NATIONAL OPEN UNVERSITY OF NIGERIA

UNIVERSITY VILLAGE, PLOT 91, CADASTRAL ZONE,
NNAMDI AZIKIWE EXPRESSWAY, JABI, ABUJA

FACULTY OF SCIENCES

DEPARTMENT OF MATHEMATICS

STUDENT HANDBOOK 2020-2022

FOR UNDERGRADUATE MATHEMATICS AND
MATHEMATICS AND COMPUTER SCIENCE

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VISION AND MISSION STATEMENTS OF THE NATIONAL OPEN UNIVERSITY OF NIGERIA

Vision Statement

To be regarded as the foremost university providing highly accessible and enhanced quality education anchored by social justice, equity, equality and national cohesion through a comprehensive reach that transcends all barriers.

Mission Statement

To provide functional, cost effective, flexible learning which adds lifelong value to quality education for all who seek knowledge.

NOUN ANTHEM

National Open University of Nigeria
Determined to be the foremost university in Nigeria
Providing highly accessible
And enhanced quality education
Anchored on social justice
Equity, equality and national cohesion

Come to NOUN
For quality, cost effective and flexible learning
That adds lifelong value
For all who yearn
For quality education
And for all who seek knowledge

VISION STATEMENT OF THE FACULTY OF SCIENCES

- Our vision is to be the foremost Faculty in terms of quality and relevance of curriculum, research and instruction, making science training available to and accessible by all at competitive yet affordable cost on the open distance learning platform.

Mission Statement of the Faculty of Sciences

The Faculty of Sciences is committed to:

- providing a comprehensive and relevant distance learning curriculum in science based programmes
- producing well-informed graduates for careers in academia, industry and government
- conducting high-quality research in science-related disciplines
- Encouraging and supporting strong cross-disciplinary, interdisciplinary, and multi-disciplinary collaborations both within and beyond the University (nationally and internationally)

Core Values of the Faculty of Sciences

Our Core Values in the Faculty of Sciences are:

Excellence: We will continue to set our sights and standards high.

Achievement: We will capitalise on our distinctive strengths and unique opportunities to excel in an increasingly competitive world.

Collegiality: We will maintain an inclusive and supportive yet challenging environment that attracts the best students, staff and faculty, working together with mutual respect.

Innovation: We will be creative in our efforts to achieve our objectives.

Relevance: We will seek to continually improve our programs, ensuring that they are appealing and well suited to the society and development, equipping our graduates for successful career and future.

Collaboration: We will initiate mutually beneficial relationships with a variety of partners to ensure development of facilities, programmes and research for community development and service.

Sustainability: We will maintain our self-sufficiency by seeking efficiencies and being entrepreneurial in our approach to challenges.

WELCOME ADDRESS FROM THE HEAD OF DEPARTMENT MATHEMATICS

I am delighted to welcome you to the Department of Mathematics, Faculty of Sciences of the National Open University of Nigeria. We are a dynamic Department and we offer B.Sc. Mathematics; and B.Sc. Mathematics and Computer Science.

This departmental handbook will provide our prospective students further information on admission requirements, registration policies, deferment and compulsory courses, guidance and procedures.

Prospective students are therefore welcome to contact member of staff or the Department Staff or visit the Department in person to make enquires. Looking forward to a period of exciting academic journey with every student of this great Department.

Dr. Akeem B. Disu
HOD

1.0 STAFF INVOLVEMENT IN THE ADMINISTRATION

The Head of Department is the academic and administrative head of the Department. He is assisted by coordinators of programmes in the Department. The Head of Department assisted by coordinators of programme in the Department. The Department offers two programmes: B.Sc. Mathematics and Mathematics/Computer Science programmes. The Head of Department assigns work to the staff towards the smooth running of the Department. Also specific activities, namely, examinations and lecture time-tabling are put under designated staff for accountability and efficiency purposes. Furthermore, matters affecting the Department are tabled at the staff meetings for deliberations and decisions emanating from the meetings are to be implemented by the Head of Department.

2.0 STAFF LIST

2.1 List of Academic Staff in Mathematics Department

S/N	NAME	RANK	QUALIFICATIONS	AREA OF SPECIALISATION
1.	Dr. Akeem B. Disu	Senior Lecturer/ HOD	Ph.D.(Mathematics), M.Sc.(Mathematics), B.Sc. (Mathematics)	Fluid Dynamics, Combustion Theory
2.	Prof. Saheed O. Ajibola	Professor	Ph.D.(Mathematics), M.Sc.(Mathematics), B.Sc. (Mathematics)	Applied Mathematics
3.	Mrs. Christie Y. Ishola	Lecturer I	Ph.D. (Mathematics in View), M.Sc.(Mathematics), B.Sc. (Mathematics)	Numerical Analysis

4.	Mr. Olalekan Ogundipe	Assistant Lecturer	Ph.D.(Statistics in view), M.Sc. (Statistics), B.Sc. (Mathematics)	Statistics

2.2 List of Technologist

S/N	NAME	RANK	QUALIFICATIONS OBTAINED, MEMBERSHIP OF PROFESSIONAL ASSOCIATION	DUTIES PERFORMED COURSES TAUGHT
1.	Akujobi Ikechukwu	Hardware Engineer II CONTISS 07/04, 4th October, 2017	B.Engr. Computer Engineer (2002)	Logic design practical, packages lab. Practical.

2.3 List of Administrative Staff

S/N	NAME	RANK	QUALIFICATIONS OBTAINED,	DUTIES
1.	Gloria Nonye Nwankwo	Admin. Officer II	B.Ed. Adult Education/Economics	Secretariat assignment and others as assigned

2.	Omotayo Joshua	Assistant Chief Clerical Officer	SSCE	Dispatching and collection of memo, general office maintenance and other duties as assigned.

