



DISTANCE LEARNING CENTRE
Ahmadu Bello University

STUDENT HANDBOOK

B.Sc. COMPUTER SCIENCE

ABU DLC Student Handbook (B.Sc. Computer Science)
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FORWORD

Whereas the Distance Learning Centre Prospectus covers all aspects of the Distance Learning delivery in Ahmadu Bello University, the DLC B.Sc. Computer Science Student Handbook is designed to give you an overview of the B.Sc. Computer Science by Distance Learning in the Ahmadu Bello University.

A Handbook of this nature is a must read for you. It provides useful information on the nature, orientation and scope of the B.Sc. Computer Science programme as well as highlights the uniqueness of this delivery modality.

As you opt for the distance learning mode to acquire a Bachelor of Science degree in Computer Science, we shall strive to make your learning experience a memorable one.

I urge you to commit, discipline and submit yourself to the demand of distance education. This shall entail an appraisal of your obligations and most suitable time to commit to your studies. You are to note that your success as a distance learner largely depends on you as there are no lecture time table or lecturers to insist you should be in class at any specific time.

Once again, I welcome you to a wonderful experience of distance learning and looking forward to seeing you on graduation day.

Prof. Muhammed Ibrahim SULE
Director, Distance Learning Centre

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PART I

General Information



Sir Ahmadu Bello, KBE, GCON

Sardaunan Sokoto and Premier of Northern Nigeria
Founder and First Chancellor, Ahmadu Bello University, Zaria

1.1 PRINCIPAL OFFICERS OF THE UNIVERSITY



His Majesty, Nnaemeka Alfred Ugochukwu Achebe, CFR
Chancellor.
(Obi of Onitsha)



Malam Adamu Fika, CFR
MICI Arb (Wazirin Fika)
Pro-Chancellor and Chairman of Council



Prof. Kabiru Bala, FNIOB,
Vice-Chancellor



Prof. Ahmed Doko Ibrahim
**Deputy Vice-Chancellor,
Administration**



Prof. Danladi A. Ameh
**Deputy Vice-Chancellor,
Academic**



Mal. Rabi'u Samaila
Registrar



Mal. Muhammad Bello Aminu Gurin
Bursar



Mal. Abdulhameed Gambo Liman
Ag. University Librarian

1.2 VISITOR, PRINCIPAL OFFICERS, DEANS AND DIRECTORS

Visitor: Bola Ahmed Tinubu, GCFR, President and Commander in Chief of the Armed Forces of the Federal Republic of Nigeria.

Chancellor: His Majesty, Nnaemeka Alfred Ugochukwu Achebe, CFR, Obi of Onitsha (Agbogidi).

Pro-Chancellor and Chairman Governing Council: Malam Adamu Fika, CFR, (Wazirin Fika).

Vice-Chancellor: Prof. Kabiru Bala, MBA, Ph.D, FNIOB, MAPM, MCABE, MSClarb

Deputy Vice-Chancellor (Administration): Prof. Ahmed Doko Ibrahim, B.Sc., M.Sc., Ph.D.

Deputy Vice-Chancellor (Academic): Professor. Danladi Amodu Ameh. B.Sc., MSc., Ph.D.

Registrar: Mal. Rabiu Samaila

Bursar: Mal. Muhammad Bello Aminu Gurin

Ag. Librarian: Mal. Abdulhameed Gambo Liman

Ag. Provost, College of Medical Sciences: Prof. M. S. Shehu

Dean, School of Postgraduate Studies: Prof. Sani A. Abdullahi

Director, Directorate of Academic Planning & Monitoring: Prof. Bello Mukhtar

Dean, Students Affairs: Prof. M. Yakasai Fatihu

Director, Distance Learning Centre: Prof. M. I. Sule

Director, Institute of Administration: Prof. Siraj Barau Abdulkarim

Director, Institute of Development Research & Training: Prof. Binta Abdulkarim

Director, National Animal Production Research Institute: Prof. A. M. Kolo

Director, Centre for Energy Research and Training: Prof. S. A. Jonah

Director, Institute for Agricultural Research: Prof. M. F. Ishiyaku

Director, Institute of Education: Prof. Bashir A. Maina

Director, University Health Service: Prof. Muhammed S. Isah

Director, Division of Agricultural Colleges: Prof. Musa A. Mahdi

Director, National Agricultural Extension and Research Liaison Services: Prof. Ike Emmanuel Ikani

Director, School of Basic and Remedial Studies, Funtua: Prof. Balarabe Abdullahi

Director, Ahmadu Bello University Consultancy Services: Dr. Umar Farouq Yaya

Director, Directorate of University Advancement: Prof. Sani Abba Aliyu

Director, Iya Abubakar Institute of Computing and ICT: Malam Shuaibu Umar

Managing Director, ABU Press: Malam Ahmad Ibrahim Ja'e

Director, Veterinary Teaching Hospital: Prof. Sani Adamu

Director, Centre for Biotechnology Research & Training: Prof. Muhammad Nasir Shuaibu

Director, Centre for Historical Research and Documentation (CHRD) - Arewa House: Dr. S. S. Aliyu

Director, Equipment Development & Maintenance Centre: Prof. Abdulghaffar Amoka

Director, Centre for Disaster Risk Management & Development Studies: Dr. Usman A. Kibon

Director, Centre for Counselling & Human Development: Dr. (Mrs.) Sa'adatu M. Makarfi

Ag. Director, Physical Planning & Municipal Services: Arc. Sulaiman Mohammed

Director, International Centre of Excellence for Rural Finance and Entrepreneurship: Dr Idris B. Bugaje

Director, Centre for Islamic Legal Studies: Dr. Sa'ad Musa Abubakar

Chief Medical Director, Ahmadu Bello University Teaching Hospital: Prof. Ahmed Umdagas Hamidu

Director, CBN Centre for Economic & Finance: Prof. Auwalu Haruna

Director, Centre for Inland Basin Studies: Prof. Umaru Adamu Dambatta

Director, Directorate of Sports: Dr. Ali Isa Danlami

Director, Public Affairs Directorate: Mal. Auwalu Umar

Dean, ABU Business School: Dr. Idris Ahmed Aliyu

Dean, Faculty of Administration: Prof. Musa Idris

Dean, Faculty of Agriculture: Prof. Mukhtari Mahmoud

Dean, Faculty of Arts: Prof. Muhammad Sule

Dean, Dental Surgery: Prof. S. O. Ajike

Dean, Faculty of Education: Prof. H. I. Bayero

Dean, Faculty of Engineering: Prof. Mohammed I. Dabo

Dean, Faculty of Environmental Design: Prof. Umar A. A. Sullayman

Dean, Faculty of Law: Dr. Salim Bashir Magashi

Dean, Faculty of Basic Medical Sciences: Prof. Wilson O. Hamman

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Dean, Faculty of Allied Health Sciences: Prof. Shehu Abubakar Akuyam

Dean, Faculty of Basic Clinical Sciences: Prof. H. M. Muktar

Dean, Faculty of Clinical Sciences: Prof. M. M. Dauda

Dean, Faculty of Pharmaceutical Sciences: Prof. A. Musa

Dean, Faculty of Life Sciences: Prof. M.N. Shuaibu

Dean, Faculty of Physical Sciences: Prof. I. M. Jaro

Dean, Faculty of Social Sciences: Dr. Shamsuddeen Mohammed

Dean, Faculty of Veterinary Medicine: Prof. Junaidu Kabir

1.3 HISTORICAL PERSPECTIVE

Ahmadu Bello University is one of the First Generation Universities in Nigeria. Others in this category are: the University of Ibadan, the University of Nigeria Nsukka, the University of Lagos and the University of Ife Ile-Ife, now called Obafemi Awolowo University, Ile-Ife.

ABU had a good start because of its solid foundation laid by its founding father, Sir Ahmadu Bello. He attracted to Zaria a talented crop of academics from across Nigeria and other parts of the world, which got the University going on a foundation of excellence. The University was officially launched on 4th October, 1962 in a colourful ceremony presided over by its first Chancellor, Sir Ahmadu Bello, Sardauna of Sokoto, and attended by dignitaries from all over Nigeria, West Africa and other parts of the Commonwealth.

Although officially opened in 1962, the origin of the Ahmadu Bello University dated back ten years earlier when the Nigerian College of Arts, Science and Technology was founded in Samaru, Zaria and provided courses in Engineering, Architecture, Fine Art and Education. Many of the earlier Engineers and Architects in Nigeria had their education and training in this college. But it was in the area of Fine Art that the College most distinguished itself, creating a distinct and African form of art, known today internationally as the Zaria School of Art.

At its official take off in 1962, Ahmadu Bello University had a student body of no more than three thousand enrolled in its various programmes. Today, the student body is over fifty thousand, the majority of them are undergraduates but with a sizeable and growing number of postgraduate students.

As the University now looks forward, it faces the challenge of creating a digital environment in which the most up-to-date technology assists and serves the process of teaching, learning and

research. The vision is that of a campus with internet access in every office, classroom and laboratory, and with a student body and academics versatile in the use and application of these technologies.

The University opened with just four Faculties- Agriculture, Engineering, Law and Science –fifteen Departments. The institution has since inception been under the successive Vice-Chancellorship of Professor Norman Alexander (1961-1966), Professor Ishaya Audu (1966-1975), Professor Iya Abubakar (1975-1978), Professor Oladipo Akinkugbe (1978-1979), Professor Ango Abdullahi (1979-1986), Professor Adamu Nayaya Mohammed (1986-1991), Professor Daniel Saror (1991-1995), Gen. Mamman Kontagora (1995-1998), Professor Abdullahi Mahadi (1998-2004), Professor S.U. Abdullahi (2004-2009), Professor Abdullahi Mustapha (2009-2015), Professor Ibrahim Garba (2015-2020) and currently Prof.essor Kabiru Bala (2020 to date).

In 1987, the year in which the University celebrated its 25th Anniversary, it had turned out to be the largest and the most extensive of all Universities in Sub-Sahara Africa. It covers a land area of about 7,000 hectares and has Eighteen Faculties, a School of Postgraduate Studies, a Business School and 120 Departments. There are also six Institutes, eight specialised Centres, a Division of four Agricultural Colleges, a School of Basic and Remedial Studies, a Demonstration Secondary School, and a Primary School.

The University has of recent been undergoing a fundamental re-organisation. From what has so far been done; it is evident that Ahmadu Bello University will certainly outgrow its crises and become, as it was before, an embodiment of excellence.

1.4 ZARIA

Zaria is a city in Kaduna State, Nigeria. Once called Zazzau, the community was founded in the 14th century as one of the seven original Hausa city-states. According to oral tradition, Zazzau rose to prominence in the early 15th century under the brilliant military leadership of Queen Amina. It became part of the Songhai Empire in the 16th century, fell to the Fulani in the early 19th century, and was captured by the British in 1901.

It is a road and rail hub in a major agricultural area. The city is a market centre for locally produced cotton, peanuts, hides and skins, shea nuts, corn, sorghum, and vegetables. Industries include cotton ginning, peanut and shea-nut milling, tanning, cottonseed-oil production, and the manufacture of cigarettes, bicycles, perfumes, and soap. Zaria is an important centre of education and research, with Ahmadu Bello University and affiliated institutions such as the Institute for Agricultural Research, National Animal Production Research Institute, National Agricultural and Research Liaison Services and the Centre for Energy Research and Training. It also hosts the National Research Institute for Chemical Technology, Nigerian College of Aviation Technology, Nigerian Institute for Transport Technology, Nigerian Military School, Nigerian Army Depot, Nigerian Army School of Military Police, National Institute for Tuberculosis Research and the Nuhu Bamalli Polytechnic among others.

Zaria is made up of the following wards: Zaria-City, Tudun Wada, Kongo/Gyallesu, Tudun Jukun, Tukur Tukur, Wusasa, Sabon Gari, Muchia/Chikaji, GRA, Kwangila, Hanwa, Palladan, Samaru and Zango.



Map of Nigeria showing Zaria arrowed.

1.5 PHILOSOPHY AND OBJECTIVES OF THE UNIVERSITY

At the first ceremony of Ahmadu Bello University in 1963, the founding father and mentor of the University, Sir Ahmadu Bello, enunciated the philosophy of ABU when he said: *“The first duty of every university is the search for and the spread of knowledge and the establishment of truths... But it must also serve the need of the nation.”*

The philosophy of Ahmadu Bello University is predicated upon the “cardinal principles of imparting knowledge and learning to men and women of all races without any distinction on the grounds of race, religious or political beliefs”

Hence, the objectives of Ahmadu Bello University as articulated in Article 4 of its 1962 and 1975 Laws are:

“To provide regular and liberal courses of instruction in the humanities, sciences and other spheres of learning of a standard

required and expected of a university of the highest standing, to promote research and the advancement of science and learning and to secure the diffusion of knowledge throughout Nigeria”.

1.6 UNIVERSITY ADMINISTRATION

Ahmadu Bello University is owned by the Federal Government of Nigeria which funds it. The President and Commander-in-Chief of the Armed Forces of Nigeria is the Visitor. There is a Chancellor who is the ceremonial Head of the University; a Pro Chancellor and Chairman of Council; a Vice-Chancellor who is the Chief Executive and Academic Officer of the University, and a Governing Council with power to manage all matters of the University not otherwise provided for or under the University Law.

The academic affairs of the University are managed by the Senate, under which there are Faculty Boards, and a School of Postgraduate Studies Board. There are also Boards of Governors as well as Professional Academic Boards of Institutes and Centres which administer their respective administrative and academic matters.



