alkenes, alkynes-nomenclature (IUPAC), physical properties, preparation and chemical reactions with simple mechanism where applicable.

CHM122 - General Inorganic Chemistry (2 Units)

Chemical bonding and structure: ionic, covalent, coordinate covalent (dative), metallic, hydrogen bonding. General properties of compounds formed by the different types of bonding. Influence of bonding on size, shape and structure. Main Group Chemistry (Groups IA – VIIIA): trends in the properties of elements (structure, ionization energies, physical and chemical properties). Properties of selected types of compounds.

CHM129 - General Chemistry Practical II (1 Unit)

Qualitative analysis for common captions and anions. Identification of organic functional group: Hydroxyl, carboxyl, carboxylic, amino groups, carbohydrate, protein, etc.

PHY121 - Electricity and Magnetism I (3 Units)

Coulomb's law. Capacitors. Ohm's law; conductivity, Kirchhoff's laws. Electrical energy, DC bridges; Wheatstone; potentiometer. Magnetic effect of current; electromagnetic induction; moving coil galvanometers; multi-meters. DC and AC motors; generators. Power in AC circuits. Rectification.

CSC121 - Introduction to Problem Solving (2 Units)

Problem solving strategies, Roles of algorithm in problem solving process, implementation strategies, concepts and properties of algorithm. Using C-language.

200 Level

Alpha Semester

BLY211 - Introductory Genetics and Evolution (2 Units)
Prerequisite: BLY112
Basic concepts in genetics. Cell, Nucleus, Chromosome, Genes, DNA, RNA. Chromosome and DNA Structure. Other Sources of DNA: Mitochondrion and Chloroplast. Mendelian genetics: Principles and Laws of genetic inheritance, Heritable and Non-heritable traits, Behaviour of traits: Dominance and Recessiveness. Hybrid crosses, Sex-linked inheritance. Behaviour of chromosomes, Chromosomal aberrations and repair mechanism. Effect of mitochondrial and nuclear chromosome aberrations. Current concepts of evolution: Macro and Micro-evolution, Factors determining evolution. Macro-evolution and speciation. Polymorphism and heterozygosity, Hardy-Weinberg principle and factors of evolution. Population genetics, Probability and tests of goodness of fit. Phylogeny, Evolution and society. Applied Genetics: Animal Breeding, Heterosis, Inbreeding, Out Breeding, Out Crossing, Hybrid Vigour.

BLY212 - Animal Physiology (2 Units)
Prerequisite: BLY111
Metabolism and energy production, Circulatory system in animals, Homeostasis, Nervous and Hormonal systems. Excretion and Osmoregulation. Respiratory and reproductive systems in animals.

BLY213 - Basic Biological Techniques (2 Units)
Basic techniques on Cell biology, Genetics, Biotechnology, Plant and Animal Physiology, Ecology: Microscopy: Preparation of microscope slides (Fixation, Embedding, Sectioning, Staining, Preservation); cell types, cell counting. Cell division analysis (mitosis and meiosis); blood smear analysis; blood grouping. Photometry; Colorimetry; Chromatography; Conductometry. Chromosome squash preparation; DNA Isolation and Visualization; Amplification using PCR; Detection of nitrogenous waste; Estimation of Oxygen and Carbon dioxide in water

body; Salivary amylase activity in relation to pH, Plant water relation; Photosynthesis, Sterilization techniques, Wet and Dry heating techniques.

BLY214 - Fundamentals of Ecology (2 Units)
Pre-requisite: BLY 122
Concepts and Definitions of Ecosystem, Ecology at community level, Ecological classification of habitats: terrestrial and aquatic biomass and specific features. Dynamics of populations. Energy flow and Geo-Chemical cycles. Disruptions: Natural and anthropogenic.

BLY217 - Introduction to Biotechnology (2 Units)
Prerequisite: BLY 112
Brief History, types of Biotechnology, 21st century context, career prospects. Introduction to Genes and Genomes: DNA structure and replication, RNA and protein synthesis, protein as biotech product. Recombinant DNA Technology: Restriction enzymes and types of plasmid DNA vectors, transformation of bacteria bacterial cells and selection of recombinant bacteria. Genomics and Bioinformatics: Bioinformatics with specific examples, Gains from the human genome project. Microbial Biotechnology: Microbial enzymes, bacterial transformation, electroporation, cloning and expression techniques, Microbial diagnostics and microbes as bio-weapons and war against bio-terrorism. Plant Biotechnology: *Conventional breeding, cloning, chloroplast engineering and antisense technology.* Animal Biotechnology: Animal models, bioengineering mosquitoes to prevent malaria, animal cloning (dolly), transgenic animals. DNA fingerprinting and forensic analysis: Process involved in preparing DNA fingerprint, specific examples of forensic applications. Bioremediation: Importance of Bioremediation, cleanup sites and strategies, applying genetically engineered strains to clean up the environment. Aquatic Biotechnology: Aquaculture: economics, practice, limitation and future prospects. Medical Biotechnology: Biomarkers for disease detection, gene therapy, and regenerative medicine. Regulatory Biotechnology and Ethics: Legislation and regulation, environmental protection, food and drug administration and ethical issues relating to biotech.

BLY218 - Biosystematics (3 Units)
Prerequisites: BLY111, BLY121
Principles and methods in biosystematics. Concept of Taxonomy, taxonomic characters and its significance. Morphological anatomical, palynological, embryological, cytological and Phytochemical characters. Principles used in delimitation of taxa and attribution of rank. Numerical taxonomy. Concept of specific and intra-specific categories. Morphological study of selected plant families to illustrate evolutionary tendencies and phylogenetic relationships. Biochemical and Molecular evidences in systematic. Computational tools for systematic analyses.

BCH211 - Biomolecules I (2 Units)
Biomolecules - the Molecules of life; Classes of biomolecules; Definition, function, classification, chemistry and properties of amino acids, peptides, proteins and their derivatives: methods of isolation and identification. Primary, secondary, tertiary and quaternary structure of proteins. Determination and biochemical application of structures. Classes of enzymes, vitamins and Coenzymes. Chemistry, structure and functions of nucleic acids. Nomenclature of nucleosides and nucleotides. Hydrolysis of nucleic acids.

BCH213 - General Practical Biochemistry 1 (1 Unit)
Introduction to Biochemistry laboratory, Preparation of solutions and serial dilutions, Standardization of acids and bases, Preparation of buffers; acetate buffer, pH measurement using pH meter and indicators, Effect of acid, base and water on buffers, General qualitative tests for proteins and amino acids, General qualitative tests for nucleotide bases.

CHM211 - Basic Inorganic Chemistry (2 Units)
Qualitative treatment of Molecular Orbital and Valence Bond theories. Introduction to the chemistry of transition elements, lanthanides and actinides: definition and general characteristics of transition elements, lanthanides and actinides, electronic configuration of the atoms and ions. Descriptive chemistry of some selected transition metals. 1st, 2nd, and 3rd transition series, lanthanides and actinides. Coordination Chemistry.

Ligand and crystal field theories. Structure, reactivity and applications of coordination compounds.

MCB211- Bacteriology (3 Units)

Concept of normal flora, Principles of infection. Host parasite relationships. Aetiology, pathogenic mechanisms (virulence factors) of infectious processes. Structure, pathology and pathogenesis laboratory diagnosis, prophylactic/therapeutic procedures of Bacteria related viruses (Chlamydia, Rickettsia, Mycoplasma). Enterobacteriaceae family (*Escherichia coli, Salmonella, Shigella, etc*), Vibrios, Pseudomonas and other related Gram negative bacteria, Gram positive cocci (Streptococci, Staphylococci), Neisseria, Mycobacteria, Clostridia, Spirchaetes etc of human origin.

MCB212 - Mycology (3 Units)

Fungal morphology, ecology, classification and characterization. Epidemiology of important fungi and public health. Industrial and environmental significant fungi. Laboratory study of fungi.

Omega Semester

BLY221 - Basic Invertebrate Zoology (2 Units)

Pre-requisite: BLY111

The Biology of Amoeba, Paramecium. Plasmodium; Leucosolenia, Obelia, Hydra, Aurelia, Actinia, Dugesia, Fasciola, Tenia, Ascaris, Hyperiodirilus, Nereis, Hirudo, Achachatina. Aspatheria, Sepia, Macrobrachium, Lycosa, Polydesmus, Periplaneta and Asterepecten – to illustrate the classification organization, evolutionary trends and diversity of invertebrates.

BLY222 - Plant Physiology (2 Units)

Pre-requisite: BLY121

Plant water relation, respiration, photosynthesis, transport, growth and growth regulation, flowering, dormancy, seed germination, senescence, role of macro micro-nutrient elements indeficiency symptoms.

BLY223 - Basic Chordate Zoology (3 Units)

Prerequisite: BLY111

The Biology of Balanoglossus, Ciema, Branchiostoma, Petromyzon, Scolidon, Tilapia, Bufo, Agama, Colubia and Rattus to illustrate the classification, organization evolutionary trends and diversity of chordates.

BLY225 - Parasitology (3 Units)

Prerequisite: BLY111

Classification, adaptation morphology, anatomy, life cycle and other features of interest in the protozoans, plathyhelminthes, nematodes and parasitic arthropods; drawing particular attention to the various adaptations to the drawing of life exhibited by selected members of the group. Facultative and obligate parasitism, ecto and endo parasitism. Parasites of medical and veterinary importance.

BLY226 - Natural Resource Sampling (2 Units)

Statistical terminology and descriptive statistics. Sampling theory and design. Hypothesis testing ; t-tests, Anova and Simple regression. Vegetation sampling methods e.g. fixed plot, variable plot, line intercept and intersect methods. Terrestrial and aquatic animals methods e.g. double sampling, line transect, variable circular plots, points counts, recapture techniques, radio telemetry, fish sampling and depletion methods. Environmental sampling e.g light, soil, water, weather data.

BCH221 - Biomolecules II (2 Units)

Definition, functions, classes, Structure and chemistry of carbohydrates; reactions of monosaccharides and their derivatives, disaccharides and oligosaccharides, storage and structural polysaccharides; complex carbohydrates. Classification, Functions, Chemistry and structure of lipids; saturated, unsaturated and essential fatty acids, storage and membrane lipids, Blood lipids and lipoproteins. Industrial and clinical application of glycolipids, leucotrienes, prostaglandins and thromboxanes. Lipid micelles, monolayers and bilayers. Structures, functions and composition of biological membranes; plasma membrane and other major cell components.

BCH224 - Introductory Molecular Biology (3 Units)

Organization of Gene structure in prokaryotes and Eukaryotes; Gene expression: DNA replication, transcription, translation and genetic code; Bacteriophages and Eukaryotic viruses (structure, life cycles, biological assays etc.); Mutation and Mutagenesis; DNA repair mechanisms; Genes and cancer; Recombination; Plasmids and Transposoons, Restriction enzymes, Techniques in molecular Biology, PCR, Microarray etc.

BCH225 - General Practical Biochemistry II (1 Unit)

General qualitative tests for carbohydrates, Qualitative tests for specific carbohydrates, Identification of carbohydrates, Acid hydrolysis of starch, Semi-qualitative estimation of glucose, Total carbohydrate determination by Anthrone method, Estimation of reducing sugars by Somogyi method, Determination of blood sugar by Aniline method. Determination of sugars in soft drinks, Determination of glucose by glucose oxidase method, General qualitative tests for lipids, Determination of saponification and Iodine number, Determination of blood cholesterol, Estimation of free fatty acids, Estimation of triglycerides by colorimetric methods.

CHM221 - Basic Organic Chemistry (2 Units)

Factors affecting structure and physical properties of organic compounds; factors affecting availability of electrons. Stereochemistry, energy of activation and free radical substitution reactions in alkanes. Electrophilic and necleophilic substitution reactions. Aromaticity. Basic organic reactions, e.g. addition, free radical, elimination and condensation reactions etc. Some named organic reactions.

300 Level

Alpha Semester

BLY311 – Micro techniques and Tissue Culture (3 Units)
Prerequisite: BLY217
Modern biological research laboratory on cell culture techniques. Aseptic techniques for animal and plant cell culture; the requirements for cell growth in vitro; mechanisms underlying cellular differentiation; immunohistochemistry and in situ hybridization, and the expression of transfected DNA in cultures animal and plant cells; propagation techniques, commercial laboratory production; indexing for pathogens.

BLY312 - Agriculture and Pharmaceutical Biotechnology (3 Units)
Prerequisite: BLY217
Gene organization and gene cloning; gene structure and gene expression; regulation of gene expression in prokaryotes and eukaryotes; Transgensis: methods of production of transgenic organisms (with case studies); producing proteins in bacteria, fungi and mammalian cells; monoclonal antibodies production, manipulation for specific agricultural and pharmaceutical relevant traits (Case study of herbicide tolerance); biotechnology applications in agricultural and pharmaceutical industry.

BLY313 - Pharmacology and Medicinal Chemistry (2 Units)
Prerequisite: CHM221
Introduction to the biological macromolecules where drugs interact in the body: Lipids, Protein receptors, Enzymes, Nucleic acids, Review of drug/macromolecular interactions. Drug classes: antimicrobials, morphine analogues, anti-ulcer and ACE inhibitors, etc. Pharmacokinetics: The pharmacology of receptors, neurotransmitters in the central nervous system, The measurement of agonist and antagonist activity and drug access and pro-drugs. Drug discovery from natural products: Through optimisation of biological activity ("rule of five"), Pharmacokinetics to scale up, Manufacture and clinical trials, Combinatorial and computer-based methods for drug discovery will be

briefly introduced, the status and future impact of molecular biology in drug discovery will be addressed. Classes of Drug Plants: Plants commonly known to produce classes of compounds for drug manufacture.

BLY314 – Hydrobiology (2 Units)
Prerequisite: BLY214
Physical and chemical aspects of freshwater environments, spatial and temporal patterning of light temperature and Oxygen. Fresh water flora and fauna with particular reference to West Africa. Plankton, benthic invertebrates, fish and plant communities production and energy flow. Characteristics of African freshwater. Case studies of various African freshwater habitats: a tropical swamp (Lake Chilwa), a warm spring (Wikki spring), an ancient lake (Lake Tanganyika), a new man-made lake (Lake Kainji and Tiga Lake). Problems associated with tropical freshwater, eutrophication, pollution and water-linked diseases.

BLY315 - Developmental Biology (2 Units)
Prerequisite: BLY211
Outlines of origin: Spermatogenesis and oogenesis. Comparative study of vertebrate and invertebrate sperms and eggs: Viability of gamete cells; influence of yolk; polarity; symmetry; Egg membranes; Mechanics and Physiology; Theories of fertilization. Parthenogenesis: Natural and Artificial; Cleavage and Gastrulation: General Principles - Outlines of their physiology - Comparative study in Amphioxus, frog, chick and mammals; Factors influencing cleavage; Fate map; Development of brain, eye and ear in frog. Embryonic Adaptations: Embryonic membranes and their functions; Placentation in mammals; Regeneration: regeneration in invertebrates and vertebrates; Puberty - Menstrual cycle - Menopause - Pregnancy and related problems - Parturition – Lactation; Development and differentiation; Contraception - its merits and family welfare; Reproductive Technology: Monitoring of estrus cycle - Artificial insemination - Cryopreservation - IVF - Embryo transfer - Test tube babies.

BLY316 - Ecotoxicology and Environmental Biology (2 Units)
Prerequisite: BLY214
Human and the environment in various ecosystems: Air,Water and Soil. Impacts on the ecosystems; assessment of risks and abatement techniques. Principles of Ecotoxicology: Quantification of toxicity on biolabel, individual, population, ecosystem level, use of dose response curves to determine the toxicity Global pollution and impacts; Contaminant groups: heavy metals, nanoparticles, microbial contaminants, organic xenobiotics and natural toxins. Calculation methods for determination of: concentration, speciation, sorption, degradation, ecotoxicity and transport of contaminants. Case study: Pesticides– Their use and abuse; Endocrine Disruption in fish- An Introduction; population-level consequences in wildlife and for human health; The application of molecular biology in ecotoxicology

BLY317 - Recombinant DNA Technology (2 Units)
Prerequisite: BLY217
Principles and methods of recombinant DNA technology. Methods in rDNA: Transformation, Phage Introduction, and Non-Bacterial Transformation. Restriction modification enzymes used in recombinant DNA technology: Hybridization, cloning, sequencing, polymerase chain reaction. Gene manipulations: cloning vectors, cloning in E.coli, plasmids, bacteriophages and cosmid vectors. Cloning strategies: genomic and cDNA library. Screening of gene libraries: screening by DNA hybridization, immunological assay and protein activity. DNA delivery methods and expression: physical methods and biological methods, expression of cloned genes in prokaryotes (*E. coli*), and eukaryotes (yeast); Expression signals promoters and terminators; Translation expression vectors. Case studies: DNA integration into bacterial genome; Increasing secretions; Metabolic load, Directed mutagenesis; transposon mutagenesis, Gene targeting, Site specific recombination. Applications and future of rDNA technology.

BLY318 - Molecular Genetics and Forensic Science (3 Units)
Prerequisite: BLY211, BLY217
Principles of physical science and genetics at the molecular level for investigative (crime) studies. Physical Evidence in forensics; Fingerprints, firearms and ammunition, hair, fibres, glass fragments, impression, splash patterns, fire and paint etc; Drug identification and substances of abuse: Cannabis, heroin, cocaine, alcohol etc. Forensic Serology: Blood, semen, vaginal fluid, saliva etc; Elements of Forensic pathology, entomology and anthropology. Comparative molecular processes; Molecular evidences: DNA Fingerprinting (nuclear, mitochondria); protein profiling of materials.

BLY319 - Biostatistics and Bioinformatics (2 Units)
Prerequisite: BLY211
Basic statistical concepts, Experimental design, Data transformation, Biological data, Accuracy of Measurement, Significant figures. Frequency distribution. Measure of central tendency, Measure of dispersion and variability. Graphical presentation of data. Normal distribution and standard curve. Statistical hypotheses and level of significance, Central limit theorem and confidence interval. *t*-test: Student *t*- distribution, One sample hypotheses, Two sample hypotheses: (Paired and Unpaired) Parametric *t*- distribution, Non- Parametric *t*- distribution. Multisample hypotheses: ANOVA, Fischer's test. Simple Linear Correlation and Regression. Sequence Analysis, Molecular Phylogenetics, Basic Structure Modeling, Visualization of Alignments, Trees and Structure Models.

MCB315 - Analytical Microbiology and Quality Control (2 Units)
Microbiological standards of water, foods, pharmaceuticals and other industrial products. National and international Agencies responsible for the establishment and implementation of standards, specifications and relevant regulations. Methods of quality control assessments. Industrial plant sanitation and hygiene. Quality charts according to variables and attributes. In process quality control.

MCB316 – Immunology (3 Units)

Evolution of immune system. Cells of the immune system (myeloid and lymphoid cells). The non-specific immune system. Antigen and antibody diversity (structure, properties and production). Major histocompatibility complex (MHC). Recognition of self and immune tolerance. The complement system. Transplantation and hypersensitivity. Genetic defects in the immune system. Immunological assays. Vaccine and immunization.

Omega Semester

BLY329 - Industrial Training (6 Units)

Prerequisite: Good Academic standing on not less than a CGPA of 1.0. Students will be attached for a period of 6 months to relevant organizations for industrial field experience, in relevant areas.

400 Level

Alpha Semester

BLY410 - Soil Ecology (2 Units)

Prerequisite: BLY122, BLY214

Classification and characterization of soils and Chemical components. Overview Soil organisms, their environment and Analytical methods: Fungi, Soil bacteria, Soil invertebrates, Soil ecology methods Soil health determination. Microbial Ecology: Microbial ecology theories, Microbial Ecology. Mycorrhizas: Mycorrhizae, Mycorrhizal fungi. Decomposition and Carbon Cycling: Decomposition, Breakdown of xenobiotics and biodegradable materials. Element Transformations: Microbial element, transformations, Nitrogen cycling – Mineralization/ Waste Products; Immobilization, N fixation, Nitrification/Denitrification, transformations. Disturbances and Management on Soil Ecology: Clear cutting, Fertilization, Fire, Air pollution, Climate change, Pesticides, Ecosystem restoration.

BLY411 - Methods in Molecular Biology (2 Units)
Prerequisite: BLY213, BLY217, BLY317, CHM221
Fundamentals of the Recombinant DNA Technology – Theoretical review of Basics. A practical laboratory routine with regards to: Sources and applications Endonucleases: Restriction enzymes, as the initiator of the field of recombinant DNA technology. Isolation and analysis of eukaryotic genes: Isolation and analysis of cDNA clone from an phage cDNA expression library of *Arabidopsis* using antibodies from Known and Unknown protein. Identification of cDNA clone using nucleotide sequence analysis. Expression of cDNA in: tissues, times in development, environmental conditions. Analysis of expression of cDNA by northern blot, quantitative RT-PCR, and western blot analysis. Approaches in gene identification in bacteria: Chemical and transposon mutagenesis, Direct cloning for phenotype expression in heterologous hosts. Advantages and disadvantages of the various approaches are discussed. Investigation of genetics of eucaryotic organisms: The use of yeast as a model system. i) The use of genetic crosses to create individuals with particular genetic characteristics; ii) cloning a gene by complementation; and iii) deletion of a gene from the yeast chromosome.

BLY412 – Seminar (2 Units)
Prerequisite: Good Academic standing as judged by Department
Literature review of an approved topic in contemporary areas of studies plus oral presentation.

BLY413 - Applied Entomology (2 Units)
Prerequisite: BLY111, BLY214
Overview of arthropod evolution, distribution. History of medical entomology. Some common tropical parasitic diseases indigenous in Nigeria and Africa. Myiasis: Arthropods as agents of diseases to plants and animals. Arthropods as pseudo-hosts and vectors of disease pathogens. Invertebrate reservoirs of parasitic pathogens. Arthropods and diseases transmission cycles involving some major diseases of plants and animals: mosquitoes, tse-tse fly, muscid flies, lice, mites, bugs, fleas, sandfly aphids, etc). Arthropods success as diseases agents and vectors.

Management of arthropod borne and arthropod mediated diseases: Agricultural, Medical, Veterinary. Pest Life History: Case study: construct and identify stages of pest(s) studied, identify the host organism(s), diagnose the pest problem on host, state management options (to include possible bio-antogonist, predator or pesticides).

BLY414 - Principles of Plant and Animal Breeding (2 Units)
Prerequisite: BLY211, BLY217

Breeding methods: Line breeding: bulk, pedigree, backcross, Population improvement, Inbred line development, Evaluating hybrids and combining ability. Selection methods: Single trait selection: mass selection, line selection, multiple stage selection, Multiple trait selection: independent culling, tandem selection, selection indices, Indirect selection methods: theory, Linkage disequilibrium Indirect selection methods: conventional breeding, Indirect selection methods: DNA markers. Genotype by environment interactions: GxE and decisions in population development, Genetic correlation: treatment of GxE, Selection environment: single vs multiple environments, Designs to control GxE, Variance component analysis. Breeding systems: Breeding for hybrids, Genetic control of pollination: sex expression, self-incompatibility, male sterility, Breeding cultivars, Breeding clones, Breeding populations (synthetics). Resistance breeding: Diseases, Insects, Stress. Special topics: Mutation breeding, Biotechnology (transgenic), Mechanization of breeding programs, Off-season nurseries, Data management. Finishing varieties: Cultivars vs hybrids, Protecting varieties and intellectual property. Seed production and quality: Certification agencies, Seed production schemes, Maintaining genetic purity: isolation and gene flow, Producing and enhancing seed quality, Seed dormancy and storage. Breeding program overview: Monitoring progress, Global seed Dairy, Poultry and Pork market overview.

BLY415 - Bio-resources Management (2 Units)
Prerequisite: BLY122, BLY214

Concepts in Biological diversity: biological diversity, genetic diversity, specific diversity, species of local cereals, local legume, fruit tree species.

Genetic diversity expression: through large number of associations, combinations of genes in individuals of single species, wild relatives of domesticated species, species resistance to (disease, drought, extreme environments etc), utilization of (plant and animal) for varied needs and local germplasms. Conservation and Preservation: importance of plant and animal genetic resources conservation, effects of destruction of natural environment on local plant and animal resources, development of seed, gene and germplasm banks, germplasm collections of local crop species (Case study), selection and breeding of resistant varieties. Alternate management of bioresources: Biotechnologically-based alternatives to live animal experiments; biotechnological protection of forest plantations and economic plants, germplam appropriation and privatization for crop improvement, patents and plant breeders rights, production of improved plants and animals.

MCB414 - Comparative Virology (3 Units)

The course is to bring the student to the knowledge of the forms of viral interactions with other organisms, broad spectrum of viruses. The place of these viral interactions in biotechnological manipulations and the impact of biotechnology on virology and virus diseases: Overview of virology, Composition, structure and classification; DNA and RNA viruses; positive and negative stranded RNA viruses. Reverse transcription in viruses; Functional peculiarities in viruses (Satellites, viroids, defective nucleic acids, and prions); Viral control through Antivirals and genetic engineering, Viral applications in biotechnology.

BLY416 - Bioinformatics and Functional Genomics (2 Units)

Prerequisite: BLY319

The topic contains an overview of the potential applications of genome analysis and introduces students to the role of bioinformatics in evolutionary analysis, functional genomics, proteomics and disease management. It covers the principles of protein structure and protein structure prediction (e.g. homology modelling, threading). It also covers nucleotide sequence analysis i.e. computer analysis of nucleotide sequences assembly; restriction analysis, gene location and identification,

protein sequence analysis and structure prediction, database searching, sequence alignments and phylogenetic analysis.

MCB416 - Epidemiology and Public Health Microbiology (3 Units)
Nosocomial and community acquired infections. Epidemiology and pathogenesis of salmonellosis, E. coli O157H infections, MRSA, vancomycin resistant enterococci, Mycobacterium tuberculosis and the Non-Mycobacterium tuberculosis mycobacteria and other emerging and re-emerging bacterial pathogens. Herd immunity. Hospital infection control program. Laboratory procedures for the epidemiological analysis of microorganisms (biotyping and genetic fingerprinting techniques). Investigation of foodborne and waterborne outbreaks.

Omega Semester

BLY422 - Marine and Fisheries Biology (2 Units)
Prerequisite: BLY214
A study of the Biology of Marine fauna and flora. Economic importance of the marine organisms. Types of aquatic ecosystems; Fresh; Brackish ecological adaptations to aquatic life by planktons etc. Major Classes of Fishes of Economic importance in our inland and coastal waters.

BLY423 - Industrial and Microbial Biotechnology (3 Units)
Prerequisite: BLY217
The objective is to assess Industrial Microbial Biotechnology in a discussive manner. To cover: The history of microbial biotechnology. Microbial biodiversity. Production of important component by bacteria: proteins, fuel alcohol, beer, wine, amino acids, vitamins, alkaloid. Biomass transformation and microbiology of pulp and paper. Polymer synthesis. Microbial bioremediation. Enzyme biotechnology: uses of enzymes, isolation and purification, immobilization of enzymes, enzyme engineering; Immunotoxins; Drug design; Metabolic engineering. Future of Industrial and microbial biotechnology.

BLY424 - Economic Botany (2 Units)

Human aspects of economic Botany: Ethnobotanical disposition that shaped the uses of plants. Classification of plants based on their uses: Food; Constructions (Shelter, Bridges, Boats, Wagons etc.); Medicine; Poisoning (War, Hunting, fishing, trapping, assassination, etc); Spiritual and Cultural communication (Feud, Peace, Marriage, Naming, Burial). Major emphasis will be placed on the growth in Economic Botany in Nigerian particularly in the areas of food and Medicine.

BLY425 - Bio-ethic, Bio-safety, Patents and Regulations in Biotechnology (2 Units)

Ethics Generally, Ethical theory, Resolution of St. Thomas Aquinas to the above "dispute" Contemporary Ethics, Problems with Rule-Based Ethics, Basic Features of Morality, Ethical Reasoning, Universal Norms on bioethics. Pharmaceutical Products, Forensics and DNA fingerprinting, Agricultural cases: such as in Milk Progesterone Test, Plant Tissue Culturing, Flavor Savor Tomato, Roundup ready, Transgenic Plants and Animals, Human Genome Project, Reproductive Technologies. Patents and regulations in biotechnology. Intellectual Property Rights, Sui generis systems: policies and practices, Bio-piracy. Definition and scope of Bio-safety. Hierarchy of regulatory organs. Overview of safety issues and application in various products and services. Environmental risks associated with gene manipulation. Biohazards, risks assessment and management. Biosafety in the laboratory: Handling and uses of toxic and mutagenic reagents, bench practices.

BLY426 - Environmental Biotechnology (2 Units)

Prerequisite: BLY217

Biotechnology as applied in Pollution control; Renewable energy; Energy conservation; Restoration of degraded lands: Bioremediation and Phytoremediation. Biodiversity and its conservation: Environmental genomics, Gene flow, Monitoring and Analysis of genetic contamination of biodiversity. The fate of genetically engineered microorganisms is considered, together with the topic of extreme environments.

BLY427 - Biotechnology in Sustainable Energy (3 Units)
The objective is to introduce students to one of the most dominating and compelling areas of human existence and endeavor: energy; with focus on the Technology, Ecology, Economics, Sustainability of the energy issue as well as the place of biotechnology in the future of energy technologies. Overview of the global demand for energy, and the resource availability and technology used in its current and future supply; Concepts of Alternative, Renewable and Sustainable Energy; Sustainable energy and C-skeleton cycles; Biotechnology augmentations and creations for the Exploitation of plants for cellulosic-, and of algae for hydrocarbon-based fuels; Chemical feed stocks; plants and plant cells as factories for high value products; animal and human as prospects for future energy systems in power generation for localized, general as well as use in space.

BLY428 - Government Regulations and the Food Industry (2 Units)
This course will deal with regulations involving food wholesomeness, safety, sanitation, handling, processing, distribution, import and export, ingredients, misbranding, and labeling. Discussions, case studies, and project concerning the governmental laws and regulations affecting the food industry.

BLY429 - Research Project (6 Units)
Prerequisite: Good Academic standing as judged by Department
A short research project involving an investigation on a selected biological problem. The project is to be written up in the form of a scientific report or paper. Oral and paper dissertation are to be presented.

One of the equipment at the Biochemistry Lab.

A Researcher working with the UV and Vis Spectrophotometer at the Biochemistry Lab

Students undertaking Research at the Biochemistry Lab

6.1.2 BIOCHEMISTRY PROGRAMME

PROGRAMME: Biochemistry

DEGREE AWARDED: B.Sc. (Honours) Biochemistry

DURATION: 4 Years (8 Semesters)

Vision

To be a leading, world-class academic Programme committed to raising a new generation of leaders in the field of Biochemistry and Molecular Biology.

Mission

- To provide a theoretical, research- based and comprehensive educational experience in Biochemistry and Molecular Biology.
- To produce graduates in Biochemistry and Molecular Biology who will provide adequate and competent manpower for the nation.
- To train the students in Biochemistry and Molecular Biology using practical, interdisciplinary approach capable of meeting the needs of society, especially in the area of improved crops and animal varieties, development of new drugs and industrial products, improved food preservation, waste conversion, etc.
- To produce world-class Biochemists and Molecular Biologists equipped to lead the biological and biotechnological revolution that will transform the nation's agriculture, medicine, industry and environment, and thereby eradicate hunger and poverty, combat diseases and conserve the environment.

Philosophy

Biochemistry and Molecular Biology involves teaching and research at the macromolecular, molecular, and atomic levels with a view to understanding the fundamental processes of life. The Biochemistry and Molecular Biology B.Sc. Degree Programme is offered through collaboration by the Departments in the School of Natural and Applied Sciences, consisting of Chemistry, Physics, Mathematics and Biological Sciences. The Programme constitutes an integrated curriculum of basic instruction in Biology, Chemistry, Mathematics, Physics, Computer Science and general courses. Our distinguished faculty are engaged in

frontline research in modern, well-equipped laboratories and the Programme hosts a very active training series in Molecular Biology by national and international scholars. The Programme features close faculty-student interaction, small tutorial classes, stimulating learning environments, and opportunities for independent research and study. The Programme meets the Benchmark Minimum Academic Standard (BMAS) prescribed by the National Universities Commission (NUC, 2007) and the Guidelines set by the Nigerian Society for Biochemistry and Molecular Biology (NSBMB). The students are prepared for exciting and challenging technical, scientific and research positions in industry, particularly the biomedical, pharmaceutical and agricultural sciences, and for advanced study and research in Biochemistry, Molecular Biology, or Health Sciences.

Objectives

The objectives of the Degree Programme in Biochemistry are to:

i. provide students with a broad and balanced foundation of Biochemical and Molecular Biology knowledge and hands-on practical skills;
ii. develop in the students the ability to apply knowledge and skills to solving theoretical and practical problems in Biochemistry;
iii. develop in the students, a range of transferable skills that are of value in biochemical and non-biochemical employment;
iv. provide the students with a knowledge and skills base from which they can proceed to further studies in the specialized areas of Biochemistry or multi-disciplinary areas involving Biochemistry;
v. provide, through training and orientation, an appreciation of the rewards of inter- and multi-disciplinary approach to the solution of complex life problems;
vi. generate in the students an appreciation of the importance of Biochemistry in industrial, economic, environmental, technological and social development;
vii. instill in the students an enthusiasm for Biochemistry, an appreciation of its application in different contexts and to

involve them in an intellectually stimulating and satisfying experience of learning and studying; and

viii. prepare the students for careers in the health professions, biotechnology, food and pharmaceutical industries, academia, research and government.

ADMISSION REQUIREMENTS

The entry requirements are possession of at least credit level passes in five (5) subjects including English Language, Mathematics, Biology, Chemistry and Physics at the Senior Secondary School Certificate (SSCE), General Certificate of Education (GCE), National Examination Council (NECO) at ordinary level (O'Level) or its equivalent obtained at not more than two sittings. In addition, an acceptable pass in the Unified Tertiary Matriculation Examination (UTME) of the Joint Admission and Matriculation Board (JAMB) and other admission requirements prescribed by Covenant University are required.

GRADUATION REQUIREMENTS

Students are required to register for and pass a minimum of 165 units, which must include all Compulsory courses, University general courses, National Universities Commission (NUC) courses and SIWES to be eligible for graduation and the award of the B. Sc. Degree in Biochemistry and Molecular Biology.

Required Units for Graduation: B.Sc Biochemistry Programme

Level	Core/ Compulsory Courses	Electives	Industrial Training [SIWES]	College Courses	University Courses	NUC Courses	Total
100	31	3	-	-	4	10	**48**
200	33	2	-	-	4	6	**45**
300	20	-	6	-	2	2	**30**
400	36	2	-	-	4	-	**42**
Total	**120**	**7**	**6**	**0**	**14**	**18**	**165**

A Technologist mounting an experiment at the Biochemistry Lab

COURSE STRUCTURE

100 Level Biochemistry						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	BLY111	Animal Diversity: Forms and Functions	C	3		α
	BLY112	Introductory Cell Biology	C	2		α
	CHM111	General Physical Chemistry	C	3		α
	CHM112	Chemistry and Society	C	1		α
	CHM119	General Chemistry Practical I	C	1		α
	MAT111	Mathematics I: Algebra	C	3		α
	MCB111	General Microbiology	C	3		α
	PHY111	Mechanics and Properties of Matter	C	2		α
	PHY119	Practical Physics I	C	1		α
	BCH121	Introductory Biochemistry	C	2		Ω
	BLY121	Plant Diversity: Forms and Functions	C	3		Ω
	CHM121	General Organic Chemistry	C	2		Ω
	CHM122	General Inorganic Chemistry	C	2		Ω
	CHM129	General Chemistry Practical II	C	1		Ω
	CSC121	Introduction to Problem Solving	C	2		Ω
Elective	MAT121	Mathematics V: Calculus	E	3		Ω
University Courses	EDS111	Entrepreneurial Development Studies I	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept – Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	GST111	Communication in English I	U	2		α
	CST111	Use of Library, Study skills and information communication Technology I	U	2		α
	CST121	Use of Library, Study skills and information communication Technology II	U	2		Ω
	GST121	Communication in English II	U	2	GST111	Ω
	GST122	Communication in French	U	2		Ω
			α =25 Ω = 23 Total = 48 Units			

200 Level Biochemistry						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	BCH211	Biomolecules I	C	2	BCH121	α
	BCH212	Introduction to Physical Biochemistry	C	2		α
	BCH213	General Practical Biochemistry 1	C	1		α
	BCH214	Experimental Biochemistry I	C	1		α
	BLY211	Introductory Genetics and Evolution	C	2		α
	CHM211	Basic Inorganic Chemistry	C	2		α
	CHM212	Basic Physical Chemistry	C	2		α
	CHM216	Experimental Physical Chemistry	C	1	CHM122	α
	CHM218	Experimental Inorganic Chemistry	C	1	CHM111	α
	MAT217	Statistics I for Biological Sciences	C	3		α
	BCH221	Biomolecules II	C	2	BCH121	Ω
	BCH222	General Aspects of Metabolism	C	3	BCH121	Ω
	BCH223	Bioenergetics	C	2	BCH121	Ω
	BCH224	Introductory Molecular Biology	C	3	BLY112	Ω
	BCH225	General Practical Biochemistry II	C	1		Ω
	CHM221	Basic Organic Chemistry	C	2		Ω
	CHM228	Experimental Organic Chemistry	C	1		Ω
	CIS227	Use of Software Packages III	C	2		Ω
Elective	BLY217	Introduction to Biotechnology	E	2		α
University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept - Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept - Sports	V	0		Ω
NUC General Courses	GST211	Introduction to Philosophy and Logic	U	2		α
	GST221	Nigerian People and Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution.	U	2		Ω
			α =23 Ω = 22 Total = 45 Units			

300 Level Biochemistry						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	BCH311	Metabolism of Lipids	C	2	BCH221	α
	BCH312	Enzymology	C	2	BCH222	α
	BCH313	Metabolism of Amino Acids and Proteins	C	2	BCH211	α
	BCH314	Analytical Biochemistry	C	2		α
	BCH315	Metabolism of Carbohydrates	C	2	BCH221	α
	BCH316	Metabolism of Nucleic Acids	C	2	BCH211	α
	BCH317	Food Biochemistry	C	2		α
	BCH318	Experimental Biochemistry II	C	1	BCH214	α
	BLY319	Biostatistics and Bioinformatics	C	2	MAT217	α
	CHM312	Organic Chemistry	C	3		α
SIWES [Industrial Training]	BCH329	Industrial Training	S	6		Ω
University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =24 Ω = 6 Total = 30 Units			

400 Level Biochemistry						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-Requisite**	**Semester**
Compulsory Courses	BCH411	Advanced Enzymology	C	2	BCH312	α
	BCH414	Advanced Biochemical Genetics	C	2	BLY211	α
	BCH415	Biochemical Reasoning and Research Methods	C	2	BCH314	α
	BCH417	Biochemistry of Macromolecules	C	2	BCH221	α
	BCH431	Tissue Biochemistry	C	2		α
	BCH432	Techniques in Molecular Biology	C	2	BCH314	α
	BCH433	Trends in Medical Biochemistry	C	2		α
	BCH418	Seminar	C	2		α
	BCH421	Plant Biochemistry	C	2		Ω
	BCH422	Pharmacological and Toxicological Biochemistry	C	2		Ω
	BCH423	Metabolic Regulations	C	2	BCH222	Ω
	BCH424	Immunochemistry	C	2		Ω
	BCH425	Topics in Biotechnology	C	2	BCH224	Ω
	BCH428	Comparative Biochemistry	C	2		Ω
	BCH441	Membrane and Hormonal Biochemistry	C	2	BCH221	Ω
	BCH429	Research Project	C	6		Ω
Electives	***Note: choose at least 2 Units***					
	BCH412	Nutritional Biochemistry	E	2		α
	BCH413	Industrial Biochemistry	E	2		α
	MCB414	Comparative Virology	E	3		α
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept - Sports	V	0		α
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α =20 Ω = 22 Total = 42 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

BLY111 - Animal Diversity: Forms and Functions (3 Units)
Nomenclature and classification of animals; Classification, general characteristics, their forms, functions and economic and evolutionary significance of major animal phyla namely Protozoa, Portifera, Cnideria, Plathyhelminthes, Nematoda, Mollusca, Annelida, Arthropoda, Echinodermata and Chordata. Structure and functions of organs and organ systems in vertebrates.

BLY112 - Introductory Cell Biology (2 Units)
An overview of cells: origin, type, cells as experimental models (Prokaryotic and Eukaryotic cell types). Structure, organization and functions of plant and animal cell organelles. Cell Divisions and Cell Cycle: Amitosis, Mitosis and Meiosis and their Significance; Cancer, Ageing of Cells and Stem cell. Tools in cell biology studies: Light microscopy, phase contrast Microscopy, Scanning and Transmission Electron Microscopy, Flourescence Microscopy, Polarization Microscopy, Staining techniques. Chemistry of cells: Inorganic molecules, Organic molecules: Carbohydrates, Protein, Lipids, Nucleic acids. Bioenergetics and Metabolism.

CHM111 - General Physical Chemistry (3 Units)
Historical development of the atom: definition of atoms, Dalton's atomic theory, relative atomic masses. Fundamental particles of the atom and atomic structure. Modern electronic theory of atoms; electronic configuration of the elements. Periodicity of the elements. Radioactivity: Stoichiometry: mole concept, chemical formulas, equations and calculations. States of matter: gas – empirical gas laws, Ideal Gas Equation of State, qualitative treatment of kinetic theory of gases, real gases and deviations from ideal gas laws; liquid, – macroscopic properties

of liquids, evaporation, vapor pressure and its variation with temperature, boiling point, heat of vaporization, Clausius-Clapeyron equation, freezing point, melting point and phase diagrams of simple systems; solids – types of solids and their properties, ionic solids and lattice energy, crystalline solids. Chemical Energetic: definition of some thermodynamic terms, heat, work, internal energy, enthalpy, pressure-volume work. Relationship between internal energy and enthalpy. First law of thermodynamics and its applications. Chemical Kinetics: rate of reaction, factors affecting reaction, order of reaction and how to determine it for zero order and first order reaction, rate of equation and temperature, reaction mechanisms and rate equation for simple reactions. Chemical Equilibrium: reversible reactions and chemical equilibrium, equilibrium constant, factors affecting equilibrium. Le Chatelier's Principle. Effect of temperature on equilibrium constant. Relationship between equilibrium constant and standard Gibbs Free Energy, ΔG°. ionic equilibrium. Electrochemistry: types of conductors, classification of compounds, electrolysis, Faraday's laws of electrolysis. Application of electrolysis. Introduction to electrochemical cells.

CHM112 - Chemistry and Society (1 Unit)

Energy sources: fossil fuels, hydroelectric, hydrodynamics, solar, nuclear. Renewable and non-renewable energy sources. Chemistry and environment; air pollution. Water pollution, solid waste. Pollution control.

CHM119 - General Chemistry Practical I (1 Unit)

Practice in weighing and measurement of volume, preparations of standard solutions Tritimetry: acid-base, oxidation-reduction, precipitation and complex metric titrations; gravimetric analysis.