3.0 ACADEMIC ATMOSPHERE

Mathematics Programme is strictly guided by all the academic policies of the University in the pursuit of academic excellence. Lecturers' offices are accessible to students for consultations.

Mathematics and Mathematics and Computer Science programmes ensures that academic standard in maintained by adhering strictly to regulations governing the administration of the unit course system, especially as they concern pre-requisites. Furthermore, for any student to be eligible to write any degree examination, the student ought to have attended at least 65% of lectures.

A vital feature of the academic atmosphere is the availability of information and communication technology. In respect, students have access to Internet Centre and cybercafé on campus. Academic staff also ensures the completion of the course outline before students are examined.

Academic advisers are appointed for each level; they are expected to give academic advice in particular, but also required to be involved in overall mentorship of students under them in general, students are strongly encouraged to get laptop of their own to complement what the computer laboratories have to offer.

Lecturers are also encouraged to give proper advice and guide on the kinds of software and hardware the students should install on their laptops and how and where to fetch them. Informal tutorial grouping of students into areas of academic and professional interests such as

internet computing, programming, networking and hardware is supported by the Department; as the knowledge gained from such arrangement goes a long way in producing balanced and versatile students. The campus has standby generators to ensure electrical power supply in the University. There are functional toilets within the Faculty and Department.

4.0 A BRIEF HISTORY OF THE DEPARTMENT

Mathematics Department is one of the pioneer units in the School of Science and Technology that was established as a servicing unit at the inception of the University in 2004. The unit continued in its servicing capacity until the 2008 academic session when the full B.Sc. Mathematics and Mathematics/Computer Science programmes took off.

5.0 PHILOSOPHY

The philosophy of B.Sc. Mathematics and Mathematics and Computer Science programmes are to combine theories and practices leading to the production of graduates who are equipped with knowledge and skills to enable them meet the needs of their immediate environment and the world at large. The unit aims to achieve this through the open and distance learning mode of instructional delivery by exploiting the combination of university's ODL infrastructure (physical and virtual) and collaboration with institutions, agencies and industries.

6.0 OBJECTIVES & AIMS

- To produce competent graduates of Mathematics with sound knowledge and skills to contribute to the rapid technological growth of the Nigerian society and the word at large.

- To produce competent graduates who will seek to advance and exploit entrepreneurial opportunities in the field of Mathematics.

- To produce graduates who will utilize their Mathematics knowledge, skills and abilities to enhance safety, health and

welfare of the public through the simulation, construction and maintenance of industrial equipment.

- To produce graduates that will satisfy the manpower needs of our society in sectors of energy, industry, communication, science, engineering and research.

7.0 GENERAL ADMISSION REQUIREMENTS

To be admitted into the B.Sc. Mathematics programme and Mathematics and Computer Science, a candidate is expected to possess at least one of the following:

(i) Five (5) credit passes in Senior School Certificate Examination (SSCE) or at the School Certificate (SC), General Certificate of Education (GCE) Ordinary Level, National Examinations Council (NECO) or 6 merit passes in National Board for Technical Education (NABTEB) or Teachers Grade Two Certificate (TC II) examinations. The credit passes must include Mathematics and Physics. Credit pass in English language is required.

(ii) General Certificate of Education (GCE) Advanced level in Mathematics and Physics for entry into 200 level of the programme.

(iii) National Certificate in Education (NCE) with merit passes in Mathematics and Physics or Physics and Chemistry for entry into 200 level of the programme

(iv) National Diploma (N.D.) in the Mathematical sciences or equivalent qualification from an institution recognized by Senate for entry into 200 level of the programme.

(v) Degree or Higher National Diploma (HND) or equivalent qualification in any physical science from an institution recognized by Senate for entry into 200 level of the programme.

Note: All direct entry candidates must satisfy the ordinary level requirement.

8.0 ENTRY REQUIREMENT

Evaluation: There are two aspects to the assessment of this programme. First, there are tutor marked assignments (TMA) which is 30% of the total course mark. At the end of the course, 100 - 200 level students would sit for Computer Based Test CBT (e-examination) and 300-400 level students would sit for written examination called Pen on Paper (POP) which has a value of 70% of the total course grade.

9.0 STRUCTURE OF THE PROGRAMME:

- **Course Credit System**

Subjects taught in the Unit are based on the 'course system' in which the subject areas are broken down into courses which are examinable. The courses are organized into levels (100-400 levels) in an order according to the academic progress.

- **Classification of Courses**

The courses in the Unit are classified as follows:

1. **Compulsory courses:** These are the core courses that must be offered and passed by students at a grade not below E
2. **Elective Courses:** These are optional courses which may be offered based on the interest of the student or for the purpose of fulfilling the minimum requirement for the award of the degree.
3. **General Studies Courses:** These consist of the university general studies courses coded GST. They are compulsory courses for all students of the university and are being offered by the University in compliance with the National University Commission (NUC) minimum Bench Mark.

- **Criteria for the award of B.Sc. Mathematics and Mathematics and Computer Science degree**

The student is required to **pass all compulsory courses** and complete a minimum of 140 credits units of core courses and at least 12 units of electives for 8 semesters to qualify to be admitted into the B.Sc. Mathematics degree. Direct entry must pass

minimum of 110 credit units of core courses and at least 10 units of elective courses for a 6 semesters to qualify to be admitted into the B.Sc. Mathematics degree. The compulsory courses are made up of those courses specifically labeled as compulsory (C) and the required elective courses labeled as elective (E).

10.0 ADMISSION INFORMATION

General Admission Regulation

(a) Any candidate seeking admission to the University for First Degree course must obtain and complete the Unified Tertiary Matriculation Examination (UTME) and Post-UTME screening examination.

(b) For Admission to all courses, candidates must satisfy the admission requirement of the University. Furthermore, additional Faculty/Department requirements have to be satisfied for some programmes and courses.

(c) New admission will normally be made only at the beginning of every academic session.