The University Senate building

1.7 FACULTIES, INSTITUTES, CENTRES AND SCHOOLS

1. ABU Business School
2. Faculty of Administration
3. Faculty of Agriculture
4. Faculty of Arts
5. Faculty of Education
6. Faculty of Engineering
7. Faculty of Environmental Design
8. Faculty of Law
9. College of Medical Sciences
10. Faculty of Basic Medical Sciences
11. Faculty of Allied Health Sciences
12. Faculty of Basic Clinical Sciences
13. Faculty of Clinical Sciences
14. Faculty of Dental Surgery
15. Faculty of Pharmaceutical Sciences
16. Faculty of Life Sciences
17. Faculty of Physical Sciences
18. Faculty of Social Sciences
19. Faculty of Veterinary Medicine
20. School of Postgraduate Studies
21. Distance Learning Centre
22. Institute of Administration
23. Institute for Agricultural Research (IAR)
24. Institute of Development Research (IDR & T)
25. Institute of Education
26. Division of Agricultural Colleges (DAC)
27. National Animal Production Research Institute (NAPRI)
28. National Agricultural Extension and Research Liaison Services (NAERLS)
29. Centre for Islamic Legal Studies (CILS)
30. Centre for Historical Research and Documentation (CHRD) - Arewa House
31. Iya Abubakar Institute for Computing and ICT
32. Centre for Energy Research and Training

33. International Centre of Excellence for Rural Finance and Entrepreneurship (ICERFE)
34. Centre for Biotechnology Research and Training
35. The Veterinary Teaching Hospital
36. Ahmadu Bello University Teaching Hospital (ABUTH)
37. Equipment Development & Maintenance Centre
38. Centre for Disaster Risk Management & Development Studies (CDRMDS)
39. Centre for Counselling & Human Development
40. CBN Centre for Economic & Finance
41. Centre for Inland Basin Studies
42. Institute of Health

PART II

Distance Learning Centre

2.1 DISTANCE LEARNING

2.1.1 Preamble

The need to commence Distance Learning in ABU has been a product of internal demands initiated by the School of Postgraduate Studies as well external agitations by some alumni as exemplified at the 50th anniversary by Mallam Adamu Fika in his lead paper to mark ABU's golden jubilee where he said *“ABU should consider developing an effective Distance Learning System that deploys modern communication facilities and online tutorial to impact functional knowledge to the millions who may not be able to enroll on its regular campus-based programmes”*.

Annually, an average of 13,000 applicants applied for various postgraduate programmes in the Ahmadu Bello University, although about 70% of these were qualified, less than 5, 000 are usually Admitted due to the limitation of on-campus facilities. The situation is even worse with the undergraduate programmes where 31,000 applicants to Ahmadu Bello University scored the minimum JAMB requirement of 180 points. Less than 10,000 of these can be admitted due to the same reason. It is thus obvious that ABU has not been able to satisfy the demands for those interested in obtaining ABU degrees.

It has also been noted that Nigeria has been credited to be among the countries with the highest number of students studying abroad with about 71,000 studying in Ghana alone and paying not less than 155 billion Naira as tuition annually. ABU should cash on this opportunity to increase its relevance as well as revenue base. In an on campus model “there are obviously limits to how many additional students can be admitted without negatively impacting on quality. The Europe Africa Quality Connect Evaluation Report concluded that ABU has obviously curtailed its capacity to generate any additional income by means of enrolling additional students. The need to explore other options of delivery and student enrollment is thus obvious.

2.1.2 Distance Learning

The principal objective of the Ahmadu Bello University (ABU) in establishing a Distance Learning Centre (DLC) is to put in place an administrative structure responsible for the coordination and delivery of its Distance learning programmes at both the Undergraduate and postgraduate levels.

The DLC is a semi-autonomous administrative Unit responsible for the coordination and delivery of Distance Learning programmes of the Ahmadu Bello University.

2.1.3 Philosophy, Vision and Mission

Philosophy

To radically proffer an alternative but robust delivery model for Ahmadu Bello University degrees and other qualifications in line with Universal ODL best practices.

Vision

The Distance Learning Centre, Ahmadu Bello University shall be a unique Distance Learning Centre of repute excelling in the delivery of Certificate/Diploma, undergraduate and postgraduate programmes in all fields to advance the scope of ABU's reach in educational delivery as envisaged by the founding fathers of the University.

Mission

The mission of the Distance Learning Centre is to ensure qualitative, accessible and timely delivery of approved academic programmes to its students without distinction based on geographic location, race, sex, religion or other affiliations.

2.1.4 Objectives

The principal objective of commencing the Open Distance and e-Learning (ODL) delivery of both undergraduate and postgraduate programmes is to extend the reach of the university in the delivery of quality and reputable undergraduate and postgraduate studies leading

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to the award of Ahmadu Bello University Undergraduate and Postgraduate Degrees.

E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face-to-face teaching or issuance of course material on computers, i-pads, CD/DVDs and hard copies, in which case the term Blended learning is commonly used. Whereas the online option has become the primary modality in the delivery of tertiary education in distance learning in some countries, the reality of Nigeria makes Blended learning a more realistic option.

2.1.5 Location

The Distance Learning Centre of the Ahmadu Bello University (see pictures) is currently located in the Ahmadu Coomassie Building (former ABU Bookshop) adjacent the Senate Building on the Main Campus.



Frontage and Interior view of the Distance Learning Centre

2.1.6 Administration

The Distance Learning Centre is directly responsible to the Ahmadu Bello University Senate and Management on academic and administrative matters respectively.

Whereas the Governing Board of the Distance Learning Centre sets out policies for the Centre in line with the overall policies of the Ahmadu Bello University, the Academic Board considers all

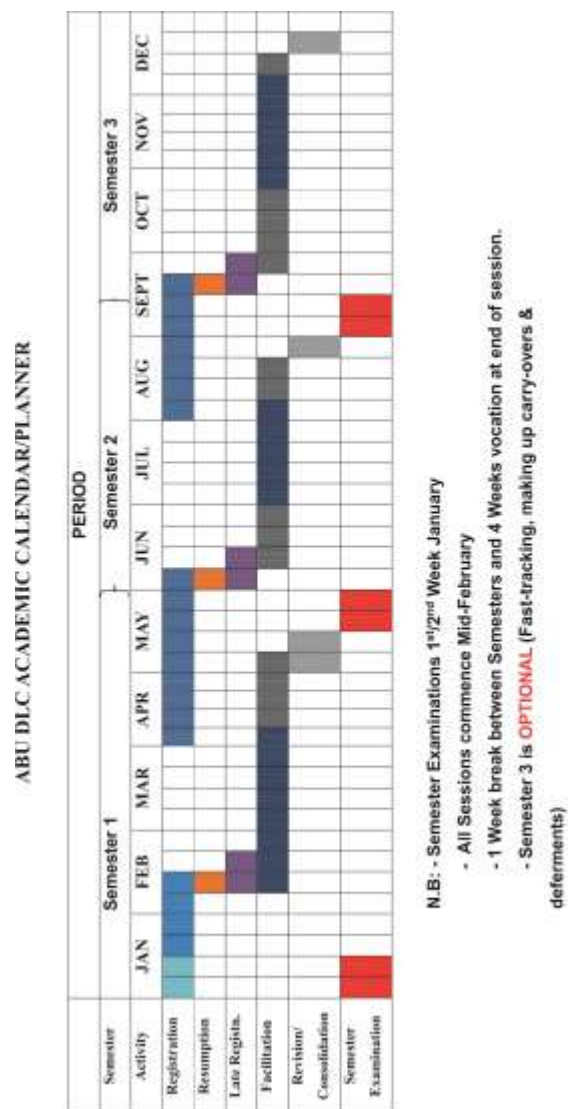
academic matters prior to its submission to University Senate. The day-to-day administration of the Centre is undertaken by the DLC Management, which comprises of the Director assisted by three Deputy Directors (Administration, Academic and Learner Support Service & IT), a Secretary and several Unit and Sectional Heads.

2.2 DISTANCE LEARNING ACADEMIC CALENDAR

The Academic Calendar of the Distance Learning Centre shall be developed annually by the Management of the Centre and presented to the Academic Board for deliberations and approval.

There shall be three Semesters annually, comprising of One week orientation (for new students only) 12 weeks of interaction, one week of optional tutorials/face to face on campus interaction and 2 weeks of examination. In each of the Semesters, there shall be 2 examination groups (weekends and weekdays). Students are at liberty to select which of the examination groups they may participate in. The calendar of the Distance Learning programmes shall differ from that of on campus programmes to accommodate the 3 semesters and other peculiarities of Distance Learning.

ABU DLC ACADEMIC CALENDAR/PLANNER



- N.B:** - Semester Examinations 1st/2nd Week January
- All Sessions commence Mid-February
 - 1 Week break between Semesters and 4 Weeks vacation at end of session.
 - Semester 3 is **OPTIONAL** (Fast-tracking, making up carry-overs & deferments)

2.3 PROGRAMMES FOR DISTANCE LEARNING DELIVERY

2.3.1 Certificate Programmes

Specific Certificate course as dictated by market needs shall be developed in consultation with the relevant Department of the University. The Public Relations and Marketing section shall be responsible for making the necessary contacts in this regard.

2.3.2 Undergraduate Programmes

The Centre currently deploys 9 undergraduate programmes viz.: BSc. Business Administration, BSc. Public Administration, BSc. Economics, BNSc. Nursing Science, B.Sc. Political Science, B.Sc. International Studies, B.Sc. Sociology, B.Sc. Accounting and B.Sc. Computer Science. It is however projected that undergraduate programmes from the Faculties of Administration, Arts, Education, Social Sciences, ABU Business School, Sciences, would be added to these.

2.3.3 Postgraduate Programmes

The Master in Business Administration (MBA) is the flagship for the delivery of postgraduate programmes. Seven additional PG programmes that include Master in International Affairs & Diplomacy (MIAD), Master in Public Health (MPH), Master in Law Enforcement & Criminal Justice (MLCJ), Master in Information Management (MIM), Master in Public Administration (MPA), Postgraduate Diploma in Education (PGDE) and Postgraduate Diploma in Management (PGDM) were also deployed. Additional PG programmes shall be deployed every session as approval is received.

2.4 DEPLOYMENT OF DISTANCE LEARNING PROGRAMMES

2.4.1 Delivery Stages

Distance learning delivery of Certificate, Diploma, UG and PG Programmes in the Ahmadu Bello University shall involve the following stages:

- i. Online Application by the prospective student.
- ii. Provisional admission by the corresponding Admissions Committee of the DLC.
- iii. Confirmation of admission by JAMB (UG programmes only).
- iv. Online Registration by students.
- v. Assignment of Tutors to students and Academic advisers to Resource Centres
- vi. Matriculation and Orientation
- vii. Course work/Academic activities (Lectures) for the corresponding number of years.
- viii. Project work and seminar.
- ix. Examination result/project report submission to DLC Academic Board.
- x. Submission of Examination result to SPGS Board (PG programmes); Senate (UG Programmes and corresponding Professional and Academic Boards (Diploma programmes).
- xi. Approval of results.
- xii. Graduation and Convocation.

2.4.2 Matriculation

All students entering the university for the first time to undergo the first year of their programme will be required to matriculate at a formal ceremony presided over by the Vice Chancellor. The ceremony shall be held at the Main Campus.

The Director of DLC will present students for matriculation, whilst the Registrar/representative reads out the Matriculation Oath viz “I solemnly undertake and swear to observe and respect the previous of

the Ahmadu Bello University Law and Statutes, Ordinances and Regulations lawfully made there under, which are now in force and which shall from time to time be brought into force”

All new students are expected to have signed the Matriculation Oath during the registration process.

2.4.3 Curriculum

The curriculum of the Certificate, Diploma, UG and PG programmes to be delivered by distance learning shall be as approved for the on campus delivered programmes and in conformity with the NUC BMAS. Elective Courses indicated by the demand of distance learning have also been developed.

The delivery method shall however be ICT Supported Blended Mode. It shall be a mixture of provision of hard and electronic copies of Course materials, face-to-face interaction as well as an online interactive component.

In conformity with the pedagogy for Distance Learning, the Modular method of organizing Course materials shall be employed.

2.4.4 ABU Model of Distance Learning Delivery

The ABU model of delivery envisages that a Blended delivery protocol shall be utilized. This would include:

- i. Provision of hard and electronic copies of all course materials for the corresponding session.
- ii. Weekly uploads of relevant Discussion questions as well as the provision of an interactive platform for other students to review and critique, write-ups shall be provided.
- iii. An optional 2 week on campus revision session and conduct of lecture sessions necessitating face-face delivery shall be provided for.

- iv. Project defences and examinations shall be held on campus or Resource Centres under the supervision of the DLC staffs.



2.4.5 Learners Support

A robust mechanism for information, advice and guidance to students has been put in place in conformity with ODL practice. These include:

- i. Provision of print (optional) and electronic versions of Course Materials
- ii. Development of a 'Distance Learning Students' Handbook' – Print & Electronic
- iii. Development of a programme specific handbook.
- iv. Assigning dedicated GSM Help lines and a telephone call centre.
- v. Dedicated E-mails (DLC)
- vi. Blog site (DLC)/Interactive website
- vii. Access to on and offline e-libraries
- viii. Activation of Resource Centres (Liaison Offices)
- ix. Allocation of Academic advisers to Resource Centres
- x. Appointment of programme specific Desk Officer/Program Coordinator for each programme deployed.

2.4.6 Liaison Offices (Resource Centres)

A DL Liaison Office is a facility dedicated for the support of DL students as well as creation of an environment to permit student-student, student-staff and student-resource person interactions, provision of offline e-learning resources as well as reserve for all course materials. Each Liaison Office would also be equipped with video conferencing, library and a common room.

The Liaison Offices shall be administered by an Administrative staff of the ABU DLC and shall host the proposed annual/semester meetings between the relevant Academic Adviser and his/her DL students. An MOU shall be in place with an adjacent CBT Centre to facilitate conduct of semester examinations at the various centres.

The geographic distribution of enrollees in the DL programme shall determine the sequence of activation of the Liaison Offices. It is however proposed that there shall be a Liaison Office in each of the 6 geopolitical zones in the country. In event of an encouraging international participation, Liaison Offices have also been proposed in the UK, USA, Middle East, Far East and South/East Africa.

2.4.7 ICT Infrastructure

- i. E- library
- ii. Video-Conferencing Centre
- iii. Online Platform/Software (Moodle)

2.5 STUDYING AS A DISTANCE LEARNER

Distance learning is designed to offer educational programmes to you in anticipation of your inability to partake in the corresponding on campus study. Often, you will be studying on your own and in your own spare time. You will be working through specially prepared materials on your own. This is at variance to the on campus situation where you would be expected to comply with a lecture time table.