MAT111 - Mathematics I: Algebra (3 Units)

Algebra of Sets; special set; theory of indices, law of logarithms, indical equations, surdic equations. Polynomials, the remainder and factor theorems; polynomial equations and inequalities-especially linear, quadratic and cubic. Solving quadratic equations and cubic equations with

an integral root. Domain and zeroes of rational functions. Partial fractions. Permutations and combinations. The binomial theorem for any index and applications. Sequences and series of real numbers (including AP and GP). Algebra of complex numbers. Introduction to m x n matrices; elementary operations on matrices and applications to solution of linear equations. Elementary properties of determinants of at most 3 x 3 matrices; The Rule of Sarrus.

MCB111 - General Microbiology (3 Units)

Major landmarks in the development of Microbiology. Scope and application of microbiology. General characteristics of major groups of microorganisms (viruses, bacteria, fungi, protozoa). Gross and fine structures of the major groups of microorganisms.

PHY111 - Mechanics and Properties of Matter (2 Units)

Physical quantities; Units and dimensions. Scalars and vectors. Kinematics. Dynamics; Newton's laws of motion; particles; rigid bodies; simple harmonic motion. Friction. Work, energy and power. Centre of mass. Newton's law of universal gravitation; Kepler's laws. Pressure in fluids. Intermolecular forces. Surface tension. Hook's law, Young's modulus.

PHY119 - Practical Physics I (1 Unit)

Simple experiments illustrating the topics covered in PHY111 and PHY112.

Omega Semester

BCH121 - Introductory Biochemistry (2 Units)

History and evolution of Biochemistry; Techniques and advances in the field of Biochemistry; Cells; Origin of building block molecules, hierarchy of molecular organization, structures and functions of major cell components; Prokaryotic versus eukaryotic cells; Metabolism and Enzyme activity; Energy transformation in living cells; Transmission and

expression of genetic information. Career prospects and relevance of Biochemistry in national development.

BLY121 - Plant Diversity: Forms and Functions (3 Units)

Occurrence and evolution of plants. Classification and Ecological distribution of plants. Diversity, Morphology, Life Cycle, Alternation of generation and General Characteristics in: Thallopyhta, Bryophyta, Pteridophyta, Spermatophyta. Structure, functions and modifications in Root, Stem Leaf, Flower, Fruit and Seed of Angiosperms. Transport in Angiosperms: Xylem and Phloem systems. Ecologic and Economic Importance of Plants.

CHM121 - General Organic Chemistry (2 Units)

Introduction to and importance of organic chemistry. Qualitative analysis of organic compounds. Isolation and purification of organic compounds. Quantitative analysis of organic compounds. Determination of structure of organic compounds; empirical, molecular and structural formulas. Hybridization; formation of sp^3, sp^2, sp orbital in carbon. Homologous series and functional groups. Isomerism-structural and stereoisomerism. Aliphatic hydrocarbon chemistry: alkenes, alkenes, alkynes-nomenclature (IUPAC), physical properties, preparation and chemical reactions with simple mechanism where applicable.

CHM122 - General Inorganic Chemistry (2 Units)

Chemical bonding and structure: ionic, covalent, coordinate covalent (dative), metallic, hydrogen bonding. General properties of compounds formed by the different types of bonding. Influence of bonding on size, shape and structure. Main Group Chemistry (Groups IA – VIIIA): trends in the properties of elements (structure, ionization energies, physical and chemical properties). Properties of selected types of compounds.

CHM129 - General Chemistry Practical II (1 Unit)

Qualitative analysis for common captions and anions. Identification of organic functional groups: hydroxyl, carbonyl, carboxylic, amino groups, sugar, carbohydrate, protein, etc.

MAT121 - Mathematics V: Calculus (3 Units)

Functions: Concept and notation. Polynomial and rational functions. Idea of limits; technique of finding limits. Derivatives: definition and calculation from first principles. Derivatives of constants, power, sums, products, quotients. Composite functions, circular functions, logarithmic/exponential function. Higher order derivatives; applications, small increments, approximations and errors. Extrema; integration of sum/scalar multiple of functions with applications; integration of circular functions. Definite integrals: general properties of definite integrals, some applications to geometry, mechanics, Biology and Social Sciences. Derivatives of hyperbolic functions; inverse circular/hyperbolic functions. Method of taking the logarithm before differentiating; successive differentiation of implicit functions and of functions like $e^{-at}\sin(bt + c)$. Hard Integration: Further techniques. Evaluation of integrals of the form Integration of irrational functions, integration by substitutions, integration by parts.

CSC121 - Introduction to Problem Solving (2 Units)

Problem solving strategies, Roles of algorithm in problem solving process, implementation strategies, concepts and properties of algorithm. Using C-language.

200 Level

Alpha Semester

BLY211 - Introductory Genetics and Evolution (2 Units)

Basic concepts in genetics. Cell, Nucleus, Chromosome, Genes, DNA, RNA. Chromosome and DNA Structure. Other Sources of DNA: Mitochondrion and Chloroplast. Mendelian genetics: Principles and Laws of genetic inheritance, Heritable and Non-heritable traits, Behaviour of traits: Dominance and Recessiveness. Hybrid crosses, Sex-linked inheritance. Behaviour of chromosomes, Chromosomal aberrations and repair mechanism. Effect of mitochondrial and nuclear chromosome aberrations. Current concepts of evolution: Macro and Micro-evolution,

Factors determining evolution. Macro-evolution and speciation. Polymorphism and heterozygosity, Hardy-Weinberg principle and factors of evolution. Population genetics, Probability and tests of goodness of fit. Phylogeny, Evolution and society.

BCH211 - Biomolecules I (2 Units)

Biomolecules - the Molecules of life; Classes of biomolecules; Definition, function, classification; Chemistry and properties of amino acids, peptides, proteins and their derivatives; methods of isolation and identification. Primary, secondary, tertiary and quaternary structure of proteins. Determination and biochemical application of structures. Classes of enzymes, vitamins and Coenzymes. Chemistry, structure and functions of nucleic acids. Nomenclature of nucleosides and nucleotides. Hydrolysis of nucleic acids.

BCH212 - Introduction to Physical Biochemistry (2 Units)

Water: physical properties and hydrogen bonding; water as a solvent, hydrophobic interactions. Solutions, osmotic pressure. Acids and bases; pH and pK values and their effects on cellular activities. Buffers, Principles and Applications of thermodynamics and chemical kinetics (driving forces, coupled conformational changes etc.) and mechanisms of biochemical processes involving proteins, lipids, and nucleic acids in solution. Protein folding, nucleic and helix formation, micelle formation; ligand binding, cooperative binding and other assembly processes; effects of water, salts, other solutes, temperature and pressure on biochemical processes; protein-nucleic acid interactions and enzyme catalysis. Electrochemical cells and redox reactions. Biophysical techniques; optical microscopy, scanning probe microscopy and electrophysiology.

BCH213 - General Practical Biochemistry 1 (1 Unit)

Introduction to Biochemistry laboratory, Preparation of solutions and serial dilutions, Standardization of acids and bases, Preparation of buffers; acetate buffer, pH measurement using pH meter and indicators, Effect of acid, base and water on buffers, General qualitative tests for proteins and amino acids, General qualitative tests for nucleotide bases.

BCH214 - Experimental Biochemistry I (1 Unit)

Potentiometric titrations; determination of acid concentration, Determination of pKa values of weak acids, Preparation of acetate buffers; Effect of Acid. Buffer systems; Effect of acid, base and water. Effect of pH and temperature on salivary amylase activity. Estimation of protein by the Biuret method, Determination of enzyme activity; fish intestinal sucrose, isolation of DNA.

BLY217 - Introduction to Biotechnology (2 Units)

Basic concepts of biotechnology; history and evolution of biotechnology; the inter-disciplinary nature of biotechnology. Introduction to the Principles and techniques in biotechnology. Applications of biotechnology in medicine, food/agriculture, industries and environment. Genetic Modification. The Biotechnology of enzymes and biocatalysis. Biotechnology of microbes.

CHM211 - Basic Inorganic Chemistry (2 Units)

Qualitative treatment of Molecular Orbital and Valence Bond theories. Introduction to the chemistry of transition elements, lanthanides and actinides: definition and general characteristics of transition elements, lanthanides and actinides, electronic configuration of the atoms and ions. Descriptive chemistry of some selected transition metals. 1^{st}, 2^{nd}, and 3^{rd} transition series, lanthanides and actinides. Coordination Chemistry. Ligand and crystal field theories. Structure, reactivity and applications of coordination compounds.

CHM212 - Basic Physical Chemistry (2 Units)

Kinetic theory of gases. Molecular velocities and their distribution. Carnot Cycle. Second law of thermodynamics. Entropy and free energy. Principles and applications of free energy concepts in determining spontaneity of reaction. Experimental methods for the determination of rates of reactions. Formation of rate equation for second, third and fourth order of reaction. Experimental determination of order of reaction. Rates laws, mechanism and theories of elementary processes.

CHM216 - Experimental Physical Chemistry (1 Unit)

A selection of experiments designed to provide illustrations of the important parts of the lectures in CHM212 Course. The experiments will afford the students the opportunity to develop their quantitative and analytical skills. Topics include chemical equilibria, heat of reaction by calorimetric technique, molecular mass determination by freezing point depression method, conductivity measurements, determination of reaction rate and activation energy.

CHM218 - Experimental Inorganic Chemistry I (1 Unit)

A selection of experiments to illustrate principles taught in CHM211. The experiments will afford the students the opportunity to develop good experimental inorganic techniques, critical and analytical approach to laboratory work. Topics include quantitative inorganic analysis by volumetric and gravimetric methods, preparation of simple inorganic compounds and metal complexes.

MAT217 - Statistics I (for Biological Sciences) (3 Units)

Use of Statistical Methods in Biology. Frequency distributions. Laws of probability. The Binomial, Poisson and Normal distributions.

Omega Semester

BCH221 - Biomolecules II (2 Units)

Definition, functions, classes, Structure and chemistry of carbohydrates; reactions of monosaccharides and their derivatives, disaccharides and oligosaccharides, storage and structural polysaccharides; complex carbohydrates. Classification, Functions, Chemistry and structure of lipids; saturated, unsaturated and essential fatty acids, storage and membrane lipids, Blood lipids and lipoproteins. Industrial and clinical application of glycolipids, leucotrienes, prostaglandins and thromboxanes. Lipid micelles, monolayers and bilayers. Structures, functions and composition of biological membranes; plasma membrane and other major cell components.

BCH222 - General Aspects of Metabolism (3 Units)

Metabolism; Definition, reaction mechanisms, Free energy concept, major metabolic pathways, Anabolic, catabolic and amphibolic pathways, Experimental studies of intermediary metabolism, biosynthesis and degradation pathways of major macromolecules, amino acids, lipids, carbohydrates, nucleotides, nitrogen compounds etc. Carbon-oxygen cycle in living organisms: photosynthesis, respiration and biodegradation. The nitrogen cycle, incorporation of nitrogen and sulphur in living organisms.

BCH223 – Bioenergetics (2 Units)

High-energy compounds; chemical potentials, electrochemical potentials; Energy conversion in living organisms; Electron transport system and oxidative phosphorylation.; photosynthesis: Light and dark reactions, photosynthetic electron transport and photophosphorylation. Mitochondrial electron transport and oxidative phosphorylation. Regulation of ATP production. Mechanisms of energy coupling. Chemical thermodynamics; Oxidations and reduction reactions.

BCH224 - Introductory Molecular Biology (3 Units)

Organization of Gene structure in prokaryotes and Eukaryotes; Gene expression: DNA replication, transcription, translation and genetic code; Bacteriophages and Eukaryotic viruses (structure, life cycles, biological assays etc.); Mutation and Mutagenesis; DNA repair mechanisms; Genes and cancer; Recombination; Plasmids and Transposoons, Restriction enzymes, Techniques in molecular Biology, PCR, Microarray etc.

BCH225 - General Practical Biochemistry II (1 Unit)

General qualitative tests for carbohydrates, Qualitative tests for specific carbohydrates, Identification of carbohydrates, Acid hydrolysis of starch, Semi-qualitative estimation of glucose, Total carbohydrate determination by Anthrone method, Estimation of reducing sugars by Somogyi method, Determination of blood sugar by Aniline method. Determination of sugars in soft drinks, Determination of glucose by glucose oxidase method, General qualitative tests for lipids, Determination of

saponification and Iodine number, Determination of blood cholesterol, Estimation of free fatty acids, Estimation of triglycerides by colorimetric methods.

CHM221 - Basic Organic Chemistry (2 Units)

Factors affecting structure and physical properties of organic compounds; factors affecting availability of electrons. Stereochemistry, energy of activation and free radical substitution reactions in alkanes. Electrophilic and necleophilic substitution reactions. Aromaticity. Basic organic reactions, e.g. addition, free radical, elimination and condensation reactions etc. Some named organic reactions.

CHM228 - Experimental Organic Chemistry I (1 Unit)

A selection of experiments to illustrate principles taught in CHM221 course. Topics include qualitative organic analysis, organic preparation and preparation of crystalline organic derivatives.

300 Level

Alpha Semester

BCH311 - Metabolism of Lipids (2 Units)

Digestion, absorption and mobilization of lipids. Biosynthesis and Oxidation of lipids and derivatives; fatty acids, phospholipids, sphingolipids, cholesterol, eicosanoids, ether lipids, ketone bodies. Acetic acid as a central precursor for biosynthesis of lipids. Regulation of lipid metabolism. Alterations in lipid metabolism; diabetes and obesity.

BCH312 - Enzymology (2 Units)

Definition, history, functions and properties of enzymes.classification and nomenclature of enzymes. Vitamins and Coenzymes; Cofactors; metalloproteins containing Zn, Fe, Co, Cu and Mo; Classification and nomenclature of enzymes. Mechanism of enzyme catalyzed reactions. Effects of temperature, pH, ions and inhibitors on enzymes. Active sites

of enzymes. Michealis-Menten equation, Estimation of kinetic parameters-enzyme activities, Km, V_{max}, K_i, etc., Production, isolation, purification and characterization of enzymes.

BCH313 - Metabolism of Amino Acids and Proteins (2 Units)

Amino acids as building blocks and covalent backbone of proteins; amino acid sequence. Biological functions of proteins. The nitrogen cycle and fixation. Biosynthesis of amino acids and derivatives; Essential amino acids. Oxidative degradation of amino acids and metabolism of one-carbon units; Ketogenicity and glucogenicity; Urea cycle, Metaboilsm of inorganic nitrogen. Disorders and Inborn errors of amino acid metabolism. Creatine and creatinine metabolism. Protein catabolism.

BCH314 - Analytical Biochemistry (2 Units)

Principles of instrumentation and analytical techniques; Manometry; Spectroscopy; Ultrafiltration; Chromatography; Electrophoresis; Centrifugation; X-ray diffraction; Immunochemical techniques; Viscosity measurements; Autoradiology and techniques of radiolabelling; (Laboratory practical should include areas of interest to academic staff to cut across a wide spectrum of general biochemistry).

BCH315 - Metabolism of Carbohydrates (2 Units)

Degradation and digestion of carbohydrates; sugars, storage polysaccharides and cell walls. Reactions of sugars. Glycolysis, the tricaboxylic acid cycle, the phospho-gluconate pathway, the glyoxylic acid cycle, the pentose phosphate pathway and cori cycle, the Calvin pathway, Glucogenesis, glycogenesis and glycogenolysis. Regulation of Carbohydrate metabolism. Disorders of carbohydrate metabolism.

BCH316 - Metabolism of Nucleic Acids (2 Units)

Occurrence, isolation, characterization and structure of Nucleic Acids, Genome organization and biosynthesis of proteins. Purine and pyrimidine synthesis and catabolism and their regulations. Conversion of ribonucleotides to deoxyribonucleotides. Abnormalities in nucleic acid metabolism, xeroderma, pigmentation and skin cancer.

BCH317 - Food Biochemistry (2 Units)

Introduction to the theory and application of physical and chemical methods for determining the constituents of food. Food processing, preservation and storage of traditional foods – root and stem tubers, fruit and fruit drinks, seeds and grains, greens and vegetables. Food poisoning and intoxication, prevention and cure.

BCH318 - Experimental Biochemistry II (1 Unit)

Determination of vitamin C in foods, separation of amino acids by paper chromatography, enzyme purification, measurement of chlorophyll, determination of components of milk, isolation of casein and fat from milk, isolation and estimation of glycogen from animal tissues, determination of starch in plant tissues

BLY319 - Biostatistics and Bioinformatics (2 Units)

Basic statistical concepts, Experimental design, Data transformation, Biological data, Accuracy of Measurement, Significant figures. Frequency distribution. Measure of central tendency, Measure of dispersion and variability. Graphical presentation of data. Normal distribution and standard curve. Statistical hypotheses and level of significance, Central limit theorem and confidence interval. *t*-test: Student *t*- distribution, One sample hypotheses, Two sample hypotheses: (Paired and Unpaired) Parametric *t*- distribution, Non- Parametric *t*- distribution. Multisample hypotheses: ANOVA, Fischer's test. Simple Linear Correlation and Regression. Sequence Analysis, Molecular Phylogenetics, Basic Structure Modeling, Visualization of Alignments, Trees and Structure Models.

CHM312 - Organic Chemistry (3 Units)

Alcohols and their reactions. Ethers and epoxides. Carboxylic acids and their derivatives. Aldehydes and Ketones, amines. Formulation of carbonions and their reactions. Aromatic, alicyclic and heterocyclic chemistry. Polyfunctional compounds.

Omega Semester

BCH329 - Industrial Training (6 Units)
Students will be attached to relevant health and industrial organizations for a period of 6 months.

400 Level

Alpha Semester

BCH411 - Advanced Enzymology (2 Units)
General review of enzyme and properties. The relation of structure and kinetics mechanisms of enzymatic catalysis; studies of specific enzyme and enzyme systems. Steady-state enzyme kinetics. Transient kinetic methods. Chemistry of enzyme catalysis. Regulatory enzymes. Molecular models for allosterism. Multi-enzymes complexes. Enzyme assays. Criteria for determining purity of enzymes. Enzyme reconstitution. Regulation of enzyme activity and synthesis. Recent advances in enzymology. Biochemical regulatory mechanisms.

BCH412 - Nutritional Biochemistry (2 Units)
Biochemical and physiological fundamentals of nutrition. Food nutrients. Energy value of foods and energy expenditure by mammals. Roles and interrelationships of foods – carbohydrates, fats, proteins, vitamins, mineral elements and water in nutrition and metabolism. Review of metabolic control; gastrointestinal physiology, nutrient absorption, molecular, cellular, organismal aspects of glucose transport, metabolism. Regulation; fuel sensing, molecular regulation of fatty acid, lipid metabolism; cellular, organismal aspects of protein metabolism; hormonal control of metabolism. Nutritional disorders, prevention and therapy. Nutritional status and nutritional requirements. Recommended dietary allowances. Assessment of nutrient status. Nutrient requirements in relation to physical activity and ageing; diet and disease, obesity and under-nutrition.

BCH413 - Industrial Biochemistry (2 Units)

Microbial physiology and genetics. Metabolic pathways: control and application; Continuous culture methods, principles and applications; the chemostat and its application in industrial fermentations. Fermentations, process evaluation and development; Over-production of metabolites, methods for screening and selecting microorganisms of industrial importance, industrial enzymes.

BCH414 - Advanced Biochemical Genetics (2 Units)

The Genome. Structure of prokaryotic genes. Gene expression in prokaryotes and viruses. Genetic transduction and conjugation. Recombinant DNA technology: Applications in food industries, agriculture, diseases, etc. Bioinformatics and Computational Biology, Genomics, Proteomics, Nanotechnology.

BCH415 - Biochemical Reasoning and Research Methods (2 Units)

Familiarization with the operations of latest biochemical equipment. Definition, types and methods of research. Scientific reasoning and knowledge. Hypothesis and theory. Evaluation and design of experimental biochemistry from available information and data. Analysis, interpretation and inference-drawing from biochemical research data. Assimilation and dissemination of information. Effective use of library, preparation of dissertations or theses, papers for journal publications and conference.

BCH417 - Biochemistry of Macromolecules (2 Units)

Structure and functions of macromolecules. Storage and Structural polysaccharides; mucopolysaccharides, glycoproteins, bacterial cell wall synthesis of complex lipids, lipoproteins and nucleic acids. Carbohydrate-derived antibiotics; Dextrans, ascorbic acids.

BCH418 – Seminar (2 Units)

Literature search, presentation of seminars on comprehensive literature review of selected research topics in Biochemistry.

MCB414 – Comparative Virology (3 Units)

Characterization of common plant viruses and diseases. Control of plant viral diseases. Major group of human viruses; DNA viruses, RNA viruses, Hepatitis viruses, Arboviruses, Tumor viruses, Slow viruses and prions. Human immunodeficiency virus and minor viral pathogens. Current trends in virus control; interferons, plant derived edible vaccines, gene cloning and the use of transgenic plants. Chemotherapy of viral infections.

BCH431 - Tissue Biochemistry (2 Units)

Biochemistry and metabolism of the Liver: distribution of nutrients, urea synthesis, excretory functions, detoxification reactions. Kidney: renal functions, metabolism and the composition of urine. Adipose tissue; composition, function and metabolism. Muscle; components, structure, mechanism of contraction and metabolism. Blood: cellular components, serum and plasma, plasma proteins. Metals in biological processes: Na, K, Mg, Ca (ionic gradients, mineralization, blood-clotting). The brain structure, functions and metabolism; Nerves: synapses, neurotransmitters, physiological actions and biochemical mechanisms. The visual process; Gastrointestinal tract; structure and function.

BCH432 - Techniques in Molecular Biology (2 Units)

DNA (Plasmid) isolation and quantitation, Restriction enzyme digestion of DNA, Purification of DNA; SDS-PAGE, Ligation of DNA, *E. coli* transformation – chemical and electroporation and expression of fusion protein, Polymerase chain reaction, Protein quantitation by densitometry and dye binding, Western blot analysis, RNA isolation and quantitation from *E. coli* and animal tissue, Real-Time-PCR

BCH433 - Trends in Medical Biochemistry (2 Units)

Biochemical aspects of diagnosis and therapeutics. Blood chemistry, metabolic diseases, abnormal hemoglobin, diagnostic enzymes. Other body fluids including cerebrospinal fluid, synovial fluid, etc – chemistry and functions. The chemical pathology of gut, liver, kidney and nervous system. Biochemical mechanisms in clinical biochemistry. Introduction to forensic biochemistry. Biochemical substances of forensic interest -

Contamination of food and drugs. Collection, preservation and biochemical analysis of materials of forensic interest. The Public analyst in forensic practice. Regulatory agencies and Forensic Biochemistry – SON, NAFDAC, etc. Biochemical and molecular analysis of selected human diseases; atherosclerosis and lipid metabolism, cancer and oncogenes, apoptosis and the cell cycle, human immunodeficiency virus replication, and AIDS.

Omega Semester

BCH421 - Plant Biochemistry (2 Units)

Organization of plant cell. The plant cell wall structure, formation and growth. Biochemistry of photosynthesis, respiration and other metabolic and biosynthetic processes in plants. Biosynthesis of alkaloids, flavonoid, plant hormones, carotenoid pigments.. Metabolism of auxins, giberellines and cytokinins. General aspects of alkaloid biosynthesis, overview of medicinal plants, current development in the biochemistry of medical plants.

BCH422 - Pharmacological and Toxicological Biochemistry (2 Units)

Metabolism in infected cells. Biochemical aspects of host-parasite relationship. Xenobiotics; drugs and toxins. Metabolic factors affecting chemotherapeutic agents. Theories of the mechanism of drug action. Drug resistance and other factors affecting efficacy. Physiological and biochemical action of selected drugs. Traditional medicinal plants in the management and therapy of common ailments; malaria, sickle-cell anaemia etc. History and development of toxicology. Determination of toxic substances in foods, environment, body fluids and tissues. Detoxification and excretion of foreign substances. Biochemical mechanisms of toxicity. Toxicity of carcinogens, teratogens and mutagens.

BCH423 - Metabolic Regulations (2 Units)

Integration of metabolic pathways: The relationship of Kreb's Cycle to protein, carbohydrate, lipid and nucleic acid metabolism. Turnover rates and metabolic pools. Levels of enzyme regulation: Feed-back inhibition

versus enzyme synthesis. Catabolite repression, end product repression, the lactose operon and arabinose operon. Regulation of enzymes and metabolic pathways. Identification of different regulatory mechanisms in metabolic pathway.

BCH424 - Immunochemistry (2 Units)

Overview of body defence mechanisms. Cells and tissues of the immune system. Lymphoid organ and tissues, Innate immunity; acquired/specific (adaptive) immunity; antibodies and antigens; the major histocompatability complex (MHC); antibody structure, antigen processing and presentation; complement; tolerance, disorders of the immune system (e.g. hypersensitivity, autoimmunity and immunodeficiency); Immunochemistry; immuno-histochemistry; immunocytochemistry. Techniques in immunology and immunochemistry.

BCH425 - Topics in Biotechnology (2 Units)

Overview of biotechnology: Definitions, history, evolution and classes of biotechnology. Principles and techniques in Molecular Biology: applications in modern biotechnology. Bioprocess technology: upstream and downstream processing and general instrumentation. Microbial growth: Kinetics, energetics and Biochemistry. Fermentation of food related products. Enzyme production: immobilized enzymes and application. Applications of biotechnology in medicine, food/agriculture, industries and environment. Pollution control: bioremediation and bioconversion of wastes.

BCH428 - Comparative Biochemistry (2 Units)

Biochemical aspects of evolution. Origin of biomolecules and cells. Comparative aspects of metabolism in different groups of organisms and their implications. Comparative metabolism and excretion of nitrogen, comparative metabolism of purines. Comparative distribution of N – bases and phosphagens. Comparative respiration in animals, respiratory pigments. Comparative nutrition and digestion. Applications of comparative biomolecules as biomarkers and forensic evidences.

BCH429 - Research Project (6 Units)

Independent research in selected areas/topics of interest to the academic staff. Students will be required to carry out literature survey on the topics, perform experiments and produce short reports.

BCH441 - Membrane and Hormonal Biochemistry (2 Units)

Structure, composition and functions of biological membranes. Isolation, characterization and classification of membranes; chemistry and biosynthesis of membranes. Molecular organization of membrane components. Natural and artificial membrane bilayers - the unit membrane hypothesis. Membrane transport system - active versus passive transport systems. Transport of sugars and amino acids; ionophores. Essential elements of cellular transduction mechanisms that allow signaling from the cell surface to the nucleus. Synthesis of peptide signals, receptors and receptor trafficking, second messengers, protein kinase cascades, cell cycle regulation, and the regulation of transcription factors and gene transcription. Membrane receptors and diseases. General consideration of the endocrine systems. Chemistry and biochemical effects of thyroid and parathyroid hormones. Hormones of the gonads and adrenal glands, the pancreatic hormones. Hormones of the hypothalamus and pituitary glands. Recent advances in studies of hormones. Pathophysiology of the hormones.

A lecture session at the Biological Science Lab

6.1.3 MICROBIOLOGY PROGRAMME

PROGRAMME: Microbiology

DEGREE AWARDED: B.Sc. (Honours) Microbiology

DURATION: 4 Years (8 Semesters)

Vision

In accordance with the University's Vision of raising a new generation of leaders, the Microbiology Programme aspires to be a reference centre, committed to the academic excellence and to the attainment of national and international recognition for its educational, research and public impact.

Mission

- To prepare the students for career opportunities in microbiological sciences and to participate in public service through high quality academic curriculum and training programmes in various disciplines of microbiology, producing microbiologists with recognizable quality.
- To empower the students to recognize, investigate and propose solutions to the several microbiological problems affecting man and his environment through the designed programmes.
- To ensure that Microbiology is positively visible and contributing to the decision-making of public administrators, private companies, educational and research institutions, media and all who can benefit from the value and potential of Microbiology.

Philosophy

The Undergraduate academic Programmes of Covenant University is focussed on raising a new generation of leaders, equipped in their total personality to positively influence their community and restore hope to the citizens of their nation and to mankind in general. The Programmes are also designed to provide the students with a thorough, broad and

balanced foundation in order to prepare them for career opportunities or an environment where they can be creative, innovative and self-reliant.

Objectives

i. To provide the students with an intellectually stimulating and satisfying learning experience in this exciting subject.
ii. To provide the students with appropriate laboratory skills and field experience.
iii. To inculcate in the students an entrepreneurial and problem-solving attitude.
iv. To provide the students with a knowledge and skills base from which they can proceed for further studies in specialized areas of Microbiology or multi-disciplinary areas involving Microbiology
v. To prepare the students for careers in agriculture, medical fields, environmental studies, research institutes, industries and even for self-employment.

ADMISSION REQUIREMENTS

To qualify for the 4-year Bachelor of Science (B.Sc) Degree in Microbiology at Covenant University, candidates must possess at least five (5) credits level passes in English, Mathematics, Biology, Chemistry and Physics at the Ordinary level Examination of WAEC/NECO/SSCE/NABTEB at not more than two (2) sittings. In addition to the above, the candidate must have taken the UTME examination of the Joint Admission and Matriculation Board (JAMB) and must have obtained the prescribed cut-off score set by JAMB. The candidate must also undergo the post-UTME screening exercise conducted by the University.

GRADUATION REQUIREMENTS

To be eligible for the award of the B.Sc. (Hons) Degree in Microbiology, the student must register for and pass a minimum of 165 units, which must include all the Compulsory Courses, University General Courses, NUC Courses and SIWES as presented below:

Required Units for Graduation: B.Sc Microbiology Programme

Level	Core/ Compulsory	Electives	Industrial Training [SIWES]	College Courses	University Courses	NUC Courses	Total
100	25	9	-	-	4	10	48
200	35	4	-	-	4	6	49
300	17	2	6	-	2	2	29
400	35	-	-	-	4	0	39
Total	**112**	**15**	**6**	**0**	**14**	**18**	**165**

COURSE STRUCTURE

100 Level Microbiology						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	MCB111	General Microbiology	C	3		α
	BLY112	Introductory Cell Biology	C	2		α
	CHM111	General Physical Chemistry	C	3		α
	CHM112	Chemistry and Society	C	1		α
	PHY111	Mechanics and Properties of Matter	C	2		α
	MCB121	Laboratory Techniques in Microbiology	C	3		Ω
	MCB122	Microbial Taxonomy, Classification and Nomenclature	C	3		Ω
	BLY122	Introductory Ecology	C	2		Ω
	CHM121	General Organic Chemistry	C	2		Ω
	CHM122	General Inorganic Chemistry	C	2		Ω
	CSC121	Introduction to Problem Solving	C	2		Ω
Electives	**Note:** *Take All Electives*					
	BLY111	Animal Diversity: Forms and Functions	E	3		α
	MAT111	Mathematics I: Algebra	E	3		α
	BLY121	Plant Diversity: Forms and Functions	E	3		Ω
University Courses	EDS111	Entrepreneurial Development Studies I	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept – Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	CST111	Use of Library, Study Skills and Information Communication Technology I	U	2		α
	GST111	Communication in English I	U	2		α
	CST121	Use of Library, study skills and Information Communication Technology II	U	2		Ω
	GST121	Communication in English II	U	2		Ω
	GST122	Communication in French	U	2		Ω
			α =23 Ω = 25 Total = 48 Units			

200 Level Microbiology						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	MCB211	Bacteriology	C	3	MCB113	α
	MCB212	Mycology	C	3		α
	BCH211	Biomolecules I	C	2		α
	BLY217	Introduction to Biotechnology	C	2		α
	MAT217	Statistics for Biological Sciences	C	3		α
	CHM211	Basic Inorganic Chemistry	C	2		α
	CHM212	Basic Physical Chemistry	C	2		α
	BCH213	General Practical Biochemistry I	C	1		α
	BLY225	Parasitology	C	3		Ω
	MCB222	Techniques in Virology	C	3	MCB112	Ω
	BCH221	Biomolecules II	C	2		Ω
	BCH224	Introductory Molecular Biology	C	3		Ω
	CHM221	Basic Organic Chemistry	C	2		Ω
	CHM228	Experimental Organic Chemistry	C	1		Ω
	CIS227	Use of Software Packages III	C	2		Ω
	BCH225	General Practical Biochemistry II	C	1		Ω
Electives	Note: Choose at least **4 units**					
	BLY213	Basic Biological Techniques	E	2		α
	BLY211	Introductory Genetics and Evolution	E	2		α
	BLY222	Plant Physiology	E	2		Ω
	BLY221	Basic Invertebrate Zoology	E	3		Ω
	BLY223	Basic Chordate Zoology	E	2		Ω
University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept – Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept - Sports	V	0		Ω
NUC General Courses	GST211	Logic, Philosophy and Human existence	U	2		α
	GST221	Nigerian People & Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution	U	2		Ω
			α =24 Ω = 25 Total = 49 Units			

300 Level Microbiology						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	MCB311	Microbial Physiology	C	3		α
	MCB312	Food Microbiology	C	3		α
	MCB313	Clinical Microbiology	C	3		α
	MCB314	Soil and Plant Microbiology	C	3		α
	MCB315	Analytical Microbiology and Quality Control	C	2		α
	MCB316	Immunology	C	3		α
Elective	**Note:** *Take the Elective*					
	BLY319	Biostatistics and Bioinformatics	E	2		α
SIWES [Industrial Training]	MCB329	Industrial Training	S	6		Ω
University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =23 Ω = 6 Total = 29 Units			

400 Level Microbiology						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	MCB411	Environmental and Petroleum Microbiology	C	3	MCB314	α
	MCB417	Research Methods in Microbiology	C	2		α
	MCB413	Microbial Genetics	C	3		α
	MCB414	Comparative Virology	C	3	MCB222, MCB316	α
	MCB415	Pharmaceutical Microbiology and Antimicrobial Agents	C	3		α
	MCB416	Epidemiology and Public Health Microbiology	C	3		α
	MCB421	Industrial Microbiology	C	3		Ω
	MCB422	Fermentation and Substrate-Enzyme biotechnology	C	3		Ω
	MCB423	Medical Entomology	C	3		Ω
	MCB424	Review Seminar	C	3		Ω
	MCB425	Research Project	C	6		Ω
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α =19 Ω = 20 Total = 39 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

MCB111 - General Microbiology (3 Units)
Major landmarks in the development of Microbiology. Scope and application of microbiology. General characteristics of major groups of microorganisms (viruses, bacteria, fungi, protozoa). Gross and fine structures of the major groups of microorganisms.

BLY111 - Animal Diversity: Forms and Functions (3 Units)
Nomenclature and classification of animals. Diagnostic features of ten major animal phyla and their classes. Structure and functions of organs and organ systems in vertebrates e.g. rat.

BLY112 - Introductory Cell Biology (2 Units)
Cellular basis of life, structure and organization of plant and animal cells. Functions of cells and cellular organelles. Cell division, Heredity.

CHM111 - General Physical Chemistry (3 Units)
Historical development of the atom: definition of atoms, Dalton's atomic theory, relative atomic masses. Fundamental particles of the atom and atomic structure. Modern electronic theory of atoms; electronic configuration of the elements. Periodicity of the elements. Radioactivity: Stoichiometry: mole concept, chemical formulas, equations and calculations. States of matter: gas – empirical gas laws, Ideal Gas Equation of State, qualitative treatment of kinetic theory of gases, real gases and deviations from ideal gas laws; liquid, – macroscopic properties of liquids, evaporation, vapour pressure and its variation with temperature, boiling point, heat of vaporization, Clausius-Clapeyron equation, freezing point, melting point and phase diagrams of simple systems; solids – types of solids and their properties, ionic solids and lattice energy, crystalline solids. Chemical Energetic: definition of some thermodynamic terms,

heat, work, internal energy, enthalpy, pressure-volume work. Relationship between internal energy and enthalpy. First law of thermodynamics and its applications. Chemical Kinetics: rate of reaction, factors affecting reaction, order of reaction and how to determine it for zero order and first order reaction, rate of equation and temperature, reaction mechanisms and rate equation for simple reactions. Chemical Equilibrium: reversible reactions and chemical equilibrium, equilibrium constant, factors affecting equilibrium. Le Chatelier's Principle. Effect of temperature on equilibrium constant. Relationship between equilibrium constant and standard Gibbs Free Energy, ΔG°. ionic equilibrium. Electrochemistry: types of conductors, classification of compounds, electrolysis, Faraday's laws of electrolysis. Application of electrolysis. Introduction to electrochemical cells.

CHM112 - Chemistry and Society (1 Unit)

Energy sources: fossil fuels, hydroelectric, hydrodynamics, solar, nuclear. Renewable and non-renewable energy sources. Chemistry and environment; air pollution. Water pollution, solid waste. Pollution control.

MAT111 - Mathematics I: Algebra (3 Units)

Algebra of Sets; special sets ($\mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R} \subset \mathbb{C}$); theory of indices, law of logarithms, indical equations, surdic equations. Polynomials, the remainder and factor theorems; polynomial equations and inequalities-especially linear, quadratic and cubic. Solving quadratic equations and cubic equations with an integral root. Domain and zeroes of rational functions. Partial fractions. Permutations and combinations. The binomial theorem for any index and applications. Sequences and series of real numbers (including AP and GP). Algebra of complex numbers. Introduction to m x n matrices; elementary operations on matrices and applications to solution of linear equations. Elementary properties of determinants of at most 3 x 3 matrices; The Rule of Sarrus.

PHY111 - Mechanics and Properties of Matter (2 Units)

Physical quantities, Units and dimensions, Scalars and vectors; Fundamental laws of Mechanics: Statics, Kinematics, Dynamics; Newton's laws of motion, particles, rigid bodies, simple harmonic motion; Friction, Molecular treatment of Properties of Matter, elasticity, Hooke's law, Young's shear and bulk moduli, Hydrostatic, Archimedes Principle; Work, energy and power; Centre of mass, Newton's law of universal gravitation, Kepler's laws, Pressure in fluids, Intermolecular forces, Surface tension, Hooke's law, Young's modulus.

Omega Semester

BLY121 - Plant Diversity: Forms and Functions (3 Units)

Diversity, morphology and general characteristics of algae, bryophytes, pteridophytes, gymnosperms and angiosperms structure and functions of main organs in angiosperms.

BLY122 - Introductory Ecology (2 Units)

Factors controlling the distribution of plants and animals in the biosphere. Basic units of ecology (populations, communities and ecosystems). Biotic and abiotic component of ecosystem. Succession and climax. Interactions. Man and environment.

MCB121 - Laboratory Techniques in Microbiology (3 Units)

Introduction to laboratory equipment and wares; functions, use and maintenance. Isolation of bacteria, fungi and viruses from samples. Aseptic techniques. Microscopy and non-cultural methods of demonstrating the presence of microorganisms. Methods in microbial enumeration. Stains, reagents and media. Standardization of bacterial inoculum. Preparation of pure cultures, methods of storage and preservation of cultures.

MCB122 - Microbial Taxonomy, Classification and Nomemclature (3 Units)

Overview of the concept of taxonomy (systematics), nomenclature, identification and classification. Criteria for species delineation. Genotypic and phenotypic methods of classification.

CHM121 - General Organic Chemistry (2 Units)

Introduction to and importance of organic chemistry. Qualitative analysis of organic compounds. Isolation and purification of organic compounds. Quantitative analysis of organic compounds. Determination of structure of organic compounds; empirical, molecular and structural formulas. Hybridization; formation of sp^3, sp^2, sp orbital in carbon. Homologous series and functional groups. Isomerism-structural and stereoisomerism. Aliphatic hydrocarbon chemistry: alkenes, alkenes, alkynes-nomenclature (IUPAC), physical properties, preparation and chemical reactions with simple mechanism where applicable.

CHM122 - General Inorganic Chemistry (2 Units)

Chemical bonding and structure: ionic, covalent, coordinate covalent (dative), metallic, hydrogen bonding. General properties of compounds formed by the different types of bonding. Influence of bonding on size, shape and structure. Main Group Chemistry (Groups IA – VIIIA): trends in the properties of elements (structure, ionization energies, physical and chemical properties). Properties of selected types of compounds.

CSC121 - Introduction to Problem Solving (2 Units)

Problem solving strategies, Roles of algorithm in problem solving process, implementation strategies, concepts and properties of algorithm. Using C-language.

200 Level

Alpha Semester

MCB211 - Bacteriology (3 Units)
Algorithms for identification of major groups of bacteria; Gram-positive cocci, Aerobic Gram-positive rods, Aerobic Gram-negative bacteria, Anaerobic bacteria, Curved and Spiral-shaped Gram-negative rods, Mycoplasma, Ureaplasma and Obligate intracellular bacteria.

MCB212 - General Mycology (3 Units)
Fungal morphology, ecology, classification and characterization. Epidemiology of important fungi and public health. Industrial and environmental significant fungi. Laboratory study of fungi.

BCH211 - Biomolecules I (2 Units)
Chemistry of amino acids, proteins and their derivatives: methods of isolation and identification. Primary, secondary, tertiary and quaternary structure of proteins. Enzymes, vitamins and Coenzymes. Chemistry and structure of nucleic acids.

BLY211 - Introductory Genetics and Evolution (2 Units)
Principles of inheritance, quantitative inheritance, heritable and non-heritable characteristics, probability and tests of goodness of fit, structure and behaviour of chromosomes, variations in genome structure. Current concepts of evolution, genetic variation and appreciation. Evolution and speciation.

BLY213 - Basic Biological Techniques (2 Units)
Microscope. Preparation of microscope slides, Photometry, colorimetry, Chromatography, Conductometry, Experimental Design.

BLY217 - Introduction to Biotechnology (2 Units)
Basic concepts of biotechnology; history and evolution of biotechnology; the inter-disciplinary nature of biotechnology. Introduction to the

Principles and techniques in biotechnology. Applications of biotechnology in medicine, food/agriculture, industries and environment. Genetic Modification. The Biotechnology of enzymes and biocatalysis. Biotechnology of microbes.

BCH212 - Introduction to Physical Biochemistry (2 Units)

Water: physical properties and hydrogen bonding; water as a solvent, hydrophobic interactions. Solutions, osmotic pressure. Acids and bases; pH and pK values and their effects on cellular activities. Buffers, Principles and Applications of thermodynamics and chemical kinetics (driving forces, coupled conformational changes etc.) and mechanisms of biochemical processes involving proteins, lipids, and nucleic acids in solution. Protein folding, nucleic and helix formation, micelle formation; ligand binding, cooperative binding and other assembly processes; effects of water, salts, other solutes, temperature and pressure on biochemical processes; protein-nucleic acid interactions and enzyme catalysis. Electrochemical cells and redox reactions. Biophysical techniques; optical microscopy, scanning probe microscopy and electrophysiology.

BCH213 - General Practical Biochemistry 1 (1 Unit)

Introduction to Biochemistry laboratory, Preparation of solutions and serial dilutions, Standardization of acids and bases, Preparation of buffers; acetate buffer, pH measurement using pH meter and indicators, Effect of acid, base and water on buffers, General qualitative tests for proteins and amino acids, General qualitative tests for nucleotide bases.