(d) During registration, each candidate shall be required to present the originals of his/her certificates (including birth certificate) or any other acceptable evidence of the qualification on the basis of which the admission is made.

(e) Any false claim concerning qualification when discovered leads to expulsion.

(f) Prescribed fees shall be paid by admitted students as contained in the regulation.

11.0. PROGRAMME DURATION

The duration for the B.Sc. Mathematics shall be five academics sessions for students that entered the university by UTME admission and four academic sessions for those by direct entry admission.

11.1. Guidelines on the Course Unit System

Definition of Unit:

The unit of course shall be by the semester, one semester unit being when a class meets one hour every week for one semester.

(a) The size of course shall, as much as possible be a maximum of three units and its duration shall be one semester except for projects or design courses which may carry more than three units and may have a duration which is more than one semester

(b) A core course is one which must be registered for and passed by student to get the degree and is counted towards the classification of his/her degree.

(c) An elective course is either compulsory or optional. A compulsory elective shall be counted towards the classification of a student's degree. An optional elective is a course that may be taken by the student and may not be counted towards the classification of his/her degree.

(d) An audited course is one which the student attends without writing an examination in it.

(e) An elective course is optional; however, a specific minimum number of units of elective courses should be passed by students before graduating.

(f) Compulsory course is the course prescribed by the University which must be passed before a student can graduate.

(g) Pre-requisite course is one which the student must pass before proceeding to the higher course.

(h) Co-prerequisite course is one which may be taken in parallel with the course for which it is specified.

11.2 Student Work Load

(a) A full time student must register for a minimum of 15 units and a maximum of 24 units per semester. However, a final year student can apply for maximum extra units in order to graduate from the programme.

(b) A student who is unable to take examination in a particular course due to approved absence will be required to register for the course at the next available opportunity. Such a student will not be allowed to take any course for which the incomplete course is a pre-requisite. A student cannot exceed the approved overload.

(c) Pre-requisite courses must be taken and passed before progression to next level.

11.3 Credit Units

Courses shall be evaluated in terms of credits units. A course credit unit is a one-hour lecture/tutorial contact per week or a three-hour laboratory practical class per week or an equivalent amount of study of any combination of these in a semester or session.

4-hour lecture	-	4 units
3- hour lecture	-	3 units
2-hour lecture	-	2 units
3-hour practical	-	1 units

The minimum units allowed for a course is 2 units.

11.4 Course Coding

There shall be levels of courses representing the years for the degree programme and the codes are as follows:

Level	First Semester	Second Semester
100	101 - odd	102 - even
200	201 - odd	202 - even
300	301 - odd	302 - even
400	401 - odd	402 - even

11.5 Students Registration

Registration for courses is done online at the ICT Centre and for two weeks from the beginning of the session. Students who cannot meet this deadline are allowed to do late registration on the payment of prescribed fee for just one extra week. After the submission of registration form in the first semester, change of course for courses meant for second semester are also allowed after the payment of prescribed fees. Registration guidelines are distributed to students before registration begins.

11.6 Industrial Training

Practical training in the field of study is a compulsory part of the degree courses in Mathematics Programme. The 6-month industrial training is compulsory which usually comes up during the second semester of 400 level. Successful completion of the supervised training requires the submission of an acceptable individual report and seminar to be given by the student.

12.0 EXAMINATION REGULATIONS

(a) To be eligible to write any degree examination, the student ought to have attended at least 65% of lectures for the courses; examiners have the right to prevent defaulting students for sitting for examination.

(b) Student must be ready to enter the examination hall 30 minutes before the time the examination is due to start. Students who arrive more than half an hour after the examination has started shall be admitted only at the discretion of the investigators.

(c) Student may only leave the hall during the first half and the last quarter of an hour of the examination.

(d) Student must bring with them to the examination hall their own biros, pens, pencil and erasers.

(e) All rough works must be done in answer booklets and cross neatly throughout.

(f) Communication between students is strictly forbidden.

(g) The only permissible way of attracting the attention of the invigilators is by the raising of hands.

(h) Students are to write legibly. Names are not to be written on the answer booklet. The answers to each question must be started on a separate page.

(i) Attendance register is to be signed by the student(s) at the commencement of the examination and when handing over their scripts to the invigilator(s).

(j) Student must ensure that he/she writes his/her examination number and the numbers of questions answered in the front cover of the booklets.

(k) Mobile phones either switched on or off are not allowed in the examination hall. Keep your mobile phones in the hostel. If you bring yours to the examination hall, it would be seized.

Handbags of any sort are not allowed in the examination hall and the surroundings.

(l) Students are hereby informed that anyone caught or implicated in examination misconduct would automatically cease to continue with the examination until the case has been decided. Server penalties are determined by the university and will be imposed on anyone caught committing examination misconduct. No plea will be entertained.

12.1 Grading System

(a) In every course assessment consists of continuous assessment (30%) and examination (70%).

(b) For practical courses, the overall assessment is 60% weekly practical classes and 40% exams of practical.

(c) The pass mark for any course is 45%

(d) The grading system is as follows

Score	**Grade**	**Grade Point**
70 – 100	A	5
60 – 69	B	4
50 – 59	C	3
45 - 49	D	2
0 – 44	F	0

(e) Students' result is to be prepared at the end of every semester reflecting grades, total units taken, total units passed and total units failed.

(f) At the end of every session, a summary of students results is prepared level by level reflecting units taken during the session, the units passed during the session, sessional GPA, the courses failed for the session, the cumulative units taken, the

cumulative units passed, the CGPA and the remarks of proceeding on caution, probation or withdrawal from the programme as the case may be.