Studying suggests learning and so to learn there must be concentration and diligence. It is not the mere act of sitting down with a book or other reading written material. It is pertinent to develop those study skills that would assist you in studying independently.

A. Study Skills

i. Listening Skills

Listening is an important component of learning. Many of the things that are taught are things you listened to. Some of these are:

1. Listening to the lecturers speaking
2. Listening to audios of the course materials
3. Listening to video tapes/U-tube sites
4. Listening to CD-ROM
5. Listening to films, radios, TV, etc.

Thus, in your study, you need to listen to things that will make you learn. You need concentration while listening. You need to follow the speaker or the medium of transmission of message, while listening. Just as you listen to learn, so also you should learn to listen.

ii. Reading

One of the most important skills of studying skills is reading. Reading occupies a central place in studying. This is because most of the information we need is stored in books. Thus, to be able to retrieve information that will be learnt, you have to acquire efficient reading ability.

Reading skills involve mainly reading to learn. As you must have noticed in your attempt to list reading components, to be able to read to learn:

1. You must be in control of the material you are reading;
2. You must be able to understand and comprehend the material;

3. You must be able to read with the speed required to complete the volume of things you have to learn;
4. You must be able to read between the lines and beyond the lines;
5. You must be able to apply what you are reading to relevant learning situations;
6. You must be able to read and create new ideas from what you are reading.

Reading is an important study skill and component of learning. If you read efficiently, you will learn. Without reading, you cannot learn many things. In studying therefore;

- i. You must read very well;
- ii. You must read with concentration;
- iii. You must read where there are less distractions;
- iv. You must read and ensure you are learning; and
- v. you must read and be able to recall what you are learning.

iii. Writing

If you read and you are unable to put what you read down for the people to know that you have read, then no reading is done. Reading and writing are thus interrelated skills. Writing involves the ability to put things down in a clear, precise, coherent and effective manner. You must learn to write well, especially during examinations. Of course, you learn to write well by imitating good writers. And you can only come in contact with good writers by reading widely.

iv. Note taking

You should be capable of taking notes whenever you are reading. In fact, the more you shorten what you are reading, the more you can get them into your brain. Note taking and making help to shorten a large volume of what you are reading. Therefore, you need the skill of note taking and note making.

When studying,

1. Put notes down;
2. Use abbreviations to shorten notes;
3. be consistent in note taking;

4. Let your notes be neat;

More than all these, read your notes constantly and revise them.

B. How to Study

i. Be in the Right Frame of Mind

Before you study, you should be in the right frame of mind. You should be calm. Nothing should be worrying you. Psychologically, you should not be under tension, you must be emotionally stable, free from shock of any kind and be highly motivated to study. Socially, you should clear all the social problems of the home, children (if any) or parental care that may stand against proper concentration. Studying demands concentration and you must give this.

ii. Have the Right Environment

The environment where study takes place must be conducive. It should be clean, inviting, well-organised, pleasant and noiseless.

iii. Have the Right Equipment

You need certain pieces of equipment for study. Without the right equipment, study will be difficult. The right equipment will make study more appropriate and effective such as:

1. Pen
2. Pencil
3. Paper/note book/file jacket
4. Dictionary
5. Relevant textbooks
6. Tape recorder/cassette
7. Ruler
8. Calculator
9. Computer equipment (if you can afford one)
10. Table and desk
11. Book shelf

Some people find it easy to file notes in a folder. If disorganised, files can pose a big problem while you are studying because notes may not

be in proper order; some notes may be missing or misplaced. If you know you cannot keep files, why don't you simply buy a notebook?

All courses are accompanied with **Course Guides (i – viii in your course material)** which state all that you need to know about the course such as:

1. Course information
2. Introduction to the course
3. Course aims and objectives
4. Activities involved in the course
5. Assessment modality
6. Suggested time required for study
7. Course structure

What to do while Studying

1. *Read* and understand what you are to study.
2. *Form* useful notes.
3. *Underline* important points.
4. *Do* some practice activities, tasks or exercises to ensure that learning is taking place.
5. *Assess* yourself periodically by doing what you are learning to do.
6. *Relax* in between study periods to refresh your brain: this you can do by walking around, chatting a bit, taking a tea break, etc.
7. *Always* be active when studying; do many things-writing, listening, reading, speaking to yourself, listing, drawing, labelling, etc; activities keep you awake.
8. *Know* what you have learnt and what you have not learnt: do not keep on reading what you have learnt as if you have not learnt it.

C. Preparing For Examinations

One of the most important reasons why we study is to pass examinations. Examinations cannot be tackled successfully without active study activities.

i. Start early

To pass examinations you have to start studying very early. In fact your first day of lecture should be your first day of preparing for examinations. You should read for the lectures before the lecture and read after the lecture. Put down major points in your jotter in preparation for revision later.

ii. Work hard

Nothing is achieved without hard work. Do not play with your time. Work consistently hard. Many students pile up their work till the last minute. This is not the best way to prepare for examinations.

iii. Read widely

Do not just depend on what is in your study pack. Read widely. Read some of the textbooks recommended for you. Listen to the audio recordings and video-recordings of the lecturers prepared for you.

iv. Reduce what to study

You cannot read and understand all that will be given in notes, hand-outs or textbooks. You need to learn the skills of note taking and note making. The more you summarise and reduce what to learn the better your focus and understanding of the materials to learn for examinations.

v. Revise

Revise for all examinations before the exam. Examination time is not the time to read new things or attempt to learn new things. Examination time is the time to revise and put back to memory what you have learnt before.

vi. Be familiar with the exam pattern

You need to be familiar with the format, the demands and the content of the examination you are preparing for. Get in touch with past question papers. Look for questions that are always set, the one that are rarely set and the ones that are not set at all. Study in order of importance of the topics.

vii. Be organised

Plan your work. Be fully organised during examinations. Be calm. Work according to your plan of study.

D. Revision

This unit treats a very important aspect of preparing for examinations. This is revising for examinations. Here you will go through specific practice exercises that will train you in the art of revising for examinations. Remember, nobody can train you enough on how to revise. You have to train yourself. The more training you have, the better.

You cannot revise for any examination unless you have what to revise. Many students do not know the difference between reading for exams and revising for exams. To read for examinations means to read your notes, study guides, units, textbooks, relevant journals, etc. In reading for examinations, you come in contact with the facts newly. You are learning the facts for the first time. As you read, you also study the points. In fact, you read by jotting down points in a note form. There are many activities you can do when reading your lecture notes for the first or second time. Below are some of them:

1. You have to skim-read the lecture notes or the textbook to determine what is relevant to be read.
2. You may underline (if the reading materials are yours) important points as you read. By underlining the important points you are actively participating in the reading process. If you just read and do not perform certain activities as you read, you may fall asleep or be tired quickly. You must be active as you read.

3. You must stay active and alert throughout the study/reading time. You should not let any important point or word drift past you. Look out for the most important points and underline them.
4. You may form notes as you go along. To form notes as taught under the *Use of English and Communication Skills*, you must have headings and sub-headings, be consistent in your numbering, put only points down, use abbreviations where necessary, use colouring, underlining, etc where needed. The notes should always take the form of a summary.

E. Studying Essay-Type Examination

This is one of the most important types of examination. Essays usually contain many questions. You may be asked to choose from the questions or may not be given any option. In an essay question, you are required to provide facts about the question. Depending on the type of essay, you may be asked to provide your own opinions. Different types of essay questions demand different kinds of answer.

Some of the essays may require you to:

- 1 *Narrate* give the events as they happen
- 2 *Describe* show the parts of the object or issue
- 3 *Enumerate* list
- 4 *Outline* present the points in a simple sentence or phrase form
- 5 *Distinguish* make distinctions
- 6 *Compare* show similarities
- 7 *Contrast* show differences
- 8 *Discuss* fully expatiate bringing all views and your own
- 9 *Prove* provide logical evidence
- 10 *Apply* take the situation to another situation
- 11 *Create* build something new
- 12 *Imagine* present the feeling that is unreal, real
- 13 *Design* construct or re-construct
- 14 *Innovate* bring new ideas
- 15 *Draw inferences* use the situation to bring out another view
- 16 *State* present as it is

- 17 *Define* give the meaning
- 18 *Elucidate* expatiate further
- 19 *Explain* make it vivid and clear

Dos and Don'ts of Essay Writing during Examinations

With the outline ready, you are now confident enough to start writing the examination. Do not waste time on outlining during examination. Remember, it is the essay that will be marked not the outline.

Dos

1. Go straight to your point.
2. Give the point and support it with proofs.
3. Link one point with the other, using linking words like: *First, second, third, most important, less important, on the one hand, on the other hand*, etc.
4. Be conscious of time and divide your time well as you treat each point.
5. Start with a captivating introduction, go to the first, second, third, etc. point and draw a very useful, captivating and well-focused conclusion.
6. Mind your language: be brief, clear and direct.

Don'ts

1. Do not write irrelevancies.
2. Beware of repetitions.
3. Do not waste time on one point thus having no time for the other *points*.
4. Do not go astray.
5. Don't be disorganised.

Before Submission

If you plan your time very well in an essay examination, you will have enough time to go over your work. But in most cases, you are so occupied during the examination that you do not have time to read over your work.

F. Studying For Multiple-Choice Examinations

You should study for examinations based on the demands of such examinations. Multiple-choice and short-answer types of examination are no exception.

Multiple-choice examination is that which requires you to choose from alternatives or options, the correct answer to the question. This kind of examination is often referred to as discrete examination because it usually tests one concept at a time.

How to Study for Multiple-choice Examination

In studying for multiple-choice examination, you need to know the major points of what you are to study. In most of our textbooks, the major point or the main technical term or word is italicised or produced in bold print. For example, in the passage under discussion, some words may be made bold, italicised or underlined to show that they are important.

During a Multiple-choice Examination

- 1. Be careful:** Read the questions carefully. Sometimes the words like *not*, *only*, *but*, *through*, *off*, etc may make a big difference. You may miss the answer if your attention is not drawn to these words.
- 2. Eliminate obviously wrong answers:** Some answers are obviously wrong. Eliminate these first. Then think more deeply on the options (or detractors) that are very close.
- 3. Follow the instructions:** Sometimes you may require *shading*, *ticking* (P), or *underlining* the correct answer; if you do not do what you are asked to do, your paper may be disqualified.

G. The Examination Day

The examination day is perhaps the most important day. You need to be well composed, confident and determined to succeed. Here are some suggestions you may wish to consider on the examination day.

1. Read and fully understand the examination regulations
2. ii. Be sure of the time and venue of the examination (useful to reconfirm a day before the examination).
3. Revise the facts quickly some hours to the examination.
4. Read the examination questions very well. Follow all instructions including the number of questions to answer.
5. Divide your time very well. Do not spend time on one or two questions at the expense of other questions.
6. Read over your work before submission.
7. Be sure you write the particulars of yourself as demanded by the examination regulations. Write
8. this first. You may forget to do so later on.
9. Answer the question in a clear, correct and well-structured language. Be well organised in your
10. presentation.
11. Neatness, legible handwriting and well-collated examination papers are necessary and should be done.

2.6 WAIVER AND DEFERMENT GUIDELINES

Application Procedure:

Waiver

1. Application for waiver should be addressed to the Director DLC via the ABU support mail (support@abudlc.edu.ng) This should state justifications for request, relevant subject for waiver and earlier courses offered.
2. Payment of waiver fee of N20,000 (\$60)/course requested for waiver and attachment of proof of payment (scanned slip)/payment details for electronic transfers. If course registration has been done, no additional fee is paid.

3. Processing and transmission of transcript by e-mail and later the original hard copy.
4. Consideration of application and transmission of response to applicant.

*In event of securing waivers, registration of higher level courses only permissible in October Semester. Alongside other Courses, maximum permissible load is 24CU while minimum is 09CU.

Deferment:

- A. **Course deferment:** could be made at any time in the semester.
 1. The portal for the deferment application is abudlc.edu.ng
 2. If registration for course has not been made, payment of N20,000 (\$60)/ course for deferment and transmission of proof of payment(scanned slip)/ payment details for electronic transfers.
 3. Consideration of application and transmission of response to applicant.
- B. **Examination deferment:** application must be made at least 2 weeks before commencement of the semester examination.
 1. Ditto A
 2. Ditto A but N20,000(\$60)/course is paid.
 3. Ditto A
- C. **Semester or Session deferment:** could be made only after registration for the semester / session .
 1. Ditto
 2. Ditto: N20,000 (\$60) deferment of semester and N40,000 (\$120) deferment of entire session
 3. Ditto

D. Examination Rectification

1. Application of rectification within 2 weeks of release of result stating justification.
2. Attach evidence of payment (scanned slip) of N20,000 (\$60)/course/ payment details for electronic transfers.
3. Response to request shall be made within 7 days of closing acceptance of applications.

*** Payments for waivers/deferments/transcript/statement of result/examination rectification to be in Account:
AcctName: ABU Microfinance Bank, Acct No.: 1016508300, Bank: Zenith Bank.**

At ABU Distance Learning Centre you are assured of:

1. **Flexibility in fee payment (Full or in Instalments); admission; registration & examination (period & venues); duration of study; learning platforms (Hard copies/book; Electronic copies, lecture videos and Audio versions) & programme transfer (on-campus to Distance learning):**
 - Fees are paid on a per subject basis, your purse and available study time are determinants to number of courses registered.
 - You are at liberty to join us in the 1st, 2nd or 3rd semester – whichever is more convenient for you.
 - Admission & Registration processes are online, you may however be required to present your credentials at the nearest Liaison Office for screening, foreign students are to scan and forward their credentials for remote screening but originals must be sighted at the nearest Nigerian Embassy.
 - ABU DLC Semester examinations are held in Zaria, Abuja, Lagos Sokoto, Gombe, Port Harcourt, Kano, Kaduna, Bauchi, Makurdi, Birnin Kebbi, Minna, UK (London), and UAE (Dubai). Maiduguri, Yola, US (New York) and KSA (Jeddah) soon to be activated. You are thus at liberty to select your examination venue.