CHM211 - Basic Inorganic Chemistry (2 Units)

Qualitative treatment of Molecular Orbital and Valence Bond theories. Introduction to the chemistry of transition elements, lanthanides and actinides: definition and general characteristics of transition elements, lanthanides and actinides, electronic configuration of the atoms and ions. Descriptive chemistry of some selected transition metals. 1st, 2nd, and 3rd transition series, lanthanides and actinides. Coordination Chemistry. Ligand and crystal field theories. Structure, reactivity and applications of coordination compounds.

CHM212 - Basic Physical Chemistry (2 Units)
Kinetic theory of gases. Molecular velocities and their distribution. Second law of thermodynamics. Entropy and free energy. Principles and applications of free energy concepts in determining spontaneity of reaction. Experimental methods for the determination of rates of reactions. Formation of rate equation for second, third and fourth order of reaction. Experimental determination of order of reaction. Rates laws, mechanism and theories of elementary processes.

MAT217 - Statistics for Biological Sciences (2 Units)
Use of Statistical Methods in Biology. Frequency distributions. Laws of probability. The Binomial, Poisson and Normal distributions.

Omega Semester

BCH221 - Biomolecules II (2 Units)
Chemistry and structure of carbohydrates: sugars, storage and structural polysaccharides; complex carbohydrates. Chemistry and structure of lipids; storage and membrane lipids. Determination and biochemical applications of the structures. Structures and functions of major cell components.

BCH224 - Introductory Molecular Biology (3 Units)
Organization of Gene structure in prokaryotes and Eukaryotes; Bacteriophages and Eukaryotic viruses (structure, life cycles, biological assays etc.); Mutation and Mutagenesis; DNA repair mechanisms; Recombination at the molecular level; Plasmids and Transposons, Restriction Endonucleases and Nucleases.

BLY221 - Basic Invertebrate Zoology (3 Units)
The Biology of Amoeba, Paramecium. Plasmodium, Leucosolenia, Obelia, Hydra, Aurelia, Actinia, Dugesia, Fasciola, Tenia, Ascaris, Hyperiodirilus, Nereis, Hirudo, Achachatina. Aspatheria, Sepia, Macrobrachium, Lycosa, Polydesmus, Periplaneta and Asterepecten – to

illustrate the classification, organization, evolutionary trends and diversity of invertebrates.

BLY222 – Plant Physiology (2 Units)
Taxonomy and its significance. A biosystematic approach to classification of organisms and nomenclature. Principles and concepts in plant taxonomy. Construction and use of taxonomic keys. Experimental taxonomy with special emphasis on cytotaxonomy and chemotaxonomy.

BLY223 - Basic Chordate Zoology (2 Units)
The Biology of Balanoglossus, Ciona, Branchiostoma, Petromyzon, Scolidon, Tilapia, Bufo, Agama, Colubia and Rattus to illustrate the classification, organization evolutionary trends and diversity of chordates.

BLY225 - Parasitology (3 Units)
Classification, adaptation morphology, anatomy, Life cycle and other features of interest in the protozoans, Platyhelminthes, nematodes and parasitic arthropods; drawing particular attention to the various adaptations exhibited by selected members of the group. Facultative and obligate parasitism, ecto and endo parasitism. Parasites of medical and veterinary importance. Laboratory methods in parasitology.

MCB222 - Techniques in Virology (3 Units)
Relevance of viruses in industry, agriculture, environment and medicine. Methods for virus cultivation, detection and identification. Methods of virus transmission. Maintenance of viruses in plant and animal cells *in vivo*. Application of tissue/cell culture techniques in virology.

BCH225 - General Practical Biochemistry II (1 Unit)
General qualitative tests for carbohydrates, Qualitative tests for specific carbohydrates, Identification of carbohydrates, Acid hydrolysis of starch, Semi-qualitative estimation of glucose, Total carbohydrate determination by Anthrone method, Estimation of reducing sugars by Somogyi method, Determination of blood sugar by Aniline method. Determination of sugars in soft drinks, Determination of glucose by glucose oxidase

method, General qualitative tests for lipids, Determination of saponification and Iodine number, Determination of blood cholesterol, Estimation of free fatty acids, Estimation of triglycerides by colorimetric methods.

CHM221 - Basic Organic Chemistry (2 Units)

Factors affecting structure and physical properties of organic compounds; factors affecting availability of electrons. Stereochemistry, energy of activation and free radical substitution reactions in alkanes. Electrophilic and necleophilic substitution reactions. Aromaticity. Basic organic reactions, e.g. addition, free radical, elimination and condensation reactions etc. Some named organic reactions.

CHM228 - Experimental Organic Chemistry (1 Unit)

A selection of experiments to illustrate principles taught in CHM221 course. Topics include qualitative organic analysis, organic preparation and preparation of crystalline organic derivatives.

300 Level

Alpha Semester

MCB311 - Microbial Physiology (3 Units)

Microbial nutrition and growth. Generation of energy for metabolism, transport system, thermodynamics and enzymes. Fermentation and biosynthesis.

MCB312 - Food Microbiology (3 Units)

Survey of microorganisms in food (processed and unprocessed). Intrinsic and extrinsic properties of food that affect microbial survival and growth. Application of microorganisms in food production. Food quality and control safety. HACCP system: use in controlling microbiological hazards in industrial processing of food. Food spoilage and preservation. Fermented Nigeria foods and probiotics. Epidemiology of important food borne pathogens.

MCB313 - Clinical Microbiology (3 Units)
Selection, collection and transportation of clinical specimens. Handling of hazardous specimens. Packaging, shipment of cultures, clinical specimens and hazardous materials. Disposal of cultures and hazardous materials. Aseptic and Safety measures. Cultivation and identification of pathogenic bacteria (conventional and rapid diagnostic methods) in blood, urine, Cerebro Spiral Fluid (CSF), sputum, stool, abscess and purulent materials. Clinical and laboratory diagnosis of sexually transmitted diseases and sexually transmitted Infections (STI). Methods for antibiotic susceptibility testing.

MCB314 - Soil and Plant Microbiology (3 Units)
Factors affecting distribution and activities of microorganisms in soil. Role of microorganisms in decomposition, soil fertility and recycling of nutrients. Mycorrhiza and nitrogen fixation. Concept of plant diseases. Classsification of plant diseases. Infectious diseases of some economic crops in Nigeria. Practical plant protection methods (chemical and biological controls). Epiphytotics and causes. Disease forcasting.

MCB315 - Analytical Microbiology and Quality Control (2 Units)
Microbiological standards of water, foods, pharmaceuticals and other industrial products. National and international Agencies responsible for the establishment and implementation of standards, specifications and relevant regulations. Methods of quality control assessments. Industrial Plant sanitation and hygiene. Quality charts according to variables and attributes. In process quality control.

MCB316 - Immunology (3 Units)
Evolution of immune system. Cells of the immune system (myeloid and lymphoid cells). The non-specific immune system. Antigen and antibody diversity (structure, properties and production). Major histocompatibility complex (MHC). Recognition of self and immune tolerance. The complement system. Transplantation and hypersensitivity. Genetic defects in the immune system. Immunological assays. Vaccine and immunization.

BLY319 - Biostatistics and Bioinformatics (2 Units)

Basic statistical concepts, Experimental design, Data transformation, Biological data, Accuracy of Measurement, Significant figures. Frequency distribution. Measure of central tendency, Measure of dispersion and variability. Graphical presentation of data. Normal distribution and standard curve. Statistical hypotheses and level of significance, Central limit theorem and confidence interval. *t*-test: Student *t*- distribution, One sample hypotheses, Two sample hypotheses: (Paired and Unpaired) Parametric *t*- distribution, Non- Parametric *t*- distribution. Multisample hypotheses: ANOVA, Fischer's test. Simple Linear Correlation and Regression. Sequence Analysis, Molecular Phylogenetics, Basic Structure Modeling, Visualization of Alignments, Trees and Structure Models.

Omega Semester

MCB329 - Industrial Training (6 Units)

Industrial training in an Establishment where microbiological practice is carried out.

400 Level

Alpha Semester

MCB411 - Environmental and Petroleum Microbiology (3 Units)

Microflora of different environment (air, terrestrial, aquatic). Effect of pollution on ecology of microbial community. Biofilms and methods of study of biofilm consortia. Compositing and municipal waste management. Selection, sampling and collection of environmental samples. The role of microorganisms in prospecting recovery and degradation of petroleum products. Corrossion and mining microbiology and oil reservoir souring. Principle of microbial deterioration of materials (jet fuels, paper, paints, textiles, leather, metals). The microbiology of water supply. Assessment of sanitary quality of water bodies.

Characterization, treatment and disposal of sewage. Microbial life and human space flight.

MCB413 - Microbial Genetics (3 Units)

General principles of microbial genetics. The gene code, gene structure. Mutation and their chemical basis. Detection and isolation of mutants. Carcinogenicity testing. DNA repair. General principles of bacterial recombination. Bacterial plasmids. Conjugation, transformation and transduction. Mapping and sequencing of genome. Recombination and genome mapping in viruses.

MCB414 – Comparative Virology (3 Units)

Characterization of common plant viruses and diseases. Control of plant viral diseases. Major group of human viruses; DNA viruses, RNA viruses, Hepatitis viruses, Arboviruses, Tumor viruses, Slow viruses and prions. Human immunodeficiency virus and minor viral pathogens. Current trends in virus control and genetic engineering; interferons, plant derived edible vaccines, gene cloning and the use of transgenic plants. Chemotherapy of viral infections. Functional peculiarities in viruses (Satellites, viroids, defective nucleic acids and prions)

MCB415 - Pharmaceutical Microbiology and Antimicrobial Agents (3 Units)

Pharmaceutical products of microbial origin. Industrial production of some pharmaceutical products. Quality assessment of sterile and non-sterile pharmaceuticals.Recent techniques in aseptic processing (class I, II, III environment; resolic sterility testing, pyrogen test, principle of good manufacturing practice). Resistance of microorganisms to antimicrobials and evaluation of activities of antibiotics and disinfectants. Screening and assessment of activities of new antibiotics and disinfectants. Expanding the frontiers of medicinal plants.

MCB416 - Epidemiology and Public Health Microbiology (3 Units)

Nosocomial and community acquired infections. Epidemiology and pathogenesis of salmonellosis, E. coli O157H infections, MRSA,

vancomycin resistant enterococci, Mycobacterium tuberculosis and the Non-Mycobacterium tuberculosis mycobacteria and other emerging and re-emerging bacterial pathogens. Herd immunity. Hospital infection control programme. Laboratory procedures for the epidemiological analysis of microorganisms (biotyping and genetic fingerprinting techniques). Investigation of foodborne and waterborne outbreaks.

MCB417 - Research Methods in Microbiology (2 Units)

Operations of latest Microbiological Equipment, Methods of Research. Evaluation and design of experimental microbiology from available information and data. Analysis, interpretation and inference – drawing from microbiological research data. Assimilation and dissemination of information. Effective use of library, preparation of dissertations or theses papers for Journal Publications and Conferences.

Omega Semester

MCB421 - Industrial Microbiology (3 Units)

Nature of industrial microbiology. Examples of industrial microorganism and their characteristics. Propagation, maintenance and improvement of industrial microorganisms and Patents. Optimization of fermented processes. Industrial products of microbial origin and their production (beverages, acids, enzymes, amino acids, proteins (SCP), steroids transformation, whole cell and immobilized cells. Bioassays in industrial production and quality control. Microbiological standards and specifications.

MCB422 - Fermentation and Substrate-Enzyme Biotechnology (3 Units)

Design, classification and analysis of biological reactors and fermenters. Fermentation and brewing technology. Fermentation products and single cell proteins. Introduction to substrate and enzyme technology. Industrial application; substrate sourcing and adaptation of microorganisms for efficient enzyme production. Metabolic pathways and energetics of the cells.

MCB423 - Medical Entomology (3 Units)

History of medical entomology. Some common tropical parasitic diseases indigenous in Nigeria and Africa. Arthropods as direct agents of diseases (myiasis). Arthropods as gents of disease pathogens. Invertebrate reservoirs of parasitic pathogens. Life history of arthropods vectors and disease transmitted (mosquitoes, tse tse fly, muscid flies, lice, mites, bugs, fleas, sandfly etc). Factors that make arthropods effective vectors for disease transmission. Control and prevention of arthropod borne diseases.

MCB424 - Review Seminar (3 Units)

Literature review of an approved topic in microbiology plus oral presentation.

MCB425 - Research Project (6 Units)

Selected topics of relevance in Microbiology (Medical, Pharmaceuticals, Industrial, Food, Petroleum, Environment and Biotechnology).

Refrigerated Centrifuge at Molecular Biology Research Lab

Atomic Absorption Spectrophotometer at the Central Instrumentation Room in the Chemistry Department

Gas Chromatograph at the Central Instrumentation Room in the Chemistry Department

6.2 DEPARTMENT OF CHEMISTRY

OVERVIEW OF THE DEPARTMENT

The Department of Chemistry was created from the Department of Applied Sciences which was established in the 2004/2005 academic session. The Department of Applied Sciences offered the following Programmes:

1. B.Sc Applied Chemistry
2. B.Sc Applied Mathematics and
3. B.Sc Applied Physics

Before the end of the session, the name of the Department was changed to the Department of Natural Sciences to include three (3) additional Programmes namely: B.Sc Biochemistry, B.Sc Biology and B.Sc Microbiology.
The word applied was replaced with industrial to make the Programmes more attractive to prospective students. In the 2006/2007 academic session, the Department of Natural Sciences was split into four (4) Departments namely Departments of Biological Sciences, offering B.Sc Biology, Biochemistry and Microbiology programmes; Chemistry, offering B.Sc Industrial Chemistry; Mathematics, offering B.Sc Industrial Mathematics, and Physics, offering B.Sc Industrial Physics.

Vision

The Department of Chemistry is to effectively impart our students' with modern Chemistry education targeted towards building a large, strong, diversified, sustainable and competitive economy, thereby guaranteeing the productivity and well-being of the people.

Mission

The Department of Chemistry aspires to eradicate poverty and restore the dignity of the black man by recognising and developing competencies and knowledge; encourage innovative thinking through intensive Chemistry education.

Philosophy

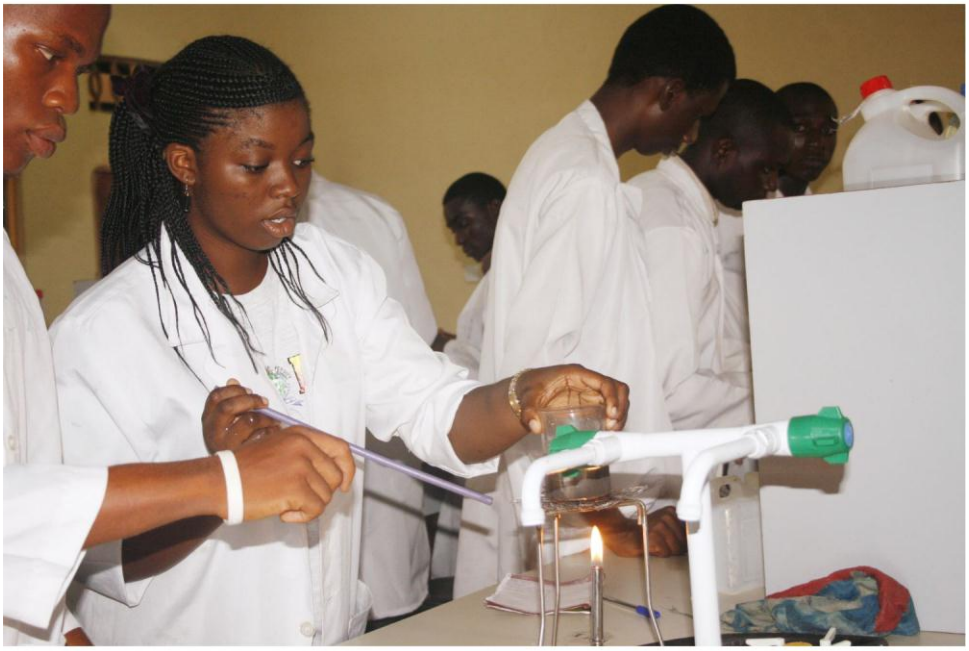
In line with Covenant University's Departure Philosophy, the Department of Chemistry is grounded in an awareness of the rapidly changing tie between Chemistry and the environment. Knowing this reality, the students are prepared for the practice of Chemistry using the perspective of industrial strategies that are based on evidence. The Department of Chemistry believes that all individuals have inherent worth, dignity and are continually developing and adapting. Learning is a life-long process which enables individuals to think critically in the appraisal and application of knowledge skills and values as these relate to self, others, and the environment. The Department is responsible for creating a learning environment that facilitates the acquisition of the necessary knowledge and skills for professional Chemistry practice.

Objectives

The specific objectives of the Chemistry Programme/options are to:

i. provide sound knowledge of Chemistry and skills to enable the students understand and appreciate chemical technology;
ii. impart to the students appropriate skills and abilities to handle chemical processes in the chemical and allied industries and in the environment;
iii. prepare the students for jobs in the growing chemical and allied manufacturing industries in the country;
iv. produce self-reliant graduates for self-employment in applied Chemistry; and
v. prepare the students for teaching and research work in applied Chemistry in our higher institutions of learning in the country.

Practical session at the Chemistry Lab



Practical session at the Chemistry Lab

LIST OF ACADEMIC STAFF IN THE DEPARTMENT

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Dr. Ajanaku, K. O.	B.Sc, M.Sc, Ph.D (Ibadan)	Associate Professor/ HOD	Waste Management / Materials Chemistry
2.	Prof. Ita, B. I.	B.Sc, M.Sc, Ph.D (Cal)	Professor	Physical Chemistry
3.	Dr. Inegbenebor, A. I.	B.Sc (Lagos), M.Sc, Ph.D (Wales)	Associate Professor	Applied Chemistry, Biogeoinorganic Chemistry & Bioinorganic Chemistry
4.	Dr. Benson, N. U.	B.Sc (Cal), M.Sc (Uyo), Ph.D (CU)	Associate Professor	Analytical/Environmental Chemistry
5.	Dr. Mordi, R. C.	B.Sc (Lagos), Ph.D (Manchester)	Senior Lecturer	Organic Chemistry
6.	Dr. Williams, A. B.	B.Sc (Cal), M.Sc (PH), Ph.D (CU)	Senior Lecturer	Analytical/Environmental Chemistry
7.	Dr. Ajani, O. O.	B.Sc, M.Sc (OAU), Ph.D (CU)	Senior Lecturer	Organic Chemistry
8.	Dr. Ogunniran, K. O.	B.Sc, M.Sc (Ilorin), Ph.D (CU)	Senior Lecturer	Inorganic Chemistry
9.	Dr. Olugbuyiro, J. A. O	B.Sc, M.Sc, M.Sc, Ph.D (Ibadan)	Lecturer I	Natural Product Chemistry
10.	Dr. Adekoya, J. A.	HND (Ogun), M.Sc, PGD (LASU), Ph.D (CU)	Lecturer I	Nano Chemistry
11.	Dr. Siyanbola, T. O.	B.Sc (UNAD), M.Tech (FUTA), Ph.D (CU)	Lecturer II	Industrial Chemistry/Polymeric Coatings
12.	Mrs. Anake, W. U.	B. Sc (Cal), M.Sc (Ibadan)	Lecturer II	Analytical/ Environmental Chemistry
13.	Mrs. Akinsiku, A. A.	B. Sc, M. Sc (UNAAB)	Lecturer II	Industrial Chemistry
14.	Mr. Ehi-Eromosele, C. O.	B. Sc, (AAU), M. Sc (Unilag)	Lecturer II	Physical Chemistry
15.	Mrs. Edobor-Osoh, A.	B. Sc, M.Sc (CU)	Assistant Lecturer	Biophysical Chemistry
16.	Mrs. Olarenwaju, I. O.	B. Sc, M.Sc (CU)	Assistant Lecturer	Natural Product Chemistry
17.	Mrs. Ajanaku, C. O.	B. Sc (Ibadan), M.Sc (CU)	Assistant Lecturer	Organic Chemistry / Natural Product Chemistry
18.	Mr. Aladesuyi, O.	B. Sc (UNAAD), M.Sc (CU)	Assistant Lecturer	Industrial Chemistry
19.	Mr. Adedapo, E. A.	B. Sc (Ilorin), M.Sc (Unilag)	Assistant Lecturer	Analytical Chemistry

VISITING LECTURERS

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Prof. Echeme, J. O.	B.Sc (B'lore), M. Sc, Ph.D (S. Venkat)	Professor	Organic/Medicinal Chemistry
2.	Prof. Das, S.K.	B.Sc, B.Tech, M.Tech. Ph.D (Calcutta)	Professor	Ceramic Engineering

TECHNOLOGISTS & LAB ATTENDANTS

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Mr. Phillips, O. A.	City & Guilds Technicians Certificates Course 735 Parts I, II & III	Chief Technologist	Physics/ Electronics Techniques
2.	Mrs. Owoeye ,T. F.	HND (Ilorin) (NIST)	Technologist I	Chemistry
3.	Mrs. Ayo-Ajayi, J.	HND (NIST)	Technologist I	Chemistry
4.	Mr. Durodola, B. M.	HND (NIST)	Technologist I	Chemistry
5.	Mrs. Ogunleye, O. M.	HND (NIST)	Technologist I	Chemistry
6.	Miss Owolabi, F. E.	HND	Technologist II	Chemistry
7.	Mr. Oluade, O. A.	HND (Ekiti)	Technologist II	Chemistry
8.	Miss Audu, O.Y.	B.Sc (Ilorin)	Technologist II	Industrial Chemistry
9.	Mr. Emmanuel, S. N.	SSCE	Lab. Attendant	
10.	Mrs. Adeboye, F. E.	ND (NIST)	Lab. Assistant	

ADMINISTRATIVE STAFF

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Olojede, I. T.	B.Sc (CU)	Admin. Officer	

Practical Session at the Chemistry Lab

Practical Session at the Chemistry Lab

6.2.1 CHEMISTRY PROGRAMME (WITH OPTIONS)

PROGRAMME: Chemistry
DEGREE AWARDED: B.Sc (Honours) Industrial Chemistry/Chemistry
DURATION: Four (4) years (8 Semesters)

Options:

1. B.Sc (Hons) Chemistry
2. B.Sc (Hons) Industrial Chemistry
3. B.Sc (Hons) Chemistry (Analytical/Environmental)
4. B.Sc (Hons) Chemistry (Materials/Polymer)

ADMISSION REQUIREMENTS

U.M.E. Requirements: Five 'O' Level (WASC/GCE/SSCE/NECO or equivalent) Credit passes in English Language, Chemistry, Mathematics, Physics and Biology, obtained in not more than 2 sittings. U.M.E Subjects include English Language, Chemistry, Mathematics and Physics.

GRADUATION REQUIREMENTS

To qualify for the 4-year Bachelor of Science (B.Sc) Degree award in the Chemistry Programme, a student must pass a minimum of 163 credit units, as shown in the Table below:

Required Units for Graduating in any of the B.Sc. Chemistry Programmes

Level	100	200	300	400	Total
Core/ Compulsory Courses	33	38	21	21	113
Electives				10	10
SWEP					0
Industrial Training [SIWES]			6		6
College Courses					0
University Courses	4	4	2	6	16
NUC Courses	10	6	2		18
Total	47	48	31	37	163

All students, irrespective of their options, take the same courses from 100 level to 300 level in order to ensure a good foundation in Chemistry.

100 Level Chemistry						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	CHM111	General Physical Chemistry	C	3		α
	CHM112	Chemistry and Society	C	1		α
	CHM119	General Chemistry Practical 1	C	1		α
	BLY111	Animal Diversity: Forms and Functions	C	3		α
	MAT111	Mathematics I: Algebra	C	3		α
	PHY111	Mechanics and Properties of Matter	C	2		α
	PHY119	Physics Practical I	C	1		α
	MAT114	Mathematics IV: Statistics I	C	2		α
	CHM121	General Organic Chemistry	C	2		Ω
	CHM122	General Inorganic Chemistry	C	2		Ω
	CHM129	General Chemistry Practical 1I	C	1		Ω
	BLY121	Plant Diversity: Forms and Functions	C	3		Ω
	MAT121	Mathematics V: Calculus	C	3		Ω
	MAT123	Mathematics VII: Statistics II	C	2		Ω
	PHY121	Electricity and Magnetism I	C	2		Ω
	CSC121	Introduction to Problem Solving	C	2		Ω
University Courses	EDS111	Entrepreneurial Development Studies I	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept – Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	CST111	Use of Library, Study Skills and Information Technology I	U	2		α
	GST111	Communication in English I	U	2		α
	CST121	Use of Library, Study Skills and Information Technology II	U	2	CST111	Ω
	GST121	Communication in English II	U	2	GST111	Ω
	GST122	Communication in French	U	2		Ω
			α =22 Ω = 25 Total = 47 Units			

200 Level Chemistry						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	CHM211	Basic Inorganic Chemistry	C	2	CHM122	α
	CHM212	Basic Physical Chemistry	C	2	CHM111	α
	CHM218	Experimental Inorganic Chemistry	C	1		α
	CHM216	Experimental Physical Chemistry I	C	1		α
	MAT212	Mathematical Methods I	C	3		α
	MAT213	Differential Equations I	C	3		α
	CSC211	Computer Programming I	C	3	CSC121	α
	PHY231	Electronics I	C	3		α
	BCH212	Introduction to Physical Biochemistry	C	3		α
	CHM221	Basic Organic Chemistry	C	2	CHM121	Ω
	CHM222	Analytical Chemistry	C	3	CHM111/ CHM122	Ω
	CHM223	Physical Chemistry	C	3	CHM212/ CHM216	Ω
	CHM224	Management and Chemical Industry	C	2		Ω
	CHM225	Industrial Raw Material Resource Inventory	C	2		Ω
	CHM226	Experimental Physical Chemistry II	C	1	CHM212/ CHM219	Ω
	CHM228	Experimental Organic Chemistry I	C	1		Ω
	CHM229	Experimental Analytical Chemistry	C	1		Ω
	CIS228	Use of Software Packages III	C	2		Ω
University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept –Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept - Sports	V	0		Ω
NUC General Courses	GST211	Logic, Philosophy and Human Existence	U	2		α
	GST221	Nigerian People and Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution	U	2		Ω
			α =25 Ω = 23 Total = 48 Units			

300 Level Chemistry						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre- requisite**	**Semester**
Compulsory Courses	CHM312	Organic Chemistry	C	3	CHM221	α
	CHM313	Experimental Organic Chemistry II	C	2	CHM 221, 228	α
	CHM315	Unit Operations/Heat Transfer	C	3	CHM212	α
	CHM317	Environmental Chemistry	C	3		α
	CHM332	Inorganic Chemistry	C	3		α
	CHM333	Instrumental Methods of Analysis	C	2		α
	CHM334	Applied Spectroscopy	C	2	CHM211	α
	CHM335	Industrial Chemistry Laboratory	C	1	CHM222,229	α
	CHM356	Metallurgy and Metal Fabrication	C	2		α
SIWES [Industrial Training]	CHM329	SIWES	S	6	6	Ω
University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =25 Ω = 6 Total = 31 Units			

400 Level - B.Sc (Hons) Chemistry						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	CHM410	Quantum mechanics	C	2	CHM 212, 223	α
	CHM412	Seminar	C	2		α
	CHM435	Modern Aspects of Organic Chemistry	C	2		α
	CHM474	Coordination Chemistry	C	2		α
	CHM420	Statistical thermodynamics	C	3	CHM212, 223	Ω
	CHM444	Molecular Spectroscopy	C	2		Ω
	CHM429	Research Project	C	6		Ω
	CHM446	Electrochemistry Cells and Corrosion	C	3	CHM311	Ω
Electives	*Note: Choose 10 Units from these Electives*					
	CHM406	Symmetry and Group Theory	E	2		α
	CHM432	Mineral Processing	E	2		α
	CHM434	Mathematics for Material Scientists	E	2		α
	CHM454	Materials Thermodynamics	E	2		α
	CHM494	Materials Processing	E	2		α
	CHM498	Advanced Electrochemistry	E	2		α
	CHM424	Introduction to Catalysis	E	2		Ω
	CHM440	Chemistry of Macro- Molecules	E	2		Ω
	CHM460	Modern Chemical Kinetics	E	2		Ω
	CHM484	Organometallic Chemistry	E	2		Ω
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS321	Entrepreneurial Development Studies VI	V	1		Ω
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC321	Total Man Concept VI	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α =16 Ω = 21 Total = 37 Units			

400 Level- B.Sc. (Hons) Industrial Chemistry						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	CHM411	Quality Control	C	2	CHM322	α
	CHM412	Seminar	C	2		α
	CHM418	Natural Products	C	2	CHM312	α
	CHM439	Analysis of Selected Materials	C	2	-	α
	CHM421	Surface Chemistry and Electrochemistry	C	3	CHM311	Ω
	CHM422	Petroleum Chemistry	C	2		Ω
	CHM429	Research Project	C	6		Ω
	CHM448	Industrial Analytical Chemistry	C	2		Ω
Electives	***Note:*** *Choose* ***10 Units*** *from these Electives*					
	CHM414	Fertilizers and Agrochemicals	E	2		α
	CHM415	Textile and Dyestuff Chemistry	E	2		α
	CHM416	Detergent and Cosmetics Chemistry	E	2		α
	CHM417	Sugar Technology	E	2		α
	CHM431	Polymer Chemistry	E	2		α
	CHM432	Mineral Processing	E	2		α
	CHM433	Wood, Pulp and Paper Chemistry	E	2		α
	CHM423	Polymer Technology	E	2		Ω
	CHM424	Introduction to Catalysis	E	2		Ω
	CHM425	Ceramics and Composite Materials	E	2		Ω
	CHM426	Pulp and Paper Technology	E	2		Ω
	CHM441	Food Chemistry	E	2		Ω
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS321	Entrepreneurial Development Studies VI	V	1		Ω
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC321	Total Man Concept VI	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept – Sports	V	0		Ω
			α =16 Ω = 21 Total = 37 Units			

400 Level - B.Sc (Hons) Chemistry (Analytical/Environmental Option)						
Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	CHM411	Quality Control	C	2	CHM322	α
	CHM412	Seminar	C	2		α
	CHM413	Natural Products	C	2		α
	CHM450	Environmental Assessment Techniques	C	2		α
	CHM462	General Concept in Environmental Chemistry	C	2		Ω
	CHM480	Separation Methods of Analysis	C	3	CHM311	Ω
	CHM429	Research Project	C	6		Ω
	CHM481	Quantitative Spectroscopic Methods	C	2		Ω
Electives	***Note:*** *Choose* ***10 Units*** *from these Electives*					
	CHM430	Environmental Analysis	E	2		α
	CHM438	Chemical Environmental Pollution	E	2		α
	CHM439	Analysis of Selected Materials	E	2		α
	CHM470	Water Analysis	E	2		α
	CHM477	Hazardous Waste Management	E	2		α
	CHM490	Automatization in Analytical Science	E	2		α
	CHM442	Chemical Oceanography	E	2		Ω
	CHM448	Industrial Analytical Chemistry	E	2		Ω
	CHM461	Global Chemical Environmental Issues	E	2		Ω
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS321	Entrepreneurial Development Studies VI	V	1		Ω
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC321	Total Man Concept VI	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α =16 Ω = 21 Total = 37 Units			

400 Level - B.Sc. (Hons) Chemistry (Materials/Polymer Option)						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	CHM411	Quality Control	C	2	CHM322	α
	CHM412	Seminar	C	2		α
	CHM434	Mathematics for Material Scientists	C	2		α
	CHM476	Basic Polymer Science I	C	2		α
	CHM420	Statistical Thermodynamics	C	3	CHM212, 223	Ω
	CHM446	Electrochemistry Cells and Corrosion	C	2	CHM311	Ω
	CHM429	Research Project	C	6		Ω
	CHM487	Basic Polymer Science II	C	2	CHM476	Ω
Electives	***Note:*** *Choose* ***10 Units*** *from these Electives*					
	CHM431	Polymer Chemistry	E	2		α
	CHM432	Mineral Processing	E	2		α
	CHM452	Polymer and Rubber Additives	E	2		α
	CHM453	Morphology	E	2		α
	CHM454	Materials Thermodynamics	E	2		α
	CHM492	Polymer Engineering	E	2		α
	CHM494	Materials Processing	E	2		α
	CHM423	Polymer Technology	E	2		Ω
	CHM424	Introduction to Catalysis	E	2		Ω
	CHM425	Ceramics and Composite Materials	E	2		Ω
	CHM464	Micro/Nano Processing Technology	E	2		Ω
	CHM484	Organometallic Chemistry	E	2		Ω
	CHM488	Polymer Nanotechnology	E	2		Ω
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS321	Entrepreneurial Development Studies VI	V	1		Ω
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC321	Total Man Concept VI	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept – Sports	V	0		Ω
			α =16 Ω = 21 Total = 37 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

CHM111 - General Physical Chemistry (3 Units)
Historical development of the atom: definition of atoms, Dalton's atomic theory, relative atomic masses. Fundamental particles of the atom and atomic structure. Modern electronic theory of atoms; electronic configuration of the elements. Periodicity of the elements. Radioactivity: Stoichiometry: mole concept, chemical formulas, equations and calculations. States of matter: gas – empirical gas laws, Ideal Gas Equation of State, qualitative treatment of kinetic theory of gases, real gases and deviations from ideal gas laws; liquid, – macroscopic properties of liquids, evaporation, vapour pressure and its variation with temperature, boiling point, heat of vaporization, Clausius-Clapeyron equation, freezing point, melting point and phase diagrams of simple systems; solids – types of solids and their properties, ionic solids and lattice energy, crystalline solids. Chemical Energetic: definition of some thermodynamic terms, heat, work, internal energy, enthalpy, pressure-volume work. Relationship between internal energy and enthalpy. First law of thermodynamics and its applications. Chemical Kinetics: rate of reaction, factors affecting reaction, order of reaction and how to determine it for zero order and first order reaction, rate of equation and temperature, reaction mechanisms and rate equation for simple reactions. Chemical Equilibrium: reversible reactions and chemical equilibrium, equilibrium constant, factors affecting equilibrium. Le Chatelier's Principle. Effect of temperature on equilibrium constant. Relationship between equilibrium constant and standard Gibbs Free Energy, ΔG^{o}. ionic equilibrium. Electrochemistry: types of conductors, classification of compounds, electrolysis, Faraday's laws of electrolysis. Application of electrolysis. Introduction to electrochemical cells.

CHM112 - Chemistry and Society (1 Unit)
Energy sources: fossil fuels, hydroelectric, hydrodynamics, solar, nuclear. Renewable and non-renewable energy sources. Chemistry and environment; air pollution. Water pollution, solid waste. Pollution control.

CHM119 - General Chemistry Practical I (1 Unit)
Practice in weighing and measurement of volume, preparations of standard solutions. Titrimetry: acid-base, oxidation-reduction, precipitation and complex metric titrations; gravimetric analysis.

BLY111 - Animal Diversity: Forms and Functions (3 Units)
Nomenclature and classification of animals. Diagnostic features of ten major animal phyla and their classes. Structure and functions of organs and organ systems in vertebrates e.g. rat.

MAT111 - Mathematics I: Algebra (3 Units)
Algebra of Sets; special set; theory of indices, law of logarithms, indical equations, surdic equations. Polynomials, the remainder and factor theorems; polynomial equations and inequalities-especially linear, quadratic and cubic. Solving quadratic equations and cubic equations with an integral root. Domain and zeroes of rational functions. Partial fractions. Permutations and combinations. The binomial theorem for any index and applications. Sequences and series of real numbers (including AP and GP). Algebra of complex numbers. Introduction to m x n matrices; elementary operations on matrices and applications to solution of linear equations. Elementary properties of determinants of at most 3 x 3 matrices; The Rule of Sarrus.

MAT114 - Mathematics IV: Statistics I (2 Units)
Introduction to statistics. Diagrammatic representation of descriptive data. Measures of location and dispersion for ungrouped data. Grouped distribution, measures of location and dispersion for grouped data. Problems of grouping. Associated graphs. Introduction to probability.

Sample space and events, addition law, use of permutation and combination in evaluating probability.

PHY111 - Mechanics and Properties of Matter (2 Units)

Physical quantities; Units and dimensions. Scalars and vectors. Kinematics. Dynamics; Newton's laws of motion; particles; rigid bodies; simple harmonic motion. Friction. Work, energy and power. Centre of mass. Newton's law of universal gravitation; Kepler's laws. Pressure in fluids. Intermolecular forces. Surface tension. Hook's law, Young's modulus.

PHY119 – Physics Practical I (1 Unit)

Simple experiments illustrating the topics covered in PHY111 and PHY112.

Omega Semester

CHM121 - General Organic Chemistry (2 Units)

Introduction to and importance of organic chemistry. Qualitative analysis of organic compounds. Isolation and purification of organic compounds. Quantitative analysis of organic compounds. Determination of structure of organic compounds; empirical, molecular and structural formulas. Hybridization; formation of sp^3, sp^2, sp orbital in carbon. Homologous series and functional groups. Isomerism-structural and stereoisomerism. Aliphatic hydrocarbon chemistry: alkenes, alkenes, alkynes-nomenclature (IUPAC), physical properties, preparation and chemical reactions with simple mechanism where applicable.

CHM122 - General Inorganic Chemistry (2 Units)

Chemical bonding and structure: ionic, covalent, coordinate covalent (dative), metallic, hydrogen bonding. General properties of compounds formed by the different types of bonding. Influence of bonding on size, shape and structure. Main Group Chemistry (Groups IA – VIIIA): trends

in the properties of elements (structure, ionization energies, physical and chemical properties). Properties of selected types of compounds.

CHM129 - General Chemistry Practical II (1 Unit)

Qualitative analysis for common captions and anions. Identification of organic functional groups: hydroxyl, carbonyl, carboxylic, amino groups, sugar, carbohydrate, protein, etc.

BLY121 - Plant Diversity: Forms and Functions (3 Units)

Occurrence and evolution of plants. Classification and Ecological distribution of plants. Diversity, Morphology, Life Cycle, Alternation of generation and General Characteristics in: Thallopyhta, Bryophyta, Pteridophyta, Spermatophyta. Structure, functions and modifications in Root, Stem Leaf, Flower, Fruit and Seed of Angiosperms. Transport in Angiosperms: Xylem and Phloem systems. Ecologic and Economic Importance of Plants.

PHY121 - Electricity and Magnetism (2 Units)

Electricity, coulomb's law, Ohm's law. Gauss's theorem, Capacitors, Kirchoffs laws, Electrical energy, DC, Bridges potentiometer, Magnetic effect of current, Electromagnetic induction, Moving coil and ballistic galvanometers, Multimeters, DC and AC motors, and generators, Hysteresis, Power in AC circuits, Semi conductors, Conductivity and Mobility, Rectification.

MAT121 - Mathematics V: Calculus (3 Units)

Functions: Concept and notation. Polynomial and rational functions. Idea of limits; technique of finding limits. Derivatives: definition and calculation from first principles. Derivatives of constants, power, sums, products, quotients. Composite functions, circular functions, logarithmic/exponential function. Higher order derivatives; applications, small increments, approximations and errors. Extrema; integration of sum/scalar multiple of functions with applications; integration of circular functions. Definite integrals: general properties of definite integrals, some applications to geometry, mechanics, Biology and Social Sciences.

Derivatives of hyperbolic functions; inverse circular/hyperbolic functions. Method of taking the logarithm before differentiating; successive differentiation of implicit functions and of functions like $e^{-at}\sin(bt + c)$. Hard Integration: Further techniques. Evaluation of integrals of the form Integration of irrational functions, integration by substitutions, integration by parts.

MAT123 - Mathematics VII: Statistics II (2 Units)

Linear correlation, scatter diagram, product moment and rank correlation. Linear regression. Probability distribution: binomial, Poisson and normal distributions. Sampling and sampling distribution. Estimation of population parameters, confidence intervals, test of hypothesis concerning two or more populations, contingency tables.

CSC121 - Introduction to Problem Solving (2 Units)

Problem solving strategies, Roles of algorithm in problem solving process, implementation strategies, concepts and properties of algorithm. Using C-language.

200 Level

Alpha Semester

CHM211 - Basic Inorganic Chemistry (2 Units)

Qualitative treatment of Molecular Orbital and Valence Bond theories. Chemistry of Main Group elements: definition and general characteristics of transition elements. Chemistry of hydrogen and noble gases. Groups IA and IIA, boron and aluminium, carbon and silicon, nitrogen and phosphorus, oxygen and sulphur and the halogens. Introduction to the Chemistry of transition elements: definition, electronic configuration of the atoms and ions, and the general characteristics of the transition elements, lanthanides and actinides.

CHM212 - Basic Physical Chemistry (2 Units)

Kinetic theory of gases. Molecular velocities and their distribution. Second law of thermodynamics. Entropy and free energy. Principles and applications of free energy concepts in determining spontaneity of reaction. Experimental methods for the determination of rates of reactions. Formation of rate equation for second, third and fourth order of reaction. Experimental determination of order of reaction. Rates laws, mechanism and theories of elementary processes.

CHM216 - Experimental Physical Chemistry I (1 Unit)

A selection of experiments designed to provide illustrations of the important parts of the lectures in CHM212 Course. The experiments will afford the students the opportunity to develop their quantitative and analytical skills. Topics include chemical equilibria, heat of reaction by calorimetric technique, molecular mass determination by freezing point depression method, conductivity measurements, determination of reaction rate and activation energy.

CHM218 - Experimental Inorganic Chemistry (1 Unit)

A selection of experiments to illustrate principles taught in CHM211. The experiments will afford the students the opportunity to develop good experimental inorganic techniques, critical and analytical approach to laboratory work. Topics include quantitative inorganic analysis by volumetric and gravimetric methods, preparation of simple inorganic compounds and metal complexes.

BCH212 - Introduction to Physical Biochemistry (3 Units)

Water: Physical properties and hydrogen bonding; water as a solvent, hydrophobic interactions. Solution, Osmotic pressure. Acids and bases; pH and pK values and their effects on cellular activities. Buffers, Donnan equilibrium. Chemical kinetics. Chemical equilibrium. Applied thermodynamics. Electrochemical cells and redox reaction.

MAT212 - Mathematical Methods I (3 Units)

Partial differentiations, application and classification of critical points of functions of two variables. Lagrangian multipliers. Coordinate system: change from cartesian to polar, spherical and cylindrical coordinate systems. Taylor's and Maclaurin's series. Differential coefficients of the nth order. Lebnitz's rule, application to the solution of differential equations.

MAT213 - Differential Equations I (3 Units)

First order ordinary differential equations. Existence and uniqueness. Second order ordinary differential equations with constant coefficients. General theory of nth order linear equations. Laplace transforms, solution of initial value problem by Laplace transform method. Simple treatment of partial differential equation in two independent variables. Application of ordinary differential equations and partial differential equations to physical life and social sciences.

CSC211 - Computer Programming I (3 Units)

Introduction to problem solving methods and algorithm development, designing, coding, debugging and documenting programmes using techniques of a good programming language style, programming language and programming algorithm development. A widely used programming language should be used in teaching the above. e.g. C++ language.