(g) Both the sessional GPA and CGPA are calculated using the weighted grade point. The weighted grade point for the courses is the product of the grade point and units for the courses. For example, a student with a grade point of 4 (Grade B) in a 3 – unit course has a weighted grade point of 4x3=12 for that course. Thus, the sessional GPA is calculated from the formula: Similarly, the CGPA is calculated from the formula:

$$\text{Grade Point Average (GPA)} = \frac{\text{Total Weighted Point in a Semester}}{\text{Total Units Taken}}$$

$$\text{Cumulative Grade Point Average (CGPA)} = \frac{\text{Total Weighted Point Session(s) up till date}}{\text{Total Units Taken}}$$

Provided that all course taken that are relevant to a particular degree programme are used in the computation of the various averages. In computing CGPA, performance in all registered and taken courses in a particular programme are used.

12.2 Common Terminology and Abbreviations

(a) **Total Load Unit** (TLU) is the total number of course units carried by a student in a particular semester. It is the summation of the load units on all courses carried during the semester. For example, a student who is taking 6 courses of 3 units each has TLU of 18 for that semester.

(b) **Cumulative Load Unit** (CLU) is the summation of Total Load Unit from the first semester of a student to date. A student who is prone to repeating courses will finish (if he/she does not drop out) with higher CLU than his/her non repeating colleagues, and will most likely require a longer time to complete the requirements for the award of degree.

(c) **Total Credit Point** (TCP) is the sum of the, products of course unit and rating in each course, for the entire semester or period e.g. consider a student who took five courses of 3 units each. Suppose the grades he / she obtained in the five courses were A, B, C, D and E. The TCP of this student is obtained as follows (3 x 5.00) + (3 x 3.0) + (3 x 2.0) + (3 x 1.0) + = 15.00 = 12 + 9.00+6.00 +3.0 = 45.00

(d) **Cumulative Credit Point** (CCP) is the summation of Total Credit Point over all the semester from the beginning to date.

(e) **Grade Point Average** (GPA) is the total credit point (TCP) divided by the Total Load Unit (TLU) e.g., consider the student's scores referred to above. His/ her TCP is 45.0 and his/her TLU is 15. His / her GPA is therefore 45/15=3.00. The highest possible GPA that can be earned is 5.00 and this happens when a student earned a grade of "A" in every course during the semester. The lowest GPA obtained is 0.00.

(f) **Cumulative Grade Point Average** (CGPA) is not summation of GPA for the semester. Rather, it is the summation of TCP for all semesters till date, divided by the summation of TLU for the said semester. In effect CGPA = CCP/CLU.

12.3 Probation and Withdrawal for the University

Any student, whose CGPA falls below 1.50 at the end of first session, shall by placed on probation in the following session. If he/she then fails to achieve a CGPA of at least 1.50 at the end of that session, he/she shall be required to withdraw from the University. A student will not be placed on probation until the end of the second semester of the first session; thereafter, it shall be from semester to semester. A student on probation shall not carry more than the minimum load of 15 units for the semester for which he/she is on probation. A student who is unable to get out of probation at the end of the session, but a student who is out of probation at the end of the first semester

shall be allowed to carry a maximum load unit during the following semester.

12.3.1 Carry over Courses

All failed courses shall be carried over to the corresponding semester of the following year and must be taken and passed before taking higher courses for which such are pre-requisites.

12.3.3 Duration of Semester

Each semester shall normally consist of 15 weeks or as determined by Senate which shall be reserved for teaching. The two weeks that come after the 15 weeks of teaching shall be for examination.

12.3.4 Registration for Course Examinations and Procedure for Deleting Courses

Registration for a course at the beginning of a semester automatically means registration for the course and the examination. Students wishing to add or delete a course must do so within six weeks of commencement of lectures in the course by completing the prescribed form obtained from the Academic Affairs Office.

12.3.5 Continuous Assessment

Evaluation of student's achievement shall be continuous. The student shall be periodically informed of his/her standing in the course. Continuous assessment shall be by tests and at least three (3) tests shall be given on each course in a semester.

12.3.6 Final Examination

Final written examination for a course shall not normally exceed three (3) hours duration and it shall take place only at the times and places established for the purpose by Senate or its designated committee. The final examination for each course shall normally be at the end of the semester in which the course is offered. Both the examination and continuous assessment will be used for final grading. Examination carries 70%, and continuous assessment 30%.

12.3.7 Graduation Requirements

To be eligible for the award to B.Sc. Mathematics and Mathematics and Computer Science, a student must have:

(a) Passed all compulsory courses, and minimum units of electives courses
(b) 140 units of core courses (including SIWES)
(c) At least 15 units of Electives.
(d) Completed the compulsory 6 months industrial training.

12.3.8 Final Assessment and Class of Degree

At the completion of the programme, students' results are prepared reflecting details of the session's performance, including the degree classification according to the following scheme.

CGPA	**CLASS OF DEGREE**
4.50 – 5.00	1st Class
3.50 – 4.49	2nd Class Upper
2.50 – 3.49	2nd Class Lower
1.50 – 2.49	3rd Class

For the purpose of determining the class of degree, the CGPA shall cover 100 to 400 – level courses.

12.3.9 Procedure for seeking a Revision of Marked Scripts at the End of Semester

(a) Applications for revision of marked scripts shall be made by any aggrieved student, irrespective of the grade obtained in the course, on the payment of a prescribed fee.

(b) All applications for revision of marked scripts shall be addressed/forwarded to the Registrar through the Dean.

(c) The receipt of prescribed fee for each course shall accompany application.

(d) The Registrar shall forward the request to the appropriate Dean.

(e) The Dean shall appoint a minimum of three independent assessors (internal or external) in consultation with Head of Department if need be.

(f) The Dean shall ensure that the marking scheme and model answers original used are made available to the assessors.

(g) The Dean shall present his/her report before the Board of Studies and thereafter to Senate for consideration and approval.

(h) Where the student's case is upheld, the application fee shall be refunded.

(i) Where the case is not upheld, the student shall forfeit the fee and shall be warned for making frivolous allegations.

(j) Where Senate is convinced that the marking –down of a candidate by the lecturer is deliberate, such staff shall be reprimanded.