- Students are also grouped (for examinations) into weekday and weekend groups, you are also at liberty to choose which is more convenient for you.
 - You are at liberty to extend your study period (twice the advertised duration) or fast track it by participating in the 3rd Semesters.
 - You are given 4 study options to choose the preferred study mode you are most inclined to (hard copies, e-copies, Audio and videos).
 - On campus students facing challenges with keeping up on campus are at liberty to transfer their studies to the Distance Learning option.
- 2. Same curriculum and certificate as on campus students @ completion of studies:**
- Your admission, study and graduation requirements are similar to the corresponding on campus programme.
 - On graduation, you shall be issued the same certificate as on campus students, signed by the Vice Chancellor and Registrar of the University.
- 3. Work and learn with no need to commute or relocate:**
- Relocating to or frequently commuting to and from Zaria is not required, you may however be a frequent visitor (if it's convenient for you).
 - You can thus maintain your job/business while earning a degree.
 - You have a 'head start' over your mates since you can commence business/vocation while still in school and you are also not expected to participate in the NYSC programme.
- 4. Stable Academic calendar; Secure and stable online activities via remote Server - 24/7:**
- ABU DLC staff are independent of the University hence there are NO STRIKES and you are guaranteed of timely graduation.

- Our externally hosted server guarantees stable and seamless online presence, you can thus access our website, portal and other online resources 24/7.
- 5. Electronic delivery/”classroom” using any computer device (tablet/i-pad, smart phone, laptop or desktop) to improve interaction and IT competency:**
- Our courseware (e-text, audio and videos) are adaptable for use on desktops, laptops, notebooks, tablets and smartphones.
 - Our courseware shall be available online (Learning Management System) and offline (drives).
- 6. Robust learning support: Telephone helplines, e-mail, Skype, Webinar/Video conferencing & e-library services:**
- Telephone and e mail helplines are available to you 24/7.
 - Telephone and e mail access to Academic Advisers, IT attaches, Guidance and Counselling staff as well as your e-tutors shall be made available to you.
 - Well stocked online e-library services are available for your use while offline e-libraries are available in Zaria and our liaison offices in Abuja, Lagos, Port Harcourt, Kano, Kaduna and Sokoto.
 - Skype/videoconferencing facilitation of seminar and project defences ensure you are not left out of similar on campus activities.
- 7. A two week per semester optional on campus tutorial session or alternative participation by Webinar is available:**
- Although on campus optional tutorials shall be held at the end of each semester, to ensure your participation, all sessions shall be streamed live to ensure remote participation, you can forward your questions and listen to your tutors address them in real time wherever you are, you can also view at your convenience since all sessions are recorded and available on our Facebook page..

8. Developing the Business Skill in you – “Business Skill Acquisition” :

- This compulsory elective course is to develop or improve your capacity to be successful upon graduation, it comprises of a taught component, apprenticeship and a reading component.

9. Developing the Leader in you – “Motivational Leadership” :

- This compulsory elective course is to develop or improve your leadership capacity is available to all PG students, it comprises of a taught component and a reading component.

10. Chance to interact with your Vice Chancellor and other Principal University and Distance Learning Centre Officers; world-class tutors by webinar/video conferencing as well as Learning from diverse and experienced internationally acclaimed tutors/lecturers:

- Whereas you shall be having frequent online interactions with the DLC Management, an occasional interaction with key management staff of the university would be arranged.
- Guest tutors/speakers shall be occasionally invited to interact with you online.

11. Extending support to your doorstep by a system of Resource Centres/Liaison Offices:

- To enhance the quality of support for our learners, Liaison offices have been established in Abuja, Lagos, Port Harcourt, Sokoto, Gombe, Minna, Kano and Kaduna (others coming up soon).
- Most services can be rendered to you at these Centres.
- A provision for you to study or meet with fellow students shall also be made at these Centres.

12. Our programmes can be undertaken concurrently with other University Certificate, Diploma, UG or PG programmes:

- Universally, distance learners can participate in other on campus programmes independent of their status in DLC, this provision is also available to you.

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= For this Lifetime Learning Experience or to learn more about us, visit

www.abudlc.edu.ng OR register.abudlc.edu.ng

"With us, Learning is a Pleasure, not an ordeal"

PART III

B.Sc. Computer Science

3.0 OVERVIEW

The Distance Learning Centre (DLC) has established academic requirements that apply to all students working towards a first degree in Computer Science that are consistent with the standards set by the National University Commission (NUC). These requirements reflect the Centre's commitment to a broad-based quality education. The main components of the Distance Learning BSc. Computer Science programme are:

- (a) Core Curricular; in which students concentrate their studies and receive degrees.
- (b) Electives; which permit students to take courses of their own choice in consultation with their academic advisors.
- (c) General Studies; which acquaint students with the foundation of general education in science, social sciences and humanities, as well as inculcating in the undergraduate students the essence of nationalism and morality.
- (d) Internship; which permits students to go on a 6 month industrial training to learn on the job applications of the field in an organization of their preferred area of specialization.

The BSc. Computer Science programme runs for a three year and a four year period leading to the award of the Bachelor of Science Degree in Computer Science. The three year program lasts for a minimum of six semesters and a maximum of ten semesters, and admits direct entry candidates to the 200 level. Candidates admitted into the four year program start from the 100 level. The program lasts for a minimum of eight semesters and a maximum of twelve semesters.

3.2 OBJECTIVES OF THE PROGRAMME

It is expected that, at the end of the undergraduate programme in the Distance Learning Centre students would have acquired:

The necessary skill-set to function in today's fast-growing technological world, as computers have become indispensable in almost all activities - irrespective of gender, race, location and in flexible manner. They offer a wide range of functions and services. Few of such areas where Computer Science is applicable include the following:

- Education
- Medicine
- Business
- Banking
- Government
- Defense
- Communication

The electives at 100 and 200 levels are designed to enable students acquire a liberal education and to broaden the intellectual base of the student. The general studies acquaint students with the foundation of general education in the sciences, social sciences and humanities as well as inculcating in the undergraduate students the essence of nationalism and morality.

3.3 ADMISSION REQUIREMENTS

General Entry Requirements

The Department admits students into 100 level as well as 200 level for the B.Sc (Hons.) Computer Science based on their

qualifications. In rare cases they may be admitted into upper levels.

I. For 100 level: Candidates must satisfy the general University and Faculty of Science requirements of five O'Level credits which must include: Mathematics, English, Physics and any other two relevant science subjects at Senior Secondary School Certificate level or examination in at most two sittings.

II. For 200 level: Candidates must in addition to (I) above have an Advanced level (A 'Level) or its equivalence in Computer Science and any other science subject.

3.4 REGISTRATION

Registration of students who are offered provisional admission into the DLC is conducted in a central location and lasts for two to three weeks. At the venue of the registration exercise, the registration officer will check and ensure that an applicant's name is on the admission list before asking the candidate to show his/her original copies of the following documents:

- (a) Academic certificates (SSCE O/Level, A/level, UME scores, etc.) to confirm that the student fulfils the admission requirements.
- (b) Local Government Area of origin declaration
- (c) Valid travelling documents and Residence permit (if a foreign student)
- (d) Birth Certificate or Sworn Declaration of Age

If they have ascertained that the credentials are satisfactory, the registration officer will issue registration forms and files to the new student. Certain of forms having been completed by the

student, the student will be given a registration number which together with the students profile will be forwarded to the Management Information Unit of the Centre for uploading unto the Student's Management System as well as the Centre's database. Once the uploading has been done successfully, the new student will proceed to the payment of registration fees and the online course registration. The student can also proceed to request for his/her identification card using the online payment receipt obtained from the bank into which the registration fees were paid.

3.5 MATRICULATION

All students admitted into the Distance Learning Centre for the first time (100 or 200 level) are required to matriculate just as their on campus counterparts. The students matriculate at a formal ceremony presided over by the Vice-Chancellor and the Director of the Distance Learning Centre. The Director shall clearly spell out the core values, in terms of the mission and vision of the DLC to the students.

3.6 COMPLAINTS AND COUNSELLING

The complaints and counselling committee shall assist students with both academic and personal matters where possible. The guidance and counselling unit assist students with issues relating to registration, examination, general academic issues and personal matters as well.

3.7 COURSE STRUCTURE AND REQUIREMENTS FOR GRADUATION

i. Course Structure

The undergraduate program has five main elements

- (a) Core courses;
- (b) Project-six credit units in final year;
- (c) Electives from within the program and other programs from the unit
- (d) General courses.
- (e) Foundational courses

Table 1 below shows the core courses, electives and the minimum and maximum credit requirements for promotion at each level and graduation.

TABLE 1: Course Structure (Core Courses, Electives and Requirements for promotion and graduation)
Structure and Duration

The duration of B.Sc. (Hons.) Computer Science programme is four years. There are two semesters of formal University Studies in each academic session. At 300 Level, a student is expected to go for at least 6 months Students Industrial Work Experience Scheme (SIWES) after completion of the first semester courses, at the end of which he/she has to write, present and defend a report on what he/she learnt in the industry. At 400 Level, each student undertakes a one year project in any field of interest besides the usual prescribed courses. A report on the project is also to be presented and defended.

Summary: B.Sc. Computer Science

	100 Level	200 Level	300 Level	400 Level	TOTAL
Core Courses (Departmental)	22	27	20	31	100
Cognate Courses (GENS)	3	2	2	0	7
Restricted Electives	2	3	6	6	17
Unrestricted Electives	8	9	2	6	25
TOTAL	35	41	30	43	149

The above summary table shows that *for a student to graduate he/she needs to register a total of at least 149 credit units of which 100 credits must be core.*

The following gives a detailed breakdown of the courses in the curriculum on a semester-by-semester basis.

100 LEVEL – A MINIMUM OF 35 CREDIT UNITS.

- Core courses (Departmental) : 22
- Core courses (General Studies) : 03
- Restricted Elective : 02
- Unrestricted Electives : 08
- Total : 35
- Core Courses (Departmental)

1ST Semester

Code	Course Title	Credit Units	Prerequisite
MATH101	Sets and Number System	2	O/L Maths
MATH103	Trigonometry and Co-ordinate Geometry	2	“
MATH105	Differential and Integral Calculus	2	“
COSC101	Introduction to Computing	2	“
PHYS111	Mechanics	2	O/L Physics
PHYS131	Heat and properties of matter	2	“

2ND Semester

Code	Course Title	Credit Units	Prerequisite
MATH102	Algebra	2	O/L Maths.
MATH104	Conic Sections and Application of Calculus	2	“
MATH106	Vectors and Dynamics	2	“
STAT102	Introductory Statistics	2	“
PHYS124	Geometric and Wave Optics	1	“

Restricted Elective

PHYS122	Electricity, Magnetism and Modern Physics	2	O/L Physics.
GEOG106	Introduction to Environmental Science	2	

Cognate Courses (General Studies)

Code	Course Title	Credit Units	Prerequisite
GENS101	Nationalism	1	
GENS103	English and Communication Skills	2	
GENS104	History and Philosophy of Science	2	
GENS102	Environmental Health	2	

Electives at 100 Level

1st/2nd Semester

A minimum of eight (8)-credit units chosen from the following subject areas: Biology, Chemistry, STAT101, GENS102 and GENS104

200 Level – A Minimum of 41 Credit Units

- Core courses (Departmental) : 27
- Core courses (General Studies) : 02
- Restricted Electives : 03
- Unrestricted Electives : 09
- Total : 41

Core Courses (Departmental)

1st Semester

ABU Distance Learning Student Handbook (B.Sc. Computer Science)

Code	Course Title	Credit Units	Prerequisite
MATH201	Mathematical Methods I	3	MATH105 or equiv.
MATH207	Linear Algebra I	3	MATH102 or equiv.
COSC211	Object-Oriented Programming I	3	COSC101 or equiv.
COSC203	Discrete Structures	3	MATH101 or equiv.
COSC205	Digital Logic Design	3	COSC101 or equiv.

2nd Semester

Code	Course Title	Credit Units	Prerequisite
COSC212	Object-Oriented Programming II	3	COSC101 or equiv.
COSC204	Computer Organization and Assembly Language	3	COSC101 or equiv.
STAT202	Continuous Probability Distributions and Distribution Techniques	3	STAT101 or equiv.
COSC208	Introduction to Artificial Intelligence	3	COSC101

Cognate Course (General Studies)

GENS202	Entrepreneurship and Innovation	2	
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Restricted Departmental Electives

MATH209	Numerical Analysis I	3	MATH104 or equiv.
STAT204	Biometry I	3	STAT101 or equiv.
STAT201	Discrete Probability Distributions	3	STAT101 or equiv.

Unrestricted Electives

COSC206	Human Computer Interaction	2	COSC101 or equiv.
MATH208	Linear Algebra II	3	MATH102 or equiv.

A minimum of nine (9) credit units chosen from any of the following subject areas: Biology, Chemistry, Mathematics, Statistics and Physics.

300 Level – A Minimum of 30 Credit Units

- Core courses (Departmental) : 20
- Core courses (General Studies) : 02
- Restricted Electives (Departmental) : 06
- Unrestricted Electives (minimum) : 02
- Total : 30

Core Courses

1st Semester

Code	Course Title	Credit Units	Prerequisite
COSC301	Data Structures and Algorithm	3	COSC211
COSC303	Computer Architecture	3	COSC205
COSC305	Systems Analysis and Design	2	COSC101
COSC309	Database Management systems	3	COSC203
COSC311	Organization of Programming Languages	3	COSC211

2nd Semester

COSC300	SIWES	6	
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Cognate Course (General Studies)

GENS302	Business Creation and Growth	2	
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Restricted Electives

COSC307	Web Application Engineering I	3	COSC101
MATH311	Mathematical Modeling	3	MATH201

Unrestricted Electives

A minimum of two (2) credit units chosen from any of the following:

Any relevant 300 level course in the Faculty of Science, Department of Electrical Engineering, Department of Economics, and Department of Business Administration.