PHY231 - Electronics I (3 Units)

Prerequisite: PHY121

Thermionic emission; vacuum, thermionic devices; valves and the CRT, semiconductors; p-n junctions, diodes and their applications, bipolar transistor; characteristics and biasing of bipolar transistors, small signal amplifier waveform generators, logic elements and circuits, amplifiers, noise, feedback, simple resistive capacitive network, power, tunnel, Shot key and multifunction diodes and their applications.

Omega Semester

CHM221 - Basic Organic Chemistry (2 Units)

Factors affecting structure and physical properties of organic compounds; factors affecting availability of electrons. Stereochemistry, energy of activation and free radical substitution reactions in alkanes. Electrophilic and necleophilic substitution reactions. Aromaticity. Basic organic reactions, e.g. addition, free radical, elimination and condensation reactions etc. Some named organic reactions.

CHM222 - Analytical Chemistry (3 Units)

Theory of errors, statistical treatment of data. Theory of sampling. Chemical methods of analysis including volumetric, gravimetric and physico-chemical methods, optical methods of analysis. Principles of solvent extraction. Introduction to separation methods of analysis. Chromatography: thin layer, paper and column chromatography. The use of RF values.

CHM223 - Physical Chemistry (3 Units)

Chemical Kinetics: Theory of the rates of reaction in both gas phase and solutions. Complex reactions and catalysis. Electrolytic conductance. Measurement of conductance. Treatment of modern conductance. Qualitative treatment of Debye-Huckel theory. The Debye_Huckel limiting law. Applications of conductance measurements. Thermodynamics: Zeroth and third laws of thermodynamics, solutions and colligative properties, chemical and phase equilibria.

CHM224 - Management and Chemical Industry (2 Units)

Management theory. Management of personnel. Line and staff structure: functions and relationship. The Manager role. Organization structure and management structure. Authority and organization. Corporate policy and organizational constraints on management process. The decision process, managerial techniques, supportive information system. introduction to the anatomy of management, industrial relations, public

relations, Industrial psychology. General problem solving processes and creative thinking.

CHM225 - Industrial Raw Material Resource Inventory (2 Units)
Survey of Nigeria's industries and their raw material requirements. Mineral resources. Raw materials from petroleum, coal. Plant and animal products. Potentials and applications of locally available raw materials as industrial feedstocks.

CHM226 - Experimental Physical Chemistry II (1 Unit)
Determination of rate, rate constant and activation energy of a reaction. Determination of standard thermodynamic quantities of a reaction, phase rule. Application of electrochemical principles in titration reactions. Conductance measurements. Viscosity measurements.

CHM228 - Experimental Organic Chemistry I (1 Unit)
A selection of experiments to illustrate principles taught in CHM221 course. Topics include qualitative organic analysis, organic preparation and preparation of crystalline organic derivatives.

CHM229 - Experimental Analytical Chemistry (1 Unit)
The course is the practical component of CHM222 course. Topics include sampling technique and statistical treatment of data, solvent extraction, simple separation techniques and chromatography.

300 Level

Alpha Semester

CHM312 - Organic Chemistry (3 Units)
Alcohols and their reactions. Ethers and epoxides. Carboxylic acids and their derivatives. Aldehydes and Ketones, amines. Formulation of carbonions and their reactions. Aromatic, alicyclic and heterocyclic chemistry. Polyfunctional compounds.

CHM313 - Experimental Organic Chemistry II (2 Units)
Preparation of simple organic compounds, chemical transformation to show the concept of synthesis and mechanism of organic reactions.

CHM315 - Unit Operations/Heat Transfer (3 Units)
Introductory fluid mechanics and fluid handling processes. size reduction, filtration, concentrations, distillation and solvent processes. Heat transfer principles and applications in chemical industries, forced and natural convections, steady – state conduction, radiation, boiling and condensation. Boilers and heat exchangers.

CHM317 - Environmental Chemistry (3 Units)
Characteristics of the atmosphere, Sources and types of atmospheric pollution; Natural sources and human activities. Global warming and its effects. Ozone layer and its functions. Depletion of Ozone layer and its implication. Water Chemistry: Composition of domestic waste and water treatment. Solid wastes and their treatment.

CHM332 - Inorganic Chemistry (3 Units)
Chemistry of metals: occurrence, extraction, general properties and uses. Comparative chemistry of the following elements Ga, In, Ti; Ge, Sn, PB; As, Sb, Bi; and Se, Te, Po. Chemistry of transition metals, lanthanides and actinides. Ligands and Crystal field theories. Introduction of coordination chemistry: nomenclature and stereochemistry, reactivity and applications.

CHM333 - Instrumental Methods of Analysis (2 Units)
Spectroscopic techniques. Quantitative analysis. X-ray methods. Fluorescence technique, refractometry and interferometer polarimetry, voltametry, colorimetric.

CHM334 - Applied Spectroscopy (2 Units)
Basic principles and applications of UV/Vis, IR, NMR and Mass spectroscopy in the structural elucidation of compounds and quality control.

CHM335 – Industrial Chemistry Laboratory (1 Unit)
An integrated laboratory practicals covering specifically 300 level Industrial Chemistry Courses.

CHM356 - Metallurgy and Metal Fabrication (2 Units)
The scope of metallurgy; history of metallurgical processes in Nigeria. Modern metallurgical processes ad operations - production of metals and alloys. Machining processes: Metal cutting, mechanics of metal cutting, cutting tool materials; grinding processes. Metal forming: hot forming, cold forming. Casting and sintering processes. Oxidation and corrosion phenomena.

Omega Semester

CHM329 - SIWES (6 Units)
Students will be attached to various chemical industries and allied companies immediately after the 300L alpha semester examination for six months. A programme of training will be drawn by the College and the Industry for each student, and a prescribed log book with daily recording of the student activities is to be kept by each student and appropriately signed. At the end of the programme each student will be required to submit a written report and give oral presentation on the same. The grading will normally be based on the reports, presentation and assessment by the Industry base Supervisor.

400 Level

Alpha Semester

CHM406 - Symmetry and Group Theory (2 Units)
Definitions and theorems of Group Theory: properties of a Group; examples of Groups; subgroups; classes; Molecular symmetry and the symmetry groups: symmetry elements and operations; symmetry planes and reflections; inversion centre; proper axes and rotations; products of symmetry operations; equivalent symmetry elements and equivalent atoms; symmetry point groups; systematic procedure for symmetry classification of molecules; classes of symmetry operations; representation of groups; properties of matrices and vectors; the "Great Orthogonality Theorem" and its consequences; Character Tables; representations for cyclic groups; Group theory and quantum mechanics; wave functions as bases for irreducible representations; the Direct Product; identifying non-zero matrix elements; Applications in chemical systems.

CHM410 - Quantum Mechanics (2 Units)
Wave mechanics and application of boundary conditions. Bohr's theory of atomic spectra and its limitations. The Heisenberg uncertainty principle. Operators and the postulates of quantum mechanics. Term symbols; the Schroedinger wave equation (for the hydrogen and helium atoms, hydrogen molecule ion and hydrogen molecule) and application in the interpretation of spectra. Introductory molecular orbital theory for chemical bonding.

CHM411 - Quality Control (2 Units)
Chemical and technical quality control of textiles, plastics, food, dyes, soap and detergents, cosmetics, etc.

CHM412 - Seminar (2 Units)
A student chooses from a list of subjects of topical interest provided by academic staff, does a literature survey on the chosen topic and presents a written report and a seminar on it at the end of the semester.

CHM413 - Environmental Assessment Techniques (2 Units)
Introduction to principles of Environmental Assessment including Environmental Impact Assessment (EIA), Environmental Auditing, Environmental baseline studies, Environmental modeling, Policy and regulations.

CHM414 - Fertilizers and Agrochemicals (2 Units)
Introductory chemistry of fertilizers. Applications of fertilizers. Chemistry and applications of physically mixed and complex NPK fertilizers. Chemistry of organochlorine and organophoshorus insecticides, fungicides, herbicides and growth regulators. The effects of fertilizers and pesticides on the environment. Synthesis and structural elucidation of commercial fertilizers and pesticides.

CHM415 - Textile and Dyestuff Chemistry (2 Units)
Basic chemistry of natural and synthetic fibres, chemistry of dyes and bleaching; synthesis of dyes and intermediates; physico-chemical methods of dye analysis; applications of dyes for foods and drugs.

CHM416 - Detergent and Cosmetics Chemistry (2 Units)
Survey of classes of synthetic detergents and cosmetics, surfactants. Preparation of surfactants, detergents and cosmetics from local raw materials. Industrial applications of surfactant.

CHM417 - Sugar Technology (2 Units)
Introduction, crushing, shredding, extraction, diffusion, clarification, evaporation, crystallization and drying.

CHM418 - Natural Products (2 Units)
Organic natural products, including terpenes, steroids, alkaloids vitamins, antibiotics: synthesis, degradation and biological functions. Pheromone – a review. Conformational effects and interactions in polyfunctional molecules.

CHM430 - Environmental Analysis (2 Units)
Introduction, principles and applications. Environmental sampling methodology, Sample preservation and processing, Analytical techniques for environmental analysis, Data management and preservation.

CHM431 - Polymer Chemistry (2 Units)
Definitions of basic terms. Outline sources of raw materials for polymers. Phase systems for polymerization. Step-growth polymerization, free radical addition polymerization, ionic polymerization. Solubility and solution properties of polymers. Fibre forming polymers.

CHM432 - Mineral Processing (2 Units)
Occurrence and classification of important world course of economic minerals. Mineral resources of Nigeria. Physical processing of minerals. Mineral beneficiation. Chemical processing- hydro-pyro- and electrometallurgical processes. Extraction of selected metals featuring each of the chemical processes.

CHM433 - Wood, Pulp and Paper Chemistry (2 Units)
Forest – conservation, exploration and aforestation. Spicies, anatomy, physical properties and classification of wood. Preparation of wood for pulping. Physical and chemical methods of pulping. Bleaching reagents and pulp bleaching. Pulp properties and uses.

CHM434 - Mathematics for Material Scientists (2 Units)
This course covers the mathematical techniques necessary for understanding of materials science and engineering topics such as energetics, materials structure and symmetry, materials response to applied fields, mechanics and physics of solids and soft materials. Linear algebra and quadratic forms, symmetry operations, calculus of several variables, introduction to complex analysis, ordinary and partial differential equations and fourier analysis.

CHM435 - Modern Aspects of Organic Chemistry (2 Units)

NMR Spectroscopy: Advanced NMR techniques, with worked examples. Pericyclic Reactions: Thermal and Photochemical Reactions. Electrocyclic Reactions, cycloaddition reactions and sigmatropic rearrangements. Synthetic applications of pericyclic reactions. Organic reactive intermediates: carbanions and cations, radicals. Free radicals in organic synthesis. Carbenes. Nitrenes. Organometallics: properties of organometallics. Principles of organometallic reactions. Catalytic organometallic process: synthesis with organometallics. Retrosynthetic Analysis. Enantio and diastereocontrolled processes and asymmetric synthesis. Main group elementoorganic chemistry: S, Se, Si, application in organic synthesis.

CHM438 - Chemical Environmental Pollution (2 Units)

Principles of chemical pollution of environmental media (air, soil and water) and associated resources. Water/waste water Chemistry. Soil chemistry and fate of pollutants. Remediation of contaminated environment.

CHM439 - Analysis of Selected Materials (2 Units)

Analysis of air, soils, minerals, rocks and other miscellaneous materials.

CHM450 – Environmental Assessment Techniques (2 Units)

Electroanalytical methods, UV-Visible and molecular statistics in Chemical analysis absorption spectrophotometry, Analysis of material: methodology and examples selected from industrial raw materials, air, medicine and soil.

CHM452 - Polymer and Rubber Additives (2 Units)

Antioxidants, blowing agents, colourants, coupling agents, flame retardants, heat stabilisers, impact modifiers, lubricants, plasticisers, preservatives, uv stabilisers, etc. Accelerators, activators, antioxidants, antiozonants, blowing agents, bonding agents, fillers, plasticisers, process oils, retarders and vulcanising agents, etc.

CHM453 - Morphology (2 Units)

Effects of composition and architecture on morphology. Micellation of copolymers in solution. Introduction to integrated circuits (microchips). Optical lithography. Lithographic materials. Lithographic processes. Ion lithography. Construction of materials with defined shapes and dimensions at the nanometric level.

CHM454 - Materials Thermodynamics (2 Units)

Laws of thermodynamics and their applications to equilibrium and the properties of materials. Provides a foundation to treat general phenomena in materials science and engineering, including chemical reactions, magnetism, polarizability, and elasticity. Develops relations pertaining to multiphase equilibria as determined by a treatment of solution thermodynamics. Develops graphical constructions that are essential for the interpretation of phase diagrams. Treatment includes electrochemical equilibria and surface thermodynamics. Introduces aspects of statistical thermodynamics as they relate to macroscopic equilibrium phenomena.

CHM470 - Water Analysis (2 Units)

Water quality parameters for various (Industrial, Agricultural and Domestic) uses. Methods of analysis of water and wastewater for various quality parameters. Analysis for trace organics. Water pollution control and treatment.

CHM474 - Coordination Chemistry (2 Units)

The nomenclature of coordination compounds- types of ligands - coordination number, Kinetics and reaction mechanisms, characterization methods (molecular spectroscopy, including NMR spectroscopy) and theories on structure and bonding will be discussed with examples being drawn from coordination and organometallic complexes of the transition metals. Stereochemistry and isomerism constitutional, geometrical and optical-coordination numbers, CFT, crystal field splitting in octahedral, square planar, tetrahedral complexes, applications of CFT, Jahn-Teller distortions – limitations.

CHM476 - Basic Polymer Science I (2 Units)

Introduction, Structures and Molecular Weights, How Polymers are Made: Chain Reaction Polymerizations, Properties of Polymers: Thermal and Optical, How Polymers are Made: Step Reaction Polymerizations, Processing of Polymers, Properties of Polymers: Mechanical and Electrical, Properties of Polymers: Chemical and Solution, Specific Polymers and Applications.

CHM477 - Hazardous Waste Management (2 Units)

Types and classification of hazardous substances and wastes, Environmental chemical processes. Waste prevention including waste minimization, treatment and disposal. Waste recycling/recovery/reuse and Cleaner Production Technology.

CHM490 - Automation in Analytical Science (2 Units)

Expert systems: library programs which describe the analysis procedure (treatment of sample, separation methods and detection methods) of chemical compounds. Laboratory automation: centralized versus decentralized strategy, role of the central computer and the P.C., information processing and communication, Analysis automation: sampling, treatment of sample and detection, continuous analysis systems, GC automation and HPLC automation, data processing and control, applications, Optimization methods: experimental planning, mathematical models, calculation methods, application of 'central composite method' to ion chromatography.

CHM492 - Polymer Engineering (2 Units)

Flow Behaviour of Polymer Melts, Extrusion Processing, Injection Moulding Technology, Solid Phase Deformation Processing, Melt Processing, Coating Technology.

CHM494 - Materials Processing (2 Units)

Cost-effective and sustainable production of solid materials with a desired geometry, structure or distribution of structures, and production volume.

Different types of phase transformations which determine the structure in various processes for making materials, solid heat treatment, liquid-solid processing, fluid behaviour, deformation processing, and vapour-solid processing.

CHM498 - Advanced Electrochemistry (2 Units)

Overview of electrochemical systems, thermodynamics of electrochemical reactions, electrolysis, batteries and accumulators, and ion transport of ionic solutions, ionic activity coefficients in solutions, electrolysis and laws of electrolysis, overvoltage.

Omega Semester

CHM420 - Statistical Thermodynamics (3 Units)

Macroscopic properties in terms of the microscopic. The Boltzmann distribution law. Partition functions. Statistical thermodynamic discussion of entropy; the third law of thermodynamics. Equilibria and chemical potentials; use of calorimetric data and of standard thermodynamics data tables.

CHM421 - Surface Chemistry and Electrochemistry (3 Units)

Thermodynamics and electrical surface phenomena. Adsorption at the gas-solid, liquid-gas, and solid-liquid interfaces. The Gibbs adsorption, Kelvin equation, Langmuir isotherm. Wetting and flotation. The colloidal state. Electrode processes. Electrochemical cells. Emf measurement and its applications Thermodynamics and kinetics of electrode processes.

CHM422 - Petroleum Chemistry (2 Units)

Nature, Classification and Composition of crude petroleum and natural gases. Distribution of petroleum and natural gasses resources (the Global and Nigeria situations). Petroleum Technology. Survey of Refinery production and processes. Petrochemicals as industrial raw materials. Prospects for the Petrochemical industry in Nigeria.

CHM423 - Polymer Technology (2 Units)
Structural characterization and physical properties of polymers. Manufacture, processing (injection, extrusion, compression, transfer moulding) and properties of major thermosetting resins, thermoplastics, elastomers and fibre forming polymers. Polymer additives. Polymeric surface coatings and adhesives.

CHM424 - Introduction to Catalysis (2 Units)
General principles of catalytic processes. Homogeneous and heterogeneous catalysis. Kinetics and mechanisms of catalytic processes. Industrial applications of catalysis. Chemistry and structure of commercial catalyst.

CHM425 - Ceramics and Composite Materials (2 Units)
Chemistry; structure and properties of soils containing useful clays. Ceramics: definition, structure, production, chemical and physical properties; and application. Composites: definitions, types, production, properties and applications of some commercial composites - glasses, cements.

CHM426 - Pulp and Paper Technology (2 Units)
Detailed studies of the technology of pulp and paper manufacture. Special papers and structural boards. Pulp industries.

CHM429 - Research Project (6 Units)
Students are required at the 400 level to carry out research projects. The projects are sustained experimental investigations throughout the session on industrial or applied chemistry problems under the supervision of an academic member of staff. The project may be assigned to the student at the end of the 300 level. At the end of the investigation the student prepares a research project report. Assessment of the course is based on the report and students performance in the presentation of the report.

CHM440 - Chemistry of Macromolecules (2 Units)

Introductory symmetry, conformations and resolutions of aracemic mixtures, stereochemistry and biological activities, stereo-selectivity and stereospecificity in synthesis. The structures and brief chemistries of monosaccharides, polysaccharides, amino acids, proteins, DNA, synthetic polymers and detergents. Physical methods for the determination of the structures and properties of macromolecules. Interactions in biological macromolecules and membranes.

CHM441 - Food Chemistry (2 Units)

The nature of food, vitamins, additives and adulterants; chemistry and microbiology of production processes and control. Food preservation and spoilage. Processing and preservation of local food stuffs. Formulation and practice of food standards.

CHM442 - Chemical Oceanography (2 Units)

Principles of chemical oceanography. Historical review. Water balance on earth - hydrological cycle. The ocean as a chemical system. Water. Sea water. Impact of electrolytes on structure - properties. Components of marine water. Speciation of the components of seawater. Chemical elements and forms in marine water. Photosynthesis and marine life cycle. Dissolved gases in seawater. Nutrients. Elements of physical, biological and geological oceanography.

CHM444 - Molecular Spectroscopy (2 Units)

The underlying principles of spectroscopy are examined using quantum mechanics, the interaction of light and matter, and group theory as starting points. The main focus of this course is the various forms of optical spectroscopy, including rotational, vibrational and electronic spectroscopy, as well as a brief look at photoelectron spectroscopy and lasers. The course finishes with an introduction to radiofrequency spectroscopy techniques, including nuclear magnetic resonance and electron spin resonance.

CHM446 - Electrochemistry Cells and Corrosion (2 Units)

The electrochemical double layer, electrode kinetics, mass transfer in electrochemical systems, electrocatalysis. Design of electrochemical reactors, current distribution. Porous electrodes. Survey of electrochemical processes and power sources. Get basic and advanced information on conductivity, ions, fuel cells, batteries, and electrodes. What is corrosion? Cost of corrosion. Electrochemical mechanisms involved in corrosion. Aqueous corrosion. High-temperature (hot) corrosion. Equipment selection for corrosive service: materials (alloy) selection, economics, codes & standards, design aspects. Corrosion control: Corrosion monitoring. Corrosion issues in specific industries: power generation, chemical processing, oil & gas, marine, etc.

CHM448 - Industrial Analytical Chemistry (2 units)

Food and drugs, Agrochemicals and soil, sampling and analysis of industrial waste.

CHM460 - Modern Chemical Kinetics (2 Units)

A thorough study of modern chemical kinetics and reaction dynamics. Topics will include atomic spectroscopy, microwave, infrared and UV-visible spectroscopy of diatomic and polyatomic molecules, lasers, creation and detection of excited states, fluorescence, phosphorescence, radiationless processes and photochemical transformations.

CHM461 - Global Chemical Environmental Issues (2 Units)

Climate change and Global Warming, Ozone layer depletion, Biological diversity, Oil and Gas Pollution, Control of International trade in toxic chemicals.

CHM462 - General Concept in Environmental Chemistry (2 Units)

Basic concepts: Environment, Ecosystem, pollution, Pollutants Surveillance, Monitoring, Guidelines, Standards, Regulations, Compliance.

CHM464 - Micro/Nano Processing Technology (2 Units)
The theory and technology of micro/nano fabrication. Basic processing techniques such as diffusion, oxidation, photolithography, chemical vapor deposition.

CHM480 - Separation Methods of Analysis (3 Units)
Separation methods – ion exchange, gas, paper, liquid and column electrophesis, Atomic and molecular emission and absorption techniques, electroanalytical techniques, titrimetric analysis, complexometric and precipitation, gravimetric contamination and appropriate handling of precipitates/crystals colorimetry.

CHM481 - Quantitative Spectroscopic Methods (2 Units)
Atomic absorption spectroscopy (flame and non-flame). Atomic emission spectroscopy, UV-Visible absorption Spectrophotometry, Turbidimetry.

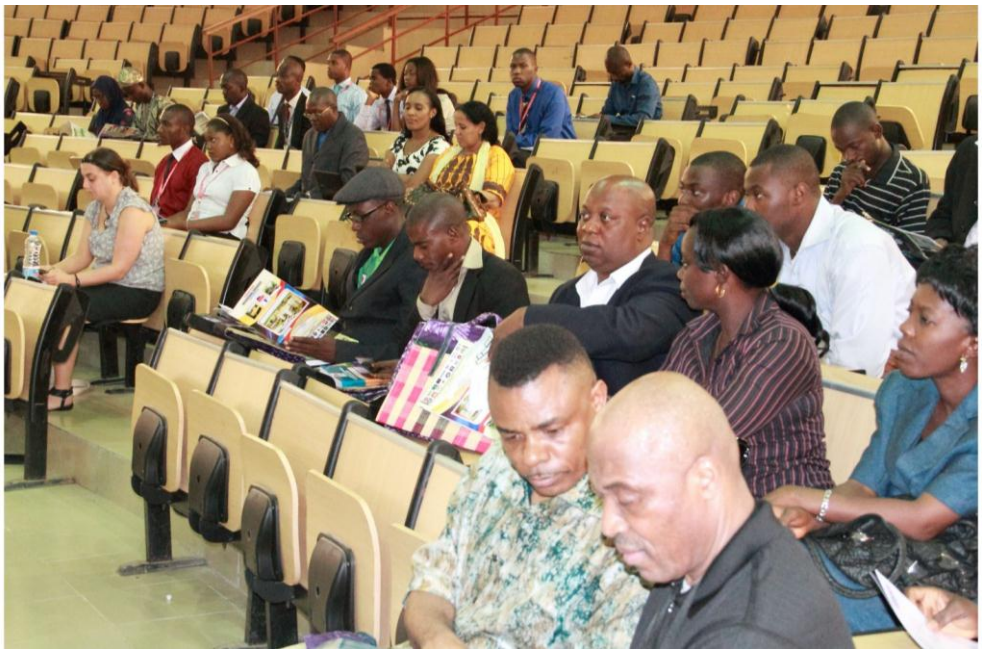
CHM484 - Organometallic Chemistry (2 Units)
This course examines important transformations of organotransition-metal species with an emphasis on basic mechanisms, structure-reactivity relationships, and applications in organic synthesis.

CHM487 - Basic Polymer Science II (2 Units)
Determination of Molecular Weight, Polymer characterization: NMR Spectroscopy, Thermal Analysis , IR/Raman Spectroscopy, Chromatographic Techniques , Other Techniques.

CHM488 - Polymer Nanotechnology (2 Units)
Synthesis of Controlled Architecture Polymers, Characterisation of Morphology, Block Copolymers, Polymer Surfaces and Interfaces, Polymer Electronics, Polymer Photonics, Responsive Systems.

Students performing experiment at the Chemistry Lab

International conference on ICT for Africa



A cross section of participants at the International conference on ICT for Africa

6.3 DEPARTMENT OF COMPUTER AND INFORMATION SCIENCES

OVERVIEW OF THE DEPARTMENT

The Department started in 2002 when the University commenced. Computer Science and Management Information System programmes were under the then Department of Computer and Information Technology with Prof. T.S Ibiyemi as the Head of the Department. The pioneer Faculty in the Department were Mr. V.C Osamor, Mr. Nicholas A. Omoregbe and Mr O.O. Olugbara. In 2003, Dr. C. K. Ayo joined the University and became the first substantive Head of Department. Dr. E.F Adebiyi was the Head of Department from 2008-2011. Also, Prof. C. K. Ayo became the Head of Department from 2011-2012 after serving as the Director of Academic planning. Dr. Nicholas A. Omoregbe assumed the office as Head of the Department of Computer and Information Sciences in 2012. Dr. A. A. Adebiyi became the Head of Department from 2014-to date. The Department which started with 13 faculty has produced several graduates at B.Sc, M.Sc and Ph.D levels.

Vision

The vision of the Department of Computer and Information Sciences is to be rated among the top-ranked academic departments in the world within a very short time through commitment to excellence in teaching, research and innovative community engagements. Our aim is to produce top graduates in the disciplines of Computer Science and Management Information System, who will be globally competitive and well equipped to make valuable contributions both locally and internationally.

Mission

The mission of the Department is to create an ambience for excellence where innovation and creativity in the field of computing from students and faculty is allowed to thrive. Our students will be equipped with the necessary tools that will strategically position them in the cutting edge of computing knowledge and applications, making them capable of making

significant contributions to the society. We specifically aim at the following:

- to produce top quality and competitive graduates of Computer Science and Management Information System that are in high demand in the industry.
- to develop the entrepreneurial aptitudes and potentials of our students through product-oriented research endeavours that are beneficial to the society, thereby entrenching in them the ethos of contribution.
- to train highly competent graduates who are imbued with the drive for excellence, innovation and creativity, and having capacity for intellectual distinction both in the academia and in the industry.
- to raise students with strong intellectual and moral orientation who will be valuable citizens, and new generation of leaders in the society.

Philosophy

The Department thrives on the philosophy that *excellent and comprehensive training is a necessary precursor of outstanding contributions*. Our focal objective is to produce graduates that are educationally, culturally, morally and spiritually sound, with a strong entrepreneurial orientation. Therefore, the Department is committed to the application of wide range of human capacity development strategies for teaching, learning, research, and community engagements that will engender the development of the total graduate. This is to ensure that our graduates have what it takes to be distinguished in a globally competitive world, by being not only worthy of the best employment opportunities, but also becoming job creators and employers of labour.

Objectives

The objectives of the **Computer Science Programme** are to:

(i) develop manpower with the skills and knowledge needed to meet the requirements of a rapidly advancing and challenging field of IT and Management;

(ii) produce graduates with IT skills and prepare them for global competitiveness; produce managers with the spirit of self-reliance and encourage them to adopt a holistic approach in professional pursuit;
(iii) develop human capital with emphasis on creating a knowledge-based society; and
(iv) develop manpower to pursue careers in a wide range of professions, including software development, web design, and system administration.

The objectives of the **Management Information System Programme** are to:

(i) develop manpower with the skills and knowledge needed to meet the requirements of a rapidly advancing and challenging field of IT and Management;
(ii) produce managers with the quality of self-reliance, and encourage them to adopt a holistic approach in professional pursuit;
(iii) develop system managers with adequate knowledge in business, management and IT;
(iv) produce career graduates in a wide range of professions, including software development, web design, system and business administration; and
(v) develop manpower for the ever-green and promising field of e-commerce and m-commerce.

LIST OF ACADEMIC STAFF IN THE DEPARTMENT

S/N	NAME	ACADEMIC QUALIFICATION	PROFESSIONAL QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Dr. A. A. Adebiyi	B.Sc, MBA, M.Sc, Ph.D	MNCS, MCPN	Senior Lecturer/ HOD	MIS
2.	Prof. C. K. Ayo	B.Sc, M.Sc, Ph.D	MNCS, MCPN, MCP,CCNA	Professor	Computer Science/ MIS
3.	Prof. E. F. Adebiyi	B.Sc, M.Sc, Ph.D	MNCS, MCPN, ASBCB, ISCB, NISEB	Professor	Computer Science/ Bioinformatics
4.	Prof. S. Misra	B.Sc, M.Sc, M.Tech, Ph.D	MIEEE	Professor	Computer Science/Software Engineering
5.	Dr. N. A. Omoregbe	B.Sc, M.Sc, Ph.D	MNCS, MIEEE	Associate Professor	Computer Science
6.	Dr. J. O. Daramola	B.Sc, M.Sc, Ph.D	MNCS, MCPN	Associate Professor	Computer Science
7.	Dr. V. C. Osamor	B.Sc, M.Sc, Ph.D	ASBCB, MNCS, MCPN	Senior Lecturer	Computer Science
8.	Dr. (Mrs.) O. O. Oladipupo	B.Sc, M.Sc, Ph.D	MNCS, MCPN	Senior Lecturer	Computer Science
9.	Dr. O. J. Oyelade	B.Sc, M.Sc, Ph.D	ASBCB, MNCS, MCPN	Senior Lecturer	Computer Science
10.	Dr. Z. O. Omogbadegun	B.Sc, M.Sc, Ph.D	MNCS, MCPN, MIEEE, MGHWA	Senior Lecturer	Computer Science
11.	Dr. I. O. Akinyemi	B.Sc, M.Sc, Ph.D	MNCS, MCPN	Senior Lecturer	Computer Science
12.	Dr. O. O. Oluwagbemi	B.Sc, M.Sc, Ph.D	MNCS, MCPN	Senior Lecturer	Computer Science
13.	Dr. A. A. Azeta	B.Sc, M.Sc, Ph.D	MNCS, MCPN	Senior Lecturer	Computer Science
14.	Dr. M. O. Oyelami	B.Sc, M.Sc, Ph.D	MNCS, MCPN	Senior Lecturer	Computer Science
15.	Dr. (Mrs) I. T. Afolabi	B.Sc, M.Sc, Ph.D	MNCS, MCPN	Lecturer I	Computer Science
16.	Dr. (Mrs) A. A. Oni	B.Sc, M.Sc, Ph.D		Lecturer I	MIS
17.	Dr. (Mrs.) M. O. Adebiyi	B.Sc, M.Sc, Ph.D	ISCB, ASBCB, IEEE, WIE, MNCS,	Lecturer I	Computer Science
18.	Dr. (Mrs) S. R. Okuboyejo	B.Sc, M.Sc, Ph.D		Lecturer II	MIS
19.	Mrs. M. I. Isewon	B.Sc, M.Sc		Asst. Lecturer	Computer Science
20.	Mr. O. Emebo	B.Sc, M.Sc		Asst. Lecturer	Computer Science
21.	Mr. A. A. Ezenwoke	B.Sc, M.Sc		Asst. Lecturer	Computer Science

22.	Mr. B. O. Odusote	B.Sc, M.Sc		Asst. Lecturer	Computer Science
23.	Mr. I. O. Eweoya	B.Tech, M.Sc		Asst. Lecturer	Computer Science
24.	Miss. Ekenna Chinwe Pamela	B.Sc, M.Sc		Asst. Lecturer	Computer Science
25.	Mrs. F. Oluwagbemi	B.Sc, M.Sc		Asst. Lecturer	MIS
26.	Mrs V. Samuel	B.Sc, M.Sc		Asst. Lecturer	Computer Science
27.	Mrs. O. T. Oladimeji	B.Sc, M.Sc		Asst. Lecturer	Computer Science
28.	Mr. A.O. Adewumi	B.Sc, M.Sc		Asst. Lecturer	Computer Science
29.	Mr. J. Oluranti	B.Sc. M.Sc		Asst. Lecturer	Computer Science

VISITING LECTURERS

S/N	NAME	ACADEMIC QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Prof. V. Mbarika	B.Sc, M.Sc, Ph.D	Professor	MIS
2.	Prof. M. O. Adigun	B.Sc, M.Sc, Ph.D	Professor	Computer Science
3.	Prof. Daniel Okunbor	B.Sc, M.Sc, Ph.D	Professor	Computer Science
4.	Dr. P. A. Adewole	B.Sc, M.Sc, Ph.D	Associate Professor	Computer Science
5.	Dr. O. B. Longe	B.Sc, M.Sc, Ph.D	Associate Professor	Computer Science
6.	Dr. A. Adewumi	B.Sc, M.Sc, Ph.D	Senior Lecturer	Computer Science

ADMINISTRATIVE STAFF

S/N	NAME	ACADEMIC QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Miss B. Olowolade	B.Sc.	Admin Officer	Mass Communication

PROGRAMMES IN THE DEPARTMENT

The Department offers two (2) Programmes:

1. B.Sc Computer Science (4yrs)
2. B.Sc Management Information System (4yrs)

ADMISSION REQUIREMENTS

(a) General Requirements:

The minimum entry requirement for admission into Covenant University is a Credit level pass in five (5) subjects, including English and Mathematics, obtained at not more than two sittings. In addition, Covenant University conducts Screening Exercises for all candidates seeking admission into the University. Candidates are also to note that there are other requirements that may be specific to a College and / or a Programme.

(b) College Requirements:

In addition to the general requirements above, the five- (5) subjects in the SSCE/GCE/NECO O/L or their equivalent must be obtained at not more than two sittings and must include Mathematics and English Language.

6.3.1 COMPUTER SCIENCE PROGRAMME

PROGRAMME: Compter Science

DEGREE AWARDED: B.Sc (Honours) Computer Science

DURATION: Four (4) Years (8 semesters)

ADDITIONAL ADMISSION REQUIREMENTS FOR B.Sc COMPUTER SCIENCE PROGRAMME

Credit level passes in five (5) subjects in the SSCE/GCE/NECO O/L or their equivalent must be obtained at not more than two sittings and must include Physics, Chemistry and either Biology or Agricultural Science.

Graduating Requirements

To graduate from the 4-year Bachelor of Science Degree Programme in Computer Science, students must have successfully completed a minimum of 152 Credit Units as shown below:

Graduating Required Units for B.Sc. Computer Science Programme

Level	100	200	300	400	Total
Core/ Compulsory Courses	29	25	15	31	100
Electives		6	4	4	14
Industrial Training [SIWES]			6		6
College Courses					0
University Courses	4	4	2	4	14
NUC Courses	10	6	2		18
Total	43	41	29	39	152

COURSE STRUCTURE

100 Level Computer Science

Course Grouping	Course Code	Course Title	Status	Units	Pre-requisite	Semester
Compulsory Courses	PHY111	Mechanics and Properties of Matter	C	2		α
	BLY112	Introductory Cell Biology	C	2		α
	MAT111	Mathematics I: Algebra	C	3		α
	MAT112	Mathematics II: Trigonometry and Geometry	C	2		α
	PHY119	Physics Practical I	C	1		α
	CSC111	Introduction to Computer Science	C	3		α
	CHM111	General Physical Chemistry	C	3		α
	CHM119	General Chemistry Practical I	C	1		α
	PHY121	Electricity and Magnetism I	C	2		Ω
	PHY122	Atomic and Nuclear Physics	C	2		Ω
	MAT121	Mathematics V: Calculus	C	3		Ω
	MAT122	Mathematics VI: Vector Algebra	C	2		Ω
	PHY129	Physics Practical II	C	1		Ω
	CSC121	Introduction to Problem Solving	C	2		Ω
University Courses	EDS111	Entrepreneurial Development Studies I	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept – Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	CST111	Use of Library, Study Skills and Information Communication Technology I	U	2		α
	GST111	Communication in English I	U	2		α
	CST121	Use of Library, Study Skills and Information Communication Technology II	U	2	CST111	Ω
	GST121	Communication in English II	U	2	GST111	Ω
	GST122	Communication in French	U	2		Ω
			α =23 Ω = 20 Total = 43 Units			

200 Level Computer Science						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	CSC211	Computer Programming I	C	3		α
	CSC213	Structured Programming	C	3		α
	CSC214	High Performance Computing and Data Management	C	3		α
	CSC215	Mathematical Methods	C	3		α
	CSC216	Foundations of Sequential and Parallel Programming	C	2		α
	CSC221	Computer Programming II	C	3		Ω
	CSC223	Computer Hardware	C	3		Ω
	CIS226	Statistical Methods	C	2		Ω
	CSC225	Operating System	C	3		Ω
Electives Courses	***Note:*** *Select 3* ***units*** *from Electives*					
	CSC231	Linear Algebra I	E	3		α
	PHY231	Electronics 1	E	3		α
	ECN111	Introduction to Economics I	E	2		α
	ACC111	Principles of Accounting I	E	2		α
	CSC241	Linear Algebra II	E	3		Ω
	MIS221	Introduction to Management Information System	E	3		Ω
University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept – Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept – Sports	V	0		Ω
NUC General Courses	GST211	Logic, Philosophy and Human Existence	U	2		α
	GST221	Nigerian People and Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution	U	2		Ω
Serviced Courses	CIS215	Use of Software Packages I	C	1		α
	CIS225	Use of Software Packages II	C	1		Ω
	CIS228	Use of Software Packages III	C	2		Ω
			α =21 Ω = 20 Total = 41 Units			

300 Level Computer Science						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-requisite**	**Semester**
Compulsory Courses	CSC311	Discrete Structure	C	2		α
	CSC312	Fundamentals of Data Structure	C	3		α
	CSC313	Object Oriented Programming	C	2		α
	CSC318	Compiler Construction I	C	2		α
	CSC315	Computer Architecture and Organization	C	2		α
	CSC310	Internet Programming	C	2		α
	CSC317	System Analysis and Design	C	2		α
Electives	***Note:*** *Select 4* ***units*** *from these Electives*					
	CSC314	Theory of Computing	E	2		α
	CSC319	Operations Research	E	2		α
	CIS319	Statistical Computing	E	2		α
SIWES	CSC329	Student Industrial Work Experience Scheme (SIWES)	S	6		Ω
University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =23 Ω = 6 Total = 29 Units			

400 Level Computer Science						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-Requisite**	**Semester**
Compulsory Courses	CSC411	Software Engineering	C	3		α
	CSC413	Algorithms and Complexity Analysis	C	3		α
	CSC415	Artificial Intelligence	C	3		α
	CSC431	Computational Science and Numerical Method	C	3		α
	CSC432	File Processing	C	2		α
	CSC433	Computer Graphics and Animation	C	3		α
	CIS421	Computer Security	C	2		Ω
	CSC423	Concept of Programming Languages	C	3		Ω
	CSC424	Computer Networks / Communication	C	3		Ω
	CSC441	Human Computer Interface	C	2		Ω
	CSC429	Project	C	6		Ω
Electives	***Note:*** *Select 4* ***units*** *from these Electives*					
	MIS415	Project Management	E	2		α
	CSC442	Computational Biology and Interdisciplinary Topics	E	2		Ω
	CSC443	Modeling and Simulation	E	2		Ω
	CSC444	Computer System Performance Evaluation	E	2		Ω
	CSC445	Queuing System	E	2		Ω
	CSC446	Distributed Computing System	E	2		Ω
	CSC447	Formal Model of Computation	E	2		Ω
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α =19 Ω = 20 Total = 39 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

PHY111 - Mechanics and Properties of Matter (2 Units)
Units and dimensions, Scalar and vectors, Particle kinematics, Newtons laws, Friction, Work, Energy, Centre of mass, Simple harmonic motion, Rigid body dynamics, Kepler's laws, Pressure in fluids, Intermolecular forces, Hooke's law, Young modulus, Fluid flow Streamline turbulence, Strooke's law surface tension.

MAT111 – Mathematics 1: Algebra (3 Units)
Algebra of set theory: Definition of concepts, laws of algebra of sets, Venn diagram and application. Real Number: Rational numbers, theory of surd, sequences and series (including AGP), binomial theorem, theory of quadratic, cubic and quadratic equations, indices and logarithms, mathematical induction, partial fractions, theory of equations, inequalities and polynomials (including factor and remainder theorems). Complex Numbers: Algebra of complex numbers, Argand diagram, multiplication and division of numbers in polar form, n^{th} root of unity, and Demoivre's theorem, expansion of Sin nØ, Cos nØ, Tan nØ.

MAT112 - Mathematics 11: Trigonometry and Geometry (2 Units)
Trigonometry and analytic geometry in (2-D & 3-D): Elements of trigonometry, circular measure, elementary treatment of circles, coordinate geometry: straight lines in (2B-D); plans. Functions and relations: permutation and algebra of functions, Binary operations, Permutation and combination, elementary treatment of logic.

PHY119 - Physics Practical I (1 Unit)
Simple experiments illustrating the topics covered in PHY111 and PHY112.

CSC111 - Introduction to Computer Science (3 units)

Definition of computer science. History of computer science and their generations, Computer Hardware; functional components, Modern I/O units. Software: Operating Systems, Application Packages Program: Development; Flowcharts and algorithms; Program Object; BASIC or VISUAL BASIC Fundamentals.

CHM111 - General Physical Chemistry (3 Units)

General Physical Chemistry: Atoms, Dalton's atomic theory law, atom masses. Fundamental particle of the atom. Atomic structure. Modern electronic, theory of atoms. Periodicity of the elements. Mole of concept, Chemical formulae, equations, and calculations. State of matter: gas liguid, and solid. Engergetics and thermochemistry. Chemistry kinetics, equilibra and electrochemistry. General inorganic Chemistry: periodic table and periodic properties, chemical bonding, structures of solids. The chemistry of selected representative elements. Hybridization.

CHM119 - General Chemistry Practical I (1 Unit)

Practice in weighing and measurement of volume, preparations of standard solutions. Titrimetry: acid-base, oxidation-reduction, precipitation and complex metric titrations; gravimetric analysis.

BLY112 – Introductory Cell Biology (2 Units)

Cell structure and organization, functions of cellular organelles, diversity, characteristics and classification of living things, general reproduction, interrelationship of organisms; heredity and evolution, elements of ecology and types of habitat.

PHY121 - Electricity and Magnetism 1 (2 Units)

Electricity, coulomb's law, Ohm's law. Gauss's theorem, Capacitors, Kirchoffs laws, Electrical energy, DC, Bridges potentiometer, Magnetic effect of current, Electromagnetic induction, Moving coil and ballistic galvanometers, Multimeters, DC and AC motors, and generators, Hysteresis, Power in AC circuits, Semi conductors, Conductivity and Mobility, Rectification.

PHY122 - Atomic and Nuclear Physics (2 Units)

Atomic & Nuclear physics: Theory of atomic structure. Thompson, Rutherford and Bohr's theories, the hydrogen atom. Properties of nucleus, Natural radioactivity, wave particles duality of light, X-rays, Photo-electricity, Thermionic emission, Diode valve.