Frivolous Allegation: Making an application for revision of marked script by a student which lacks merit but with no imputation of victimization or malevolence shall be regarded as misconduct.

Penalty: Letter of warning.

Malicious Allegation: Making an application for revision of marked script with imputation of victimization or malevolence shall be regarded as misconduct.

Penalty: Suspension for two semesters.

Absence from Examination: A student who is absent from a course examination without approval of the Head of Department during or at the end of the semester will receive a grade of 0 (f). Permission may be granted only on substantiated, compassionate grounds as recommended by the faculty Board of Studies and by Senate.

12.3.10 Carry over Course Grade

When a student re-registers for a carry-over course and takes an examination in the course, he/she shall be credited with the actual grade scored.

13.0 MISCONDUCT BEFORE EXAMINATION

(a) Involvement in and bearing responsibility for examination question leakage.

Penalty: Expulsion from the University.

(b) Participating in or benefiting from question leakage.

Penalty: Expulsion from the University.

(c) Attempting to participate in and, or benefit from examination question leakage of an examination.

Penalty: Expulsion from the University.

(d) Coming into the examination hall within 30 minutes of the commencement of an examination.
Penalty: The candidate should be allowed into examination hall but should not be given extra time

(e) Coming into the examination hall later than 30 minutes of the commencement of an examination.

Penalty: The candidate should be allowed into the examination hall and should be scored 0 in the course examined.

14.0 MISCONDUCT DURING EXAMINATIONS

(a) Student that sits for an examination that she/he did not register for or qualify to sit for shall be penalized

Penalty: The result of the candidate in the course should be nullified He / She should be scored 0 (f) and be issued a letter or warning.

(b) Representing or standing in for another in the course of an examination.

Penalty: Expulsion from the University.

(c) Conniving with another candidate /student / person to represent or stand in for another in an examination.

Penalty: Expulsion from the University.

(d) Destroying, defacing, mutilating or swallowing of potentially incriminating material relating to a course during the course of an examination.

Penalty: Suspension for two semesters. In addition, the candidate should be scored 0 (f) in the course.

(e) Displaying of inappropriate or anti-social behavior (e.g. smoking, singing. Cat-call, etc.) capable of causing delay and / or disruption of an examination.

Penalty: Suspension for one semesters

(f) Displaying of inappropriate or anti-social behavior leading to disruption and suspension of an examination.

Penalty: Suspension for two semesters

(g) Giving or receiving, or anyway benefiting from information relating to a course in an examination through electronic, personal dress material, part of the body in any manner or form whatsoever.

Penalty: Suspension for two semesters

(h) Leaving the examination hall without the permission of the invigilator.

Penalty: Letter of warning. In addition, the candidate should be scored 0 (f) in the course examined.

(i) Leaving the examination hall with examination material before the end of the examination without the permission of the invigilator.

Penalty: Suspension for two semesters

(j) Substituting or exchanging answer script(s) given to a candidate in whatever manner or form during the examination.

Penalty: Expulsion of all the students involved from the University.

(k) Exhibiting insulting, rude, impolite behavior to a staff during the course of an

examination.

Penalty: Suspension for two semesters

(l) Physical assault on another student during the course of an examination.

Penalty: Suspension for two semesters

(m) Physical assault or battery on staff during the course of an examination.

Penalty: Expulsion from the University.

(n) Talking to or communicating with another candidate without due permission during the course of an examination.

Penalty: Letter of warning.

(o) Bringing in of prohibited/unauthorised material(s) into the examination hall by candidate with proven evidence of using the material(s) or any part thereof.

Penalty: Suspension for two semesters. The candidate should also be given 0 (f) in the course.

(p) Failure by a candidate to submit his/ her answers script after taking part in examination.

Penalty: Suspension for two semesters. In addition, the candidate should be scored 0 (f) in the course.

(q) Any student that gives/receives irregular assistance, cheat, aid and abet examination malpractice shall be punished.

Penalty: Suspension for two semesters

15.0 MISCONDUCT AFTER EXAMINATION

(a) Involvement in any attempt to substitute or change or remove or effect change in examination script(s), record sheet(s), attendance register or any examination-related, material/document.

Penalty: Expulsion from the University.

(b) Gentle/subtle exertion of influence with a view to obtaining undue advantage in the grading of scripts or award of marks on an internal or external examiner.

Penalty: Letter of warning.

(c) Non-gentle/non subtle exertion of influence with a view to obtaining undue advantage in the grading of scripts or award of marks by an internal or external examiner.

Penalty: Expulsion from the University.

(d) Any Student that impersonates or conspires with impersonators during or after examination shall be punished.

Penalty: Expulsion from the University.

(e) Any case of disruption of examination, disorderly behaviour or assault on invigilator.

Penalty: Expulsion from the University.

(f) Any attempt by the candidate directly or indirectly or influence the process of an examination with a view to obtaining undue advantage, vitiating the examination or getting involved in examination leakages.

Penalty: Suspension for two semesters

(g) Any effort by a candidate or staff to illegally have or give a pre-knowledge of an examination question or to influence the marking of scripts, the award of marks by the internal or external examiner.

Penalty: The candidate shall be suspended for two semesters. The staff involved shall be referred to the appropriate disciplinary committee.

(h) Any other offence/malpractice as may be determined by the Disciplinary Committee as impacting negatively on the smooth and fair conduct of the examination.

Penalty: Penalty to be determined by the appropriate Disciplinary Committee.