400 LEVEL – A MINIMUM OF 43 CREDIT UNITS

- Core courses (Departmental) : 31
- Restricted Electives : 06
- Unrestricted Electives (minimum) : 06
- Total : 43

Core Courses

1st Semester

Code	Course Title	Credit Units	Prerequisite
COSC400	Project	3	COSC300
COSC401	Algorithms and Complexity Analysis	3	COSC301
COSC403	Software Engineering	3	COSC305
COSC405	Web Application Engineering II	2	COSC307
COSC407	Data Communications and Networks	3	COSC205
COSC411	Operating Systems	3	COSC204

2nd Semester

Code	Course Title	Credit Units	Prerequisite
COSC400	Project	3	COSC300
COSC402	Formal Methods and Software Development	3	MATH201
COSC404	Network Design and Management	3	COSC307
COSC406	Advanced Database Systems	2	COSC309
COSC408	Compiler Construction	3	COSC311

Restricted Electives

COSC409	Professional and Social Aspects of Computing	3	COSC206
COSC416	Simulation Methodology	3	STAT202

Unrestricted Electives

A minimum of 6 credit units, chosen from any of the following 400 level subject areas: Computer Science (COSC415,COSC413,COSC414,COSC412), Electrical Engineering, Physics, Electronics, Economics, Business Administration, Mathematics, Statistics or other relevant sciences depending upon the availability of facilities and resources.

Undergraduate Syllabus for B.Sc. (Hons.) Computer Science

100-Level First Semester Courses

COSC 101: Introduction to Computing

Prerequisite: O/Level Mathematics

Introduction to computer systems. Components of computer systems and their functions. Windows operating systems and its utilities. Hands-on exposure to Office application software (MS

Office or Open Office): Word processing, spreadsheets, presentation graphics and databases. Introduction to and use of Internet tools and technologies.

Suggested Lab work

Lecturers should develop laboratory exercises and assignments targeted at providing hands-on practical experience on all topics in the syllabus. The exercises should cover the typical tasks that students do with computers throughout their studies.

Textbooks

1. S.B. Junaidu, A.F. Donfack-kana and A. Salisu, Fundamentals of information technology ABU press (2013)
2. J.J. Parsons and D. Oja, *Practical Computer Literacy*, Thompson Learning, 2005
3. Curt Simmons, *How to Do Everything with Windows XP*, 2nd Edition McGraw-Hill/Osborne, 2003, ISBN 0-07-223080-0
4. Peter Norton's, *Introduction to Computers*, 5th Edition McGraw-Hill/Glencoe, 2003, ISBN 0-07-826421-9

MATH 101: Sets and Number System (2 Credit Units)

Prerequisite – O/Level Mathematics

Sets: Definition of a set, finite and infinite sets, equality of sets, subsets, union, intersection, universal set, complements, empty set, Venn diagram. Symmetric difference, power sets and De-Morgan theorems. Inclusion-Exclusion principle. Elements of relations and functions.

Some Properties of number systems: Natural numbers, integers, rationals, irrationals and reals. Order relations in the set of real numbers. Open and closed intervals on the number line.

Complex Numbers: Definition of a complex number, addition, multiplication and division. Geometric interpretation modulus and conjugation. Polar representation, De- Moivre's theorem, n^{th} roots of a complex number, n^{th} roots of unity.

Text books

1. Mathematics for Fresh Undergraduates Vol. I, D. Singh, A. Mohammed, A.M. Ibrahim and I.A. Fulatan ABU press (2013)
2. Set Theory and Related Topics, S. Lipschutz, (Schaum's Outline Series), McGraw-Hill (1964).

MATH 103: Trigonometry and Coordinate Geometry (2 Credit Units)

Prerequisite – O/Level Mathematics

Circular Measures: Trigonometric ratios of angles of any magnitude, inverse trigonometric functions.

Addition formulae: $\sin (A+B)$, $\cos (A+B)$, $\tan (A+B)$ and their proofs. Multiple and half angles, solutions of simple trigonometric equations. Factor formulae. Solution of triangles, heights and distances (including three-dimensional problems)

Plane Polar Coordinates: Relation between polar and Cartesian coordinates, plotting and sketching of simple curves whose polar equations are known.

Coordinate Geometry of lines and Circles: Pair of straight lines and system of circles. (Emphasis on concepts rather than formulae).

Text books

1. Mathematics for Fresh Undergraduates Vol. II, B.K. Jha, A.O. Ajibade, M.I. Yakubu and A.T. Imam, ABU press (2013)
2. Pure Mathematics Books I & II, J.K. Backhouse *et al*, Longman (1980)
3. Calculus and Analytical Geometry, G.B. Thomas and R.L.Finney, Addison- Wesley, (1979).
4. Theory and Problems of Trigonometry, Frank Ayres, (Schaum's Outline Series). (1954).

MATH 105: Differential and Integral Calculus (2 Credit Units)

Prerequisite – O/Level Mathematics.

Functions of a real variable: Odd, even, periodic functions and their symmetries, graphs, limits and continuity (Intuitive treatment only)

Differentiation: First principle, techniques of differentiation in general. Higher derivatives.

Integration: Integration as the inverse of differentiation, techniques of integration in general, definite integral (Evaluation only).

Text books

1. Mathematics for Fresh Undergraduates Vol. III, J. Singh, H.M. Jibril, A.J. Alkali, Y.M. Baraya and A. Umar, ABU press (2013)
2. Pure Mathematics Books I & II, J.K. Backhouse, *et al* Longman (1980).
3. Calculus and Analytic Geometry, G.B. Thomas and R. L. Finney, Addison –Wesley (1979).

PHYS 111: Mechanics

Prerequisite – O/Level Physics.

Units and dimensions; Dimension methods for checking correctness of equations and for deriving simple relations. Additions and subtraction of vectors, projectiles, Newton laws, conservation laws, Elastic collisions, work, energy and power. Circular motion, simple harmonic motion, motion of rigid bodies, statistics Gravitational potential, circular orbit, escape velocity.

PHYS 131: Heat and Properties of Heat

Prerequisite – O/Level Physics.

Structure of solids, liquids and gases. Kinetic theory of gases, Elasticity, surface tension, solid friction. Fluid in motion, Bernuillis's law, Aerofoil; thermodynamics; thermal expansion. Heat transfer. EM radiation, prevost theory of heat exchange. Thermal radiation detectors; Optical pyrometer.

100-Level Second Semester Courses

MATH 102: Algebra (2 Credit Units)

Prerequisite – O/Level Mathematics

Quadratic and other polynomial functions: Elementary properties of quadratic expressions, roots of quadratic equations, application to symmetric functions, polynomial functions of third and fourth degrees, remainder theorem, location of roots.

Permutation and combination: Notion of Factorials, ${}^n P_r$, ${}^n C_r$, and simple applications, mathematical induction principle and applications.

Binomial Theorem: Expansion of all rational index, interval of convergence, approximations and errors.

Text books

1. Mathematics for Fresh Undergraduates Vol. I, D. Singh, A. Mohammed, A.M. Ibrahim and I.A. Fulatan ABU press (2013)
2. Pure Mathematics Book I and II, J.K. Backhouse, *et al*, Longman (1980)

MATH 104: Conic Sections and Application of Calculus (2 Credit Units)

Prerequisite – O/Level Mathematics.

Conics: Properties of parabola, ellipse, hyperbola, rectangular hyperbola, their Cartesian and parametric equations, problems involving elimination of parameters, tangents and normals. Rate of Change: Velocity, acceleration and other rates.

Curve Sketching: Asymptotes, maxima and minima. Small increments, approximations and errors. Newton's approximation, simple application of integration to areas and volumes.

Differential equations: First order differential equations only.

Text books

1. Mathematics for Fresh Undergraduates Vol. II, B.K. Jha, A.O. Ajibade, M.I. Yakubu and A.T. Imam, ABU press (2013)
2. Mathematics for Fresh Undergraduates Vol. III, J. Singh, H.M. Jibril, A.J. Alkali, Y.M. Baraya and A. Umar, ABU press (2013)
3. Pure Mathematics Books I & II , J.K. Backhouse, *et al*, Longman (1980)
4. Calculus and Analytic Geometry , G.B. Thomas and R.L.Finney, Addison-Wesley (1979).

MATH 106: Vectors and Dynamics (2 Credit Units)

Prerequisite – O/Level Mathematics

Vectors: Geometric representation of vectors in 1-3 dimensions, components, direction cosines. Addition, scalar multiplication, linear independence and dependence of vectors. Scalar and vector products of vectors. Differentiation and integration of vectors w.r.t a scalar variable.

Dynamics: Kinematics of a particle. Components of velocity and acceleration of a particle moving in a plane. Force, momentum, laws of motion under gravity, projectiles, restricted vertical motion, elastic strings, simple pendulum, impulse. Impact of two smooth spheres, and of a restricted sphere and a smooth sphere.

Text books

1. Mathematics for Fresh Undergraduates Vol. III, J. Singh, H.M. Jibril, A.J. Alkali, Y.M. Baraya and A. Umar, ABU press (2013)
2. Textbook of Dynamics, F. Charlton, Ellis Horwood, 1977.
3. Vector Analysis, Murray R. Spiegel, Schaum's Outline Series (1974)

STAT 102: INTRODUCTORY STATISTICS II (2 CREDIT UNITS)

Prerequisite – O/Level Mathematics.

Random experiment, Sample space, event space, definitions of probability, conditional probability, addition and multiplication theorems, definition of random variable (discrete and continuous), mathematical expectations of a random variable, addition and multiplication theorems of expectation, definition of moment, relationship between raw moments and central moments, the bi-variate frequency distribution, fitting of curves by method of least squares, concepts of correlation and regression and their coefficients, the rank correlation coefficient.

Text Books

1. Statistics for Fresh Undergraduates, Yahaya A. and Nnamani C.N., ABU press (2013), Zaria.
2. Mathematical Statistics, Ray, M., Sharma, H.S. and Choudhary, S., Ram Prakash and Sons Agra - 3, India.
3. Fundamentals of Mathematical Statistics, Gupta S.C. and Kapoor, V.K., Sultan Chand and Sons, New Delhi, India.

PHYS 122: Electricity, Magnetism and Modern Physics

Prerequisite – O/Level Physics.

Electric force; Field and potential, Electric flux and Gauss's theorem. Capacitances, current electricity, magnetic force, magnetic effects of currents, magnetic materials, electromagnetic induction, Alternating current, Planck's constant quanta of light energy, photo electric effect, Radioactivity, Nuclear composition, binding energy, Nuclear fission and fusion. Thermionic emission, rectification by diodes, transistor.

PHYS 124: Geometric Wave and Optics

Prerequisite – O/Level Physics.

Reflection, refractive index, Snell's law measurement of refractive index, total internal reflection, air cell. Refraction through prism, minimum deviation. Thin lens formula, Lenses in contact, Newton formula. Spherical and chromatic aberrations, power of lenses, Dispersive Powers. Classification of spectra, Optical instruments, interference phenomenon, Newton rings, Polarization, Malus's law, polaroids

200-Level First Semester Courses

COSC 211: Object-Oriented Programming I

Prerequisite: COSC101 or Equivalence

Overview of computers and computing; Introduction to object-orientation as a technique for modeling computation. Introduction of a typical object-oriented language, such as Java; Basic data types and operators; Basic object-oriented concepts; Introduction to Strings; Simple I/O; Logical expressions, control structures, algorithms and problem solving; Arrays; Simple recursive algorithms; inheritance; polymorphism.

Suggested Lab work

Programming assignments involving hands-on practice in the design and implementation of simple algorithms such as finding the average, standard deviation, searching and sorting. Practice in developing and tracing simple recursive algorithms. Developing programs involving inheritance and polymorphism.

Textbooks

1. Nell Dale and Chip Weems, *Programming and Problem Solving with Java*, Second Edition, Jones and Barlett Publishers, 2008. (Lab Manual Available)
2. J. Lewis and W. Loftus, *Java Software Solutions*, 5th Edition, Addison Wesley, 2006. (Lab Manual Available)
3. G. Bronson, *Program Development Using Java: A Class-Centered Approach*, Enhanced Edition, Thompson Learning, 2006.
4. D.J. Barnes and M.K. Kolling, *Objects First with Java: A practical introduction using Blue J*, Pearson Education, 2006

COSC 203: Discrete Structures

Prerequisite: MATH101 or Equivalence

Functions and relations. Basics of counting: inclusion-exclusion principle, pigeon-hole principle, permutations, recurrence relations, generating functions. Graphs and trees: definitions, properties and applications. Discrete probability: computing probabilities, dependent and independent events, applications.

Textbooks

1. K. Rosen, *Discrete Mathematics and Its Applications*, McGraw-Hill Higher Education, 6th Edition, 2007.

2. F. Giannasi and R. Low, *Maths for Computing and Information Technology*, Longman, 1996.
3. J. Truss, *Discrete Mathematics for Computer Scientists*, Addison-Wesley, 1999.

COSC 205: Digital Logic Design

Prerequisite: COSC101 or Equivalence.

Introduction to information representation and number systems. Boolean algebra and switching theory. Manipulation and minimization of completely and incompletely specified Boolean functions. Physical properties of gates: fan-in, fan-out, propagation delay, timing diagrams and tri-state drivers. Combinational circuits design using multiplexers, decoders, comparators and adders. Sequential circuit analysis and design, basic flip-flops, clocking and timing diagrams. Registers, counters, RAMs, ROMs, PLAs, PLDs, and FPGAs.

Textbooks

1. M. M. Mano and C. R. Kime, *Logic and Computer Design Fundamentals & XILINX 6.3 Student Edition*, Prentice Hall, 3rd Edition, 2004.
2. Englander, *The Architecture of Computer Hardware and Systems Software*, 3rd Edition, Wiley, 2003.

MATH 201: – Mathematical Methods - I (3 Credit Units)

Prerequisite – MATH105 or equivalence

Applications of Calculus: Revision of different techniques of differentiation, successive differentiation, Leibniz's theorem, Taylor and Maclaurin series. Tangents and normals to plane curves, curvature, Definite integrals. Methods of integration, reduction formulae, lengths of arc of a plane curve. Area enclosed by a plane curve.