MAT121 – Mathematics V: Calculus (3 Units)

Functions of real-variables: Graph, limits, and concepts of continuity. Techniques of differentiation of algebraic and trigonometric functions, higher order derivatives, maxima and minima, Liebnitz rule, application of differentiation. Integration as inverse of differentiation, methods of integration, definite integral. Application to areas, volume, moment of inertia. Approximate integration: Trapezoidal and Simpson's rule. Taylor's and Maclaurin's theorems, partial differentiation and implicit differentiation.

MAT122 - Mathematics VI: Vector Algebra (2 Units)

3-D Cartesian coordinate systems. Definition and representation of vectors; Algebra of vectors: multiplication of a vector by a scalar, addition of vectors, scalar product of two vectors, vector product of two vectors, direction cosines, calculus of vector function: differentiation of vector function, integration of vector function; conic: circles, parabola, ellipse and hyperbola; kinematics of a Particle: basic concepts, motion under constant acceleration, motion under variable acceleration: rectilinear motion, motion in a plane. Force.

PHY129 - Physics Practical II (1 Unit)

A selection of experiments to illustrate the principles covered in PHY121 and PHY122.

CSC121 - Introduction to Problem Solving (2 Units)

Problem solving strategies, Roles of algorithm in problem solving process, implementation strategies, concepts and properties of algorithm. Using C-language.

200 Level

Alpha Semester

CSC211 - Computer Programming I (3 Units)
Introduction to problem solving methods and algorithm development, designing, coding, debugging and documenting programmes using techniques of a good programming language style, programming language and programming algorithm development. A widely used programming language should be used in teaching the above. E.g. C/C++ language.

CSC213 - Structured Programming (3 Units)
Structured Programming elements, structured design principles, abstraction modularity, stepwise refinement, structured design techniques. Teaching of a structured programming language etc.

CSC214 - High Performance Computing and Database Management (3 Units)
Rational Databases: Mapping conceptual schema to relational Schema; Database Query Languages (SQL) Concept of Functional dependencies & Multi – value dependencies. Transaction processing; Distributed databases. Text: CJ Date. Terminology in Relational Data Model, Integrity Constraints, Primitive Operations on Relations, Relational Algebra (RA), Relational Algebra Operations, Relational Completeness, Additional Operations on Relations. Foundations of relational implementation. Structured Query Language (SQL): DML Features in SQL, DDL in SQL, Updates in SQL, Views in SQL, Embedded SQL, Query-by-Example (QBE). Concurrency, recovery and security issues. Amstrong's inference rules and minimum covers, normal forms. Current trends in database systems: Client-Server database systems, Open Database Connectivity (ODBC) standard, Knowledge-Based Systems, Object-Based Systems, data warehousing and data mining concepts, Web databases. Information storage & retrieval, Information management applications, Information capture and representation, analysis & indexing,

search, retrieval, Information privacy; integrity, security, efficiency and effectiveness.
Introduction to database systems: Components of database systems DBMS functions, Database architecture and data independence use of database query language.
Overview of Database Systems: model, schema, instance. Database Systems vs. File Systems. Data abstraction levels, database languages, system architecture. Classification of DBMS. Data modeling: Entity-Relationship(ER) Model, Entities and Entity types, Relationship and Relationship type, Constraints, Weak Entity Types, ER Diagrams. Semantic object model. Process of database design: Requirement analysis, conceptual database design, database schema design. Database design using entity-relationship and semantic object models, database application design.

CIS215 – Use of Software Packages 1 (1 Unit)

Computer Hardware; communications Technology; Operating Systems; Ethics and Security; Information Literacy; Productivity Tools; Words Processing; Spreadsheets, Databases; Presentation Graphics; Web Authoring and Publishing; Software Development.

CSC215 - Mathematical Methods (3 Units)

Sequences of real numbers, Monotone sequence, Convergence, Absolute and conditional convergence, Infinite series, Convergence tests, Addition and multiplication of series. Power series, Radius of convergence, Taylor and Maclaurin series and their applications, Taylor polynomials and Taylor's formula, The binomial theorem and binomial series. Matrices and linear transformations, Matrix operations, Solutions of linear systems by matrices, Rank and inverse, eigenvalues and eigenvectors, canonical forms, Jordan form, generalized inverse of a matrix. Complex numbers and their properties, complex numbers as vectors, The complex plane, Complex algebra, Functions of a complex variable.

CSC216 - Foundations of Sequential and Parallel Programming (3 Units)

The relationships between H/L languages and the Computer Architecture that underlies their implementation: basic machine architecture, assembles specification and translation of P/L Block Structured Languages, parameter passing mechanisms.

CSC231 - Linear Algebra I (3 Units)

Vector space over real field. Subspaces, linear independence, basis and dimension. Linear transformations and their representation by matrices-range, null space, rank. Singular and non-singular transformation and matrices. Algebra of matrices.

PHY231 - Electronics I (3 Units)

Prerequisite: PHY121

Thermionic emission; vacuum, thermionic devices; valves and the CRT, semiconductors; p-n junctions, diodes and their applications, bipolar transistor; characteristics and biasing of bipolar transistors, small signal amplifier waveform generators, logic elements and circuits, amplifiers, noise, feedback, simple resistive capacitive network, power, tunnel, Shot key and multifunction diodes and their applications.

ACC111 - Principles of Accounting I (2 Units)

This course introduces the students to basic bookkeeping and accounting. This foundation course in accounting aims at exposing the students to the basic techniques of classifying and recording the different types of costs and revenues associated with transactions and computing simple practical reports. Topic areas include: definition of accounting, and other terms, perspectives and branches of accounting, accounting data, accounting information, users and uses of accounting information, historical sketch of accounting, prospects for Accountants, Background of current Accounting Methods, Transactions. Nature, Purpose of Basic concept of Accounting, the accounting equation, measurement of income, costs, assets, equities. Subsidiary Books – Sales Day Book, Purchases Day Book, Returns Inward Journal, Returns Outward Journal and Journal Proper. Cash Book – Single Column, Double Column and Three

Column Cash Book. Differences between capital and revenue, reserves and provisions, trade and cash discounts etc. accruals and prepayments capital and revenue expenditure. The Ledger and Trial Balance, uses. Bank Reconciliation Statements, types, causes of differences. Final Accounts of Sole Trader. Income measurement – end of year adjustments in final accounts. Introduction to Accounting Standards, History of NASB, IASC, IASB, SAS, IAS, IFRS.

ECN111 - Introduction to Economics I (2 Units)

The Basic Problem of Scarcity and Choice: The Methodology of Economic Science; the General Principles of Resource Allocation; the Concepts of Optimality and Equity; Equilibrium and Disequilibrium; Micro-economics versus Macroecomics: Demand, Supply and Price: Types of Resources Allocation Decision; Methods of Resource Allocation in an Economy: Theory of the Firm; Introduction to Welfare Economics.

Omega Semester

CSC221 - Computer Programming II (3 Units)

Principles of good programming, structured programming concepts, Debugging and testing, string processing, internal searching and sorting, recursion. Use a programming language different from that in CSC 201 e.g C# or VB.net.

CSC223 - Computer Hardware (3 Units)

Computer circuits; diode arrays, PIAs etc, Integrated circuit fabrication process. Use of MSI, LSI and VLSI IC hardware Design. Primary and secondary memories; core memory, etc. Magnetic devices; disks, tapes, video disks etc. Peripheral devices; printers, CRT's keyboards, character recognition. Operational amplifiers; Analog-to-Analog computer.

CSC225 - Operating System (3 Units)

Overview of O/S: Role and Purpose, Functionality Mechanisms to support Client-server models, handheld devices, Design Issues influences of Security, networking, multimedia, Windows.

O/S Principle: Structuring methods Abstraction, processes and resources, Concepts of APIS Device organization interrupts.

Concurrency: States & State diagrams Structures, Dispatching and Context Switching; interrupts; Concurrent execution; Mutual exclusion problem and some solutions Deadlock; Models and mechanisms (Semaphones, monitors etc.). Producer-Consumer Problems and Synchronization. Multiprocessor issues. Scheduling & Dispatching

Memory Management: Overlays, Swapping and Partitions, Paging & Segmentations Placement & replacement policies, working sets and Trashing, Caching.

CIS226 - Statistical Methods (2 Units)

Review of probability as a measure of uncertainty, sample points and events, combination of events. Binomial, Exponential, Normal, Gamma, Chi-Squared distributions; probability function, mean, variance, and moment generating function. Joint probability distribution and joint probability density function, marginal distribution, expected value, covariance and correlation; Statistical independence; Transformation of variable; Moment and moment generating function; Linear combination of random variable; Multinomial and Normal Bivariate distributions. Sampling distribution of , and S2; Central Limit Theorem; Approximation for discrete distributions; Sampling distribution for t and F. Point Estimation: Bias and unbiased estimator; principle of minimum variance unbiased estimation; Method of moment; Maximum Likelihood estimation. Interval Estimation: Population mean and difference between two population mean using z - distribution and t – distribution.

MIS221 - Introduction to Management Information System (3 Units)

History and motivation for MIS. Management structure and MIS. Roles of Information System in management. Computers and information processing. Information processing software. Managing data resources.

Digital Firm: e-commerce, and e-business opportunities. Redesigning the organization with Information System. Enhancing management decision making. Information System security and control. Using IT for competitive advantage. Accounting Information system. Financial Information System. Market Information System. Manufacturing Information System. Geographic Information System. Medical Information System. Information System architecture.
Wiretapping and encryption. Advantages and disadvantages of stand-alone vs. network computer. Acquisition sources of software packages, advantages and disadvantages. Organising Data and Information: Data Warehouse, data mart. The Internet, Intranet, and Extranet relationship changes with customers, and marketing processes. Decision support system. Artificial intelligence and Expert system in business. System development life cycle. Ethical and social impact of Information system. Managing hardware asset, software asset, and data resources. Information System, Organisation, Management, and Strategy.

CSC241- Linear Algebra II (3 Units)
Systems of linear equation change of basis, equivalence and similarity. Eigenvalues and eigenvectors. Minimum and characteristic polynomials of a linear transformation (Matrix). Caley-Hamilton theorem. Bilinear and quadratic forms, orthogonal diagonalisation. Canonical forms.

300 Level

Alpha Semester

CSC311 - Discrete Structure (2 Units)
Basic Set Theory: Basic definitions, Relations, Equivalence Relations Partition, Ordered Sets. Boolean Algebra & Lattices, Logic, Graph theory: Directed and Undirected graphs, Graph Isomorphism, Basic Graph Theorems, Matrices; Integer and Real matrices, Boolean Matrices med m, Path matrices. Adjacency Vectors/Matrices: Path adjacency

matrix, Numerical & Boolean Adjacency matrices. Applications to counting, Discrete Probability Generating Functions.

CSC312 – Fundamentals of Data Structure (3 Units)

Primitive types, Arrays, Records, Strings and String processing, Data representation in memory, Stack and Heap allocation, Queues, TREES. Implementation Strategies for stack, queues, trees. Run time Storage management; Pointers and References, Linked structure.

CSC313 - Object-Oriented Programming (2 Units)

Basic OOP Concepts: Classes, Objects, inheritance, polymorphism, Data Abstraction, Tools for developing, Compiling, interpreting and debugging, Java Programs, Java Syntax and data objects, operators. Central flow constructs, objects and classes programming, Arrays, methods. Exceptions, Applets and the Abstract, OLE, Persistence, Window Toolkit, Laboratory exercises in an OOP Language.

CSC314 - Theory of Computing (2 Units)

Chomsky Hierarchy: Type 0, type 1, type 2 and type 3 grammar. Finite Automata: Deterministic and non-deterministic finite automata; Conversion of non-deterministic finite automata to deterministic finite automata; Regular expressions and their relationships to finite automata. Pushdown Automata and Context-Free Grammars: Deterministic and non-deterministic pushdown automata; Context-free grammars; Useless productions and emptiness test; Ambiguity; Context-free grammars for pushdown automata and vice-versa. Properties of Context-Free Languages: Pumping lemma; Closure properties; Existence of non-context-free languages. Turing Machines, Decidability and Undecidability.

CSC315 - Computer Architecture and Organization (2 Units)

Fundamental building blocks, logic expressive immunization, sum of product forms. Register transfer notation, Physical considerations. Data representation, and number bases, Fixed and Floating point systems, representation memory systems organization and architecture.

CSC317 - Systems Analysis and Design (2 Units)

System Concept; System Development Life Cycle. Analysis: Fact gathering Techniques, data flow diagrams, Process description data modeling. System Design: Structure Charts, form designs, security, automated Tools for design. System Development Techniques and Methodologies.

CSC318 - Compiler Construction I (2 Units)

Review of compilers assemblers and interpreters, structure and functional aspects of a typical compiler, syntax semantics and pragatics, functional relationship between lexical analysis, expression analysis and code generation. Internal form of course programme. Use of a standard compiler (FORTRAN<COBOL/PL) as a working vehicles. Error detection and recovery. Grammars and Languages: the parsing problem. The scanner.

CSC319 - Operations Research (2 Units)

Overview of the operation research Modeling approaches. Linear programming model; assumption of linear programming; Simplex method; Two-phase Method; Artificial Variable Technique; Minimization and maximization Two-Phase method. Transportation simplex method: tableau initialization, optimality test, and iteration; Assignment Problems: Formulation and Solution. Directed network; Shortest-path problem: Algorithm for minimum spanning tree problem; Maximum cost flow problem; Minimum cost flow problem; Network simplex method; Project planning and control with PERT-CPM. Deterministic Model; Continuous Review: Economic order quality model (EOQ); Periodic review: Production planning; Stochastic Models: Single Period model; Two-period inventory model; Multi-period model. One-dimensional Search: Golden section search derivations; Taylor series and conditions for local optima; Convex / Concave function and global optimality; Gradient search; Newton's method; Quasi-Network method and BFGS search. Lagrange multipliers method; Karush-Kuhu-Tucker optimality conditions; Penalty and barrier method.

CIS319 - Statistical Computing (2 Units)

An introduction to R; Data and text manipulation in R, including regular expressions and database operations; R programming: data structures and types, object orientation, flow control, functions, efficient programming, parsing/expressions/formulas; Numerical methods; Numerical linear algebra; Simulation studies and Monte-Carlo; Object-oriented programming; Graphics programming. Numerical integration and numerical differentiation, symbolic integration and differentiation. Optimization.

CSC310 - Internet Programming (2 Units)

Distributed Computing, Mobile & Wireless computing, Network Security; Client/Server Computing (using the web), Building Web Applications.

Omega Semester

CSC329 - Student Industrial Work Experience (SIWES) Training Scheme (6 Units)

During the SITS, each student will undergo a practical on the job training in IT industry approved for its relevance to the student's major for a minimum of 14 weeks starting immediately after the alpha semester's examinations at 300 level. A program of training will be drawn by the College and the Industry for each student, and a prescribed log book with daily recording of the student activities is to be kept by each student and appropriately signed. At the end of the program, a written report is to be submitted to the college and each student to present a seminar on his/her industrial experience. Each student must pass a prescribed certification examination during this second industrial training.

400 Level

Alpha Semester

CSC411 - Software Engineering (3 Units)
Software Design: Software architecture, Design Patterns, O.O. analysis & Design, Design for re-use. Using APIS: API programming Class browsers and Related tools, Component based computing. Software tools and Environment: Requirements analysis and design modeling Tools, Testing tools, Tool integration mech.

CSC413 - Algorithms and Complexity Analysis (3 Units)
Basic algorithmic analysis: Asymptotic analysis of upper and average complexity bounds; standard Complexity Classes Time and space tradeoffs in algorithms analysis recursive algorithms. Algorithmic Strategies: Fundamental computing algorithms: Numerical algorithms, sequential and binary search algorithms; sorting algorithms, Binary Search tress, Hash tables, graphs & its representation.

CSC415 - Artificial Intelligence (3 Units)
Introduction to artificial intelligence, understanding natural languages, knowledge representation, expert systems, pattern recognition, the language LISP.

MIS415 - Project Management (2 Units)
Team Management, Project Scheduling, Software measurement and estimation techniques, Risk analysis, Software quality assurance, Software Configuration Management, Project Management tools.

CSC431 - Computational Science and Numerical Methods (3 Units)
Operations research, Numerical Computation, Graphical computation, Modeling and simulation, High performance computation.

CSC432 - File Processing (2 Units)

Introduction to file processing. Fundamental File Processing Operations. Managing Files of Records: Sequential and direct access. Secondary Storage, physical storage devices: disks, tapes and CDROM. System software: I/O system, file system, buffering. File compression: Huffman and Lempel-Ziv codes. Reclaiming space in files: Internal sorting, binary searching, keysorting. Introduction to Indexing. Indexing. Cosequential processing and external sorting. Multilevel indexing and B trees. Indexed sequential files and B+ trees. Hashing. Extendible hashing

CSC433 - Computer Graphics and Animation (3 Units)

Introduction and definitions. Primitives, Polygonal Modelling, Subdivision Surfaces and NURBS. Image types. Creating Scene using 3D software eg Maya, 3D Max. Hardware aspect, plotters microfilm, plotters display, graphic tablets light pens, other graphical input aids Facsimile and its problems Refresh display refresh huggers, changing images, light pen interaction. Two and three dimensional transformation, perspective Clipping algorithms. Hidden line removal bolded surface removal. Warmock's method, shading, data reduction for graphical input. Introduction to had writing and character recognition. Curve synthesis and fitting. Contouring. Ring structures versus doubly linked lists. Hierarchical structures. Data structure: Organization for interactive graphics. Creating Keyframe animation, Motion path animation and dynamic animation. Creating simple scene and complex scene, painting etc. Animating objects and rendering.

Omega Semester

CIS421 – Computer Security (2 Units)

Introduction: Objectives, privacy and ethics, risk analysis in computer security, threats and security, security measures, physical protection (natural disaster, physical facility, access control), hardware and software security control, viruses (trojan horses, worms and logic bomb), encryption and cryptography techniques. Developing Secured Computer

System: External security measures, issue, security models (specification and verification, Bell and LaPadulla Model, Clark-Wilson Model, Goguen-Meseguer, TCSEC), discretionary access requirements, mandatory access requirements, user authentication, access and information flow control, auditing and intrusion detection, damage control and assessment, microcomputer Security. Network and Telecommunication Security: Fundamentals, issue, objective and threats, security services, distributed system security, trusted network interpretation, TNI security services, AIS interconnection issues, firewalls-gateways, application, cost and effectiveness. Database Security: Security requirements to Databases, designing the security, methods of protection, security of multilevel Database. Legal Issue and Current Legislation: Computer crime, software violation, crimes, privacy considerations, corporate policy, managerial issues, government-based security standards.

CSC423 - Concept of Programming Languages (3 Units)

Language definition structure. Data types and structures, Review of basic data types, including lists and tress, control structure and data flow, Run-time consideration, interpretative languages, lexical analysis and parsing. Pre-requisite – CSC211, 221, 214, 312.

CSC424 - Computer Networks/ Communication (3 Units)

Introduction, wares, Fourier analysis, measure of communication, channel characteristics, transmission media, noise and distortion, modulation and demodulation, multiplexing, TDM FDM and FCM Parallel and serial transmission (synchronous Vs analynchronous). Bus structures and loop systems, computer network Examples and design consideration, data switching principles broadcast techniques, network structure for packet switching, protocols, description of network e.g. ARPANET, etc.

CSC429 - Project (6 Units)

Students should embark on work that will lead to substantial software development under the supervision of a member of staff.

CSC441 - Human-Computer Interface (2 Units)

Foundations of HCI, Principles of GUI toolkits; Human-centred software evaluation and development; GUI design and programming.

CSC442 - Computational Biology and Interdisciplinary Topics (2 Units)

Introduction: Computational approaches in bioinformatics. An overview of artificial neural network algorithms. Graphical Models: Mathematical formalism of graphical models. Graphical models of network architectures. Molecular and cellular structures. Probabilistic graphical models. Gene expressions. Sequence analysis. Computational Modeling: Computational modeling of genetic and biochemical networks. Models of gene activity. Models of interactions among gene products. Computational Models for Analysis: Machine learning approaches. Neural networks, Hidden markov models, belief networks. Model Visualization: Visualizing protein structures. Modeling Kinetics and Physiology. Sequence data visualization. Networks and pathway visualization.

CSC443 – Modeling and Simulation (2 Units)

Basic Definitions and Uses, Simulation Process, Some basic statistic Distributions Theory, Model and Simulation. Queues; Basic components, Kendal notation, Queuing rules, Little's Law, Queuing networks, Special/types of queues. Stochastic Processes; Discrete state and continuous state processes, Markov processes, Birth-Death Processes, Poisson Processes. Random Numbers; types of Random Number Exercises.

CSC444 - Computer System Performance Evaluation (2 Units)

Measurement techniques, simulation techniques; techniques, workload characterization, performance evaluation in selection problems, performance evaluation in design problems, evaluation of programme performance.

CSC445 - Queuing System (2 Units)

Introduction; Birth-death queuing systems; Markovian queues, the queue M/GI bounds, inequalities and approximations.

CSC446 - Distributed Computing System (2 Units)

Introduction: Definitions, Motivation; Communication Mechanisms: Communication Protocols, RPC, RMI, Stream Oriented Communication; Synchronization: Global State, Election, Distributed Mutual Exclusion, Distributed Transactions; Naming: Generic Schemes, DNS, Naming and Localization; Replication and Coherence: Consistency Models And Protocols; Fault Tolerance: Group Communication, Two- And Three-Phase Commit, Check pointing; Security: Access Control, Key Management, Cryptography; Distributed File Systems: NFS, Coda etc.

CSC447 – Formal Model of Computation (2 Units)

Strings and Languages: concatenation, powers, and reversal of strings. Regular languages: regular expressions. finite automata DFAs NFAs, cross product construction, subset construction Kleene's theorem, closure properties - union, concatenation, star, intersection, complement, decision problems - emptiness, finiteness, equivalence, nonregular languages. Optional: Myhill-Nerode Theorem, minimization of DFAs, pattern matching. context-free languages: context-free grammars, examples from real programming languages such as C++, derivation trees, leftmost derivations, ambiguous grammars, closure properties - union, concatenation, star, Chomsky normal form. Non-context-free languages, non-closure properties: intersection, complement. Parsing methods, top-down and bottom-up parsing, efficient deterministic parsing (Cocke-Kasami-Younger algorithm), pushdown automata, equivalence of PDAs and context-free grammars, deterministic PDAs. Optional: decision problems, inherently ambiguous context-free grammars. Turing machines and undecidability: countability and uncountability (Cantor's proof), universal Turing machine, halting problem is undecidable.

6.3.2 MANAGEMENT INFORMATION SYSTEM PROGRAMME

PROGRAMME: MANAGEMENT INFORMATION SYSTEM

DEGREE AWARDED: B.Sc (Honours) Management Information System

DURATION: Four (4) Years (8 Semesters)

ADDITIONAL ADMISSION REQUIREMENTS FOR B.Sc MANAGEMENT INFORMATION SYSTEMS

Credit level passes in five (5) subjects in the SSCE/GCE/NECO O/L or their equivalent must be obtained at not more than two sittings and must include Mathematics, English Language, Physics, Economics and either Biology or Agricultural Science.

GRADUATION REQUIREMENTS

The graduation requirements for the Bachelor of Science (B.Sc Honours) in Management Information System enjoin a student to register for and pass a minimum of 152 credit units as detailed below:

Graduating Required Units for the B.Sc Management Information System

Level	100	200	300	400	Total
Core/ Compulsory Courses	27	26	15	32	100
Electives		6	4	4	14
Industrial Training [SIWES]			6		6
College Courses					0
University Courses	4	4	2	4	14
NUC Courses	10	6	2		18
Total	41	42	29	40	152

COURSE STRUCTURE

100 Level Management Information System						
Course Grouping	Course Code	Course Title	Status	Units	Pre-Requisite	Semester
Compulsory Coures	ECN111	Introduction to Economics I	C	2		α
	ACC111	Principles of Accounting 1	C	2		α
	PHY111	Mechanics and Properties of Matter	C	2		α
	MAT111	Mathematics I: Algebra	C	3		α
	MAT112	Mathematics II: Trigonometry and Geometry	C	2		α
	CSC111	Introduction to Computer Science	C	3		α
	ECN121	Introduction to Economics II	C	2		Ω
	ACC121	Principles of Accounting II	C	2		Ω
	MAT121	Mathematics V: Calculus	C	3		Ω
	MAT122	Mathematics VI: Vector Algebra	C	2		Ω
	CSC121	Introduction to Problem Solving	C	2		Ω
	BUS124	Business Communication	C	2		Ω
University Courses	EDS111	Entrepreneurial Development Studies I	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept – Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	CST111	Use of Library, Study Skills and Information Communication Technology I	U	2		α
	GST111	Communication in English I	U	2		α
	CST121	Use of Library, Study Skills and Information Communication Technology II	U	2	CST111	Ω
	GST121	Communication in English II	U	2	GST111	Ω
	GST122	Communication in French	U	2		Ω
			α =20 Ω = 21 Total = 41 Units			

200 Level Management Information System						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-Requisite**	**Semester**
Compulsory Courses	CSC211	Computer Programming I	C	3		α
	CSC213	Structured Programming	C	3		α
	BFN211	Business Finance I	C	2		α
	CSC214	High Performance Computing and Data Management	C	3		α
	BUS211	Principles of Management I	C	2		α
	CSC221	Computer Programming II	C	3		Ω
	CSC225	Operating System	C	3		Ω
	MIS221	Introduction to Management Information System	C	3		Ω
	CIS226	Statistical Methods	C	2		Ω
	BUS221	Principles of Management II	C	2		Ω
Electives	***Note:*** ***Select 3 Units from Elective***					
	CBS111	Mathematics for Business and Social Science	E	2		α
	CSC231	Linear Algebra I	E	3		α
	CBS121	Statistics for Business and Social Science	E	2		Ω
	CSC241	Linear Algebra II	E	3		Ω
University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept – Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept – Sports	V	0		Ω
NUC General Courses	GST211	Logic, Philosophy and Human Existence	U	2		α
	GST221	Nigerian People and Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution	U	2		Ω
			α =20 Ω = 22 Total = 42 Units			

300 Level Management Information System						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-Requisite**	**Semester**
Compulsory Courses	BFN311	Business Finance II	C	3		α
	CSC312	Fundamental of Data Structure	C	3		α
	CSC313	Object Oriented Programming	C	2		α
	CSC310	Internet Programming	C	2		α
	BUS313	Business Law	C	3		α
	CSC317	System Analysis and Design	C	2		α
Electives	***Note:* Select 4 units from these Electives**					
	MIS316	Research Methods	E	3		α
	MKT211	Principles of Marketing I	E	3		α
	CSC319	Operation Research	E	2		α
	CIS319	Statistical Computing	E	2		α
	CBS211	Mathematics for Business and Social Science	E	2		α
SIWES	MIS329	Student Industrial Workshop Experience Scheme (SIWES)	S	6		Ω
University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =23 Ω = 6 Total = 29 Units			

400 Level Management Information System						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-Requisite**	**Semester**
Compulsory Coures	CSC411	Software Engineering	C	3		α
	MIS412	Knowledge Management	C	2		α
	CSC415	Artificial Intelligence	C	3		α
	CSC432	File Processing	C	2		α
	MIS415	Project Management	C	2		α
	MIS418	E-Commerce Technology	C	3		α
	MIS421	Decision Support System	C	3		Ω
	MIS422	Production and Operation Management	C	2		Ω
	MIS423	Management Theory	C	3		Ω
	CSC424	Computer Network/Communication	C	3		Ω
	MIS429	Project	C	6		Ω
Electives	***Note:*** *Select* ***2 Units*** *from these Electives*					
	MIS413	System Accounting	E	2	ACC111, EDS322	α
	MIS414	Financial Information System	E	2		α
	BUS326	International Business and World Resources	E	3		Ω
	MIS425	System Security Management	E	2		Ω
	MIS426	Supply Chain and Logistics Management	E	2		Ω
	CSC443	Modeling and Simulation	E	2		Ω
	CSC444	Computer System Performance Evaluation	E	2		Ω
	CSC446	Distributed Computing Systems	E	2		Ω
	CBS221	Statistics for Business and Social Science	E	2		Ω
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α =19 Ω = 21 Total = 40 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

PHY111 - Mechanics and Properties of Matter (2 Units)
Units and dimensions, Scalar and vectors, Particle kinematics, Newtons laws, Friction, Work, Energy, Centre of mass, Simple harmonic motion, Rigid body dynamics, Kepler's laws, Pressure in fluids, Intermolecular forces, Hooke's law, Young modulus, Fluid flow Streamline turbulence, Strooke's law surface tension.

MAT111 – Mathematics 1: Algebra (3 Units)
Algebra of set theory: Definition of concepts, laws of algebra of sets, Venn diagram and application. Real Number: Rational numbers, theory of surd, sequences and series (including AGP), binomial theorem, theory of quadratic, cubic and quadratic equations, indices and logarithms, mathematical induction, partial fractions, theory of equations, inequalities and polynomials (including factor and remainder theorems). Complex Numbers: Algebra of complex numbers, Argand diagram, multiplication and division of numbers in polar form, n^{th} root of unity, and Demoivre's theorem, expansion of Sin nØ, Cos nØ, Tan nØ.

MAT112 - Mathematics 11: Trigonometry and Geometry (2 Units)
Trigonometry and analytic geometry in (2-D & 3-D): Elements of trigonometry, circular measure, elementary treatment of circles, coordinate geometry: straight lines in (2B-D); plans. Functions and relations: permutation and algebra of functions, Binary operations, Permutation and combination, elementary treatment of logic.

CSC111 - Introduction to Computer Science (3 Units)
Definition of computer science. History of computer science and their generations, Computer Hardware; functional components, Modern I/O units. Software: Operating Systems, Application Packages Program:

Development; Flowcharts and algorithms; Program Object; BASIC or VISUAL BASIC Fundamentals.

ACC111 - Principles of Accounting I (2 Units)

This course introduces the students to basic bookkeeping and accounting. This foundation course in accounting aims at exposing the students to the basic techniques of classifying and recording the different types of costs and revenues associated with transactions and computing simple practical reports. Topic areas include: definition of accounting, and other terms, perspectives and branches of accounting, accounting data, accounting information, users and uses of accounting information, historical sketch of accounting, prospects for Accountants, Background of current Accounting Methods, Transactions. Nature, Purpose of Basic concept of Accounting, the accounting equation, measurement of income, costs, assets, equities. Subsidiary Books – Sales Day Book, Purchases Day Book, Returns Inward Journal, Returns Outward Journal and Journal Proper. Cash Book – Single Column, Double Column and Three Column Cash Book. Differences between capital and revenue, reserves and provisions, trade and cash discounts etc. accruals and prepayments capital and revenue expenditure. The Ledger and Trial Balance, uses. Bank Reconciliation Statements, types, causes of differences. Final Accounts of Sole Trader. Income measurement – end of year adjustments in final accounts. Introduction to Accounting Standards, History of NASB, IASC, IASB, SAS, IAS, IFRS.

ECN111 - Introduction to Economics I (2 Units)

The Basic Problem of Scarcity and Choice: The Methodology of Economic Science; the General Principles of Resource Allocation; the Concepts of Optimality and Equity; Equilibrium and Disequilibrium; Micro-economics versus Macroecomics: Demand, Supply and Price: Types of Resources Allocation Decision; Methods of Resource Allocation in an Economy: Theory of the Firm; Introduction to Welfare Economics.

Omega Semester

ACC121 – Principles of Accounting II (2 Units)

More detailed topics discussed in ACC111. Attention will be focused on the preparation and presentation of simple final accounts of sole traders, partnership and company. Topics covered include; Depreciation of fixed assets, methods and reasons of computing depreciation and treatment in financial statements. Definition and treatment of Bad debts and provision for bad and doubful debts et. Self-balancing ledgers and their uses; Incomplete Records, Single and double entry bookj-keeping; Accounts of Non trading organizations e.g. Club and Charities, Manufacturing accounbts; Types and correction of errors, and uses of suspense account. Inventory valuation; various adjustments of Bank reconciliation. (Complex problems). Manual, mechanical and electronic bookkeeping system. Simple final accounts of sole traders and criticism. (PR-ACC111).

ECN121 – Introduction to Economics II (2 Units)

Introduction to Macroeconomics: National Income Determination; the Public Sector in the National Economy; Macroeconomic Policy Objectives and Instruments; Introduction to Money and Banking, Introduction to Economic Growth and Development. Trade politics with Particular reference to Nigeria.

BUS124 – Business Communication (2 Units)

Communication in the workplace, role of communication in business, Main forms of communication, variety in communication activity by business. Adaptation and selection of words, basic needs for adaptation. Construction of clear sentences/words, writing for effect, business etiquette and the need for effect. Accent for positive language. Directness, process of writing, routine inquiries, Indirectness, situations in Indirectness, Indirectness in persuasion/sales messages. Pattern variation in memorandum and emails. Strategies in the job search process. Basics of report writing. Report structure, graphics, informal oral communication, public speaking and oral reporting, technology-enabled

communication. Techniques of cross-cultural communication, correctness of communication, businesses research methods.

MAT121 – Mathematics V: Calculus (3 Units)

Functions of real-variables: Graph, limits, and concepts of continuity. Techniques of differentiation of algebraic and trigonomietric functions, higher order derivatives, maxima and minima, Liebnitz rule, application of differentiation. Integration as inverse of differentiation, methods of integration, definite integral. Application to areas, volume, moment of inertia. Approximate integration: Trapezoidal and Simpson's rule. Taylor's and Maclaurin's theorems, partial differentiation and implicit differentiation.

MAT121 – Mathematics VI: Vector Algebra (2 Units)

3-D Cartesian coordinate systems. Definition and representation of vectors; Algebra of vectors: multiplication of a vector by a scalar, addition of vectors, scalar product of two vectors, vector product of two vectors, direction cosines, calculus of vector function: differentiation of vector function, integration of vector function; conic: circules, parabola, ellipse and hyperboa; kinematics of a Particle: basic concepts, motion under constant acceleration, motion under variable acceleration: rectilinear motion, motion in a plane. Force.

CSC121 – Introduction to Problem Solving (2 Units)

Problem solving strategies, Roles of algorithm in problem solving process, implementation strategies, concepts and properties of algorithm. Using C-language.

200 Level

Alpha Semester

CSC211 – Computer Programming 1 (3 Units)
Introduction to problem solving methods and algorithm development, designing, coding, debugging and documenting programmes using techniques of a good programming language style, programming language and programming algorithm development. A widely used programming language shoule be used in teaching the above. E.g. C++ language.

CSC213 – Structured Programming (3 Units)
Structured Programming elements, structured design principles, abstraction modularity, stepwise refinement, structured design techniques. Teaching of a structured programming language etc.

CSC214 – High Performance Computing and Database Management (3 Units)
Information storage & retrieval, Information management applications, Information capture and representation, analysis & indexing, search, retrieval, Information privacy; integrity, security, efficiency and effectiveness. Introduction to database systems: Components of database systems DBMS functions, Database architecture and data independence use of database query language. Overview of Database Systems: model, schema, instance. Database Systems vs. file Systems. Data abstraction levels, database languages, system architecture. Classification of DBMS. Data modeling: Entity-Relationship (ER) Model, Entities and Entity types, Relationship and Relationship type, Constraints, Weak Entity Types, ER Diagrams. Semantic object model. Process of database design: Requirement analysis, conceptual database design, database schema design. Database design using entity-relationship and semantic object models, database application design.

BFN211 – Business Finance 1 (2 Units)

Small & Medium Enterprises financing in Nigeria, Agricultural Business financing in Nigeria, Principles of Working Capital Management, Investment decision under condition of certainty, Investment decision under condition of uncertainty, Capital Rationing, Cost of capital as decision criteria.

BUS211 – Pinciples of Management 1 (2 Units)

The course is divided into lecture series covering the wide scope of the multi-dimensional and the multi-disciplinary nature of management with peculiar emphasis on effectiveness of management practice and organizational objective. Each lecture is presented in a form that allows for a theoretical study of the principles, theories and concepts underlining the practice of management. Applications of real life cases are also used to draw close the objective of the course. In addition, each lecture is ended with review questions to assist students test their understanding. General discussion on course structure and outline, Authority and Delegation, Comparative management, Managing productivity. Employee motivation and performance, Management Information system, Strategic management, Elements of International management, Elements of International management II, Total quality management, Basic elements of control in organization, Management system concept and, Interpersonal relations and Communication.

CSC231 – Linear Algebra 1 (3 Units)

Partial differentiations, application and classification of critical points of functions of two variables. Lagrangian multipliers. Coordinate system: change from cartesian to polar, spherical and cylindrical coordinate systems. Taylor's and Maclaurin's series. Differential coefficients of the nth order. Lebnithz's rule, application to the solution of differential equations.

CBS111 – Mathematics for Business and Social Sciences 1 (2 Units)

Mathematics and Symbolic Logic; Inductive and Deductive System; Concepts of Sets; Mappings and Transformation; Introduction to

complex Numbers; Introduction to Vectors; Matrix and Determinants, Discrete and continuous variables, the straight line in various forms; The Circle, Trigonometric Functions; Exponential Functions Maxima, Minima and Points of Inflection; Integral Calculus; Integration by Substitution and By-Parts: Expansion of Algebraic Functions; - Simple Sequences and Series.

Omega Semester

CSC221 - Computer Programming II (3 Units)

Principles of good programming, structured programming concepts, Debugging and testing, string processing, internal searching and sorting, recursion. Use a programming language different from that in CSC 201 e.g C# or VB.net.

CSC225 - Operating System (3 Units)

Overview of O/S: Role & Purpose, Functionality Mechanisms to support Client-server models, handheld devices, Design Issues influences of Security, networking, multimedia, Windows. O/S Principle: Structuring methods Abstraction, processes and resources, Concepts of APIS Device organization interrupts. Concurrency: States & State diagrams Structures, Dispatching and Context Switching; interrupts; Concurrent execution; Mutual exclusion problem and some solutions Deadlock; Models and mechanisms (Semaphones, monitors etc.). Producer-Consumer Problems and Synchronization. Multiprocessor issues. Scheduling & Dispatching Memory Management: Overlays, Swapping and Partitions, Paging & Segmentations Placement & replacement policies, working sets and Trashing, Caching.

CIS226 - Statistical Methods (2 Units)

Review of probability as a measure of uncertainty, sample points and events, combination of events. Binomial, Exponential, Normal, Gamma, Chi-Squared distributions; probability function, mean, variance, and moment generating function. Joint probability distribution and joint probability density function, marginal distribution, expected value,

covariance and correlation; Statistical independence; Transformation of variable; Moment and moment generating function; Linear combination of random variable; Multinomial and Normal Bivariate distributions. Sampling distribution of , and S2; Central Limit Theorem; Approximation for discrete distributions; Sampling distribution for t and F. Point Estimation: Bias and unbiased estimator; principle of minimum variance unbiased estimation; Method of moment; Maximum Likelihood estimation. Interval Estimation: Population mean and difference between two population mean using z - distribution and t – distribution.

MIS221 - Introduction to Management Information System (3 Units)
History and motivation for MIS. Management structure and MIS. Roles of Information System in management. Computers and information processing. Information processing software. Managing data resources. Digital Firm: e-commerce, and e-business opportunities. Redesigning the organization with Information System. Enhancing management decision making. Information System security and control. Using IT for competitive advantage. Accounting Information system. Financial Information System. Market Information System. Manufacturing Information System. Geographic Information System. Medical Information System. Information System architecture. Wiretapping and encryption. Advantages and disadvantages of stand-alone vs. network computer. Acquisition sources of software packages, advantages and disadvantages. Organising Data and Information: Data Warehouse, data mart. The Internet, Intranet, and Extranet relationship changes with customers, and marketing processes. Decision support system. Artificial intelligence and Expert system in business. System development life cycle. Ethical and social impact of Information system. Managing hardware asset, software asset, and data resources. Information System, Organisation, Management, and Strategy.

CSC241 – Linear Algebra II (3 Units)
Rigorous treatment of D-operator and application to integration by parts. Differentiation and Integration of integrals, elliptic integrals, line integrals.

Detailed treatment of multiple integrals. Series development of differential equations. Introduction to Fourier series and application.

BUS221 - Principles of Management II (2 Units)

General discussion on course structure and outline, Authority and Delegation, Comparative management, Managing productivity, Employee motivation and performance, Management Information system, Strategic management Elements of International management 1, Elements of International management 11, Total quality management, Basic elements of control in organization, Management system concept and Interpersonal relations and communication.

CBS121 - Statistics of Business and Social Science I (2 Units)

Nature of Statistics, Statistical Inquiries, Forms and Design. The Role of Statistics, Basic Concepts in Statistics, Discrete and Continuous Variable, Functional Relationships, Sources of Data, Methods of Collecting Primary Data, Presentation of Statistical Data, Measures of Central Tendency, Measures of Dispersion, Moments Skewness and Kurtosis, Elementary Probability Distribution, Normal Binomial, Poisson and Hyper geometric. Elementary Sampling Theory, Estimation, Theory, Student's Distribution, Statistical Decision Theory, Test of Hypothesis for Small and Large Samples, Chi-Square Distribution and Test of Goodness of Fit, Linear Regression. Correlation Theory, Index, Numbers, Time Series and Analysis of Time Series.

300 Level

Alpha Semester

CSC310 - Internet Programming (2 Units)

Distributed Computing, Mobile & Wireless computing, Network Security; Client/Server Computing (using the web), Building Web Applications.

CSC312 - Fundamental of Data Structure (3 Units)

Primitive types, Arrays, Records, Strings and String processing , Data representation in memory, Stack and Heap allocation, Queues, TREES. Implementation Strategies for stack, queues, trees. Run time Storage management; Pointers and References, Linked structure.

CSC313 - Object-Oriented Programming (2 Units)

Basic OOP Concepts: Classes, Objects, inheritance, polymorphism, Data Abstraction, Tools for developing, Compiling, interpreting and debugging, Java Programs, Java Syntax and data objects, operators. Central flow constructs, objects and classes programming, Arrays, methods. Exceptions, Applets and the Abstract, OLE, Persistence, Window Toolkit, Laboratory exercises in an OOP Language.

MIS316 - Research Methods (3 Units)

Basic concepts in Scientific Inquiry; Scientific Research: Meaning, Basic Steps. Basic and Applied Research Concepts, Theories, Laws, Hypotheses, Research Design; Choosing a Research Topic. Problem Analysis, Literature Review, Model Building/Conceptual Framework. The Research Proposal. Sampling Techniques. Data Collection Techniques; Data Types (Primary, Secondary etc), Data Collection Strategies, Surveys, Experiments, Content Analysis Motivation Research, Data Collection Instruments e.g. (a) The interview (b) The Questionnaire, Data Measurement, Analysis and Interpretation: Measurement Scaling, Validity, Reliability Analysis: Qualitative Statistical Data Presentation: Tables, Charts, Cross tabs etc. Report Audience, Types and Length, Mechanical Aids (Footnotes, Maps, Charts etc). Business Research in Nigeria: Scope; Problems and Possibilities. 45h.