16.0 OUTLINE PROGRAMME PROPOSAL (OPP)

OUTLINE OF COURSE STRUCTURE MATHEMATICS PROGRAMME

B.SC. MATHEMATICS REGISTRABLE COURSES

100 Level 1st Semester

Course Code	Course Title	Unit(s)	Status
BIO101	General Biology I	2	C
BIO191	General Biology Practical I	1	C
CHM101	Introductory Inorganic Chemistry	2	C
CHM103	Introductory Physical Chemistry	2	C
CHM191	Introductory Practical Chemistry I	1	C
CIT104	Introduction to Computer Science	2	C
MTH101	Elementary Mathematics I	3	C
MTH103	Elementary Mathematics II	3	C
PHY101	Elementary Mechanics, Heat and Properties of Matter	2	C
PHY191	Introductory Practical Physics I	1	C
GST101	Use of English and Communication Skills	2	C
GST107	The Good Study Guide	2	C
	Total Credit Units	**23**	

100 Level 2nd Semester

Course Code	Course Title	Unit(s)	Status
BIO102	General Biology II	2	C
BIO192	General Biology Practical II	1	C
CIT102	Software Application Skills	2	C
CHM102	Introductory Organic Chemistry	2	C

CHM192	Introductory Practical Chemistry II	1	C
MTH102	Elementary Mathematical II	3	C
STT102	Introductory Statistics	2	C
PHY102	Electricity, Magnetism and Modern Physics	3	C
PHY192	Introductory Physics Laboratory II	1	C
GST102	Use of English and Communication Skills II	2	C
		19	

200 Level - 1st Semester

Course Code	**Course Title**	**Unit(s)**	**Status**
CIT215	Introduction to Programming Languages	3	C
MTH211	Abstract Algebra	3	C
MTH213	Numerical Analysis I	3	C
MTH241	Introduction to Real Analysis	3	C
MTH281	Mathematical Methods I	3	C
STT211	Probability Distribution I	3	C
GST201	Nigerian Peoples and Culture	2	C
GST203	Introduction to Philosophy and Logic	2	C
	Elective	2	E
	Total Credit Units	**24**	

Elective Courses

PHY207	Thermodynamics	2	E
PHY201	Classical Dynamics	3	E

200 Level - 2nd Semester

Course Code	**Course Title**	**Unit(s)**	**Status**

MTH212	Linear Algebra II	3	C
MTH232	Elementary Differential Equation	3	C
MTH210	Introduction to complex analysis	3	C
MTH251	Mechanics	3	C
MTH282	Mathematical Methods II	3	C
GST202	Fundamentals of Peace Studies and Conflict Resolutions	2	C
	Elective	2	E
	Total Credit Units	**19**	

Elective Courses

PHY204	Electrodynamics	2	E
PHY206	Optics I	2	E

300 Level – 1st Semester

Course Code	**Course Title**	**Unit(s)**	**Status**
MTH301	Functional Analysis I	3	C
MTH304	Complex Analysis I	3	C
MTH311	Calculus of Several Variables	3	C
MTH341	Real Analysis	3	C
MTH381	Mathematical Methods III	3	C
MTH303	Vector and Tensor Analysis	3	C
GST301	Entrepreneurial Studies	2	C
	Elective	3	E
	Total Credit Units	**23**	

Elective Courses

MTH307	Numerical Analysis II	3	E
STT311	Probability Distribution II	3	E

300 Level 2nd Semester

Course Code	**Course Title**	**Unit(s)**	**Status**

MTH302	Elementary Differential Equation II	3	C
MTH305	Complex Analysis II	3	C
MTH308	Introduction to Mathematical Modeling	3	C
MTH312	Abstract Algebra II	3	C
MTH382	Mathematical Methods IV	3	C
	Elective Course	3	E
		18	

Elective Courses

MTH309	Optimization Theory	3	E
MTH315	Analytical Dynamics I	3	E

400 Level - 1st Semester

Course Code	**Course Title**	**Unit(s)**	**Status**
MTH401	General Topology I	3	C
MTH411	Measure Theory and Integration	3	C
MTH421	Ordinary Differential Equation	3	C
MTH423	Integral Equation	3	C
	Elective Course	3	E
	Total Credit Units	**15**	

Electives Courses

MTH417	Electromagnetic Theory	3	E
CIT425	Operation Research	3	E

400 Level - 2nd Semester

Course Code	**Course Title**	**Unit(s)**	**Status**
MTH402	General Topology II	3	C
MTH412	Functional Analysis II	3	C
MTH422	Partial Differential Equation	3	C
MTH499	Project	6	C
	Total Credit Units	**15**	

17.0 SYNOPSES OF COURSES AND DETAILED PROGRAMME PROPOSAL (DPP) FOR B.SC. MATHEMATICS PROGRAMME

BIO 101 GENERAL BIOLOGY I (2 UNITS)
General characteristics, similarities, differences, distribution and economic importance of virus, Bacteria, fungi, lower green vascular plants. Ecological adaptation of various plant forms. Interrelationship of plants evolution and reproduction

BIO 102 GENERAL BIOLOGY II (2 UNITS)
Systematic studies of diversity of life including monera, protista, plants (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and angiosperms) and animals (Protozoa, Platyhelminthes, Annelids, Arthropods, Fishes, Amphibians, Reptiles, Birds and Mammals) based on similarities and differences in external morphology. Taxonomic divisions of plant and animal kingdoms. Ecological adaptations of these forms.

CHM 101: INTRODUCTORY INORGANIC CHEMISTRY (2 UNITS)
Hypothesis, theory and law with appropriate illustrations, Nature of matter – 3 states of matter, Atomic structure, electronic energy levels and orbital. Periodic classification of elements and its relationship to their electronic configurations, Chemical bonding, Survey of properties and trends in groups I, II, IV, VI and transition metal.

CHM 103: INTRODUCTORY PHYSICAL CHEMISTRY (2 UNITS)
Mole concepts and calculations based on it, methods of expressing concentrations, Chemical Kinetics and equilibrium, and related calculations, Important application of equilibrium – pH, solubility products and solubility of ionic solids, Thermo chemistry and simple calculations based on Hess's law, Electrochemistry and working of various cells, Brief mentions of corrosion; chemical thermodynamics; $\Delta G = \Delta H - T\Delta S$.