Differential Equations: Concept of differential equations. First order ordinary differential equations of the forms; variable separable, homogeneous, exact and linear. Second order ordinary linear differential equations with constant coefficients, auxiliary equation, and cases of auxiliary equations having distinct, equal, and complex roots, complementary functions and particular integrals in connection with non-homogeneous equations. Uses of the operator $D = d/dx$ and the method of undetermined coefficients for calculating particular integrals. Differential equations of Euler's type of second order. Solutions of systems of two linear differential equations. Second order Ordinary Linear Differential Equations with variable coefficients; reduction of order, variation of parameters.

Partial Differentiation: Real valued functions of two and three variables. Partial derivatives, chain rule, Jacobian. Extrema, Lagrange's multipliers, increments, differentials and linear approximations.

Text books

1. Mathematical Methods, J. Heading, University Press, (1963).
2. Advanced Engineering Mathematics, E. Kreyszig, Wiley, (1987).

MATH 207: Linear Algebra I (3 Credit Units)

Prerequisite – MATH102 or equivalence

Matrices: Definition, types of matrices, algebra of matrices, matrix as a sum of symmetric and skew symmetric matrices. Elementary operations of matrices and echelon form, equivalence matrices. Inverse of a matrix.

Systems of linear equations and matrices: Systems of m linear equations in n unknowns and their solutions. Gaussian elimination by pivot method and matrix representation. Solution of the system using Gaussian elimination and Gauss-Jordan reduction.

Determinants: Definition, evaluation of determinants. Cofactor expansion, inverse of a non-singular matrix. Solution of systems of linear equations using Cramer's rule.

Text books

1. Linear Algebra, S. Lipschutz (Schaum's Outline Series) McGraw-Hill (1987)
2. Linear Algebra and Matrix Theory, E.D. Nering, John Wiley, (1967).

MATH 209: Numerical Analysis I (3 Credit Units)

Prerequisite – MATH105

Accuracy in numerical calculations: errors and their sources, error accumulation in different operations.

Finite differences: difference operators and difference table.

Evaluation of functions: using series approximation, solution of polynomial, algebraic and transcendental equations, curve fitting.

Interpolation: Newton's difference formulae, central difference formulae, Lagrange's formula. Numerical differentiation. Numerical Integration

Text books

1. Introduction to Numerical Analysis, Carl-Eric Froberg, Addison-Wesley publication, (1981).
2. Theory and Problems of Numerical Analysis, Francis Scheid, Schaum's Series (1968).
3. Numerical Analysis: An Introduction, S.A. Bhatti, Mathematics Departmental Library, (Lecture Notes, 1980's).
4. Calculus of Finite differences and Numerical Analysis, P.P. Gupta & G.S. Malik.

200 - Level Second Semester Courses

COSC 212: Object-Oriented Programming II

Prerequisite: COSC102 or Equivalence

Advanced object-oriented programming - polymorphism, abstract classes and interfaces: Program organization using packages/namespaces; Use of API – use of

iterators/enumerators, List, Stack, Queue from API; Recursion; Event-driven programming.

Suggested Lab work

Programming assignments leading to extensive practice in problem solving and program development with emphasis on object-orientation. Solving basic problems using static and dynamic data structures. Solving various searching and sorting algorithms using iterative and recursive approaches. GUI programming.

Textbooks

1. Nell Dale and Chip Weems, *Programming and Problem Solving with Java*, Second Edition, Jones and Barrlett Publishers, 2008. (Lab Manual Available)
2. J. Lewis and W. Loftus, *Java Software Solutions*, 5th Edition, Addison Wesley, 2006. (Lab Manual Available)
3. G. Bronson, *Program Development Using Java: A Class-Centered Approach*, Enhanced Edition, Thompson Learning, 2006.
4. D.J. Barnes and M.K. Kolling, *Objects First with Java: A practical introduction using Blue J*, Pearson Education, 2006

COSC 204: Organization and Assembly Language

Prerequisite: COSC101 or Equivalence

Introduction to computer organization. Signed and unsigned number representation, character representation, ASCII codes. Assembly language programming, instruction format and types, memory and I/O instructions, dataflow, arithmetic, and flow control instructions, addressing modes, stack operations, and interrupts. Datapath and control unit design. RTL,

microprogramming, and hardwired control. Practice of assembly language programming.

Suggested Lab work

Programming assignments to practice MS-DOS batch programming, Assembly Process, Debugging, Procedures, Keyboard input, Video Output, File and Disk I/O and Data Structure.

Textbooks

1. Vincent P. Heuring, Harry F. Jordan, *Computer System Design & Architecture*, Prentice Hall, 2004.
2. Dandamudiet al, *Introduction to Assembly Language Programming: From 8086 to Pentium*, Springer, New York, 1998.

COSC 206: Human Computer Interaction

Prerequisite: COSC101 or Equivalence

Foundation of HCI, principles of GUI, GUI toolkits. Human-centered software evaluation and development; GUI design and programming.

Textbooks:

1. Dix, Finlay, Aboud& Beale, *Human-Computer Interaction*. Pearson Prentice-Hall, Third ed, 2004.
2. Preece, J., Rogers, Y. & Sharp, H., *Interaction Design: Beyond Human-Computer Interaction*. New York, NY: John Wiley & Sons, 2002.

COSC 208: Introduction to Artificial Intelligence

Prerequisite: COSC101 or Equivalence

Introduction to the types of problems and techniques in Artificial Intelligence. Problem-Solving methods. Major structures used in Artificial Intelligence programs. Study of knowledge representation techniques such as predicate logic, non-monotonic logic, and probabilistic reasoning. Examples of expert systems. Introduction to natural language understanding and various syntactic and semantic structures. Expert systems. Introduction to computer image recognition.

Textbooks

1. Stuart Russell and Peter Norvig, *AI: A Modern Approach*, 2nd Edition, Prentice Hall, 2003.
2. G.F. Luga, *Artificial Intelligence: structures and strategies for complex problem solving*, 5th Edition, Addison Wesley, 2005.

MATH 208: Linear Algebra II (3 Credit Units)

Prerequisite – MATH 102

Vector Spaces: Review of basic definitions and examples of vector spaces. Subspaces, linear dependence and independence. Bases, dimension of a vector space. Homomorphism and quotient space. Direct sum, Dual spaces.

Linear Mappings and Matrices: General linear transformation of n-dimensional into m-dimensional space, matrix representation of a linear map, similar matrices and change of basis. Eigenvalues and eigenvectors. Characteristic polynomial and characteristic equation. Caley-Hamilton theorem. Orthogonal diagonalization.

Canonical Forms: Primary decomposition theorem, Triangular Jordan and Rational forms for linear operator (square matrices). Quadratic and bilinear forms.

Text books

1. Linear Algebra, S. lipschutz (Schaum's Outline Series) Mc Graw-Hill (1987)
2. Linear Algebra and Matrix Theory, E.D. Nerring, John Wiley, (1967).

STAT 202: Continuous Probability Distributions and Distribution Techniques (3 Credit Units)

Prerequisite – STAT 102

Univariate continuous probability distributions such as Normal, Uniform, exponential, type I and type II beta and gamma distributions, various properties of these distributions, fitting of normal distribution. Concept of Bi-variate probability distribution, joint, marginal, conditional probability distribution, covariance and correlation of bi-variate r.v. sampling distribution and standard errors of statistics, distribution of functions of random variables using the techniques such as cumulative distribution function technique, moment generating function technique and transformation technique.

Text Books

1. Introduction to the theory of Statistics, Mood, A.M., Graybill, F.A. and Boes, D.C. Mc-Graw-Hill, New York, USA.
2. Fundamentals of Mathematical Statistics, Gupta S.C. and Kapoor, V.K., Sultan Chand and Sons, New Delhi, India.

300-Level First Semester Courses

COSC301: Data Structures and Algorithm

Prerequisite: COSC212 or Competence in Programming

Review of object-oriented concepts; Basic algorithm analysis - the big-O notation; Fundamental data structures – implementation strategies for stacks, queues and lists; Recursion; Implementation strategies for tree and graph algorithms; Hash tables; Application of data structures.

Suggested Lab work

Programming assignments leading to extensive practice in problem solving and program development involving the use of the various data structures implemented in the course.

Textbooks

1. Adam Drozdek, *Data Structures and Algorithms in Java*, 2nd Edition, Thomson Course Technology, 2005.
2. J Lewis & J Chase, *Java Software Structures*, 2nd Edition, Addison-Wesley, 2005.
3. D.S. Malik, *Java Programming: Program Design Including Data Structures*, Thomson Course Technology, 2005.

COSC 303: Computer Architecture

Prerequisite: COSC205

Memory hierarchy and cache memory. Integer and floating point arithmetic. Instruction and arithmetic pipelining, superscalar architecture. Reduced instruction set computers. Parallel architectures and interconnection networks.

Textbooks

1. David Patterson & John Hennessy, *Computer Architecture: A Quantitative Approach*, 4th Edition, Kaufmann, 2006, ISBN 0-12-370490-1.
2. Linda Null and Julia Lobur, *The Essentials of Computer Organization and Architecture*, 2nd Edition, Jones & Bartlett, 2006. ISBN 0-7637-3769-0

COSC 305: Systems Analysis and Design

Prerequisite: COSC211 or Competence in Programming

The software development life cycle: conception, business case, business context, system requirements, requirements analysis, systems analysis, design, implementation, testing, deployment, maintenance. The Unified Modeling Language (UML): models, use case diagrams, activity diagrams and state chart diagrams, sequence and collaboration diagrams, class diagrams, component diagrams. Managing the process: customers, organization types, project management, teams and team dynamics, computer assisted software engineering (CASE) tools, documentation.

Suggested Lab Work

Analysis and design assignments leading to extensive practice in the use of UML and CASE tools.

Textbooks

1. Dennis, Wixom, Roth, *Systems Analysis and Design*, 3rd Edition, John Wiley, 2006.
2. Farmer, McRobb & Bennett: *Object Oriented Systems Analysis and Design Using UML*, 3rd Edition, Mc-Graw Hill 2006.

3. Roger S. Pressman, *Software Engineering: A Practitioner's Approach*, 6th Edition Mc-Graw Hill, 2005.
4. Ken Lunn, *Software Development with UML*, Palgrave Macmillan Limited, 2003.

COSC 307: Web Applications Engineering I

Prerequisite: COSC211 or Competence in Programming

The Internet (brief history, Internet protocols and Internet services); The Web architecture (Client-server architecture, multi-tier architecture, URL); XHTML; DHTML (Cascaded Style Sheet, JavaScript, DOM); Web interface and interactivity design principles and practice. Incorporating multimedia content into Web pages (using Photoshop, Flash or similar tools).

Textbooks

1. [Dietel, H. M.](#), Dietel, P. J., Goldberg, A. B. *Internet & World Wide Web How to Program*, 4th Edition, Prentice-Hall, 2008.
2. R. W. Sebesta, *Programming the World Wide Web*, 3rd Edition, Addison Wesley, 2006
3. Flanagan: *JavaScript: The Definitive Guide*, 5th Edition, O'Reilly, 2006

COSC 309: Database Management Systems

Prerequisite: COSC211

Basic database concepts. Conceptual modeling. Relational data model. Relational theory and languages. Database Design. Database security and integrity. Introduction to query processing and optimization. Introduction to concurrency and recovery.

Suggested Lab work

Programming assignments to learn database design using CASE tools. Introduction to back-end/Server-based Relational DataBase Management System (RDBMS). Learning Standard SQL (interactive/embedded). Introduction and programming assignments on Front-End tools. Programming team projects to design and develop real life database systems using the learned tools.

Textbooks

1. Ramez Elmasri and Shamkant B. Navathe, Fundamentals of Database Systems, 5th Edition, Addison-Wesley, 2007.
2. Carolyn Begg and Thomas Connolly, Database Systems: A Practical Approach to Design, Implementation and Management, 4th Edition, Prentice Hall, 2004.

COSC 311: Organization of Programming Languages

Prerequisite: COSC211 or Competence in Programming

Concepts of Programming languages: Syntax and semantics. Data types. Control structures. Sub-Programs. Exception handling. Run-time Storage Management. Programming Paradigms: Imperative, functional, logic, object-oriented and concurrent.

Textbooks

1. Robert W. Sebesta, *Concepts of Programming Languages*, 7th Edition, Addison-Wesley, 2006.
2. Kenneth Loudon, *Programming Languages: Principles and Practice*, Second Edition, Course Technology, 2003.
3. Allen Tucker and Robert Noonan, *Programming Languages: Principles and Paradigms*, Mc-Graw Hill, 2002.

MATH 311: Mathematical Modeling (3 Credit Units)

Prerequisite – MATH201

Methodology of Model building: Identification, formulation and solution of problems. Cause-effect diagrams. Modeling using graphs and proportionality: modeling by interpolation using polynomials. Modeling using Least squares and Linear programming. Modeling deterministic behavior and probabilistic processes. Modeling using derivatives: applications using differential equations.

Text books

1. A first course in Mathematical Modeling, F.R Giordano & M.D. Weir, Woodsworth, Inc. (1985).
2. Mathematical Modeling for Industrial Processes, Lassi Hyvaarinen, Springer-verlag (1970).
3. Mathematical Methods of Operations Research, T.L. Saaty, Dover Publications, Inc. (1988).

400-Level First Semester Courses

COSC 400: Project

Prerequisite: COSC 300

The project aims to provide experience with planning, executing and formally reporting on a substantial computing task within a set time. Students will develop their understanding of relevant areas of computing and their capabilities in the practical engineering and writing activities involved, and demonstrate their competence as candidate computing professionals.

An essay on a topic selected from a list covering generalized areas of economic disciplines dealing with significant current economic problems. This is to be presented in at least five (5) chapters of not less than sixty (60) pages of A4 paper and

double spaced type with 14 font size characters following the format below:

CHAPTER ONE: Introduction

CHAPTER TWO: Literature review and Theoretical frameworks.

CHAPTER THREE: Methodology – method of data presentation, analysis and interpretation.

CHAPTER FOUR: Data presentation, analysis and interpretation.