CSC317 - Systems Analysis and Design (2 Units)

System Concept; System Development Life Cycle. Analysis: Fact gathering Techniques, data flow diagrams, Process description data modeling. System Design: Structure Charts, form designs, security, automated Tools for design. System Development Techniques and Methodologies.

CSC319 - Operations Research (2 Units)

Overview of the operation research Modeling approaches. Linear programming model; assumption of linear programming; Simplex method; Two-phase Method; Artificial Variable Technique; Minimization and maximization Two-Phase method. Transportation simplex method: tableau initialization, optimality test, and iteration; Assignment Problems: Formulation and Solution. Directed network; Shortest-path problem: Algorithm for minimum spanning tree problem; Maximum cost flow problem; Minimum cost flow problem; Network simplex method; Project planning and control with PERT-CPM. Deterministic Model; Continuous Review: Economic order quality model (EOQ); Periodic review: Production planning; Stochastic Models: Single Period model; Two-period inventory model; Multi-period model. One-dimensional Search: Golden section search derivations; Taylor series and conditions for local optima; Convex / Concave function and global optimality; Gradient search; Newton's method; Quasi-Network method and BFGS search. Lagrange multipliers method; Karush-Kuhu-Tucker optimality conditions; Penalty and barrier method.

CIS319 - Statistical Computing (2 Units)

An introduction to R; Data and text manipulation in R, including regular expressions and database operations; R programming: data structures and types, object orientation, flow control, functions, efficient programming, parsing/expressions/formulas; Numerical methods; Numerical linear algebra; Simulation studies and Monte-Carlo; Object-oriented programming; Graphics programming. Numerical integration and numerical differentiation, symbolic integration and differentiation. Optimization.

BFN311 - Business Finance II (3 Units)

Capital Structure of a firm, Leverage; operating leverage, Financial leverage & combine leverage, Dividend Policy; theories of dividend policy, internal financing, Ratio Analysis; overview of financial statements, users of financial statement, concept of financial ratio, types of financial

ratio & limitations, Analysis of Working Capital, Valuation of firms; Mergers, Acquisition & take over.

BUS313 - Business Law (3 Units)

Examination of the nature of law in Nigeria and the formation and application of legal principles in Nigeria; the role of law in society; the legal environment in which business operates, particularly government taxation; negotiable instruments, insurance, competition, and labour-management relations; and the concept of property; property creation, transfer, and importance to our business society. General principles of contracts; sales of goods, hire purchase, products liability, commercial paper, debtor-creditor relations, property, agency and employment, partnership, corporation.

MKT211 - Principles of Marketing I (3 Units)

This is the first semester of a two-semester course designed to introduce the undergraduate student to the basic concept and principles involved in initiating and executing the marketing process in a business form. Although emphasis is on the marketing functions and activities of private-sector profit oriented businesses, the application of the marketing knowledge skills and techniques discussed in this course will be highlighted in the public sector and non-for-profit domains.

CBS211 - Mathematics for Business and Social Sciences (2 Units)

Nature of statistics and data collection and presentations of data. The nature and meaning of statistics, scope of statistics, statistical methods and their purposes. Types and sources of statistical data, approximations, errors and accuracy in statistics. Types of tables, construction of tables, tabular presentation, pictorial presentation. Frequency distribution, histogram, O give, bar chart and pie charts measures of central tendency : mean, median, mode, distribution for both grouped and ungrouped data, geometric mean, harmonic mean, root mean square, quartile deciles and percentiles, measures of dispersion and types of sample, range, variance, standard deviation, coefficient of variation, skewness and kurtosis. Random sampling,

systematic sampling, stratified sampling, cluster sampling, Multi-stage sampling, Non-random sampling, Quota sampling, Purposive sampling, Judgmental sampling.

Omega Semester

MIS329 - Student Industrial Work Experience Scheme (SIWES) (6 Units)

During the SIWES, each student will undergo a practical on the job training in IT industry approved for its relevance to the student's major for a minimum of 14 weeks starting immediately after the alpha semester's examinations at 300 level. A programme of training will be drawn by the College and the Industry for each student, and a prescribed log book with daily recording of the student activities is to be kept by each student and appropriately signed. At the end of the programme, a written report is to be submitted to the college and each student to present a seminar on his/her industrial experience. Each student must pass a prescribed certification examination during this second industrial training.

400l Level

Alpha Semester

CSC411 - Software Engineering (3 Units)

Software Design: Software architecture, Design Patterns, O.O. analysis & Design, Design for re-use. Using APIS: API programming Class browsers and Related tools, Component based computing. Software tools and Environment: Requirements analysis and design modeling Tools, Testing tools, Tool integration mech.

CSC432 - File Processing (2 Units)

Introduction to file processing. Fundamental File Processing Operations. Managing Files of Records: Sequential and direct access. Secondary

Storage, physical storage devices: disks, tapes and CDROM. System software: I/O system, file system, buffering. File compression: Huffman and Lempel-Ziv codes. Reclaiming space in files: Internal sorting, binary searching, keysorting. Introduction to Indexing. Indexing. Cosequential processing and external sorting. Multilevel indexing and B trees. Indexed sequential files and B+ trees. Hashing. Extendible hashing.

CSC415 - Artificial Intelligence (3 Units)

Introduction to artificial intelligence, understanding natural languages, knowledge representation, expert systems, pattern recognition, the language LISP.

MIS412 - Knowledge Management (2 Units)

Overview: Introduction to Knowledge Management; foundations of knowledge management, including cultural issues, technology applications, organizational concepts and processes, management aspects, and decision support systems. The Evolution of Knowledge management, From Information Management to Knowledge Management, Key Challenges Facing the Evolution of Knowledge Management, Ethics for Knowledge Management. Organization and Knowledge Management, Building the Learning Organization, Knowledge Markets: Cooperation Among Distributed Technical Specialists, Tacit Knowledge and Quality Assurance. Telecommunications and Networks in Knowledge Management, Internet Search Engines and Knowledge Management, Information Technology in Support of Knowledge Management, Knowledge Management and Vocabulary Control, Information Mapping in Information Retrieval, Information Coding in the Internet Environment, Repackaging Information. Components of a Knowledge Strategy, Case Studies-From Library to Knowledge Center, Knowledge Management in the Health Sciences, Knowledge Management in Developing Countries, etc.

MIS413 - System Accounting (2 Units)

Accounting and System Concepts: A model for Processing Accounting Information, Managerial Accounting Systems, Systems concepts and

Accounting. Developing Accounting Systems: System development Processes, Analysis, design, implementation and operations. Technology of Accounting Systems: Computer Software and Configurations, Date processing and storage, file processing methods controls; internal Control, Information System control data Security and integrity. Processing Accounting transaction cycles, revenue, expenditure and financial cycles applications.

MIS414 – Financial Information System (2 Units)

Business Analysis – analysis and forecasting of financial statements, and financial modeling for planning and controlling the growth of the business enterperise. Quantitative Finance. Investment Analysis. Capital Markets and Derivatives: capital budgeting, designing and issuing securities, manager performance evaluation, resolution of agency problems, and working capital management. Corporate Finance and Risk. Decision Support Systems End User Computing Risk Management. Information and Knowledge Management Software Tools. Value Based Customer Relationship and Process Management. Research Methods (with emphasis on Function Point Analysis and Structured Systems Analysis and Design Method).

MIS415 - Project Management (2 Units)

Team Management, Project Scheduling, Software measurement and estimation techniques, Risk analysis, Software quality assurance, Software Configuration Management, Project Management tools.

MIS418 - E-Commerce Technology (3 Units)

E-Commerce: Definition. History of e-commerce. Selling on the Web. Business-to-Business (B2B), Business-to-Customer (B2C) and Business-to-Government (B2G) Models. Standards for e-commerce: Standards by agreement, SET, others. Solving Problems by Searching; Informed Search Methods; Game Playing. Online Banking. Virtual Shopping Centres. Portals and Vortals. Web servers: Hardware, Software. Security. Installing new Web Server. Designing and maintaining webpages. Website administration. Advertising the Website. Using CGI for E-

Commerce. CGI Authoring Tools. Applet and Servlet Solutions. Handling Credit Cards. Secure Transport. Processing Credit Cards. Using JDBC for E-Commerce. Interaction Examples: Virtual Shopping Carts, Auction Engines. Standard CGI Library. Configuration and Storage Devices. File String Replacement Facility. Credit Card Transaction Processing. Single Page CGI. Shopping Cart CGI. Web Query Language, Embedded SQL ; Development of E-commerce sites by using CGI , Java and databases. Future Trends: Set-top Boxes. TV interface. Emerging Technologies.

Omega Semester

MIS421 - Decision Support System (3 Units)

History, Development of DSS, Basic Concepts, DSS Paradigm and Architecture, Components of DSS, Classes of DSS, Decision Support Tools. Decision Style, Comparison of Statistical Decision Making Methods, Cognitive Process, Brainstorming, Bounded Rationality, Adaptive and Structured DSS Design, Effectiveness and Efficiency Criteria. Groups: Collaborative and Competitive, Co-located and Non-collocated Groups, Organisational Learning, Group Decision Support Systems, DSS Software Identification, Groupware, Lotus Notes / Domino. Optimisation Models, Satisfying Models, Visualisation. Fuzzy Decision Making Concepts, Neural Network Applications in Decision Making, Expert Systems and Artificial Intelligence, Knowledge Engineering, Data Warehousing and Data Mining.

MIS423 - Management Theory (3 Units)

Definition of management; needs for theory and technique of management, managerial transformation process, evolution of management theory, theories of management, concept of a manager, management functions. Management in developing countries (production in Nigeria main causes of low productivity) the management grid and management by objective, practice in construction management, expatriates management approach to work in Nigeria organizations,

theories observable in the way Nigeria enterprises are managed, securing productivity at work, criteria for locating bad management and group conflicts in organization.

CSC424 – Computer Network/ Communication (3 Units)

Introduction, wares, Fourier analysis, measure of communication, channel characteristics, transmission media, noise and distortion, modulation and demodulation, multiplexing, TDM FDM and FCM Parallel and serial transmission (synchronous Vs analynchronous). Bus structures and loop systems, computer network Examples and design consideration, data switching principles broadcast techniques, network structure for packet switching, protocols, description of network e.g. ARPANET, etc.

CSC443 – Modeling and Simulations (2 Units)

Basic Definitions and Uses, Simulation Process, Some basic statistic Distributions Theory, Model and Simulation. Queues; Basic components, Kendal notation, Queuing rules, Little's Law, Queuing networks, Special/types of queues. Stochastic Processes; Discrete state and continuous state processes, Markov processes, Birth-Death Processes, Poisson Processes. Random Numbers; types of Random Number Exercises.

CSC444 - Computer System Performance Evaluation (2 Units)

Measurement techniques, simulation techniques; techniques, workload characterization, performance evaluation in selection problems, performance evaluation in design problems, evaluation of programme performance.

CSC446 - Distributed Computing Systems (2 Units)

Introduction: Definitions, Motivation; Communication Mechanisms: Communication Protocols, RPC, RMI, Stream Oriented Communication; Synchronization: Global State, Election, Distributed Mutual Exclusion, Distributed Transactions; Naming: Generic Schemes, DNS, Naming and Localization; Replication and Coherence: Consistency

Models And Protocols; Fault Tolerance: Group Communication, Two-And Three-Phase Commit, Check pointing; Security: Access Control, Key Management, Cryptography; Distributed File Systems: NFS, Coda etc.

MIS422 - Production and Operation Management (2 Units)

Introductory course in decision–making problems in production; include the theoretical foundations for production management as well as the applications of decision-making techniques to production problems in the firm; and considers production processes, plant layout, maintenance, scheduling, quality control, and production control in particular. In-depth treatment of concepts involved in designing and implementing planning and control systems within the context of a dynamic environment; particular emphasis on the systematic use of information to maintain the efficient flow of materials, utilization of people and technology, coordination with suppliers, and communication with customers.

MIS425 - System Security Management (2 Units)

Introduction: Objectives, privacy and ethics, risk analysis in computer security, threats and security, security measures, physical protection (natural disaster, physical facility, access control), hardware and software security control, viruses (trojan horses, worms and logic bomb), encryption and cryptography techniques. Developing Secured Computer System: External security measures, issue, security models (specification and verification, Bell and LaPadulla Model, Clark-Wilson Model, Goguen-Meseguer, TCSEC), discretionary access requirements, mandatory access requirements, user authentication, access and information flow control, auditing and intrusion detection, damage control and assessment, microcomputer Security. Network and Telecommunication Security: Fundamentals, issue, objective and threats, security services, distributed system security, trusted network interpretation, TNI security services, AIS interconnection issues, firewalls-gateways, application, cost and effectiveness. Database Security: Security requirements to Databases, designing the security, methods of protection,

security of multilevel Database. Legal Issue and Current Legislation: Computer crime, software violation, crimes, privacy considerations, corporate policy, managerial issues, government-based security standards.

MIS426 – Supply Chain and Logistics Management (2 Units)

Supply Chain Management: An overview. Purchasing Management Supplier and Supply Chain Relationships Management. Global Dimensions of Supply Chains. Collaborative Planning, Forecasting, and Replenishment. Enterprise Resource Planning Systems. Supply Chain Technology- Managing Information Flows. Demand Management. Order Management and Customer Service. Inventory Management – Managing Inventory in the Supply Chain. Process Management: JUST-IN-TIME and Total Quality Management. Transportation-Managing the Flow of the Supply Chain. Distribution-Managing Fulfilment Operations. Supply Chain Network Analysis and Design. Strategic Sourcing Materials and Services for Successful Supply Chain Management. Operations-Producing Goods and Services. Logistics Management. Role of Logistics in Supply Chains. Customer Relationship Management. Location Decisions. Service Response Logistics. Process Integration. Performance Measurement-Supply Chain Performance Measurement and Financial Analysis. Supply Chain Sustainability. Strategic Challenges and Change for Supply Chains.

MIS429 - Project (6 Units)

Each student is required to undertake a project giving productivity value to the academic knowledge gained. The project shall involve problem solving using computer science and management theories and techniques. At the end of the first semester, each student shall present the first seminar on his/her project.

BUS326 - International Business and World Resources (3 Units)

Analyses of the major business management functions of international business operations of multinational firms: topics include international business environment, organizational policies and strategies of multinational companies; industrial relations and control policies. Import and export procedures, foreign exchange procedures and the role of international cooperation such as IMF, World Bank, IBRD, GATT, etc.

CBS221 - Statistics for Business and Social Sciences (2 Units)

Sequence and series, permutation, combination and binomial theorem, Functions, limits and continuity, matrix algebra, derivative and the rules of differentiation: the slope of a curvilinear function, the derivative, derivative notation, Rules of differentiation, Implicit differentiation.

A training session at the International Workshop & Training in Mathematical Modeling, Scientific Computing with Maple & Matlab, organised by Department of Mathematics

A cross session of participants at the International Workshop & Training in Mathematical Modeling, Scientific Computing with Maple & Matlab

6.4 DEPARTMENT OF MATHEMATICS

OVERVIEW OF THE DEPARTMENT

The Department of Mathematics served as a servicing unit at the inception of the University in the year 2002. In 2004, it became a full Unit under the Department of Natural Sciences, admitting her first set of five students (all females) into the B.Sc. Industrial Mathematics. In 2006, it became an autonomous Department under the pioneer headship of Dr. M. B. Olorunsaiye. The five pioneer female students were then in their final year. Mr. H. A. Isede then acted as the head briefly from January to March, 2008. The baton of headship was taken over by Dr. M. R. Odekunle (now Professor) in March, 2008. He was the Head of the Department till August 31, 2009. Professor M. R. Odekunle was succeeded by Dr. J. O. Olaleru. Thereafter, Dr. P. O. Olanrewaju was appointed as the acting Head of Department. Prof. J. A. Gbadeyan was the Head of Department between September, 2010 and November, 2011 before Dr. P. O. Olanrewaju became the acting Head of Department with effect from January, 2012. Prof. S. Iyase became the Head of Department in 2014.

Vision

The undegraduate programme in the Department of Mathematics is designed to provide the students with a sound, broad and balanced foundation in mathematics knowledge and skills with courses which are oriented towards practical development. The programme is designed to achieve the 20-2020 millenium goals of the Federal Government, bearing in mind the mathematical skills, understanding and attitude that graduates of the programme will need to be successful in their careers and daily lives.

Mission

The Department provides students opportunities to develop specific skills and competencies, become aware of the social role of scientists and mathematicians in the world community, develop personal and

intellectual attributes for thoughtful decision making, and develop a general education foundation which promotes competency for life.

Philosophy

The Philosophy of the Department is in line with the founding philosophy of the University in 'raising a new generation of leaders' who will apply the mathematical concepts for life-matics.

Objectives

The objectives are to:

(i) develop in students enthusiasm for mathematics and appreciation of its applications in different areas of our national manpower needs.

(ii) produce graduates who are able to handle mathematics in industrial, business and related disciplines involving mathematics.

(iii) prepare students for graduate studies in specialized areas of mathematics or multi-disciplinary areas involving mathematics.

(iv) develop in students the ability to apply their mathematics knowledge and skills to the solution of theoretical and practical problems in real-life situations.

(v) provide service courses in mathematics for students in other disciplines requiring a working knowledge of mathematics.

LIST OF ACADEMIC STAFF IN THE DEPARTMENT

S/N	NAME	ACADEMIC QUALIFICATION	PROFESSIONAL QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Prof. S. Iyase	B.Sc, M.Sc, Ph.D	MNMS, MMAN	Professor/ HOD	Real/Functional Analysis
2.	Dr. T. A. Anake	B.Sc, M.Sc, Ph.D	MNMS, MMAN, MICMCS, EMS	Lecturer I	Numerical Methods of ODEs, Mathematics of Finance
3.	Dr. A. E. Owoloko	B.Sc, M.Sc, Ph.D	MMAN, MSAN, MICMCS	Lecturer I	Mathematics of Finance, Statistics and Optimization
4.	Dr. (Mrs.) S. A. Bishop	B.Sc, M.Sc, Ph.D	MNMS, MMAN, MICMCS	Lecturer I	Numerical Analysis of Stochastic Differential Equations
5.	Dr. M. C. Agarana	B.Sc, M.Sc, Ph.D		Lecturer II	Analytical Dynamics / Optimization
6.	Mr. J. G. Oghonyon	B.Sc, M.Sc		Assistant Lecturer	Numerical Methods of ODEs
7.	Mr. O. O. Agboola	B.Sc (Ed.), M.Sc		Assistant Lecturer	Analytical Dynamics, Vibration of Elastic Structures
8.	Mrs. K. S. Eke	B.Sc, M.Sc		Assistant Lecturer	Real Analysis
9.	Mr. O. J. Adeleke	B.Tech, M.Sc		Assistant Lecturer	Optimization
10.	Mr. O. A. Odetunmibi	B.Sc, M.Sc		Assistant Lecturer	Mathematical Statistic
11.	Mr. S. O. Edeki	B.Sc, M.Sc		Assistant Lecturer	Mathematics of Finance
12.	Mr. H. I. Okagbue	B.Sc, M.Sc		Assistant Lecturer	Mathematical Statistics
13.	Mr. P. E. Oguntunde	B.Sc, M.Sc		Assistant Lecturer	Mathematical Statistics
14.	Mr. A. A. Opanuga	B.Sc, M.Sc		Assistant Lecturer	Fluid Dynamics

VISITING LECTURERS

S/N	NAME	ACADEMIC QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Prof. J. A. Gbadeyan	B.Sc, M.Math, Ph.D	Professor	Vibration of Elastics Structures
2.	Prof. G. O. Ekhaguere	B.Sc, Ph.D, DIC	Professor	Mathematical Physics, - Algbera Partial-Algberas, Mathematics of Finance
3.	Prof. E. O. Ayoola	B.Sc, M.Sc, Ph.D	Professor	Quantum Stochastic, Differential Equations
ADMINISTRATIVE STAFF				
1	Mrs. O. Amuleya	B.Sc	Admin Officer	Economics

6.4.1 INDUSTRIAL MATHEMATICS PROGRAMME

PROGRAMME: Industrial Mathematics
DEGREE AWARDED: B.Sc (Honours) Industrial Mathematics
DURATION: Four 4 Years (8 Semesters)

ADMISSION REQUIREMENTS

(a) General Requirements:

The minimum entry requirements into Covenant University is a credit level pass in five (5) subjects, including English Language and Mathematics obtained at not more than two sittings. In addition, Covenant University conducts screening exercises for all candidates seeking admission into the University. Candidates are also to note that there are other requirements that may be specific to a College and/or a programme.

(b) Additional Admission Requirements

U.M.E. Requirements: Five 'O' Level (WASC SSCE/GCE/NECO SSCE or
equivalent) Credit passes in English Language, Mathematics, Physics, and any two of Chemistry, Biology, Agricultural Science, and Economics, obtained in not more than 2 sittings. U.M.E Subjects include English Language, Mathematics and any two of Physics, Chemistry, Agricultural Science, Economics and Business Studies.

GRADUATION REQUIREMENTS

To graduate from the 4-year Bachelor of Science (B.Sc.) degree programme in Industrial Mathematics, students must have successfully completed a minimum of 160 Credit Units as shown below:

Graduating Required Units for B.Sc. Industrial Mathematics Programme

Level	Core /Compulsory Courses	Electives	Industrial Training [SIWES]	College Courses	University Courses	NUC Courses	Total
100	31				4	10	**45**
200	30	4			4	6	**44**
300	15	6	6		2	2	**31**
400	30	6			4		**40**
Total	**106**	**16**	**6**	**0**	**14**	**18**	**160**

COURSE STRUCTURE

100 Level Industrial Mathematics						
Course Grouping	Course Code	Course Title	Status	Units	Pre-Requisite	Semester
Compulsory Courses	MAT111	Mathematics I: Algebra	C	3		α
	MAT112	Mathematics II: Trigonometry and Geometry	C	2		α
	MAT113	Mathematics III: Elementary Mechanics	C	3		α
	MAT114	Mathematics IV: Statistics I	C	2		α
	PHY111	Mechanics and Properties of Matter	C	2		α
	PHY112	Heat, Sound and Optics	C	2		α
	PHY119	Physics Practicals I	C	1		α
	MAT121	Mathematics V: Calculus	C	3		Ω
	MAT122	Mathematics VI: Vector Algebra	C	2		Ω
	MAT123	Mathematics VII: Statistics II	C	2		Ω
	PHY121	Electricity and Magnetism I	C	2		Ω
	PHY122	Atomic and Nuclear Physics	C	2		Ω
	PHY129	Physics Practicals II	C	1		Ω
	ECN121	Introduction to Economics II	C	2		Ω
	CSC121	Introduction to Problem Solving	C	2		Ω
University Courses	EDS111	Entrepreneurial Development Studies I	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept – Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	CST111	Use of Library, Study Skills and Information Communication Technology I	U	2		α
	GST111	Communication in English I	U	2		α
	CST121	Use of Library, Study Skills and Information Communication Technology II	U	2	CST111	Ω
	GST121	Communication in English II	U	2	GST111	Ω
	GST122	Communication in French	U	2		Ω
			α =21 Ω = 24 Total = 45 Units			

200 Level Industrial Mathematics						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-Requisite**	**Semester**
Compulsory Courses	MAT211	Real Analysis I	C	3	MAT 111, 121	α
	MAT212	Mathematical Methods I	C	3	MAT 111,112,113, 121	α
	MAT213	Differential Equations I	C	3	MAT121	α
	MAT214	Linear Algebra	C	3	MAT111	α
	CSC211	Computer Programming I	C	3	MAT 111, 121	α
	MAT221	Real Analysis II	C	3	MAT221	Ω
	MAT222	Mathematical Methods II	C	3		Ω
	MAT224	Introduction to Numerical Analysis	C	3	MAT121	Ω
	MAT225	Abstract Algebra	C	3		Ω
	CSC221	Computer Programming II	C	3		Ω
Electives	***Note**: Take **2 Units** from the Electives*					
	MAT216	Applied Statistical Methods	E	3	MAT 114, 123	α
	ACC211	Financial Accounting I	E	2		α
	BUS211	Principles of Management I	E	2	EDS 111, 121	α
	ECN211	Principles of Economics I (Micro)	E	2		α
	ECN221	Principles of Economics II (Micro)	E	2		Ω
	BUS221	Principles of Management II	E	2		Ω
	ACC221	Financial Accounting II	E	2		Ω
University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept – Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept – Sports	V	0		Ω
NUC General Courses	GST211	Logic, Philosophy and Human Existence	U	2		α
	GST221	Nigerian People and Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution	U	2		Ω
Serviced Course	MAT217	Statistics for Biological Sciences	C	3		α
			α =21 Ω = 23 Total = 44 Units			

300 Level Industrial Mathematics						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-Requisite**	**Semester**
Compulsory Courses	MAT312	Numerical Methods I	C	2	MAT 211, 221	α
	MAT313	Complex Analysis I	C	2	MAT221	α
	MAT314	Introduction to Operations Research	C	2	MAT225	α
	MAT315	Probability Distributions	C	2	MAT221	α
	MAT317	Mathematical Methods III	C	2	MAT 212, 222, 224	α
	MAT318	Statistical Inference	C	2	MAT 114,123	α
	MAT319	Mathematical Modeling	C	3		α
Electives	***Note:** Select 6 Units from these Electives*					
	MAT310	Dynamics of a Rigid Body	E	3	MAT 211, 221	α
	MAT311	Groups and Rings	E	3	MAT 225, 221	α
	MAT316	Vector Field Theory	E	3		α
SIWES	MAT329	Industrial Training	S	6		Ω
University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =25 Ω = 6 Total = 31 Units			

400 Level Industrial Mathematics						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-Requisite**	**Semester**
Compulsory Courses	MAT411	Topology	C	3	MAT321	α
	MAT412	Differential Equations II	C	3	MAT317	α
	MAT413	Probability Theory and Stochastic Process	C	3	MAT315	α
	MAT414	Advanced Numerical Analysis	C	3	MAT313	α
	MAT417	Functional Analysis	C	3		α
	MAT419	Research Project I	C	0		α
	MAT421	Optimization Theory	C	3	MAT315	Ω
	MAT422	Differential Equations III	C	3	MAT317	Ω
	MAT424	Survey Methodology and Quality Control	C	3	MAT321	Ω
	MAT429	Research Project II	C	6	-	Ω
Electives	***Note**: Take **3 Units** from the Electives*					
	MAT418	Complex Analysis II	E	3	MAT312	α
	MAT415	Experimental Design	E	3	MAT318	α
	MAT416	Advanced Algebra	E	3	MAT311, 322	α
	MAT423	Theory of Measure	E	3	MAT315	Ω
	MAT425	Systems Theory	E	3		Ω
	MAT426	Linear Models	E	3	MAT315	Ω
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC421	Total Man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α =20 Ω = 20 Total = 40 Units			

COURSE DESCRIPTIONS

100 Level

Alpha Semester

MAT111 - Mathematics I: Algebra (3 Units)
Algebra of Sets; special sets ($\mathbb{N}\subset\mathbb{Z}\subset\mathbb{Q}\subset\mathbb{R}\subset\mathbb{C}$); theory of indices, law of logarithms, indical equations, surdic equations. Polynomials, the remainder and factor theorems; polynomial equations and inequalities-especially linear, quadratic and cubic. Solving quadratic equations and cubic equations with an integral root. Domain and zeroes of rational functions. Partial fractions. Permutations and combinations. The binomial theorem for any index and applications. Sequences and series of real numbers (including AP and GP). Algebra of complex numbers. Introduction to m x n matrices; elementary operations on matrices and applications to solution of linear equations. Elementary properties of determinants of at most 3 x 3 matrices; The Rule of Sarrus.

MAT112 - Mathematics II: Trigonometry and Geometry (2 Units)
Trigonometric functions; exponential and logarithmic functions. Circular measure; hyperbolic functions. Equations of lines and planes; conic sections (circle, parabola, hyperbola, ellipse).

MAT113 - Mathematics III: Elementary Mechanics (3 Units)
The vector approach should be used where possible in what follows: The notions of displacement, speed, velocity and acceleration of a particle. Newton's laws of motion and applications to simple problems. Work, power, conservation of energy to motion of particles and those involving elastic and spring. Collision of smooth spheres. Simple problems of projections. Conical pendulum. Simple harmonic motion. Resultant of any number of forces acting on a particle. Reduction of coplanar forces acting on a rigid body to a force and a couple. Equilibrium of coplanar forces, parallel forces, couples laws of function. Applications of the principle of moments. Moments of inertia of simple bodies.

MAT114 - Mathematics IV: Statistics I (2 Units)
Introduction to statistics. Diagrammatic representation of descriptive data. Measures of location and dispersion for ungrouped data. Grouped distribution, measures of location and dispersion for grouped data. Problems of grouping. Associated graphs. Introduction to probability. Sample space and events, addition law, use of permutation and combination in evaluating probability.

PHY111 - Mechanics and Properties of Matter (2 Units)
Units and dimensions, Scalar and vectors, Particle kinematics, Newtons laws, Friction, Work, Energy, Centre of mass, Simple harmonic motion, Rigid body dynamics, Kepler's laws, Pressure in fluids, Intermolecular forces, Hooke's law, Young modulus, Fluid flow Streamline turbulence, Strooke's law surface tension.

PHY112 - Heat, Sound and Optics (2 Units)
Temperature and Zeroth law of thermodynamics, thermometers, Heat transfer, Kinetic theory of gases, Gas laws, First and second laws of thermodynamics; Concept of waves, transverse and longitudinal waves, standing waves, propagation of waves in pipes and strings, beats, Doppler effect; Electromagnetic spectrum, Huygens's Principle, Images formed by a single surface, spherical mirrors and thin lenses; aberrations; the eye, optical instruments, Interference, single slit, Diffraction, grating, Polarization, elementary examples.

PHY119 - Physics Practicals I (1 Unit)
Simple experiments illustrating the topics covered in PHY111 and PHY112.

Omega Semester

MAT121 - Mathematics V: Calculus (3 Units)
Functions: Concept and notation. Polynomial and rational functions. Idea of limits; technique of finding limits. Derivatives: definition and

calculation from first principles. Derivatives of constants, power, sums, products, quotients. Composite functions, circular functions, logarithmic/exponential function. Higher order derivatives; applications, small increments, approximations and errors. Extrema; integration of sum/scalar multiple of functions with applications; integration of circular functions. Definite integrals: general properties of definite integrals, some applications to geometry, mechanics, Biology and Social Sciences. Derivatives of hyperbolic functions; inverse circular/hyperbolic functions. Method of taking the logarithm before differentiating; successive differentiation of implicit functions and of functions like $e^{-at}\sin(bt + c)$. Hard Integration: Further techniques. Evaluation of integrals of the form $\int \frac{dt}{t^2+a^2}$. Integration of irrational functions, integration by substitutions, integration by parts. Reduction Formula.

MAT122 - Mathematics VI: Vector Algebra (2 Units)

3-Dimensional cartesian coordinate systems. Definition and representation of vectors. Elementary vector algebra. Multiplication of a vector by a scalar; addition of vectors; scalar products of two vectors; vector products; triple vector products. Direction cosines. Solution of vector equations. Calculus of vector functions. Differentiation of vector function. Plane curves and space curves. Serret-Frenet's formulae. Differential definition of grad, div and curl and their simple applications. Integration of vector function.

MAT123 - Mathematics VII: Statistics II (2 Units)

Linear correlation, scatter diagram, product moment and rank correlation. Linear regression. Probability distribution: binomial, Poisson and normal distributions. Sampling and sampling distribution. Estimation of population parameters, confidence intervals, test of hypothesis concerning two or more populations, contingency tables.

PHY121 - Electricity and Magnetism 1 (2 Units)

Electricity, coulomb's law, Ohm's law. Gauss's theorem, Capacitors, Kirchoffs laws, Electrical energy, DC, Bridges potentiometer, Magnetic

effect of current, Electromagnetic induction, Moving coil and ballistic galvanometers, Multimeters, DC and AC motors, and generators, Hysteresis, Power in AC circuits, Semi-conductors, Conductivity and Mobility, Rectification.

PHY122 - Atomic and Nuclear Physics (2 Units)

Atomic & Nuclear physics: Theory of atomic structure. Thompson, Rutherford and Bohr's theories, the hydrogen atom. Properties of nucleus, Natural radioactivity, wave particles duality of light, X-rays, Photo-electricity, Thermionic emission, Diode valve.

PHY129 - Physics Practicals II (1 Unit)

A selection of experiments to illustrate the principles covered in PHY121 and PHY122.

CSC121 - Introduction to Problem Solving (2 Units)

Problem solving strategies, Roles of algorithm in problem solving process, implementation strategies, concepts and properties of algorithm. Using C-language.

ECN121 - Introduction to Economics II (2 Units)

Introduction to Macroeconomics: National Income Determination; the Public Sector in the National Economy; Macroeconomic Policy Objectives and Instruments; Introduction to Money and Banking, Introduction to Economic Growth and Development. Trade politics with Particular reference to Nigeria.

200 Level

Alpha Semester

MAT211 - Real Analysis I (3 Units)

Introduction to Mathematical Proof, Method of Proof and Indirect Proof. The real number system. The number e; the absolute value function,

$||:\mathbb{R} \to \mathbb{R}_+ \cup \{0\}$; Properties of the absolute value function, $||$. Sequences in $\mathbb{R}$; convergence of sequence in $\mathbb{R}$ (abstract definition). Properties of convergent sequences in $\mathbb{R}$. Monotone sequence; Cauchy sequence; properties of Cauchy sequence. Limits of functions; continuity of functions, one-sided limits: right-hand and left-hand limits. Classification of points of discontinuities. Infinite Series, Positive Series and Test of Convergence. Indeterminate forms of the type $\frac{0}{0}$ *and* $\frac{\infty}{\infty}$; indeterminate forms of the type $0.\infty$ or ∞ - ∞; indeterminate forms of the type $1^{\infty}, \infty^0 or 0^0$. L'Hospital's Rule. Taylor's theorem and its application to approximate calculations. Numeric series. Cauchy Criterion. Comparison Tests; D'Alembert's Ratio Test; Cauchy Test; Raabe's Ratio Test. Improper integral; Cauchy Integral Test; Alternating series. Absolute convergence; conditional convergence. Convergence Test for alternating series: Leibnitz Ratio Test; Abel's Ratio Test; Dirichlet's Ratio Test. Power series: radius of convergence; Cauchy – Adamara formula.

MAT212 - Mathematical Methods I (3 Units)

Partial differentiations, application and classification of critical points of functions of two variables. Lagrangian multipliers. Coordinate system: change from cartesian to polar, spherical and cylindrical coordinate systems. Taylor's and Maclaurin's series. Differential coefficients of the nth order. Lebnitz's rule, application to the solution of differential equations.

MAT213 - Differential Equations I (3 Units)

First order ordinary differential equations. Existence and uniqueness. Second order ordinary differential equations with constant coefficients. General theory of nth order linear equations. Laplace transforms, solution of initial value problem by Laplace transform method. Simple treatment of partial differential equation in two independent variables. Application of ordinary differential equations and partial differential equations to physical life and social sciences.

MAT214 - Linear Algebra (3 Units)

Introduction to basic concepts of linear algebra. Pivoting strategies. Vector spaces; subspaces; sum and direct sum of spaces. Linear dependence; linear independence; basis and dimension. Linear mappings; kernel, image, rank, nullity of linear mappings. Algebra of matrices; matrix of a linear mapping; elementary operations on matrices; Echelon forms; row/column rank of a matrix; determinants (elementary properties); laplace expansion of a determinant; Inverses of matrices; linear equations; homogeneous and non-homogeneous systems; eigenvalues and eigenvectors.

MAT216 - Applied Statistical Methods (3 Units)

Inference about mean, proportion and standard deviations: large and small samples. The chi-square test of impedance and goodness-of-fit. One way analysis of variance. Correlation and regression. Use of calculators, tables and statistical packages.

CSC211 - Computer Programming I (3 Units)

Introduction to problem solving methods and algorithm development, designing, coding, debugging and documenting programmes using techniques of a good programming language style, programming language and programming algorithm development. A widely used programming language should be used in teaching the above. E.g. C/C++ language.

BUS211 - Principles of Management I (2 Units)

The course is divided into lecture series covering the wide scope of the multi-dimensional and the multi-disciplinary nature of management with peculiar emphasis on effectiveness of management practice and organizational objective. Each lecture is presented in a form that allows for a theoretical study of the principles, theories and concepts underlining the practice of management. Applications of real life cases are also used to draw close the objective of the course. In addition, each lecture is ended with review questions to assist students test their understanding. General discussion on course structure and outline, Authority and Delegation, Comparative management, Managing productivity. Employee

motivation and performance, Management Information system, Strategic management, Elements of International management, Elements of International management II, Total quality management, Basic elements of control in organization, Management system concept and, Interpersonal relations and Communication.

ECN211 - Principles of Economics I (Micro) (2 Units)

The course deals with a more in-depth treatment of ECN111. It also introduces the use of quantitative techniques in Micro-economic theory. Topics to be covered include: The subject matter of economics, positive and normative economics, common fallacies in economics, and basic economic question in all types of economics. Theories of demand and supply, equilibrium concept and possibility of disequilibrium with emphasis on cobweb theory; Theory of elasticity of demand and supply with applications. Theory of consumer's behaviour: The cardinalist approach, the indifference curve or ordinalist approach and the revealed preference hypothesis.

ACC211 - Financial Accounting I (2 Units)

Review of basic accounting concepts and principles - double entry, books of original-entry, trial balance; preparation of final accounts for sole traders, clubs and charities; bank reconciliation (complex situation) electronic and money transfer etc. Partnership and partnership accounting including Profit and loss Appropriation account, the valuation of goodwill on admission and retirement of partners; change in partnership; revaluation of assets, and dissolution of partnership. Introduction to company accounts; Share Capital: Share issue and redemption. Preparation and presentation of unpublished final accounts of limited liability companies. Interpretation, uses and limitations of accounting ratios. IASB Framework for the Preparation and Presentation of Financial Statements, IFRS I: First time adoption of IFRSs. (PR – ACC111/121).

MAT217 - Statistics for Biological Sciences (3 Units)

Use of Statistical Methods in Biology. Frequency distributions. Laws of probability. The Binomial, Poisson and Normal distributions. Regression and Correlation. Hypothesis testing. Estimation (Small and Large samples). Statistical Inference. Analysis of Variance.

Omega Semester

MAT221 - Real Analysis II (3 Units)

Uniform Continuity, Differentiability of functions, Monotone functions, Maxima and Minima and the Mean Value Theorem, and Role's theorem. Application of the Mean Value theorem. Introduction to Reimann Integral.

MAT222 - Mathematical Methods II (3 Units)

Rigorous treatment of D-operator and application to integration by parts. Differentiation and Integration of integrals, elliptic integrals, line integrals. Detailed treatment of multiple integrals. Series development of differential equations. Introduction to Fourier series and application.

MAT224 - Introduction to Numerical Analysis (3 Units)

Introduction to numerical computation. Solution of non-linear equations. Solution of simultaneous linear equations, direct and iterative schemes. Finite difference operators. Interpolation and approximation. Numerical differentiation and quadrature. Numerical Integration. Curve fitting and least squares. Introduction to linear programming.

MAT225 - Abstract Algebra (3 Units)

Sets; relation; equivalence relation; mapping; order (partial order, total order, well-ordering). Lattices (definitions and examples); binary operations, homomorphism of groupoid; fundamental algebraic structures: semigroups, monoids, groups, rings, integral domains, skew fields, fields, ideals (definitions, examples and elementary properties).

Homomorphism of rings; elementary number theory: Divisibility and primes; Euclid's algorithm; congruences; polynomials in single variable. Factorization; partial fractions; circuit algebra; Boolean logic; Boolean algebra.

CSC221 - Computer Programming II (3 Units)

Principles of good programming, structured programming concepts, Debugging and testing, string processing, internal searching and sorting, recursion. Use a programming language different from that in CSC 201 e.g C# or VB.net

ACC221 - Financial Accounting II (2 Units)

Redemption of shares and debentures. Miscellaneous accounts: Consignment accounts, goods on sale or return, royalties, containers, investments, joint venture, contract account, departmental account, Bills of exchange, joint venture account, and Sinking funds. Stock valuation and computation of insurance claims. Depreciation including preparation of fixed asset schedule / register. IAS 2: Inventories, IAS 11: Construction Contracts, IAS 31: Interest in Joint Ventures, IAS 40: Investment Property, IFRS 4: Insurance Contracts, IFRS 11: Joint Arrangements (PR-ACC211).

BUS221 - Principles of Management II (2 Units)

General discussion on course structure and outline, Authority and Delegation, Comparative management, Managing productivity, Employee motivation and performance, Management Information system, Strategic management Elements of International management 1, Elements of International management 11, Total quality management, Basic elements of control in organization, Management system concept and Interpersonal relations and communication.

ECN221 - Principles of Economics III (Micro) (2 Units)

This is a continuation of ECN211. Theory of production: - Definition and types; factors of production, production functions and types; the short run and the long run analysis in production; output elasticity; The

law of returns to scale. Theory of cost and revenue. Basic discussions of market structure and behaviour in perfect competition, monopoly and monopolistic competition. Pre-requisite is ECN111.

300 Level

Alpha Semester

MAT310 - Dynamics of a Rigid Body (3 Units)
General motion of a rigid body as a translation plus a rotation. Moment and products of inertia in 3-dimensions. Parallel, and perpendicular axes theorems. Principals axes. Angular momentum, kinetic energy of a rigid body. Impulsive motion, examples involving one and two dimensional motion of simple systems. Moving frames of reference rotating and translating frames of references. Coriolis force. Motion near the earth's surface. The Foucault's pendulum. Euler's dynamical equations for motion of a rigid body with one point fixed. The symmetrical tops procession.

MAT311 - Groups and Rings (3 Units)
Groups, subgroups, cyclic groups; Lagranges's theorm, normal subgroups, quotient groups. Isomorphism theorems. Symmetric groups. Cayley's theorem. Group acting on sets. Sylow theorems. Commutators, direct product; composition series. Rings, quotient rings, isomorphism theorems, Prime and Maximal Ideals, Principal Ideal Domains (PID), Euclidean Domains (ED), Unique factorization Domains (UFD).

MAT312 - Numerical Methods I (3 Units)
Numerical solution of ordinary differential equations. Existence of solution. One-step schemes and theory of convergence and stability. Linear multistep methods: Development, theory of convergence and stability. Extrapolation processes. Integral equation and boundary value problem.

MAT313 - Complex Analysis I (2 Units)

Functions of a complex variable: polynomials, rational, trigonometric, logarithmic functions and their inverses. Branch point. Convergence of sequences and series; absolute and uniform convergence. Limit and continuity of a complex-valued function of a complex variable. Differentiation: complex derivative. Cauchy-Riemann equations. Analytic functions.

MAT314 - Introduction to Operations Research (2 Units)

Phases of operations research study. Classification of operations research models. Linear, dynamic and integer programming. Decision theory, inventory models, critical path analysis and project control.