CIT 101: COMPUTERS IN SOCIETY (2 UNITS)
Introduction to Basic concepts of the Computer System; A survey of various uses of the Computer; Computer applications in the Modern Society; Effects of Computerization of the Workplace; Computer Ethnics and Security Issues, Classical examples of the effects of the internet on the society.

CIT 102: APPLICATION SOFTWARE SKILLS (2 UNITS)
Brief description of computer system: CPU, I/O devices; Operating systems; Computer File Management; Computer Software: overview, types, etc.; Application software: common application software; Using Microsoft Word; Using Microsoft Excel; Features of Database Applications and Microsoft Access; Statistical Analysis Applications; Using SPSS software; Introduction to Desktop Publishing applications; Computer applications in Nursing; Computer applications in Agriculture; Managing the computer system with the Control Panel. Protection.

GST 101: USE OF ENGLISH AND COMMUNICATION SKILLS I (2 UNITS)
Listening enabling skills, listening and comprehending comprehension, note taking and information retrieval. Including data, figures, diagrams and charts. Listening for main idea, interpretation and critical evaluation. Effective reading. skimming and scanning. Reading and comprehension at various speed levels. Vocabulary development in various academic contexts. Reading diverse texts in narratives and expository. Reading and comprehension passages with tables, scientific texts. Reading for interpretation and critical evaluation.

GST 102: USE OF ENGLISH AND COMMUNICATION SKILLS II (2 UNITS)
Writing paragraphs: Topic sentence and coherence. Development of paragraphs: illustration, Description, cause and effect including definitions. Formal letters; essential parts and stylistic forms, complaints and requests; jobs, ordering goods, letters to government and other organizations. Writing reports; reporting event, experiments. Writing summaries: techniques of summarizing letters and sounds in English, vowels and consonants. Interviews, seminar presentation,

public speech making, articles, concord and sentences including tenses. Gerund, participles, active, passive and the infinitive. Modal auxiliaries.

GST 105 HISTORY AND PHILOSOPHY OF SCIENCE (2 UNITS)

Nature of science, scientific methods and theories; Law of nature; History of science. Lost sciences of Africa, science, technology and inventions. Nature and scope of philosophy in science. Man, nature and his origin. Man, environment and resources. Great Nigerian Scientists.

GST 107: THE GOOD STUDY GUIDE. (2 UNITS)

Getting started: How to use the book, why read about skills, getting yourself organised; what is studying all about, reading and note taking; Introduction, reactions to reading, your reading strategy, memory, taking notes, conclusion. Other ways of studying: Introduction, learning in groups, talks and lectures, learning from TV and radio broadcasts, other study media. Working with numbers; Getting to know numbers, describing the world, describing with the tables, describing with diagrams and graphs; What is good writing? The Importance of writing, what does an essay look like, what is a good essay? Conclusion. How to write essays: Introduction, the craft of writing, the advantages of treating essay writing as a craft, making your essay flow, making a convincing case, the experience of writing. Preparing for examination.

GST122: INTRODUCTION TO PHILOSOPHY AND LOGIC (2 UNITS)

General introduction to logic; clarity of thought; expression and arguments as basis for conclusion. Fundamentals of logic and critical thinking, types of discourse, nature of arguments; validity and soundness; distinction between inductive and deductive inferences etc.; illustrations from familiar texts, including literature materials, novels, law reports and newspaper publications.

MTH 101 ELEMENTARY MATHEMATIC I: (3 Units)

(ALGEBRA AND TRIGONOMETRY)

Elementary set theory, subsets, union, intersection, complements, venn diagrams. Real numbers; integers, rational and irrational numbers, mathematical induction, real sequences and series, theory of quadratic equations, binomial theorem. Complex numbers; algebra of complex numbers; the Argand Diagram. Re Moivre's theorem, nth roots of unity. Circular measure, trigonometric functions of angles of any magnitude, addition and factor formalae.

MTH 102 ELEMENTARY MATHEMATICS III: (3 UNITS) CALCULUS:

Function of a real variable, graphs, limits and idea of continuity. The derivative as limit of rate of change, Techniques of differentiation, Extreme curve sketching. Integration as an inverse of differentiation, Methods of integration, Definite integrals; Application to areas and volumes

MTH 103 ELEMENTARY MATHEMATICS III: (3 Units) PRE-REQUISITE - MTH 101

(VECTORS, GEOMETRY AND DYNAMICS)

Geometric representation of vectors in 1-3 dimensions, components, direction cosines. Addition and Scalar multiplication of vectors and linear independence. The Scalar and vector products of two vectors. Differentiation and integration of vectors with respect to a scalar variable. Two-dimensional co-ordinate geometry. Straight lines, circles, parabola, ellipse, hyperbola. Tangents, normals.

STT 102 INTRODUCTORY STATISTICS (2UNITS)

Measures of Central Tendency and dispersion, (grouped and ungrouped); mean: - arithmetic and geometric, harmonic, median, mode quartiles, deciles, modes, relative and absolute dispersion, sample space and events as sets. Finite probability space properties of probability. Statistical independence and conditional probability. Tree diagram. Bayes theorem. Discrete and continuous random variables.

Expectation, independent Bernoulli trials. Binomial Poisson and Normaldistributions. Normal approximation to binomial and Poisson distribution, Hyper geometric.

PHY 101: ELEMENTARY MECHANICS (2 UNITS)

Physical quantities, unit and dimensions space and time, frames of reference, vestures and scalars, kinematics – straight line, line motion, vertical motion, circular motion, deviation. Dynamics – Equilibrium, work and energy, mass and momentum, laws of inertia, rotational motion, simple harmonic motion, conservation laws, simple machines, fundamental laws of statics and dynamics, Galilean invariance.