CHAPTER FIVE: Summary, conclusion and recommendations. Students are required to write and submit to their supervisor three topics which must be formed from the given sub-themes of that session and are expected to research and gather enough materials on the topic of interest they want to write on before forwarding it to their supervisor for approval.

Textbooks

1. CW Dawson, Projects in Computing and Information Systems, Addison-Wesley, 2005

COSC 401: Algorithm and Complexity Analysis

Prerequisite: COSC301

Introduction to algorithms and review of data structures; fundamentals of algorithm analysis; Analyzing recursive and non-recursive algorithms; Algorithm design techniques: brute-force, divide-and-conquer, greedy algorithms, dynamic programming, search techniques; NP-complete problems and approximation algorithms.

Textbooks:

1. Anany Levitin, *Introduction to the Design and Analysis of Algorithms*, Addison Wesley, 2003. ISBN 0-201-74395-7

2. M. Al-Suwaiyel, *Algorithms: Design Techniques & Analysis*, World Scientific Publishing Company, 1999.
3. Useful Resources:
<http://www.cs.ucsd.edu/classes/wi05/cse101/>

COSC 403: Software Engineering

Prerequisite: COSC305

Fundamental design concepts, design notations, and architectural design methods for large-scale software systems. Several design: examples of their use, comparisons among them. Concepts of information hiding, data abstraction, concurrency, and object-oriented software construction.

Textbooks

1. Roger S. Pressman, *Software Engineering: A Practitioner's Approach*, 6th Edition Mc-Graw Hill, 2005.
2. Ian Sommerville: *Software Engineering*, 8th Edition, Addison Wesley, 2006.
3. Dennis, Wixom, Roth, *Systems Analysis and Design*, 3rd Edition, John Wiley, 2006.

COSC 405: Web Application Engineering II

Prerequisite: COSC307

Review of client-side application development. Server-side application development. Adding content to Web applications dynamically. Input validation and use of regular expressions. Defining and managing sessions. Cookies. Working with databases. Web application security.

Assignments and projects should be given to enable students design and implement non-trivial data-driven Web applications.

Textbooks

1. [Dietel, H. M.](#), Dietel, P. J., Goldberg, A. B. *Internet & World Wide Web How to Program*, 4th Edition, Prentice-Hall, 2007.
2. Jeffrey C. Jackson, *Web Technologies: A Computer Science Perspective*, Prentice hall, 2007.
3. Shepherd, G, *Microsoft ASP.NET 2.0 Step by Step*, Microsoft Corporation, 2006.

COSC 407: Data Communications and Network

Prerequisite: COSC205

Introduction to computer networks and layered architectures: connectivity, topology, circuit and packet switching, TCP/IP and ISO models; Application layer: C/S model, DNS, SMTP, FTP, WWW, socket programming and network security; Transport layer: TCP and UDP, congestion control; Network layer: internetworking, addressing and routing algorithms and protocols; Data link layer: framing, flow and error control protocols, PPP, MAC and LANs; Physical layer: principles of data communications, circuit switching, coding, multiplexing and transmission media. Network security: fundamentals of cryptography, secret and public key algorithms, authentication protocols.

Suggested Lab work

The lab involves several projects to gain hands-on experience with network devices, programming and tools. More specifically, it provides students with the opportunity to: Setup various servers such as DNS, DHCP, Web Servers on Windows/Linux platforms; Develop simple client/server network applications using sockets; Create simple web pages; Simulate network; Analyze various protocols by capturing packets; Measure network utilization under varied situations; Use various network-related commands; Configure switches and routers.

Textbooks

1. Behrouz A. Forouzan, *Data Communications and Networking*, McGraw Hill, 2004.
2. Andrew Tanenbaum, *Computer Networks*, 4th Edition, Prentice Hall, 2003.

COSC 409: Professional and Social Aspects of Computing

Prerequisite: COSC206

Professional aspects; professions and the professional; professional institutions; professional ethics and responsibilities; the computer professional as expert witness. Standards, best practice. Legal background, sources of law; civil and criminal law. Intellectual property rights, software copyright, patents, designs, trade marks and passing off; copyright and webpages, Internet domain names, protection of computer imagers and icons, jurisdiction; confidentiality. Data protection law; freedom of movement of personal data; privacy in telecommunications. Computer crime; fraud; computer misuse; viruses; threatening emails; pornography; grooming in

chat rooms. Social aspects of the workplace/society at large.
The impact of IT on society.

Textbooks

1. David Bainbridge, *Introduction to Information Technology Law*, 6th Edition, Longman, 2007.
2. George Reynolds, *Ethics in Information Technology*, Course Technology, 2006.

COSC 411: Operating Systems

Prerequisite: COSC301

Fundamentals of operating systems design and implementation. History and evolution of operating systems; Types of operating systems; Operating system structures; Process management: processes, threads, CPU scheduling, process synchronization; Memory management and virtual memory; File systems; I/O systems; Security and protection; Case-study.

Suggested Lab work

Implementation of user-defined utilities/commands for UNIX by writing systems programs using different types of system calls including those for file/directory management, process management, signal management, and client/server management. Also involve practice on various aspects of shell environment and shell programming.

Textbooks

1. Brian Stuart, *Operating Systems: Principles and Application*, Course Technology, 2008.
2. [AviSilberschatz](#), [Peter Baer Galvin](#), [Greg Gagne](#), *Operating System Concepts*, 7th Edition, John Wiley & Sons, Inc., 2004.

3. A S Tanenbaum, *Modern Operating Systems*, Prentice Hall, 2001.
4. H M Dietel, P J Dietel and D R Choffnes, *Operating Systems*, 3rd Edition, Prentice Hall, 2004.

COSC 413: Computational Science and Numerical Methods
Prerequisite: MATH209

History and importance of computational science, overview of application areas, review of required skills. High-performance computing: processor architectures, memory systems for high performance, input/output devices, pipelining, parallel languages and architectures. Scientific visualization: presentation of results, data formats, visualization tools and packages. Application of high-performance computing to scientific and engineering problems.

Textbooks

1. Barry Wilkinson and Michael Allen, *Parallel Programming: Techniques and Applications Using Networked Workstations and Parallel Computers*, Second Edition, Prentice-Hall, 2005.
2. Michael J. Quinn, *Parallel Programming in C with MPI and OpenMP, First Edition*, McGraw-Hill, 2003.

400-Level Second Semester Courses

COSC 402: Formal Methods in Software Development

Prerequisite: COSC212

Mathematical foundations for formal methods. Formal languages and techniques for specification and design, including specifying syntax using grammars and finite state machines. Analysis and verification of specifications and

designs. Use of assertions and proofs. Automated program and design transformation.

Textbooks

1. Jonathanh Bowen, *Formal Specification and Documentation using Z: A Case Study Approach*, International Thomson Computer Press (ITCP), 1996.
2. Huth, M. and Ryan, M. *Logic in Computer Science: Modelling and Reasoning about Systems*. Cambridge University Press. 1999.
3. Cliff B. Jones, *Systematic Software Development Using VDM*, 2nd Edition, Prentice Hall, 1990.
4. Useful Resources:
 - a. <http://www.cs.chalmers.se/Cs/Grundutb/Kurser/form/>
 - b. <http://www.freetechbooks.com/forum-28.html>

COSC 404: Network Design and Management

Prerequisite: COSC205

Overview of network design and management; Design methodologies; Network management strategies; Network configuration management; Network management protocols: SNMP, and RMON; Network management tools and systems; Network management applications; Desktop and web-based network management; Network troubleshooting.

Suggested Lab Work

A closed lab with hands-on exercises using state-of-the-art tools in the design, analysis and troubleshooting computer networks.

Textbooks

1. James D. McCabe, *Network Analysis, Architecture and Design*, 2nd Edition, Morgan Kaufmann, 2003.

2. Rachel Morgan and Henry McGilton, *Introducing Unix System V*, McGraw-Hill Book Company, 1987

COSC 406: Advanced Database Systems

Prerequisite: COSC309

Advanced data models. Conceptual Database design. Concurrency control techniques. Recovery techniques. Query processing and optimization. Integrity and security. Client-server architecture. Distributed database systems. Current trends in database systems.

Textbooks

1. Ramez Elmasri and Shamkant B. Navathe, *Fundamentals of Database Systems*, 5th Edition, Addison-Wesley, 2007.
2. Carolyn Begg and Thomas Connolly, *Database Systems: A Practical Approach to Design, Implementation and Management*, 4th Edition, Prentice Hall, 2004.

COSC 408: Compiler Construction

Prerequisite: COSC212

Design and implementation of compilers, principles of languages translation. Each student implements a complete compiler for a small but substantial language. The stages of a compiler. Boot-strapping a compiler. Lexical analysis, regular expressions, finite state machines. Syntactic analysis, context free grammars, parsers. Semantic analysis, type checking, symbol tables. Syntax-directed translation. Data flow analysis, peephole optimization. Code generation.

Textbooks

1. Andrew W. Appel, *Modern Compiler Implementation in Java*, 2nd Edition, Cambridge University Press, 2002.

2. ACM//IEEE. Computing Curricula 2001. Electronic version available at <http://www.acm.org/sigcse/cc2001/>.
3. NUC BMAS. Benchmarks and Minimum Academic Standard (Science), Published by the National Universities Commission, April 2007.
4. Career Space is a European Consortium of over 20 universities all over Europe. They established a working group on ICT curriculum development. Information about this can be reached at <http://career-space.com/cdguide/>
5. M.R.K. Krishna Rao, S. Junaidu, T. Maghrabi, M. Shafique, M. Ahmad and K. Faisal (2005), Principles of curriculum design and revision: a case study in implementing computing curricula CC2001, Proc. of the ACM Special Interest Group on Computer Science Education Annual Conference on Innovation and Technology in Computer Science Education (ITiCSE'2005).

COSC 416: Simulation Methodology

Prerequisite: STAT202

Introduction and comparison with other techniques, discrete simulation model, generation of pseudo random numbers, statistical testing. Implementation of queuing theory, simulation languages and packages. System Models, System Studies, Techniques of System simulation, continuous system simulation, introduction to GPSS.

Text Books

1. System Simulation, Gordon G., Prentice Hall
2. Introduction to Simulation, Payer T.A., McGraw Hall

STAT 412: Operations Research (3 Credit Units).

Prerequisite – MATH311

Classical methods of optimization, Maxima and minima, Lagranges' multipliers. Linear programming: Convex sets and functions, simplex and revised simplex methods, duality theory, applications. Linear programming applications to diet problems, transportation problems, manufacturing problems, Network Analysis, etc.

Text Books

1. Operations Research, Sharma, J.K., Macmillan India.
2. Operations Research, Swaroop, Gupta, P.K. and Mohan, M., Sultan Chand and Sons, New Delhi, India.

Service Courses

COSC 264: Fundamentals of Data Processing (2 Credit Units).

Prerequisite – O/L MATHS

Data processing cycle & Operations, Developments in Data processing, storage media, punched-card recording & processing, electronic data processing, communicating with the computer, computer codes & arithmetic, flowcharts & programming techniques, data structure.

Text Book

1. Data processing by Martim M. Lipshutz and Seymour Lipshutz, McGraw-Hill book company, Singapore, 1982.

COSC 265: Introducing Computer (2 Credit Units).

Prerequisite – O/L MATHS

Computer (definition, types generation, history)

Computer (structure, components, number system)

Computer Software (type, application, systems, packages, languages, machine, symbolic high level languages, most popular languages)

Networks Topology; star, ring mesh, bus

Popular packages (database, spreadsheet, word processing, Dos windows with practice on information retrieval using data based management system commands)

Computer applications in Library and Nursing

Text Book

1. A Guide to FORTRAN Programming 2nd Edition by Daniel D McCracken, John Wiley & Sons, Inc., New York, 1965

COSC 344: Computer Knowledge and FORTRAN Programming (3 Credit Units).

Prerequisite – O/L MATHS

Binary, Octal and Hexadecimal number systems, conversion complement of numbers. Representation of negative numbers, Digital computers, main functional elements of a computer (memory, central and arithmetic units, input-output devices; backing storages). Information in the core store.

Binary coded decimal, fix and floating point representations, programming languages (short summary of the machine code. Assembly, machine and problem oriented languages). The flow chart language, Loops, interaction. The basic FORTRAN

Numerical data, arithmetic, arrays, input-output, control statements, sementation of programmes, statement function, function and subroutine segments. Common, equivalence statements.

Text Book

1. A Guide to FORTRAN Programming 2nd Edition by Daniel D McCracken, John Wiley & Sons, Inc., New York, 1965

Graduation Requirements

For a student to graduate, he/she must pass all his/her core courses, earn at least 120 credit units (i.e. $TECU \geq 120$) and have a Cumulative Grade Point Average of at least 1.50 (i.e. $CGPA \geq 1.50$)

3.8 EXAMINATION RESULTS

Semester Grades

- (a) Semester grades are calculated as Grade Point Averages (GPA) on the basis of A, B, C, D and F, which are equivalent to 5, 4, 3, 2, and 0 grade points (GP), respectively for classified degrees.
- (b) The minimum pass mark is 45% or GP of 1.00 for classified degrees, hence, a minimum CGPA of 1.00 is required for graduation.
- (c) In order to obtain an overall pass in the examinations in any year of study, a student is required to maintain a CGPA of at least 1.00 to be in good academic standing, a student whose cumulative GPA falls below 1.00 at the end of any year of study shall be placed on “probation”.

How Grade Points are computed in your courses

Grades	Grade Points
70-100 (A)	5
60-70 (B)	4
50-59 (C)	3
45-49 (D)	2
0-44 (F)	0

The class of degree as described above is being determined by the efforts a student puts into his/her studies from 100 level or 200 level as the case may be to the final level/year of his/her studies.