MAT315 - Probability Distributions (2 Units)

Discrete and continuous probability distributions. Mathematical expectation and moments of random variables. Moment generating functions. The binomial, Poisson, geometric, hypergeometric and negative binomial distributions. The normal, uniform, gramma and beta distributions. The central limit theorem (proof by moment generating function) Functions of a univariate random variables. Bivariate distributions. Independence; sums of independent random variables.

MAT316 - Vector Field Theory (3 Units)

Gradient, divergence and curl; further treatment and application of the differential definitions. The integral definition of gradient, divergence and curl. Line, surface and volume integrals. Green's, Gauss' and Stoke's theorems. Curvilinear coordinates. Simple notion of tensors. The use of tensor notation.

MAT317 - Mathematical Methods III (2 Units)

Linear Dependence and the Wronskian, Analytic Regular and Singular points, Series representation of solution of an Ordinary Differential Equation in the neighbourhood of an ordinary point. Serties Solution near a regular singular point. The classical orthogonal polynomials

(Legendre, Hermite and Laguerre polynomials). Rodrigue's formula. Special functions: gamma and beta functions. Bessel functions. Euler Equation. Elementary properties of the hypergeometric functions.

MAT318 - Statistical Inference (2 Units)

Principles and methods of estimation curve. P – values. The s, t, Chi – square and f-tests. Use of non-parametric test: the sign and median tests. Walcoxon two sample rank test, Analysis of variance: two analyses. Quality control: acceptance sampling, control charts, cumulative-sum techniques. Use of unbiasedness and minimum variance in selecting good estimators. Interval estimation. Derivation of point and interval estimators of means, proportions and standard deviations. Principles of hypothesis testing: type I and II errors.

MAT319 - Mathematical Modelling (3 Units)

Methodology of model building: identification, formulation and solution of problems, cause-effect diagrams. Equation types: algebraic, ordinary differential equations, partial differential equations, difference, integral and functional equations, Applications of mathematical models to Physical, Biological, Social and Behavioral Sciences.

Omega Semester

MAT329 - Industrial Training (6 Units)

Students will be attached to various industries and establishments for 20 – 24 weeks (6 Months) during the 300 level Omega Semester and the long vacation in order to expose them to the practical applications of mathematics. All students enrolled in this course would be required to submit a report and give presentation at the end of the attachment. The grading will normally be based on the reports, seminars and assessment of the industry based supervisor.

400 Level

Alpha Semester

MAT411 - Topology (3 Units)
Topological spaces; neighborhoods and neighborhood systems. Subspaces, induced topology. Bases, continuity, Metric and normed spaces. First countable, second countable, separable spaces. T_1, T_2, T_3, T_4 spaces. Compactness. Product spaces. Connectedness.

MAT412 - Differential equations II (3 Units)
General linear ordinary differential equations of second order with stipulated initial and boundary conditions. Integral transforms: detail treatment of Laplace transforms, Fourier transforms and Hankel transforms for general solution of IVPs and BVPs. General theory of operators: finite dimensional representation of operators, diagonalization operators, Special theory of function of operators. Integrals and differential operators.

MAT413 - Probability Theory and Stochastic Process (3 Units)
Probability, random variables, probability distributions, expectation probability generating functions. Convolution and compound distributions. Branching processes, random walks. Markov chains, Poisson, birth and death processes. Queuing theory.

MAT414 - Advanced Numerical Analysis (3 Units)
Introduction to numerical partial differential equations. Parabolic Equations: One space dimension, Convergence and stability analysis, Two space dimension. Hyperbolic Equations: One space dimension, Two space dimensions, First order equations, System of equations. Elliptic Equations: Dirichlet problem, Neumann problem, Mixed problem.

MAT415 - Experimental Design (3 Units)

Design and analysis of experiments: replication and randomization, completely randomized, randomized blocks and Latin square designs. Factorial experiments. Further analysis of treatment effects: Orthogonal contracts and multiple comparisons. Investigation of assumptions and theory of tests.

MAT416 - Advanced Algebra (3 Units)

Lattice theory, Notherian and Artinian modules and rings. Hilbert basis theorem. Chinese remainder theorem. Semi-simple modules and rings. Prime spectrum of a commutative ring.

MAT417 - Functional Analysis (3 Units)

Banach spaces and Hilbert spaces. Bounded linear functionals and Operators on Banach Spaces. Introduction to Topological Vector spaces. Introduction to Banach Algebras and Gelfand theory.

MAT418 - Complex Analysis II (3 Units)

Integration: curves, Jordan curve theorem, Riemann integration along smooth curves. Cauchy's theorem (proof for any closed polygon) and consequences e.g. Cauchy's integral formulae and related theorems: Morera's theorem, Cauchy's inequality, Liouville's theorem. Singularities: classification of singularities, isolated singularities. Laurent's theorem, residue theorem and application to evaluation of integrals and summation of series. Maximum modulus principles. Schwartz's lemma, the Argument theorem, Rouche's theorem. Introduction to analytic continuation.

MAT419 - Research Project I (0 Units)

The student undertakes a research project approved by the Department and supervised by a lecturer. The student consults the supervisor as often as necessary. At the end of the session, the student submits a written report on the topic and defend the same before a Departmental evaluation board.

Omega Semester

MAT421 - Optimization Theory (3 Units)
Linear programming models. The simplex method: formulation and theory. Duality integer programming. Transportation problem. Two-person zero-sum games: Nonlinear programming: quadratic programming. Kuhn-tucker methods. Optimality criteria. Simple variable optimization. Multivariable techniques. Gradient methods.

MAT422 - Differential Equations III (3 Units)
Introduction to Partial Differential Equations. Partial Differential equations of the first order: Langrange method, Standard method, Charpits method. Partial Differential equations of the second order: method by inspection, Monge's method, Monge's method of integration. Solution to general Linear Partial Differential Equations of higher order. Solutions to special types of partial differential equations: Hyperbolic, Parabolic, Elliptic equations, Diffusion equation, Wave equation. Methods of solution: Separation of variables, D'Alembert's method.

MAT423 - Theory of Measure (3 Units)
Lebesgue measure for subsets of $\mathbb{R}^n$. Lebesgue integration of real and complex-valued functions defined on subsets of $\mathbb{R}^n$. General measure space (X, μ, ϕ) and Lebsegue integration with respect to ϕ of real and complex-valued functions on X. the Classical Banach spaces.

MAT424 - Survey Methodology and Quality Control (3 Units)
Quality control acceptance sampling, control charts, cumulative sum techniques. Survey methodology: planning of surveys, simple random, stratified, cluster and systematic scenes. Sampling for means, totals and proportions. Sample size allocation in stratification. Comparison of precisions. Ratio and regression estimation, two stage sampling.

MAT425 - Systems Theory (3 Units)
Lyapunov theorems. Solution of Lyapunov stability equation $A^T P + PA = Q$. Controllability and observability. Theorem on existence of solution of linear systems of differential equations with constant coefficients.

Uniqueness Theorems, Theory of Stability, Elementary type of rest points. Stability under constantly operating perturbation. Test for Stability.

MAT426 - Linear Models (3 Units)

Revision of simple linear regression. Matrix theory: revision of results. Multivariate normal distribution: marginal and conditional distributions. Linear functions of formal variables. Quadratic form. Multiple regression. Least squares estimation. Guass-Markov theorem. Maximum likelihood (ML) estimation: distribution of functions of ML estimators, confidence regions. Hypothesis testing. Prediction. Orthogonality and multicollinearity. Model selection. Validity of assumptions: lack-of-fit and residual plots. Design of regression experiment. Dummy variables. Restricted regression: analysis of variance model.

MAT429 - Research Project II (6 Units)

The student undertakes a research project approved by the Department and supervised by a lecturer. The student consults the supervisor as often as necessary. At the end of the session, the student submits a written report on the topic and defends same before a Departmental evaluation board.

African Leadership Development Centre

One of the guest speakers at the International Conference/Workshop on Renewable Energy organised by Department of Physics

A cross session of participants of the International Conference/Workshop on Renewable Energy organised by Department of Physics

6.5 DEPARTMENT OF PHYSICS

OVERVIEW OF THE DEPARTMENT

Covenant University opened its doors to the first set of students on 21st October, 2002. Physics Unit was then housed in the Department of Computer and Information Technology as a servicing Unit to other Programmes. Later, it came under the Department of Natural Sciences. In September, 2004, it became a full- fledged Department of Physics. The following options are available in the Department:

1. Applied Geophysics
2. Electronics and Information Technology Applications
3. Renewable Energy

The Department is fully accredited by the National Universities Commission (NUC) and also has the approval to run M.Sc and Ph.D Programmes in Physics and Industrial Physics.

Vision

Our Vision is to produce graduates with an adequate and broad understanding of the basic concepts of Physics, complemented with applications-oriented courses that will advance the productive capacity of these graduates.

Mission

To create knowledge and restore the dignity of the black man through the use of the tools of Science as embodied in our curricula to train students who will be expert thinkers, skilful, intellectually resourceful, entrepreneurially self-dependent and futuristically visionary.

Philosophy

The Philosophy of the Industrial Physics Programme was birthed in the Covenant University Philosophy, viz, "Raising a New Generation of Leaders". Thus, the Industrial Physics Programme is fashioned towards

producing graduates with an adequate/broad understanding of the basic concepts of Physics, complemented with applications-oriented courses (i.e. specializations) that will advance the productive capacity of these graduates. To that extent, the two components are further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS) and Total Man Concept (TMC) which, together, would assist any of our Industrial Physics graduates to be very relevant in the production processes in one of these sub fields: Applied Geophysics, Electronics and Information Technology Applications and Renewable Energy. In essence, we endeavour to produce job creators, not just potential employees. The students would also be simultaneously prepared for postgraduate research in these sub-fields and their allied disciplines.

Objectives

To create knowledge and restore man's dignity through a Human Development concept of the Total Man, employing innovative, leading edge, teaching and learning methods that would assist our Industrial Physics graduates to be very relevant in the production process in any of the sub-fields: Applied Geophysics, Electronics and IT applications and Renewable Energy. To produce job creators and some for postgraduate research in these sub-fields and their allied disciplines.

The specific objectives of the programme are to:

i. give the students an intellectually stimulating and satisfying experience in the study of physics;
ii. provide the students with a broad and balanced foundation in Physics;
iii. develop in the students the ability to apply their knowledge of Physics and skills to the solution of theoretical and practical problems;
iv. provide exposure to a menu of industrial applications that is of national interest;
v. prepare the students for post-graduate studies in Physics/Applied Physics or other Physics-related, multi-disciplinary areas; and
vi. inculcate in the students the knowledge and skills needed for self-employment.

A Technologist performing experiment at the physics workshop

LIST OF ACADEMIC STAFF IN THE DEPARTMENT

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Dr. V. T. Omotosho	B. Tech, M. Tech, Ph.D	Senior Lecturer/HOD	Communication Physics
2.	Prof. D. K. De	B.Sc (Hons), M.Sc, Ph.D	Professor	Solid State physics
3.	Dr. (Mrs.) M. L. Akinyemi	B.Sc (Hons), M.Sc, Ph.D	Associate Professor	Atmospheric Physics
4.	Dr. A. O. Boyo	B.Sc (Hons), M.Sc, Ph.D	Associate Professor	Renewable Energy
5.	Dr. A. A. Willoughby	B.Sc (Hons), M.Sc, Ph.D	Senior Lecturer	Atmospheric and Solar Energy Physics
6.	Dr. (Mrs.) M. R. Usikalu	B.Tech (Hons),M.Tech, Ph.D	Senior Lecturer	Radiation and Health Physics
7.	Dr. A. P. Aizebeokhai	B.Sc (Hons), M.Sc, Ph.D	Lecturer I	Applied Geophysics
8.	Mr. M. Emetere	B.Sc (Hons), PGDE, M.Sc	Lecturer II	Theoretical Physics
9.	Mr. O. O. Adewoyin	B.Sc (Hons), M.Sc	Assistant Lecturer	Geophysics
10.	Mr. E. S. Joel	B.Tech, M.Sc, NCE	Assistant Lecturer	Geophysics
11.	Mr. O. C. Olawole	B.Sc (Hons), M.Sc	Assistant Lecturer	Solid State and Condensed Matter Physics
12.	Miss. J. A. Achuka	B.Sc (Hons), M. Tech	Assistant Lecturer	Radiation and Health Physics
13.	Mr. K. D. Oyeyemi	B.Sc (Hons), M.Sc	Assistant Lecturer	Applied Geophysics
14.	Miss O. T. Kayode	B.Sc (Hons), M.Sc	Assistant Lecturer	Geophysics
15.	Mrs. T. J. Abodunrin	B.Sc (Hons), M.Sc	Assistant Lecturer	Renewable Energy
16.	Mr. S. A. Akinwumi	B.Sc, M.Sc	Assistant Lecturer	Communication Physics
VISITING LECTURERS				
1.	Prof. P. I. Olasehinde	B.Sc (Hons), M.Sc, Ph.D	Professor	Applied Geophysics
2.	Dr. J. O. Fatoba	B.Sc (Hons), M.Sc, Ph.D	Lecturer I	Applied Geophysics
3.	Dr. E. O. Falayi	B.Sc (Hons), M.Sc, Ph.D	Lecturer I	Space Physics

TECHNICAL STAFF

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Mr. W. A. Ayara	HND	Technologist I	Physics, Electronics
2.	Mr. O.F. Olawole	HND	Technologist I	Physics, Electronics
3.	Mr. O. F. Oladapo	HND	Technologist I	Physics, Electronics
4.	Mrs. T. Y. Akinyosola	HND	Technologist II	Physics, Electronics
5.	Miss. E. F. Oveferoye	HND	Technologist II	Physics, Electronics
6.	Mr. L. N. Obafemi	HND	Technologist II	Physics, Electronics
7.	Mr. N. Carr	School Cert.	Laboratory Assistant	

ADMINISTRATIVE STAFF

S/N	NAME	QUALIFICATION	STATUS	AREA OF SPECIALIZATION
1.	Mrs. Flora Nkechi Paul	ACIA, CIA, B.Sc	Administrative Officer I	Public Administration

6.5.1 INDUSTRIAL PHYSICS PROGRAMME (WITH OPTIONS)

PROGRAMME: Industrial Physics
DEGREE AWARDED: B.Sc Industrial Physics (with Options in Applied Geophysics, Electronics & IT Applications, Renewable Energy)

DURATION: Four (4) Years (8 Semesters)

ADMISSION REQUIREMENTS:
Programme requirements are Five 'O'Level (WASC/GCE/SSCE/NECO or equivalent) with Credit passes in English Language, Physics, Mathematics, Chemistry, and any of the following; Biology, Agricultural Science and Geography, obtained in not more than two sittings. U.M.T. E. Examination Subjects are English Language, Physics, Mathematics and any one of the following Chemistry, Biology or Agricultural Science.

GRADUATION REQUIREMENTS
To graduate from the 4-year Bachelor of Science (B.Sc.) Degree Programme in Industrial Physics with Applied Geophysics/Electronics & IT Application/Renewable Energy a student must pass a minimum of 164/165/160 credit units respectively as shown below:

Graduation Required Units for B.Sc. Industrial Physics ProgrammeLevel	100	200	300	400	Total
Core/ Compulsory Courses	31	37/37/39	19/17/19	35/38/29	122/123/118
Electives	-	-	0	4	4
SWEP	-	-	-	-	-
Industrial Training [SIWES]	-	-	6	-	6
College Courses	-	-	-	-	0
University Courses	4	4	2	4	14
NUC Courses	10	6	2	-	18
Total	45	47/47/49	29/27/29	43/46/37	164/165/160

The respective minimum credit units a student must pass in the various areas of specializations are as shown below:

Required Units for Graduation per Option

Level	Area of Specialization	Core Course (Units)	Electives (Units)	SIWES (Units)	University Courses (Units)	NUC Courses (Units)	Total (Units)
100L	Applied Geophysics	31	-	-	4	10	45
	Electronics & IT Applications	31	-	-	4	10	45
	Renewable Energy	31	-	-	4	10	45
200L	Applied Geophysics	37	-	-	4	6	47
	Electronics & IT Applications	37	-	-	4	6	47
	Renewable Energy	39	-	-	4	6	49
300L	Applied Geophysics	19	-	6	2	2	29
	Electronics & IT Applications	17	-	6	2	2	27
	Renewable Energy	19	-	6	2	2	29
400L	Applied Geophysics	35	4	-	4	-	43
	Electronics & IT Applications	38	4	-	4	-	46
	Renewable Energy	29	4	-	4	-	37
Total	Applied Geophysics	122	4	6	14	18	164
	Electronics & IT Applications	123	4	6	14	18	165
	Renewable Energy	118	4	6	14	18	160

A Technologist at the Physics Lab

COURSE STRUCTURE

100 Level Industrial Physics						
Course Grouping	Course Code	Course Title	Status	Units	Pre-Requisite	Semester
Compulsory Courses	PHY111	Mechanics and Properties of Matter	C	2		α
	PHY112	Heat, Sound and Optics	C	2		α
	PHY119	Physics Practicals I	C	1		α
	MAT111	Mathematics I: Algebra	C	3		α
	MAT112	Mathematics II: Trigonometry and Analytical Geometry	C	2		α
	MAT114	Mathematics IV: Statistics I	C	2		α
	CHM111	General Physical Chemistry	C	3		α
	CHM119	General Chemistry Practical I	C	1		α
	PHY121	Electricity and Magnetism I	C	2		Ω
	PHY122	Atomic and Nuclear Physics	C	2		Ω
	PHY129	Physics Practicals II	C	1		Ω
	MAT121	Mathematics V: Calculus	C	3		Ω
	MAT123	Mathematics VII: Statistics II	C	2		Ω
	CHM121	General Organic Chemistry	C	2		Ω
	CHM129	General Chemistry Practical II	C	1		Ω
	CSC121	Introduction to Problem Solving	C	2		Ω
University Courses	EDS111	Entrepreneurial Development Studies I	V	1		α
	TMC111	Total Man Concept I	V	1		α
	TMC112	Total Man Concept - Sports	V	0		α
	EDS121	Entrepreneurial Development Studies II	V	1		Ω
	TMC121	Total Man Concept II	V	1		Ω
	TMC122	Total Man Concept – Sports	V	0		Ω
NUC General Courses	CST111	Use of Library, Study Skills and Information Communication Technology I	U	2		α
	GST111	Communication in English I	U	2		α
	CST121	Use of Library, Study Skills and Information Communication Technology II	U	2	CST111	Ω
	GST121	Communication in English II	U	2	GST111	Ω
	GST122	Communication in French	U	2		Ω
			α =22 Ω = 23 Total = 45 Units			

200 Level Industrial Physics						
Course Grouping	Course Code	Course Title	Status	Units	Pre-Requisite	Semester
Compulsory Course	PHY211	Elementary Modern Physics	C	2	PHY122	α
	PHY215	Thermal Physics	C	2	PHY112	α
	PHY217	Electricity and Magnetism II	C	2	PHY111	α
	PHY218	Experimental Physics I	C	1	PHY121	α
	PHY231	Electronics I	C	3	PHY119	α
	MAT211	Real Analysis	C	3	MAT111	α
	MAT213	Differential Equation I	C	3	MAT121	α
	GEC215	Applied Computer Programming I	C	2	CST121	α
	PHY221	Fluid Dynamics	C	1	PHY111	Ω
	PHY223	Waves and Optics	C	2	PHY112	Ω
	PHY224	MathCAD for Physicists	C	1	PHY218	Ω
	PHY225	Mathematical Methods in Physics I	C	3	PHY121	Ω
	PHY227	Analytical Mechanics	C	2	PHY121	Ω
	PHY228	Experimental Physics II	C	1	PHY129	Ω
	MAT224	Introduction to Numerical Analysis	C	3		Ω
	GEC225	Applied Computer Programming II	C	2	GEC215	Ω
	Applied Geophysics Option					
	PHY212	Introductory General Geology	C	2		α
	PHY226	Physics of the Solid Earth	C	2		Ω
	Electronics & IT Applications Option					
	PHY222	Semi-conductors Technology	C	2		Ω
	GEC227	Electrical Measurements and Instrumentation	C	2		Ω
	Renewable Energy Option					
	CHM211	Basic Inorganic Chemistry	C	2	CHM122	α
	CHM218	Experimental Inorganic Chemistry	C	1		α
	PHY222	Semiconductor Technology	C	2		Ω
	PHY229	Energy and Environment	C	1		Ω
University Courses	EDS211	Entrepreneurial Development Studies III	V	1		α
	TMC211	Total Man Concept III	V	1		α
	TMC212	Total Man Concept – Sports	V	0		α
	EDS221	Entrepreneurial Development Studies IV	V	1		Ω
	TMC221	Total Man Concept IV	V	1		Ω
	TMC222	Total Man Concept - Sports	V	0		Ω
NUC General Courses	GST211	Logic, Philosophy and Human Existence	U	2		α
	GST221	Nigerian People and Culture	U	2		Ω
	GST222	Peace Studies and Conflict Resolution	U	2		Ω
			α =24/22/25 Ω = 23/25/24 Total = 47/47/49 Units			

300 Level Industrial Physics						
Course Grouping	**Course Code**	**Course Title**	**Status**	**Units**	**Pre-Requisite**	**Semester**
Compulsory Courses	PHY311	MATHLAB for Physicists	C	1	MAT225	α
	PHY313	Electrodynamics	C	2	PHY217	α
	PHY314	Quantum Physics	C	2	PHY211	α
	PHY315	Electric Circuit Theory	C	2	PHY217	α
	PHY316	Statistical and Thermal Physics	C	2	PHY215	α
	PHY319	Experimental Physics and Treatment of Data	C	2	PHY218, 228	α
	PHY332	Mathematical Methods in Physics II	C	2	PHY216	α
	Applied Geophysics Option					
	PHY312	Seismic Methods	C	2	PHY226, PHY 223	α
	PHY336	Electrical and Radiometric Methods	C	2	PHY217, PHY226	α
	PHY318	Petroleum Geology	C	2	PHY212	α
	Electronics & IT Applications Option					
	PHY331	Digital Electronics and Telecommuni-cations	C	2		α
	PHY317	Electronics II	C	2	PHY231	α
	Renewable Energy Option					
	PHY334	Thin Films Technology and Solar Energy Laboratory	C	2	PHY222	α
	PHY335	Energy Conversion and Storage	C	2	PHY229	α
	PHY317	Electronics II	C	2	PHY231	α
SIWES [Industrial Training]	PHY329	Industrial Training	S	6		Ω
University Courses	EDS311	Entrepreneurial Development Studies V	V	1		α
	TMC311	Total Man Concept V	V	1		α
	TMC312	Total Man Concept – Sports	V	0		α
NUC General Course	GST311	History and Philosophy of Science	U	2		α
			α =23/21/23 Ω = 6 Total = 29/27/29 Units			

400 Level Industrial Physics						
Course Grouping	Course Code	Course Title	Status	Units	Pre-Requisite	Semester
Compulsory Courses	PHY411	Quantum Mechanics	C	2	PHY314	α
	PHY412	Mathematical Methods in Physics III	C	2	PHY332	α
	PHY414	Electrical Measurements and Instrumentation	C	2	PHY319	α
	PHY417	Condensed Matter Physics	C	2	PHY211	α
	PHY418	Advanced Physics Laboratory I	C	1	PHY319	α
	PHY421	Control Systems	C	3		Ω
	PHY422	Nuclear and Particle Physics	C	2	PHY211	Ω
	PHY428	Advanced Physics Laboratory II	C	1		Ω
	PHY429	Research Project	C	6	PHY319	Ω
	PHY441	Introduction to Special Relativity	C	2	PHY211	Ω
	Applied Geophysics Option					
	PHY432	Introduction to Hydrogeology and Engineering Geology	C	2	PHY 212, PHY 221	α
	PHY433	Electromagnetic Methods	C	2	PHY 226, PHY 313	α
	PHY448	Field School in Geophysics	C	2		Ω
	PHY439	Gravity and Magnetic Methods	C	2	PHY 226, PHY 227	α
	PHY424	Borehole Geophysics	C	2	PHY226	Ω
	PHY425	Fundamentals of Geophysical Data Processing	C	2	PHY312, 332	Ω
	Electronics & IT Applications Option					
	PHY415	Data Communications	C	3	PHY331	α
	PHY416	Programmable Logic Controllers	C	2		α
	PHY413	Physical Metallurgy	C	2	PHY333	α
	PHY423	Satellite Communications	C	3	PHY415	Ω
	PHY426	Industrial Electronics and Quality Control	C	2	PHY317, 331	Ω
	PHY427	Wireless and Mobile Communications	C	3	PHY331	Ω
	Renewable Energy Option					
	PHY435	Heat Transfer and Energy	C	2		α
	PHY413	Physical Metallurgy	C	2	PHY333	α
	PHY442	Renewable Energy Sources	C	2	PHY229, PHY335	Ω
Electives	***Note:*** *Choose* ***4 units*** *Electives*					
	PHY431	Principles of Remote Sensing	E	2	PHY313	α
	PHY434	Atmospheric Dynamics	E	2		α
	PHY436	Science of Materials	E	2		α
	PHY437	Electrical, Optical and Magnetic Properties of Materials	E	2		α
	ICT414	Internet Technology and Programming	E	2		α
University Courses	EDS411	Entrepreneurial Development Studies VII	V	1		α
	TMC411	Total Man Concept VII	V	1		α
	TMC412	Total Man Concept – Sports	V	0		α
	EDS421	Entrepreneurial Development Studies VIII	V	1		Ω
	TMC421	Total man Concept VIII	V	1		Ω
	TMC422	Total Man Concept - Sports	V	0		Ω
			α –23/22/19 Ω = 20/24/18 Total = 43/46/37 Units			

COURSE DESCRIPTION

100 Level

Alpha Semester

PHY111 - Mechanics and Properties of Matter (2 Units)
Physical quantities, Units and dimensions, Scalars and vectors; Fundamental laws of Mechanics: Statics, Kinematics, Dynamics; Newton's laws of motion, particles, rigid bodies, simple harmonic motion; Friction, Molecular treatment of Properties of Matter, elasticity, Hooke's law, Young's shear and bulk moduli, Hydrostatic, Archimedes Principle; Work, energy and power; Centre of mass, Newton's law of universal gravitation, Kepler's laws, Pressure in fluids, Intermolecular forces, Surface tension, Hooke's law, Young's modulus.

PHY112 - Heat, Sound and Optics (2 Units)
Temperature and Zeroth law of thermodynamics, thermometers, Heat transfer, Kinetic theory of gases, Gas laws, First and second laws of thermodynamics; Concept of waves, transverse and longitudinal waves, standing waves, propagation of waves in pipes and strings, beats, Doppler effect; Electromagnetic spectrum, Huygens's Principle, Images formed by a single surface, spherical mirrors and thin lenses; aberrations; the eye, optical instruments, Interference, single slit, Diffraction, grating, Polarization, elementary examples.

PHY119 - Physics Practical I (1 Unit)
Simple experiments illustrating the topics covered in PHY111 and PHY112.

MAT111 - Mathematics I: Algebra (3 Units)
Algebra of Sets; special sets ($\mathbb{N}\subset\mathbb{Z}\subset\mathbb{Q}\subset\mathbb{R}\subset\mathbb{C}$); theory of indices, law of logarithms, indical equations, surdic equations. Polynomials, the remainder and factor theorems; polynomial equations and inequalities-especially linear, quadratic and cubic. Solving quadratic equations and

cubic equations with an integral root. Domain and zeroes of rational functions. Partial fractions. Permutations and combinations. The binomial theorem for any index and applications. Sequences and series of real numbers (including AP and GP). Algebra of complex numbers. Introduction to m x n matrices; elementary operations on matrices and applications to solution of linear equations. Elementary properties of determinants of at most 3 x 3 matrices; The Rule of Sarrus.

MAT112 - Mathematics II: Trigonometry and Analytical Geometry (2 Units)

Trigonometric functions; exponential and logarithmic functions. Circular measure; hyperbolic functions. Equations of lines and planes; conic sections (circle, parabola, hyperbola, ellipse).

MAT114 - Mathematics IV: Statistics I (2 Units)

Introduction to statistics, diagrammatic representation of descriptive data, measures of location and dispersion for ungrouped data. Grouped distribution, measures of location and dispersion for grouped data. Problems of grouping, associated graphs, introduction to probability; sample space and events, addition law, use of permutation and combination in evaluating probability.

CHM111 - General Physical Chemistry (3 Units)

Historical development of the atom: definition of atoms, Dalton's atomic theory, relative atomic masses. Fundamental particles of the atom and atomic structure. Modern electronic theory of atoms; electronic configuration of the elements. Periodicity of the elements. Radioactivity: Stoichiometry: mole concept, chemical formulas, equations and calculations. States of matter: gas – empirical gas laws, Ideal Gas Equation of State, qualitative treatment of kinetic theory of gases, real gases and deviations from ideal gas laws; liquid, – macroscopic properties of liquids, evaporation, vapor pressure and its variation with temperature, boiling point, heat of vaporization, Clausius-Clapeyron equation, freezing point, melting point and phase diagrams of simple systems; solids – types of solids and their properties, ionic solids and lattice energy, crystalline

solids. Chemical Energetic: definition of some thermodynamic terms, heat, work, internal energy, enthalpy, pressure-volume work. Relationship between internal energy and enthalpy. First law of thermodynamics and its applications. Chemical Kinetics: rate of reaction, factors affecting reaction, order of reaction and how to determine it for zero order and first order reaction, rate of equation and temperature, reaction mechanisms and rate equation for simple reactions. Chemical Equilibrium: reversible reactions and chemical equilibrium, equilibrium constant, factors affecting equilibrium. Le Chatelier's Principle. Effect of temperature on equilibrium constant. Relationship between equilibrium constant and standard Gibbs. Free Energy, ΔG^{o}. ionic equilibrium. Electrochemistry: types of conductors, classification of compounds, electrolysis, Faraday's laws of electrolysis, application of electrolysis, introduction to electrochemical cells.

CHM119 - General Chemistry Practical I (1 Unit)

Practice in weighing and measurement of volume, preparations of standard solutions. Tritimetry: acid-base, oxidation-reduction, precipitation and complex metric titrations; gravimetric analysis.

Omega Semester

PHY121 - Electricity and Magnetism I (2 Units)

Electrostatics, Coulomb's law, capacitors, Ohm's law, conductivity, Kirchhoff's laws, electrical energy, DC bridges, Wheatstone bridge, potentiometer, magnetic effect of current, electromagnetic induction, moving coil galvanometers, multi-meters, DC and AC motors, generators, power in AC circuits, rectification.

PHY122 - Atomic and Nuclear Physics (2 Units)

Atomic structure, Thompson, Rutherford and Bohr's atomic theories; the hydrogen atom, properties of the electron, e/m, Millikan's experiment; properties of the nucleus, natural radioactivity; wave particle duality of light, x-rays, photo-electricity.

PHY129 - Physics Practical II (1 Unit)

A selection of experiments to illustrate the principles covered in PHY121 and PHY122.

MAT121- Mathematics V: Calculus (3 Units)

Functions: Concept and notation. Polynimial and rational functions. Idea of limits; technique of finding limits. Derivatives: definition and calculation from first principles. Derivatives of constants, power, sums, products, quotients. Composite functions, circular functions, logarithmic/exponential function. Higher order derivatives; applications, small increments, approximations and errors. Extrema; integration of sum/scalar multiple of functions with applications; integration of circular functions. Definite integrals: general properties of definite integrals, some applications to geometry, mechanics, Biology and Social Sciences. Derivatives of hyperbolic functions; inverse circular/hyperbolic functions. Method of taking the logarithm before differentiating; successive differentiation of implicit functions and of functions like $e^{-at}\sin(bt + c)$. Hard Integration: Further techniques. Evaluation of integrals of the form $\int \frac{dt}{t^2+a^2}$. Integration of irrational functions, integration by substitutions, integration by parts. Reduction Formula.

MAT123 - Mathematics VII: Statistics II (2 Units)

Linear correlation, scatter diagram, product moment and rank correlation. Linear regression. Probability distribution: binomial, Poisson and normal distributions. Sampling and sampling distribution. Estimation of population parameters, confidence intervals, test of hypothesis concerning two or more populations, contingency tables.

CHM121 - General Organic Chemistry (2 Units)

Introduction to and importance of organic chemistry, qualitative analysis of organic compounds, isolation and purification of organic compounds; quantitative analysis of organic compounds, determination of structure of organic compounds; empirical, molecular and structural formulas; hybridization; formation of sp^3, sp^2, sp orbital in carbon; homologous

series and functional groups; isomerism-structural and stereoisomerism; aliphatic hydrocarbon chemistry: alkenes, alkenes, alkynes-nomenclature (IUPAC), physical properties, preparation and chemical reactions with simple mechanism where applicable.

CHM129 - General Chemistry Practical II (1 Unit)

Qualitative analysis for common captions and anions, identification of organic functional groups: hydroxyl, carbonyl, carboxylic, amino groups, sugar, carbohydrate, protein, etc.

CSC121 - Introduction to Problem Solving (2 Units)

Problem solving strategies, Roles of algorithm in problem solving process, implementation strategies, concepts and properties of algorithm. Using C-language.

200 Level

Alpha Semester

PHY211 - Elementary Modern Physics (2 Units)

Prerequisite: PHY122

Experimental basis of quantum theory: Black body radiation; and Planck's hypothesis, electron and quanta; Bohr's theory of atomic structure; de Broglie's hypothesis, introduction to Schrödinger wave equations, Operators.

PHY212 - Introductory General Geology (2 Units)

The nature and scope of geology; elements of physical geology and physiographic features of the Earth; classification, properties, description and occurrence of mineral; rock types: identification and characteristic features; weathering and soils; distribution and classification of major fossil groups and their occurrence and use; surface processes: erosion and mass movement; basic principles of stratigraphy; and introduction to environmental geology.

PHY215 - Thermal Physics (2 Units)
Prerequisite: PHY112
Zeroth's and first laws of thermodynamics, work, heat, and internal energy; Carnot cycle and the second law of thermodynamics, entropy and irreversibility, thermodynamic potentials and Maxwell equations; applications, qualitative discussion of phase transitions, third law of thermodynamics.

PHY217 - Electricity and Magnetism II (2 Units)
Prerequisite: PHY121
Electrostatics and magnetostatics, Gauss and Stokes Theorems, Poisson and Laplace equations, dielectrics, electric and magnetic materials, Faraday's laws, AC circuits, Maxwell's equations.

PHY218 - Experimental Physics I (1 Unit)
Prerequisites: PHY119 & PHY129
Experiments drawn from diverse areas of physics: Optics, Electromagnetism, Mechanics, Modern Physics etc. It is accompanied by seminar studies of standard, experimental techniques and analyses of common and challenging experiments.

PHY231 - Electronics I (3 Units)
Prerequisite: PHY121
Thermionic emission; vacuum, thermionic devices; valves and the CRT, semiconductors; p-n junctions, diodes and their applications, bipolar transistor; characteristics and biasing of bipolar transistors, small signal amplifier waveform generators, logic elements and circuits, amplifiers, noise, feedback, simple resistive capacitive network, power, tunnel, Shot key and multifunction diodes and their applications.

MAT211 - Real Analysis (3 Units)
Introduction to Mathematical Proof, Method of Proof and Indirect Proof. The real number system. The number e; the absolute value function, $|| : \mathbb{R} \to \mathbb{R}_+ \cup \{0\}$; Properties of the absolute value function, ||. Sequences in ℝ; convergence of sequence in ℝ (abstract definition).

Properties of convergent sequences in ℝ. Monotone sequence; Cauchy sequence; properties of Cauchy sequence. Limits of functions; continuity of functions, one-sided limits: right-hand and left-hand limits. Classification of points of discontinuities. Infinite Series, Positive Series and Test of Convergence. Indeterminate forms of the type $\frac{0}{0}$ *and* $\frac{\infty}{\infty}$; indeterminate forms of the type $0.\infty$ or $\infty - \infty$; indeterminate forms of the type $1^{\infty}, \infty^{0} or 0^{0}$. L'Hospital's Rule. Taylor's theorem and its application to approximate calculations. Numeric series. Cauchy Criterion. Comparison Tests; D'Alembert's Ratio Test; Cauchy Test; Raabe's Ratio Test. Improper integral; Cauchy Integral Test; Alternating series. Absolute convergence; conditional convergence. Convergence Test for alternating series: Leibnitz Ratio Test; Abel's Ratio Test; Dirichlet's Ratio Test. Power series: radius of convergence; Cauchy – Adamara formula.

MAT213 - Elementary Differential Equations (3 Units)

First order ordinary differential equations. Existence and uniqueness. Second order ordinary differential equations with constant coefficients. General theory of nth order linear equations. Laplace transforms, solution of initial value problem by Laplace transform method. Simple treatment of partial differential equation in two independent variables. Application of ordinary differential equations and partial differential equations to physical life and social sciences.

CHM211 - Basic Inorganic Chemistry (2 Units)

Prerequisite: CHM122

Qualitative treatment of Molecular Orbital and Valence Bond theories, introduction to the chemistry of transition elements, lanthanides and actinides: definition and general characteristics of transition elements, lanthanides and actinides, electronic configuration of the atoms and ions. Descriptive chemistry of some selected transition metals. 1st, 2nd, and 3rd transition series, lanthanides and actinides, Coordination Chemistry; Ligand and crystal field theories, structure, reactivity and applications of coordination compounds.

CHM218 - Experimental Inorganic Chemistry I (1 Unit)

Prerequisites: CHM119 & CHM129

A selection of experiments to illustrate principles taught in CHM211. The experiments will afford the students the opportunity to develop good experimental inorganic techniques, critical and analytical approach to laboratory work. Topics include quantitative inorganic analysis by volumetric and gravimetric methods, preparation of simple inorganic compounds and metal complexes.

GEC215 - Applied Computer Programming I (2 Units)

Prerequisite: CST121

Software development life cycle (SDLC): Definitions, SDLC models: Waterfall model, V-shaped model, Incremental Model, Spiral Model. Program Design: Algorithms: Key features of algorithms and different ways of presenting algorithms. Flow charting of algorithms. Pseudocode: Pseudocode statements for Input, Output, Iteration, Decision, and processing, Arithmetic, Relational and Logical Operations in Pseudocodes, use of sub-process in Pseudocode. Introduction to QBASIC Programming: Symbols, Keywords, Identifiers, Data Types, Operators, Control Structure, Functions, Procedures. Arrays: 1-D and Multidimensional Arrays. File handling: Concept of files, files and streams, standard file handling functions binary files, random access files.

Omega Semester

PHY221 - Fluid Dynamics (1 Unit)

Prerequisite: PHY111

Introduction and definitions, properties of fluids, fluid-flow; stream lines, viscosity; fluid kinetic and potential energy, kinetic energy of tube flow; velocity relationship, velocity profile for tube flow, Stoke's law, continuum theory, short and long-range body forces; laminar and turbulent motion-transformation from one to the other, Bernoulli's equation: expansion and spin in a fluid; concept of vorticity equation in a rotating fluid, relevance in dynamic meteorology.

PHY222 - Semi-conductors Technology (2 Units)

Prerequisite: PHY122

Physico-chemical properties of semiconductors, preparation, purification, growth of sample crystals; evaluation of chemical structural properties; doping effects, mechanical and metallurgical properties; thermodynamics and kinetic considerations in crystal growth from melt and by chemical vapour transportation techniques.

PHY223 - Waves and Optics (2 Units)

Prerequisite: PHY112

Wave phenomena, acoustical waves, the harmonic oscillator, waves in strings, energy in waves, longitudinal waves, standing waves, group and phase velocity; spherical Waves, Doppler effect; geometrical optics: refraction and reflection at spherical surfaces, thin and thick lenses, prisms, optical instruments, microscopes, telescopes, spectrometers; physical optics: interference, diffraction, dispersion, scattering, thin films, crystal diffraction, polarization and holography.

PHY224 - MATHCAD for Physicists (1 Unit)

Prerequisite: PHY218

MathCAD basics: introduction, getting started with MathCAD, and online resources; creating MathCAD worksheet: working with Math, text, graphics and other objects; work sheet management. Computational features: calculating in MathCAD, operators, built-in-functions, matrices and data arrays, 2D and 3D plots, symbolic calculations, programming, advance computational features, and functions. Experiment on projectile motion, application to statistical physics and thermal physics.

PHY225 - Mathematical Methods in Physics I (3 Units)

Prerequisite: PHY111

Vector algebra, Vector dot and cross products, equation of a curve and a surface; vector differentiation and applications, gradient, divergent and curl of vectors; vector integration, line, surface and volume integrals, Green's, Stoke's and divergence theorems.

PHY226 - Physics of the Solid Earth (2 Units)

Prerequisites: PHY112 & PHY121

The Earth's history, the Earth's interior, seismicity and earthquake zones; the nature of the gravity field, rock magnetism, polar wandering and continental drift, heat flow, geothemometry, geomagnetism, paleomagnetism; polar geophysics and geodynamics, paleogeophysics; methods of geophysical survey: magnetic, electrical etc.

PHY227 - Analytical Mechanics (2 Units)

Prerequisite: PHY121

Newtonian mechanics: motion of particle in one, two and three dimensions; system of particle and collision theory; Newtonian gravitation, conservative forces and potentials, oscillations, central force problems, accelerated mechanics of continuous media; degrees of freedom, generalized coordinates, Lagrange's formulation and applications; calculus of variation and the principle of least action, Hamilton's formulation of mechanics; invariance and conservation laws, oscillating systems.

PHY228 - Experimental Physics II (1 Unit)

Prerequisites: PHY119 & PHY129

The laboratory course consists of a group of experiments drawn from diverse areas of physics (Optics Electromagnetism, Mechanics, Modern Physics, etc).

PHY229 - Energy and Environment (1 Unit)

Energy and power generation, transmission capacity and cost in Nigeria, electrical energy from fossil fuel, coal, biomass, hydro and thermal sources; principles and problems, pollutions and environmental effects of energy production and uses; energy generation, installations, power stations and their capacities.

MAT224 - Introduction to Numerical Analysis (3 Units)

Introduction to numerical computation. Solution of non-linear equations. Solution of simultaneous linear equations, direct and iterative schemes. Finite difference operators. Interpolation and approximation. Numerical

differentiation and quadrature. Numerical Integration. Curve fitting and least squares. Introduction to linear programming.

GEC225 - Applied Computer Programming II (2 Units)

Prerequisite: GEC215

Review of QBASIC and Introduction of Visual BASIC, Comparison of QBASIC and VBASIC. Creating applications. VBASIC Integrated Development Environment. Menu Design, Use of Procedures, Functions, Subroutines, and Event Procedures. Opening and Saving Pictures to folders. Writing to and Reading from files e.g. Notepad, Ms Word. Writing to and Reading from Database e.g. Access. Writing to and Reading from Text and database over the NET., Printing. Multimedia with VB: Sound, Music, and Video, Animation with VB. Calling other Applications from VB (Shell execute), html,pdf,.doc, files.

GEC227 - Electrical Measurements and Instrumentation (2 Units)

Instrumentation systems including transducers, signal conditioners, and read out devices. Oscilloscope, recorders, bridges. Measurement of voltage, current, resistance, impedance, frequency, phase difference, electric power, energy, force, displacement, temperature, flow, pressure, and other engineering parameters.