3.9 CLASSIFICATION OF DEGREE

CGPA	CLASS OF DEGREE
4.50-5.00	1 st First Class
3.50-4.49	2 nd Class Upper Division
2.40-3.49	2 nd Class Lower Division
1.50-2.39	Third Class
1.00-1.49	Pass
Below 1.00	Fail

APPENDIX 1:

EXAMINATION POLICY AND GUIDELINES

1.0 INTRODUCTION

1.1 PREAMBLE

The need to commence Distance Learning in ABU has been a product of internal demands initiated by the School of Postgraduate Studies as well external agitations by some alumni as exemplified at the 50th anniversary by Mallam Adamu Fika in his lead paper to mark ABU's golden jubilee where he said *"ABU should consider developing an effective Distance Learning System that deploys modern communication facilities and online tutorial to impact functional knowledge to the millions who may not be able to enroll on its regular campus-based programmes"*.

1.2 DLC LAW AND STATUTE

The Senate of the Ahmadu Bello University approved the 'ABU Open and Distance Learning Policy' and establishment of the Distance Learning Centre at its 458th meeting held on 28th March 2013). The ratification of this earlier approval by the Governing Council of Ahmadu Bello University was effected through Statute 28 (2016).

1.3 JUSTIFICATION FOR DLC EXAMINATION POLICY

1. The uniqueness of distance education has made the existing University Examination regulation incomprehensive.
2. Compliance with NUC regulations requiring all key activities to be ratified by the corresponding university authority.

2.0 EXAMINATION VENUES

Whereas continuous assessment examinations (individual and group assignments; Forum discussions) shall be undertaken using the relevant e-Learning tool, all Semester Examinations shall be supervised examinations as stipulated by the guidelines of the National Universities Commission.

Examinations shall be held in all 3 semesters (January, May and September Semesters) in secured facilities within or outside Nigeria (preferably, Nigerian Embassies) as dictated by the distribution of Distance Learning students. In all such Centres a minimum of one supervisor for every 50 students shall be made while a Supervisor (Senior Academic from the Ahmadu Bello University – preferably a relevant Head of Department) shall oversee the examinations in each Centre. CCTV monitoring and recording of the examinations shall be undertaken in all examinations within Nigeria.

2.1 NIGERIAN STUDENTS

Examinations shall be held only in JAMB accredited CBT Centres (preferably Universities) where the minimum security and technological requirements have been earlier certified. One or more such facilities in each of the six geopolitical zones of the Nigeria shall be used as venues for semester examinations.

2.2 INTERNATIONAL STUDENTS

Students not resident in Nigeria at inception of their students or who revert to an international student status shall partake in their semester examination in the nearest Nigerian Embassy (with a minimum of 10 students) under the supervision of the Education Attaché (less than 20 students or a Senior Academic

Staff (preferably a HOD) where the number of students exceed 20.

3.0 PREPARATION FOR EXAMINATIONS

1. Printing of master list of registered students shall be done by Examination Unit and distributed to various Heads of programmes six (6) weeks before the commencement of the Semester examinations.
2. Tentative time table for examination shall be ready six weeks to examination while a definite time table shall be ready four weeks to examination.
3. Registration of students for semester examination on the portal, where students select their examination venue, schedule (weekdays or weekend) and courses to be written, shall be completed two weeks before commencement of the semester examination. Once selected, the venue or schedule cannot be changed
4. All request for deferment of examinations (en-bloc) must be concluded at least 2 weeks to the commencement of the corresponding semester examination.
5. Generation and mailing of Vigicode (examination card) or other IT based identification shall be done two weeks to the semester examination.
6. Distribution/mailing of Examination Regulations to all staff/students by the Heads of programmes for compliance shall take place three weeks before commencement of semester examination.
7. Funds approved to facilitate the conduct of examinations shall always be released by mid semester.
8. Examination venues in the six (6) Geopolitical zones shall be in established JAMB Certified institutions.

9. Examination for international students/diaspora shall be supervised in the corresponding Nigerian Embassy.

4.0 ADMINISTERING EXAMINATIONS

1. Whereas Continuous Assessment (CA) examinations shall be essay type (individual & group assignments as well as forum/topical discussions); semester examinations shall be blended and to be held in multiple venues as deemed adequate.
2. All examination questions shall be dispatched to external examination venues on the day of the examination in an encrypted form.
3. Semester examinations shall be held in each of the three (3) semester in every session.
4. Examination timelines:
 - a) All examination questions and marking schemes are to be forwarded to the Programme Coordinator by e-tutors within four weeks of the semester.
 - b) All examination questions are to be internally and externally moderated within 4-8 weeks of commencement of each semester
 - c) All examination questions shall be ready and deposited with the Examination Officer four weeks to the examination.
 - d) A pool of MCQ and Essay type questions shall be developed for each course.
5. Any student who defers any semester examinations shall only be permitted to re-take the said examination in the 3rd Semester for a fee.

6. All Chief invigilators at Examination venues shall be sent examination questions in the morning of the date for the examination, however prior configurations of the CBT system and questions (with dummy questions) shall be completed a day before commencement of the examination.
7. All invigilators shall be at the venue of the each examination two hours to the beginning of each examination. Biometric accreditation of students into the examination hall must commence two hours to the examination.
8. Semester examinations shall not last for more than three weeks.
9. Internal (Programme Examiners Committee) moderation/consideration of results must be done two four weeks after examinations.
10. DLC Board of Examiners shall meet 5 weeks after the last day of the examinations to consider the results and make recommendations to the DLC Academic Board which shall meet within the next 1 week.
11. Semester examination results shall be forwarded to Senate for approval, six weeks after the last day of the examinations for Undergraduate programmes. Postgraduate examination results shall be forwarded to the Dean, School of Postgraduate Studies.
12. Semester Examination result shall be forwarded to the Examination Officer immediately the examinations are concluded while all CA results shall be forwarded prior to the commencement of Semester examinations.
13. There shall be no resit examination for failure in any examination, the course credit system require such course to be carried over to another semester.

5.0 APPOINTMENT OF EXTERNAL/INTERNAL MODERATORS/EXAMINERS

- 1) Appointment of external and internal Moderators/Examiners shall be forwarded to Senate for consideration and approval four weeks after commencement of academic session.
- 2) The Centre shall inform Senate in her submission the number of terms the external examiners they recommended had served. External Examiners shall serve for a maximum of three sessions at a stretch.
- 3) Appointment and approval of Internal and External Examiners for Postgraduate programmes shall be in compliance with 'ABU Regulations Governing Higher Degree Studies'

6.0 GENERAL EXAMINATION REGULATIONS,

1. Candidates must attend punctually at the times scheduled for their examinations, and must be at the venue of the examination two hours before the time the examination is due to start. Candidates arriving more than half an hour after the examination has started shall not be allowed to participate in the examination, or may be admitted only at the discretion of the Chief Invigilator (i.e. provided the cause(s) of lateness by the student are reasonable, cogent and sufficiently convincing).
2. Except with the special permission of the Chief Invigilator/Supervisor, candidates may not leave the examination hall during the first and last half hour of the examination. Outside those periods, candidates with the

permission of the invigilator, may leave the room temporarily, and then only if accompanied.

3. Candidates must display their Examination cards/print out of Vigicode during each examination and no writing of any form on the printout shall be condoned.
4. Candidates must bring with them to the examination hall their own pens and pencils and any materials which may be permitted by these regulations, but they are not allowed to bring any other book or paper. Candidates are warned, in their own interest, to ensure that lecture notes, textbooks, bags, mobile telephones, etc. are not brought into the examination hall. Answer booklets/Plain sheets shall be provided whenever indicated.
5. Candidates shall be searched by the Invigilator before they are allowed into the examination hall.
6. While the examination is in progress, communication between candidates is strictly forbidden, and any candidate found to be giving or receiving assistance shall be deemed to have committed an examination irregularity.
7. Silence must be observed in the examination hall. The only permissible way of attracting the attention of the invigilator is by the candidate raising his/her/her hand for recognition.
8. Candidates shall use their Registration Numbers only, throughout all Examinations
9. Every necessary precaution shall be taken including physical search before candidate leaves or returns to the examination room/hall.
10. There is a No Smoking Policy in all Examination venues/Resource Centres during examinations.

11. Candidates are informed that a First Aid Box is provided in the examination hall, and medical attention can be obtained if necessary.
12. All rough work must be done in the sheets of paper provided by invigilators for the purpose of rough work. Any other paper brought in will be confiscated and candidate penalized.
13. A student involved in examination misconduct or malpractice shall be penalised as dictated by the University Examination Regulations.
14. Candidates must adhere strictly to the sitting arrangement put in place, which has been configured automatically by the CBT system.
15. To improve the objectivity of examination results, the DLC shall put in place a “Double Marking” programme.

7.0 CONSEQUENCES FOR FAILING TO WRITE EXAMINATIONS

- 1) Students have the right to defer writing a semester examination until the third semester (for a fee), however such student must duly apply for such deferment.
- 2) Students who fail to write the examination without permission shall be made to carry over the course.
- 3) Students who fail to partake in 2 consecutive Semester examinations (without deferment) are deemed to have voluntarily withdrawn from the programme.
- 4) Students who fail to write any semester examination due to circumstances such as medical and or security engagements shall be allowed to re-write such an examination at a later time.

8.0 ACADEMIC MONITORING/QUALITY ASSURANCE

- 1) There shall be a monitoring mechanism for all examinations.
- 2) Online Programme Assessment Forms shall be made available to DLC students at the end of each of the three semesters in a session to assess the programmes (content, delivery, e-tutors and support).

9.0 RESEARCH WORK AND PROJECT, DISSERTATION AND THESISMANAGEMENT

1. All research projects by students shall conform to the standard University practice.
2. Management of Project reports, Dissertations and Thesis shall be in conformity with the subsisting 'Regulations Governing Higher Degree Studies in ABU'.

10.0 DUTIES OF INVIGILATORS

There shall be adequate number of invigilators in any examination venue (minimum of 1 invigilator/50 students). Each of the venues shall be supervised by a DLC Deputy Director; DLC Academic Adviser for the Geopolitical Zone or a Head of Department.

1. Arrive at the venue of Examination at least 1 hour before the session commences
2. Shall inspect the Identity and Admission cards of candidates before admission into the examination room/hall.
3. Ensure compliance to all schedules and time restrictions by students.
4. Ensure that items not relevant to the examination are not allowed in the examination room such as books, bags, mobile

phones, programmable calculators, palm top computers, mini scanners etc.

5. Confiscate such items and report on such matters to the Chief Invigilator.
6. Ensure that borrowing of any item or removal of examination materials does not occur.
7. Ensure that under no circumstances are candidates left without supervision
8. Should occasionally move around the examinations hall/room.
9. Ensure that candidates caught in breach of Examination Regulations are allowed to continue with the examination but the breach immediately documented.
10. Present a written report on any incident with exhibits to the Examinations Officer/Chief Invigilator.

11.0 EXAMINATION MALPRACTICE

1. All malpractice cases shall be treated in conformity with established University regulations.
2. The DLC Academic Board shall establish an ERIC committee to conduct all preliminary investigations
3. Examination malpractice shall be deemed to have been committed when any of the following has been established:
 - i. Impersonation/attempted impersonation at a CA or Semester Examination
 - ii. Plagiarism of other works, applicable to all assignments (CA) and Project
 - iii. Subletting/conscripting anyone to in parts or wholly undertake an assignment or examination on the student's behalf.
 - iv. Copying from other during center examination

- v. Tampering/Attempted tampering of/with examination grades
- vi. Introduction of foreign materials (Including Phones) into examination hall/room

12.0 SANCTIONS

12.1 Offence by Students

(A) Expulsion

The following offences shall carry the punishment of expulsion for breach of Matriculation Oath:

1. Impersonation at Examination shall involve the exchange of examination numbers or names, intentional use of someone else's name and/or registration number while registering online for the examination.
2. Introduction of relevant foreign materials and cheat notes into Examination Hall.
3. Exchange of relevant materials/information in Examination Hall which may involve collaboration/copying from each other or copying from cheat notes.
4. Consulting cheat notes outside the Examination Hall in the course of the examination.
5. Facilitating/abetting cheating during examination.
6. Use of mobile phones (GSM) text messages and/or other such communication or electronic gadgets during examinations.
7. Life threatening assault to an invigilator, examination officer or any constituted authority with evidence.
8. Willful destruction of exhibit (foreign material or cheat note) in the examination hall on the suspicion or on arrest for committing examination malpractice.

9. Solicitation for marks or change of grades from the examiner or examination officer.
10. Hacking or attempted hacking into sites containing materials/information relevant to examinations.

(B) Rustication for One Academic Year

The following offences shall carry the punishment of rustication for one session

- i. Non-submission or incomplete submission of answer scripts (where applicable)
- ii. Introduction of non-relevant materials to the Examination Hall.
- iii. Non-appearance at the Examination Irregulars and Malpractices Committee (ERIC)
- iv. If a student refuses to appear after first year of rustication, it is then implied as self- withdrawal.
- v. Introduction of mobile phone(s) and/or other such communication or electronic gadgets to examination hall.
- vi. Any student that insults an invigilator, examination officer or any other constituted authority during examinations
- vii. Introduction of fake examination card/ print out of Vigicode in the examination hall.

(C) Written Warning

The following offences shall attract a written warning

- i) Speaking/Conversation during examinations.
- ii) Unruly behaviour in the examination hall that does not affect the conduct of the examination.

11.2 OFFENCES INVOLVING STAFF

1. Any act of commission or omission amounting to examination malpractice e.g. loss of students' scripts, continuous assessments or project records, alteration of

marks etc. by a member of staff shall be referred to the corresponding Staff Disciplinary Committee for appropriate sanctions.

2. Non ABU staff engaged as adjunct staff for the purpose of any examination shall be required to endorse a document agreeing to be subjected to an appropriate legal/disciplinary action as appropriate for the circumstance e.g. police investigation and possible prosecution.

13.0 MANAGEMENT OF EXAMINATION RESULTS

1. Tentative results shall only be made available to students after its approval by the DLC Academic Board subject to ratification by the Senate.
2. Students shall be able to view their results (copy only) via the LMS, SMS/text or via other secure online options.
3. An Exam checker shall be in place for students to access their results and forward complaints (should the need arise).
4. Students are at liberty to apply for rectification (remarking) of their results for a fee.
5. Students can request for and view their scripts (for a fee) in event they are dissatisfied with the outcome of the rectification process.

****Rectification of Examination Scripts/results Does not Imply
Passing the Course!!!***