300 Level

Alpha Semester

PHY311 - MATHLAB for Physicists (1 Unit)

Prerequisite: MAT225

An overview of the main features of MATLAB, variables and functions, basic arithmetic operators, intrinsic functions, matrices and arrays, graphical user interface, desktop tools and development environment, graphics, programming, 3D visualization, and applications in communications, control system, filter design, time series, bioinformatics, signal processing, imaging, mapping, etc.

PHY312 - Seismic Methods (2 Units)

Prerequisite: PHY223 & PHY226

Elastic waves and propagation parameters, seismic velocities in rocks, seismic instruments, reflection geometry, normal move-out, dynamic move-out, common-depth point, reflection data acquisition, static and dynamic correction, data processing, migration and interpretation; refraction geometry, horizontal interface, intercept time method, mapping of dipping interface, irregular interface, refraction data acquisition, correction and interpretation, application of seismic surveys.

PHY313 - Electrodynamics (2 Units)

Prerequisite: PHY217

Maxwell's equations and electromagnetic potentials, the wave equation, propagation of plane electromagnetic waves, reflection and refraction, transmission lines, wave guides and resonant cavities, radiation, geometric optics, interference and diffraction of waves.

PHY314 - Quantum Physics (2 Units)

Prerequisite: PHY211

Experimental basis of quantum theory, blackbody radiation and Plank's hypothesis, electron and quanta; Bohr's theory of atomic structure, deBroglie hypothesis operators postulates of Quantum mechanics, wave particle duality; the formulation of quantum mechanics in terms of state vectors and linear operators, three-dimensional spherically symmetric potentials, the theory of angular momentum and spin; identical particles and the exclusion principle method of approximation, and multi-electron atoms.

PHY315 - Electric Circuit Theory (2 Units)

Prerequisite: PHY217

General outline of linear circuits and linear analysis, linear transformations, one port and two port networks, single phase sinusoidal alternating current circuits, locks diagram, poly-phase circuits, network topology. The methods of symmetrical components: some properties of

three phase systems, example of networks of unbalanced impedances. Distribution parameter networks, ladder networks, periodic non-sinusoidal currents in linear circuit, Fourier series, harmonics in three-phase systems. Conventional filter design and operation, methods of transient analysis of distributed parameter networks, non-linear a.c circuits, frequency response of electrical networks, Bode plots, poles and zeros and time delay, root-locus concepts.

PHY316 - Statistical and Thermal Physics (2 Units)

Prerequisite: PHY215

Basic concept of statistical mechanics, microscopic basis of thermodynamics and applications to macroscopic systems, the microcanonical, the canonical and the grand canonical ensembles. Density and energy fluctuations in the ensembles, Fermi-Dirac statistics, Bose-Einstein statistics

condensed states, phase transformations, quantum distributions. Elementary kinetic theory of transport processes, fluctuation phenomena and applications.

PHY317 - Electronics II (2 Units)

Prerequisite: PHY231

Voltage regulation and stabilized power supply, field effect transistor circuits, feedback and operational amplifiers, Frequency response analysis of electronic amplifier, oscillators, multivibrators, pulse and waveform shaping circuits, introduction to multistage amplifiers. Differential and instrumentation amplifiers.

PHY319 - Experimental Physics and Treatment of Data (2 Units)

Prerequisites: PHY218 & PHY228

Review of treatment of data, Forbe's bar, Heat Waves in solids, AC bridges and Potentiometers, characteristic of galvanometers, hysteresis loss in ferromagnetic materials, damped free oscillations, coupled oscillations.

PHY331 - Digital Electronics and Telecommunications (2 Units)
Prerequisite: PHY225
Number systems and codes, the transistor as a switch, logic gates: AND, OR, NAND, and NOR gates; logic families: TTL, RTL, CMOS, VMOS, ECL; Digital arithmetic: operations and circuits; Boolean algebra: De-Morgan's law, Karnaugh maps, Flip-flops, counters, registers, decoders and multiplexers. Digital-to- analog conversion, (DACs and ADCs); Introduction to the microprocessor and microcomputer; Digital modulation, amplitude and frequency modulation; radar and navigational aids, data transmission.

PHY332 - Mathematical Methods in Physics II (2 Units)
Prerequisite: PHY225
Fourier Methods, Laplace transform and applications. Generalized functions (delta, gamma, step, and green functions), introduction to partial differential equations of interest in physics; Wave equations, diffusion equation, Laplace equation and Poison's equation.

PHY334 - Thin Films Technology and Solar Energy Laboratory (2 Units)
Prerequisite: PHY222
Introduction to thin films, deposition and characterization, methods of deposition: physical and chemical techniques, scanning electron microscope (SEM), Transmission electron microscope, etc. Laboratory classes emphasizing experimental techniques: solution growth techniques (SGT), chemical vapour deposition (CVD), physical vapour deposition (PVD).

PHY335 - Energy Conversion and Storage (2 Units)
Prerequisite: PHY229
Theory of modern energy conversion, electrical energy from nuclear reactors; energy in the future, breeder reactors, fusion power, geothermal power and tidal power; promises and problems of transmission and storage methods; wind mills, heat engines, chemical engines, ocean and thermal energy converters, thermoelectric, thermionic fuel cells.

PHY336 - Electrical and Radiometric Methods (2 Units)

Prerequisite: PHY217 & PHY226

Electrical methods: electrical properties of rocks and minerals, self-potential, resistivity and induced polarization methods, principles, field procedures, instruments, data acquisitions, correction and interpretations. Radiometric methods: fundamentals of radioactive disintegration, radioactivity in rocks, field procedure and operation, instruments, interpretation and application.

PHY318 - Petroleum Geology (2 Units)

Prerequisite: PHY212

Minerals and rocks, plate tectonics, geological time and history, weathering, erosion and deposition, diagenesis, reservoirs, structural geology and petroleum, origin, migration and accumulation of petroleum, sedimentary basin and basins in Nigeria.

Omega Semester

PHY329 - SIWES (6 Units)

Students will be attached to various industries and establishments for 10-12 weeks during the long vacation to expose them to the practical applications of Physics. All students enrolled in this course would be required to submit a report and give presentation at the end of the attachment. The grading will normally be based on the reports, seminars and assessment of the industry base supervisor.

400 LEVEL

Alpha Semester

PHY411 - Quantum Mechanics (2 Units)

Prerequisite: PHY314

Time-independent and time-dependent perturbation theory, scattering theory of elastic potential scattering, Green's function and partial wave

methods; selected phenomena from each of atomic physics, molecular physics, solid state physics and nuclear physics are described and then interpreted using quantum mechanical models.

PHY412 - Mathematical Methods in Physics III (2 Units)
Prerequisite: PHY332
Linear algebra and functional analysis, Transformations in linear vector space and matrix theory; Legendre function, Bessel functions, integral transforms and Fourier transforms, Applications of transform methods to the solution of partial differential equations of interest in physics and engineering.

PHY413 - Physical Metallurgy (2 Units)
Prerequisite: PHY333
Sources and methods of production of metals and alloys, effects of heat treatment, irradiation and deformation on the physical properties of metals; theory of metal alloys, binary and ternary alloys, alloys of refracting and rare earth metals melting, casting pressure working and heat treatment of metals and alloys, welding and soldering, single crystals of metals and alloys, methods of growing, degree of purity, substructure; optical and X-ray metallography, ultrasonic examination of metals and alloys, physical metallurgy of steel.

PHY414: (a) Electrical Measurements and Instrumentation (2 Units)
Prerequisite: PHY319
Principle of measurements, errors, accuracy, units of measurements, and electrical standard Q-meters, wattmeter, semiconductor device testers; electronic counter and digital voltmeter, X-Y recorders, temperature controllers; operational amplifier for measurements of AC and DC voltage and current, introduction to the design of electronic equipment.

(b) EIE416 - Laboratory Experiments in Information and Communication Technology (ICT) (1 Unit)

PHY415 - Data Communications (3 Units)

Prerequisite: PHY331

Methods and purpose of communication, modems, modulation techniques, line encoding, multiplexing, error detention and control: Data transmission; parallel and serial, transmission media; guided and unguided, ISO OSI Models, telephone networks; call routing, telephone line characteristics, line impairment and transients, hub, router and bridge, internet protocols.

PHY416 - Programmable Logic Controllers (2 Units)

Prerequisite: PHY317

An overview of industrial control, methods and operations of the controllers; introduction to programmable logic controllers and related industrial control devices; DC motors and drives, AC motors and drives, servo motors and servo mechanisms; pressure systems and temperature control systems, flow control and level control systems; analytical and industrial instrumentation, detection sensors, Pl controllers, motion control and functional systems.

PHY417 - Condensed Matter Physics (2 Units)

Prerequisite: PHY211

Crystal structure and crystal binding, elastic properties, lattice vibrations; superconductivity, scanning and transmission electron microscopy, x-ray photograph, photo luminescence and mass spectroscopy, Si, Ge, GaAs, GaP, InSo and other common compound semiconductors, their preparation and measurements of electrical properties; Processing of semiconductor materials for device fabrication, formation of p-n junction, luminescence and luminescent materials, photoemissive and photoconductive materials, materials for IC's and their fabrication.

PHY418 - Advanced Physics Laboratory I (1 Unit)

Prerequisite: PHY319

Selected illustrative experiments on interferometry; magnetic materials, gravitation, Hall effects, Frank-Hertz, spectroscopy, thermodynamics, optics, atomic and nuclear physics, optoelectronics, vacuum techniques, electrical measurements. Transistor voltage switch, transistor astable and monostable multivibrators; Op amp applications - inverting and non-inverting amplifiers, Op Schmitt trigger, differential/bridge amplifier; Op amp temperature/light switch.

PHY431 - Principles of Remote Sensing (2 Units)

Prerequisite: PHY313

Basic principles of remote sensing, optical remote sensing, thermal infrared remote sensing, radar and sonar remote sensing; radiation theory, sensor systems, data acquisitions, storage and analysis, and spectral signature of natural and human made materials; applications of remote sensing principles and data to environmental sciences, weather and climate, hydrology, oceanography, vegetation, soil and land cover.

PHY432 - Introduction to Hydrogeology and Engineering Geology (2 Units)

Prerequisites: PHY212 & PHY221

Geology, nature, origin and occurrence of groundwater; hydrologic cycle, well hydraulics, aquifer response, water well development, groundwater movement and groundwater resource evaluation; rocks and soils classifications for engineering purposes; index and engineering properties for soils and rocks; consolidation and settlement, strength characteristics of soils and rocks; factors affecting rocks durability; application of geology and geophysics to engineering problems in roads, bridges and dams constructions; economic analysis, and environmental impact and regulations.

PHY433 - Electromagnetic Methods (2 Units)

Prerequisite: PHY226 & PHY313

Basic concept of electromagnetic methods in geophysics, propagation of electromagnetic fields, classification of electromagnetic methods, continuous wave field methods (frequency-domain EM), transient-field methods (time-domain EM), magneto-telluric methods, radio imaging methods, and ground penetrating radar, field procedures, instruments, data acquisition, correction, enhancement and interpretation.

PHY434 - Atmospheric Dynamics (2 Units)

Viscosity and thermal conductivity and their importance in meteorology, types and characteristics of atmospheric stability, and types of clouds and their classification; scales of motion in atmosphere, pressure gradient and Coriolis force; atmospheric motion: Geostrophic gradient and thermal wind; air masses and source regions, air masses affecting tropical temperate regions, ITD and ITCS. The polar front and fronted slopes, life cycles of frontal depressions; frontal cross-sections; introduction to divergence and vorticity; atmospheric optics with applications to rainbow, halo and other optical phenomena, transparency of atmosphere and visual range. The Universe: galaxies, stars and sun. The solar system: gravitation; the planets, solar flares, solar wind, solar radiation and the earth's atmosphere.

PHY435 - Heat Transfer and Energy (2 Units)

Prerequisites: PHY229 & PHY336

Two dimensional steady state conduction, analytical method (separation of variables), finite difference method, solution of finite difference, numerical treatment of transient conduction, radiation in participating media, absorption, gaseous emission, absorption, second law analysis of heat transfer processes, basic equations, energy and entropy generation, application to convection heat transfer, application to heat enhancement, application to heat exchangers.

PHY436 - Science of Materials (2 Units)

General introduction of materials, engineering requirements, mechanical properties of materials: tests to study stress, strain, ductility, hardness, toughness and fatigues. Crystal classes and system, macroscopic and

microscopic investigations of materials by electron microscope and X-ray diffraction techniques; study of imperfections, vacancies, dislocations, stacking faults and grain boundaries, clip and twining effect of defects as properties of materials. Single and multi-phase materials, solide solutions, binary alloys, eutectics and non-eutectic mixtures, ferrous and non-ferrous metals, steel, polymers, classification, properties, fabrication, ceramic structure, composition, forming and shaping, stability of materials.

PHY437 - Electrical Optical and Magnetic Properties of Materials (2 Units)

Free electron theory, band model, types of conductors, semiconductors, insulators, dielectric and polymers, conductivity of semiconductors, polarization and elastomeric, superconductivity, electron spin, diamagnetism, ferromagnetism; magnetic domains, soft and hard magnetic materials, ferrites.

PHY439 - Gravity and Magnetic Methods (2 Units)

Prerequisite: PHY217, PHY226 & PHY227

Gravity methods: potential field theory, rock densities, field instruments, data acquisition, corrections and enhancement, analysis and interpretation of gravity data, and application of gravity methods in geophysics; Magnetic methods: basic theory, magnetic properties of rocks and soils, field instruments, magnetic data acquisition, corrections, enhancement and interpretation, applications of magnetic methods in geophysics.

ICT414 - Internet Technology and Programming (2 Units)

Internet definition, Internet services- E-mail, FTP, WWW, Telnet. The Internet Architecture, organization, Protocol- IPv4, IPv6, addressing, and routing. Routing protocols: Interior, and exterior routing protocols, IP Multicast Routing, The intra domain routing protocols DVMRP, multicast OSPF, PIM dense and PIM sparse, and of the inter-domain routing protocols MSDP, BGMP and CBT. Mobile-IP standards. The Integrated Service architecture of RSVP, and of the Differentiated Service extensions to IP, New IP, Implementation Issues of Internet Protocols. Web Authoring: Introduction to Hypertext Markup Language, HTML

Standards, HTML Extensions, Types of Webpages, Webpage Basics: HTML Tags, Text and Information, Links, Lists, Tables, Multimedia: Graphics, Audio, Video, Enhanced Features: Image Maps, Counters, User Interaction: Forms, CGI, PERL, Java, Design Considerations, Dynamic Webpages, Active Server Page, XML, WML, WAP-enabled databases, Webpage Design Tools. Internet Service Providers, Types of Internet Connections, Intranets & Extranets, Browsers: Netscape Communicator, Internet Explorer, Browser Plug-Ins, Helper Applications, Web Authoring Tools, Internet Hardware Requirements. Designing and Managing Websites, Connecting to the Web Provider, Publishing Webpages, Website Maintenance Tools, Factors Affecting Website Performance, Interfacing with Other Information Servers, Internet and WWW Standardisation Activities, Guidelines for the Evaluation of New Technologies, Strategies for Integrating New Technologies in a Web Environment. On-line Applications: Simple Applications, Counters, On-line Quiz and Evaluation, On-line Databases, Monitoring User Events, Plug-ins, Database Connectivity. Web Applications: Transactions through the Web, Web Portals: Internet Marketing Basics; Developing and Integrating Internet Communication Strategy; Creative Strategies, Business Models, Online Databases, VRML, Security and Legal Considerations, Future Trends.

Omega Semester

PHY421 - Control Systems (3 Units)

Modeling of continuous systems; Computer-aided solutions to systems problems; feedback control systems; stability, frequency response and transcient response using root locus, frequency domain and state variable methods. This course includes a compulsory 3-hour laboratory work each week.

PHY422 - Nuclear and Particle Physics (2 Units)

Prerequisite: PHY211

Nuclear structure, nuclear properties, nuclear size, nuclear masses, nuclear forces, Nuclear models. Radioactive Decay: alpha, beta, gamma decays, nuclear reaction, Q values, interaction of photon with matter, radiation detection techniques, detectors. production and detection of neutrons. Fission and fusion nuclear reactor and nuclear energy. Elementary particles, conservation laws, interaction in nature; strong electromagnetic and weak interaction.

PHY423 - Satellite Communication (3 Units)

Prerequisite: PHY415

Satellite Orbits: Parameters, perturbations, geostationary, low and medium earth orbits. Frequency: bandwidths, selection, co-ordination and regulatory services. Sun transit outages. Limits of visibility. Altitude and orientation control; Spin stabilization techniques, Gimbal platform. Link calculations: Space craft configuration, payload and supporting subsystems, Satellite uplink-down link, and Link power budget. Noise: System, temperature. Impartment by hydrometers (rain and ice particles), Polarization calculations. Access techniques: Modulation and multiplexing: Voice, data, video, analog and digital transmission systems. Earth station parameters, earth station location, propagation effects of ground. Antennas: reflectors, Cassegranian feeds. Satellite application, mobile Satellite Services.

PHY424 - Borehole Geophysics (2 Units)

Prerequisite: PHY226

Concepts of logging techniques, electrical logging methods: conventional resistivity logs, focused-electrode logs, induction logs and micro-resistivity logs; self-potential, gamma ray logs induce polarization and dip meter; porosity logs: sonic logs, formation-density logs, neutron logs and neutron-density logs; determination of lithology and porosity, saturation and permeability in clean and shaly formations; and application of well logs in reservoir characterizations.

PHY425 - Fundamentals of Geophysical Data Processing (2 Units)
Prerequisites: PHY412 & PHY332
Sampled data, Z-transform, Fourier transform, fast Fourier transform, convolution and deconvolution, correlation, autocorrelation and spectra, and Hilbert transform; one-sided functions, filters, inverse filters and bilinear transform; spectral factorization, root methods, Robinson's energy delay theorem, Teoplitz method, Kolmogoroff, causality and wave propagation; resolution, time-frequency resolution, time statistical resolution, frequency statistical resolution, time-frequency statistical resolution, central-limit theorem, and confidence intervals; Markov processes, time series; and least-squares data modelling, stratified media, 2D and 3D initial value problems, the wave equation, upward and downward continuations.

PHY426 - Industrial Electronics and Quality Control (2 Units)
Prerequisites: PHY317 & PHY331
Operational amplifiers, positive and negative feedback; analog computers, electronic building blocks. Solid state devices-Thyristors, diacs and triacs; Relays and timers; Photodetectors, phototransistors, optocouplers and optoisolators and their applications; Tunnel diode, particle counters; electronic control of industrial processes. Analog/Digital conversion, Phase locked loops (PLL); Differential and instrumentation amplifiers. Measurements and signal processing – temperature, light level, strain/displacement, pressure, force, particle detectors.

PHY427 - Wireless and Mobile Communications (3 Units)
Introduction to wireless and mobile communications, history and evolution of mobile radio systems, types of mobile wireless services/systems-cellular, WLL, paging, satellite systems, standards, future trends in personal wireless systems. Cellular concept and frequency reuse, wireless networks and modes, Mobile phone standards, mobile / cellular telephony, Multiple Access Techniques – FDMA, TDMA and CDMA systems, GPRS, EDGE, paging systems, Bluetooth technology, Wireless networking, security in wireless networks, Design issues in personal wireless systems. Radio wave propagation issues in personal wireless

systems, Propagation models, Multipath fading, Antenna systems in mobile radio. Modulations and signal processing: Analog and digital modulation techniques, the course includes 3 hour laboratory work each week.

PHY428 - Advanced Physics Laboratory II (1 Unit)
Prerequisite: PHY319
Continuation of PHY418: Interferometry, magnetic materials, gravitation, Hall effects, Frank-Hertz experiment, spectroscopy, thermodynamics, Boyle's law and Charles' law apparatus; Optics, atomic and nuclear physics, optoelectronics, 555 Timer experiments.

PHY429 - Research Project (6 Units)
Continuation of Research Project I: Experimental or theoretical projects involving design, construction and testing of devices, literature survey and problem solving.

PHY441 - Introduction to Special Relativity (2 Units)
Prerequisite: PHY211
Einstein postulates and Lorentz transformation; consequences of transformations of momentum and energy; experimental verifications of special relativity, velocity addition theory and Doppler effect, electromagnetic 4-vector, transformation of E and H, Lorentz force.

PHY442 - Renewable Energy Sources (2 Units)
Prerequisites: PHY229 & PHY336
Biomass as a solar energy source, bio-fuel classification, Combustion of solid biomass, production of gaseous and liquid fuels from biomass – anaerobic digestion for biogas, pyrolysis for bio-oil, fermentation for ethanol and vegetable oils for biodiesel; Municipal Solid Waste (MSW). Solar radiation components, measurements/estimation of solar radiation, extraterrestrial solar radiation, solar water heating, selective surfaces, evacuated collectors, flat plate collectors, heat losses, collectors' efficiency factor. Solar photovoltaics, Silicon p-n junction, photon absorption, solar cell construction, PV technologies; Current-voltage and power-voltage

characteristics; applications and systems, solar home systems and grid-tied systems. Wind energy and power, characteristics of the wind, estimation of wind speed, Weibull distribution, horizontal and vertical axis turbines, and electricity generation. Hydro resource, hydro power, principles, head and flow rate, impulse and reaction type turbines, Pelton, Francis and Turgo turbines, turbine efficiency; Environmental impact. Geothermal energy – harnessing the resources, hot aquifer analysis; Ocean thermal energy, tidal power.

PHY448 - Field School in Geophysics (2 Units)

Prerequisite: PHY312 & PHY336

Field practices in the following geophysical methods:

Electrical methods	–	4 days × 6hrs
Seismic methods	–	4 days × 6hrs
Gravity methods	–	4 days × 6hrs
Magnetic methods	–	4 days × 6hrs
Electromagnetic methods	–	4 days × 6hrs
Radiometric methods	–	2 days × 6hrs

A cross session of students during an excusrion to a renewable energy plant

The Reference Section of Covenant University Library

Demonstration session at the fishery unit of the Centre for Entrepreneurial Development Studies

CHAPTER SEVEN

NATIONAL UNIVERSITIES COMMISSION (NUC) AND UNIVERSITY-WIDE COURSES

7.1 NATIONAL UNIVERSITIES COMMISSION (NUC) COURSES

100 Level

Alpha Semester

CST111 - Use of Library, Study Skills and Information Communication Technology I (2 Units)

- Libraries and Society
  History of the development of libraries, the roles of libraries in various communities, cultural and educational revival, the role of libraries in adult literacy programmes, user studies, planning library services in developing countries.
- Library Resources and their Role in Education
  Information bearing media: books, serials, cartographic materials, CD-ROMs, sound recordings, motion pictures, graphics, machine readable data, use of library materials by teachers and students.
- Reference Sources and Services
  Introduction to reference and Bibliography. Definition and concept of reference services, characteristics and uses of different types of reference materials; selection and evaluation of reference works.
- Conservation of Library Materials
  History of paper and printing, causes of damage to paper with emphasis on tropical areas, processes of book repair or restoration, preservation and repair of non-book materials, library crimes and security.
- Using the Covenant University Library

- Identification of PC parts and peripheral devices: functions, applications, and how to use them. Safety precautions. Procedure for booting a PC.
- Filing system: directory, sub-directory, file, path, and how to locate them.
- Word processing: principle of operation, application, demonstration and practical hand-on exercises in word processing using a popular word processing package.
- Internet: services available, principle of operation, application, demonstration and hand-on practical exercises on e-mail and www using popular browsers.

GST111 - Communication in English I (2 Units)

At the end of the course, students should be able to: Organise their study time, Listen to lectures and effectively manage lecture notes, Develop effective reading habits and increased reading speed, Apply effective methods of summarizing reading materials, & Develop a wide range of vocabulary for a successful academic career.

Omega Semester

CST121 - Use of Library, Study Skills and Information Communication Technology II (2 units)

- Audio-visual resources
  Variety and forms, selection organization and uses, operation and care of both hard and soft ware's. In-house production of audio-visual resources. This demands a lot of cooperation between library staff and lectures.
- Documentation
  Definition, genesis and growth; basic functions, theory and techniques of analysing, storing and retrieving information through manual and mechanical applications; abstracting; indexing principles and methods.
- Serials Librarianship

Types of serials, importance of serials, selection, organization and uses, storage of serials, print and microform, ISSN, users access through abstracts and indexes.

- Library Automation
- Computers literacy, different types of computers, programming, designs. Value of computers in the library, OPAC, Online database, Internet, search engines, digitization, virtual library etc.
- Overcoming Library Abuse
- Spreadsheet: principle of operation, application, demonstration and practical hand-on exercises in spreadsheet using a popular spreadsheet package.
- Database Management: principle of operation, application, demonstration and practical hand-on exercises in using a popular relational Database Management package.
- Report presentation
- Software package: principle of operation, application, demonstration and practical hand-on exercises in using a popular report presentation package such as Power Point package. Mini-Project to test proficiency in use of the software packages.

GST121 - Communication in English II (2 Units)

GST121 is a continuation of GST111. However, while GST111 concentrated on study skills, with emphasis on reading and summary skills, GST121 will deal with Elements of English Grammar together with the processes of written communication. It will also emphasize skills for eliciting information from simple literary text, as well as a survey of the Nigerian and African literary tradition.

At the end of this course, students should be able to: demonstrate skill for effective communication in English in different social contexts, develop adequate writing skills for academic purpose, and attain a reasonable level of competence for the appreciation of literary texts.

GST122 - Communication in French (2 Units)

The course is designed to enable students to acquire basic conversational/speaking and writing skills. Attention will therefore be focused on the basic grammatical structure and relevant items of vocabulary (lexical items) of the language. The course will be essentially oral but there will also be (reading) comprehension composition (writing) exercises. Module 1: Essentials of the French Language, Pronunciation versus spelling/orthography, pronunciation and recognition of French sounds, Greetings and introducing self, Module 2: Meeting people and introducing them, Describing people: Professions and nationalities, Describing self: family and school, Telling age: days of the week and month of the year, Describing places: countries and cities/towns, Mid-semesters Examination. Module 3: Making request, Making travel arrangements, Departure and arrival at destination, Ordering a meal in a restaurant, Shopping for clothes and other items, Banking transaction of visitor tourist, Revision, and (End of Semester) Examinations.

200 Level

Alpha Semester

GST211 - Philosophy, Logic and Human Existence (2 Units)

The Benefits of the Course include the following: An insight into the search for self-understanding, an unquenchable thirst for the love and pursuit of wisdom, an encouragement for the inquisitive minds to seek answers to the question concerning human existence, and the search for the fundamental beliefs that are rationally justified.

Course Description: Background, Nature and definitions of philosophy. History of Ancient philosophy, History of Medieval philosophy, History of Modern philosophy, African philosophy. Revision and Mid-semester examinations. The Nature of Logic, The Nature of Argument, Laws of Thoughts, Truth-tables, Venn Diagrams, Fallacies. The Question of Life, Purpose and Death. Freewill and Determinism. Existentialism and Humanism.

Omega Semester

GST221 - Nigerian People and Culture (2 Units)

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

GST222 - Peace Studies and Conflict Resolution (2 Units)

The concept of conflict: Definitions, Constructive and Destructive angles to understand conflict. The causes of conflict: Contradicting value systems, Competition for scarce resources, Psychological needs of people, Perception (self, others, circumstances, interests), Manipulations of information. Conflict Handling Styles: Avoidance, Confrontation, Role-Playing, Third-Party decision-making, Joint-Problem Solving, Compromising. The life angle of conflict: From Organization-transformation. The concept of peace: Definition of concept; Peace-making, Peace-keeping. Power and conflict: Types of power - Expert power, Referent power, Legitimate power, Reward power, Coercive power.

300 Level

Alpha Semester

GST311 - History and Philosophy of Science (2 Units)

The focus of this course shall be in the discipline of science, which at present, is held in high esteem as the greatest agent of development in the 21st century. This course is a survey of the philosophical foundation of

science. Major topical issues in Philosophy of science will be treated. It will begin with a brief account of the the role of metaphysics in scientific explanation, and determinism in the sciences. The student shall therefore be expected to, among other things, examine the main areas of philosophy; the meaning and characteristics of science, explanations in science, its objectives, methods, laws and theories with the view to justifying or debunking the superiority that has been accorded to the discipline of science over other discipline, that is where this becomes necessary. The course will also treat the philosophical thoughts of thinkers like Karl Popper, Copernicus, Newton and Fereyarband.

7.2 UNIVERSITY-WIDE COURSES

100 Level

Alpha Semester

EDS111 - Entrepreneurial Development Studies I (1 Unit)
Definition of entrepreneurship, Difference between entrepreneurship and an entrepreneur, Types of entrepreneurship, Who can be an entrepreneur, Benefits and functions of an entrepreneur, Motivations for being an entrepreneur, History of entrepreneurship in Nigeria, the role of entrepreneurship to the Nigeria economic development, Key roles entrepreneurs can play in the development of the Nigerian economy, Demand for entrepreneurship in Nigeria, Management, Entrepreneurship and Intrapreneur, Becoming a successful entrepreneur, Environment of Entrepreneurship, Entrepreneurship and the Nigerian environment, Challenges and Causes of Failure in Entrepreneur Ventures in Nigeria, Constraints faced by entrepreneurs in Nigeria, Entrepreneurship Classification; Identify the different types of entrepreneurship that exists, Identify the merits and demerits associated with different types of entrepreneurship, Demand for money by Nigerian youths, Managing money effectively, Nigerian youths and crave for money, Time Management.

TMC111 - Principles and Parameters of Life (1 Unit)

Exploration and definition of life, Life: purposes and pursuit, Defining Quality of life, Understanding the "good life, Visions and Dreams, Goal Setting, Potentials and Motivation. Steps to soaring, Anchors of life: Moral, ethical values and principles, Prescriptions for living right from biblical/cultural paradigms, Body Segment: Recreation.

TMC112 - Total Man Concept - Sports (0 Unit)

The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

Omega Semester

EDS121 - Entrepreneurial Development Studies II (1 Unit)

Generating Entrepreneurial ideas and translating same with action, Fundamental changes that stimulate entrepreneurship, Entrepreneurship Equation, Components of Entrepreneurial ventures, Elements of entrepreneurship / The Entrepreneurial process and Entrepreneurial Windows, Contributors of Entrepreneurship, The Sources and Approaches to the study of Entrepreneurship, Salaried employment Vs Entrepreneurship, Youths Entrepreneurship, Female Entrepreneurship and Productivity.

TMC121 - Self-Discovery Strategies (1 Unit)

Introducing TMC 012 (Self-discovery principles), Understanding self-discovery and its importance, Steps to self-discovery, Locus of control and attributions. Understanding self-esteem and self-esteem enhancement, Building positive self-concept and self-image, Rubrics for self-actualization, Understanding the make-up of the self: spiritual, physical, psychological and cultural dimensions.. Self in the context of human system : intra/inter systemic levels, Breaking free from the tyranny of "shoulds" and "musts", Attitudes and thoughts, Understanding the developmental stages of human kind.

TMC122 - Total Man Concept - Sports (0 Unit)
The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

200 Level

Alpha Semester

EDS211 - Entrepreneurial Development Studies III (1 Unit)
Biological studies of management giants/ business thinkers in Nigeria, Africa and Europe. Marketing Practice and Entrepreneurship Evolution of marketing, Roles of marketing, Five divisions of marketing, Responsibilities in marketing, Marketing and Sales, Relevance of Entrepreneurship and SMEs and Introduction to International Trade, Definitions of SME's, Advantages and disadvantages, Contributions of SME are to economic development, Institutions and programmers' in support of SME's, Risk Management, Profit Maximization, Definition of International Trade, Drivers of the current international business operations, Forces that make international business environment, International business environment model, Documentary credit in international trade.

TMC211 - Total Self Development Paradigms (I Unit)
Understanding Self-Development, Personal visions and missions, Self-empowerment skills and Strategies, Drive, Passion and Focus, Building Boundaries and Bridges, Positive and creative thinking Life histories of great thinkers, Self-motivation strategies, Personal capacity building, self-auditing and futuristic self projections, Body Segment: Physical exercises.

TMC212 - Total Man Concept - Sports (0 Unit)
The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

Omega Semester

EDS221 - Entrepreneurial Development Studies IV (1 Unit)

Biological studies of management giants/ business thinkers in Nigeria, Africa and Europe. Students will be made to study the lives and characters of different world class, entrepreneurs like Mark Zuckererg, Mukesh Ambani, and Femi Otedola and so many others, Marketing Practice and Entrepreneurship, Evolution of marketing, Roles of marketing, Five divisions of marketing, Responsibilities in marketing, Marketing and Sales, Relevance of Entrepreneurship and SMEs and Introduction to International, Trade, Definitions of SME's, Advantages and disadvantages, Contributions of SME are to economic development, Institutions and programmers' in support of SME's, Risk Management, Profit Maximization, Definition of International Trade, Drivers of the current international business operations, Forces that make international business environment, International business environment model, Documentary credit in international trade.

TMC221 - Success Parameters (1 Unit)

The focus of this course is on the identification of building blocks of self-development in the context of personal visions, mission and personal capacity building. Major self-motivational blocks, the power and place of focus, the place of the human thought process and how to enhance thinking and reasoning for creativity. Understanding Self-Development, Personal visions and missions, Self-empowerment skills and Strategies, Drive, Passion and Focus, Building Boundaries and Bridges, Positive and creative thinking Life histories of great thinkers, Self-motivation strategies, Personal capacity building, self-auditing and futuristic self projections, Body Segment: Physical exercises.

TMC222 - Total Man Concept - Sports (0 Unit)

The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

300 Level

Alpha Semester

EDS311 - Entrepreneurial Development Studies V (1 Unit)
Introductory class/Biographical studies of management giants/ business thinkers; in Nigeria, Africa and Europe; Quality Control under Entrepreneurship, Customer Service and Customer's relationship; Introduction to Material Management, Impact of modern technologies on Entrepreneurial Venture in Developing Countries; The importance and development of modern technologies for EDS, Acceleration Industrialization through active promotion and development of SMEs; Role of SMEs in economic development, Developing a technology service system for SMEs Managerial challenges of SMEs; Managing the business growth; different types of business growth, Characteristics of the different types of business growth: Problems associated with growth.

TMC311 - Man in his Socio-Environmental Contexts (1 Unit)
This course examines Man in different environmental contexts – the biblical, biological, cultural and ecological. The emphasis here is the civic and social responsibilities of man in society and the expectations of community living. The place of social relationships, diversity, issues of difference and conflict. The topics include; Origins and historical perspectives of man, Ecological trends, issues and ecosystems, Man and Society: social, historical and current political contexts, Globalization and economic systems, Social relationships and Conflict Resolution, Societal pressure and influences, Individualism and collectivism, Community service, responsiveness and charity supports, Parameters of responsible citizenship, Body Segment: Body Posture.

TMC312 - Total Man Concept - Sports (0 Unit)
The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

Omega Semester

EDS321 - Entrepreneurial Development Studies VI (1 Unit)

This is a continuation of EDS 311. The topics here include; Class/Biographical studies of management giants and business thinkers, Various forms of business, Incorporation of business, Various functions of entrepreneurship; such as Financial Function, Production Function, Marketing Function, Personnel Function, Entrepreneurial succession planning, Challenges and prospects of entrepreneurship, Taking entrepreneurs to the stock markets, e–Commerce/Entrepreneurship, International Entrepreneurship and Business Requirements, Product Creativity and Innovation.

TMC321 - Leadership Development I (1 Unit)

This course examines the building blocks for leadership development in the context of providing an overview of the broad dimensions of leadership. The course also explores the enhancement of leadership traits and how power and influence qualifies the dynamics of leadership. On successful completion of this course, students should be able to: define leadership, describe a leader, explain few theories of leadership, state the various laws and principles of leadership, identify leadership traits, state the levels and domains of leadership, state the principles of power and influence in leadership, identify the features of personal leadership, relate the importance of capacity building in leadership development, identify what constitute the application of leadership, state the relevance of mentoring in leadership development.

TMC322 - Total Man Concept - Sports (0 Unit)

The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

400 Level

Alpha Semester

EDS411 - Entrepreneurial Development Studies VII (1 Unit)
This course is channeled towards exposing the students to the practical aspect of Entrepreneurship particularly the development of skills and to real issues in entrepreneurship 1- 111. The course contents include; Biological studies of business thinkers, entrepreneurs and management: giants, Incorporating the company: practical steps and issues involved, Feasibility studies in Entrepreneurship, Issues involved in partnership and companies registration, Funding of entrepreneurial activities, The Impact of Associations, Institutions and Civil Societies on EDS development in LDCs, Social responsibility and entrepreneurship, Government involvement in entrepreneurship and the impact of entrepreneurship in the public sector, Presentation of Business Proposal and feasibility report.

TMC411 - Leadership Development II (1 Unit)
This is a continuation of TMC321. This second part of the course on leadership development examines the biographical details and leadership traits or styles of some biblical and historical figures and identifies some specific lessons for developing leadership traits and sensitivity. Specific character studies will examine the leadership style of Jesus, Moses, Nehemiah, Paul, Joseph, Esther Alexander the Great, Nelson Mandela, Julius Nyerere, Mother Teresa, Mahatma Ghandi, Martin Luther, Martin Luther King Jnr. Nnamdi Azikwe, Obafemi Awolowo, David Oyedepo etc., Body Segment: Preventive Health Habits.

TMC412 - Total Man Concept - Sports (0 Unit)
The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

Omega Semester

EDS421 - Entrepreneurial Development Studies VIII (1 Unit)
Biological studies of business thinkers, entrepreneurs and management giants. Reviewing/appraising of various strategies and skills for; Poverty Alleviation, Employment through SMEs, Entrepreneurial environments: types, appraising and contending with the environment in Nigeria, Africa/third World countries, Private Sector and economic development, final project / products presentation (on the dream business) and practical defence of their product/business proposal.

TMC421 - Issues in Marriage and Family (1 Unit)
In this course, marriage and family issues are explored looking at God's mandate and current trends and challenges. The place of the family in societal, national and global development, community service and family responsibilities vis-à-vis preparation for life in society and family context are explored closely. Preparation for Marriage, Understanding the Family and Family Settings, Family Systems Theory, Family responsibilities, Modern Day Family Trends and Challenges, Roles of Family in Societal, National and Global Development, God's Mandate for Families, The Christian Family Responsibility and Role Sharing in the Family, Parenting: Issues and Practices, Handling Family Finance, Careers and Modern Day Families.

TMC422 - Total Man Concept - Sports (0 Unit)
The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

500 Level

Alpha Semester

EDS511 - Entrepreneurial Development Studies IX (1 Unit)
Who are entrepreneurs and what make them unique (personally, nationally, and internationally) in the development process and

historically; what role do they play in the society, nationally and internationally? Case studies; Differentiate between entre- and intra-preneur; Case studies 1: Issues and challenges in starting a business in Nigeria and abroad; the business plan; Case studies 1: Feasibility studies and business finance; case studies; issues in business management; Case studies 3: practicals.

TMC511 - Total Man Concept IX (1 Unit)

Profile Building (Part 1). The emphasis of this course is on experimental learning and it involves pulling together the main stands of TMC from1st year to 4th year. It will introduce a personal dimension by exploring the idea of service from a student centered learning perspective. There will be practical exercises, workshop, projects, and journal keeping and detailed character study.

TMC512 - Total Man Concept: Sports (0 Unit)

The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

Omega Semester

EDS521 - Entrepreneurial Development Studies X (1 Unit)

This course is the continuation of EDS511.

TMC521 - Total Man Concept X (1 Unit)

Profile Building (Part 2). This course follows directly from TMC511 and continuous to explore the personal connections students have made with TMC as a course of study via practical exercises on the specific themes that are addressed in the course of the lecture. The question and discourse emanating from this exercise will enable students to develop their own perspective to the issues of life.

TMC522 – Total Man Concept: Sports (0 Unit)

The focus of TMC - sports is the physical fitness of man. It involves Games, Sports and Athletics.

TMC Sports

AWARDS / ACHIEVEMENTS

- The Centenary ICT Driven University of the Year Award (2014)
- Best Private University in Nigeria by the United States based US Transparency International Standards (USTIS)
- The Best Private University and No 2 Overall Best University in Nigeria and No 25 in Africa on Webometric Ranking (July, 2014)
- Ranked No 1 in Web of Repositories in Nigeria and No 2 in Africa.
- The First University in Nigeria to host two Nobel Prize Winners to an International Conference
- Most Preferred Private University in Nigeria by candidates seeking University admission through JAMB (2014)
- First Class graduates of the University emerged tops in the Presidential Special Scholarship Scheme for Innovation and Development (PRESSID) in Nigeria (2013 & 2014)
- The Best Private University in Nigeria (2013)
- The Best Maintained Educational Institution Award by the Nigerian Chapter of International Facility Management Association (2012)
- The first University in Nigeria and one of the very few in Africa to start training SAP Consultants in collaboration with SAP University Alliances and SAP Education (2012)
- The Bronze Medalist Recipient for the Development of "School Management System" Software Application at an International Innovation Fair – the Seoul International Invention Fair (SIIF), South Korea (2011)
- The Best ICT Driven University in West Africa Award (2010)
- The Best Private University Award (2009)
- The Best ICT Driven University of the Year (2009)
- The Fastest Growing Private University in Nigeria Award (2008)
- The Private University with Most Improved ICT Programme and Facilities by the Commonwealth Scholarship Prize and Awards (CSPA 2007)

...RAISING A NEW GENERATION OF LEADERS

POSTGRADUATE ACADEMIC PROGRAMMES

M. Sc/Ph.D Industrial Chemistry
M. Sc/Ph.D Industrial Physics
M. Sc/Ph.D Biochemistry
M. Sc/Ph.D Biology
M. Sc/Ph.D Microbiology
M. Sc/Ph.D Architecture
M. Sc/Ph.D Building Technology
M. Sc/Ph.D Estate Management
M. Sc/Ph.D Computer Science
M. Sc/Ph.D Mgt. Information System
M. Eng/Ph.D Computer Engineering
M.Eng/Ph.D Information & Comm. Engineering
M.Eng/Ph.D Elect &Electronics Engineering
M. Eng/Ph.D Civil Engineering
M. Eng/Ph.D Mechanical Engineering
M. Eng/Ph.D Chemical Engineering
M. Eng/Ph.D Petroleum Engineering
M.A/Ph.D English
M.A/Ph.D Sociology
M.Sc/Ph.D Psychology
M.Sc/Ph.D Accounting
M.Sc/Ph.D Banking and Finance
M.Sc/Ph.D Business Administration
M.Sc/Ph.D Mass Communication
M.Sc/Ph.D Marketing
M.Sc/Ph.D Industrial Relations & Human Resource Management
M.Sc /Ph.D Economics
M.Sc/Ph.D Demography & Social Statistics
M.Sc/Ph.D International Relations
M.Sc/Ph.D Political Science.
M.Sc/Ph.D Policy and Strategic Studies

SOME OF OUR INTERNATIONAL LINKAGE PARTNERS

Centre for Entrepreneurial Development Studies

Computer Laboratory

Some Students' Halls of Residence

Covenant University Health Centre

Covenant University Guest House

Covenant University Sports Complex

CST (L) and Lecture Theatre (R)