PHY 101: ELEMENTARY MECHANICS, HEAT AND PROPERTIES OF MATTER (2 UNITS)

Space and Time: Physical quantities: Units and dimensions of physical quantities; Kinematics: Uniform velocity motion, uniformly accelerated motion; Dynamics: Newton's laws of motion; Impulse and Linear Momentum, Linear Collision, Newton's universal law of gravitation; Work, energy and power; Conservation laws; Concept of mechanical equilibrium; Centre of mass and centre of gravity; Moment of a force; Rotational kinematics and dynamics: Torque; Moment of Inertia; angular momentum; Total mechanical energy. Simple harmonic motion

Heat and temperature, work and heat, Quantity of heat: heat capacities, latent heat; Thermal expansion of solids, liquids and gases; Gas laws, heat transfer; Laws of thermodynamics: Isothermal and Adiabatic changes, Carnot cycle; Application kinetic theory of gases; van der Waals gas.

Classification of matter into (solids, liquids and gases, forces between atoms and molecules, molecular theory of matter, Elasticity, plasticity, Hook’s Law, Young’s Shear and bulk Moduli) Crystalline and non-crystalline materials, Hydrostatics: pressure, buoyancy, Archimedes' principle; Hydro-dynamics-streamlines, Bernouli and Continuity equations, turbulence, Reynold’s number, Viscosity, laminar flow, Poiseuille’s equation; Surface tension, adhesion, cohesion, capillary, drops and bubbles.

PHY 191: INTRODUCTORY PHYSICS LABORRATORY I (1 UNITS)

Graphs, Measurement, Error Analysis, Determination of Acceleration due to Gravity by Means of Simple Pendulum, Determination of force constant of a spiral spring, Determination of effective mass of a spiral spring and the constant, Determination of surface tension of water, Determination of specific latent heat of fusion of ice, Determination of the co-efficient of limiting static friction between two surfaces, Determination of the co-efficient of static friction on two surfaces using an inclined plane, Determination of Relative Density of kerosene using the specific Gravity Bottle,

PHY 192: INTRODUCTORY PRACTICAL PHYSICS II (1 UNITS)

Refraction through the glass block; Image formed by a concave mirror; Determination of the focal length of the convex mirror; Refraction through the triangular prism; Determination of the focal length of a converging lens and the refractive index of groundnut; Determination of resistance of resistors in series and in parallel in simple circuits; Determination of internal resistance of a dry cell using a potentiometer; To compare the E.M.F. of cells using potentiometer; Determine the unknown resistance of a resistor using Wheatstone Bridge; To determine the relationship between current through a Tungsten and a potential applied across it.

CIT 215: INTRODUCTION TO PROGRAMMING LANGUAGES (3 UNITS)

FORTRAN programming language; Comparison of various versions of the language. Programming exercises using FORTRAN with emphasis on scientific application problems. Elements of Pascal language. Exercises in Pascal Program structures and programming concepts; Structured design principles; abstraction, modularity, stepwise refinement, structured design techniques teaching of a structured programming language, e.g. PASCA/JAVA, C^{++}.

MTH 201 MATHEMATICAL METHODS 1: (3 Units) (L30: P 0: T 1)
Real-valued functions of a real variable. Review of differentiation and integration and their applications. Mean value theorem. Taylor series. Real-valued functions of two or three variables. Partial derivatives chain rule, extrema, languages multipliers.
Increments, differentials and linear approximations. Evaluation of line, integrals. Multiple integrals. Pre-requisite -MTH 102.

MTH 203 SETS, LOGIC AND ALGEBRA (3 Units) (L30: P 0: T 15)

Pre-requisite -MTH 101 Introduction to the language and concepts of modern Mathematics. Topics include; Basic set theory:mappings, relations, equivalence and other relations, cartesian products. Binary logic, methods of proof. Binary operations. Algebraic structures, semigroups, rings, integral domains fields. Homeomaphics. Number systems; properties of integers, rationals, real and complex numbers.

MTH 204 LINEAR ALGEBRA I: (2 Units) (L15 P 0: T 15) Pre-requisite -MTH 101, 102 Co-requisite -MTH 203 Vector space over the real field. Subspaces, linear independence, basis and dimension. Linear transformations and their representation by matrices - range, null space, rank. Singular and non-singular transformation and matrices. Algebra of matrices.

MTH 205 LINEAR ALGEBRA II: (2 Units) (L15: P0: T 15) Pre-requisite MTH 101, 102. Co-requisite MTH 203, 204. Systems of linear equation change of basis, equivalence and similarity. Eigenvalues and eigenvectors. Minimum and characteristic polynomials of a linear transformation (Matrix). Caley -Hamilton theorem. Bilinear and quadratic forms, orthogonal diagonalisation. Canonical forms.

MTH 207 REAL ANALYSIS I: (3 Units) (L30 P 0: T 15) Pre-requisite -MTH 101, 103 Bounds of real numbers, convergence of sequence of numbers. Monolone sequences, the theorem of nested Intervals. Cauchy sequences, tests for convergence of series. Absolute and conditional convergence of series and rearrangements. Completeness of reals and incompleteness of rationals. Continuity/and

differentiability of functions R….) R. Rolles's and mean value theorems for differentiable functions Taylor series.

MTH 209 INTRODUCTION TO NUMERICAL ANALYSIS: (3 Units) (L.30 P0: T 15) Pre-requisite -MTH 101, 103 Solution of algebraic and transcedental equations. Curve fitting. Error analysis. Interpolation and approximation. Zeros or non- linear equations 'to one variable'. Systems of linear equations. Numerical differentiation and integratial equations. Initial value problems for ordinary differential equation.

MTH 210 VECTOR ANALYSIS

Elementary Vector Algebra, Vector and Tripplre vector Products (more application solution of vector equation, plain curves and space curves. Geometrical equation of lines and planes. Linear independence of vectors; components of vectors, direction cosines; position vector and scaler products; senent frenent formulae; differential definition of gradients, divergent and simple multiplication

PHY 202: MODERN PHYSICS I (3 UNITS) PREREQUISITES: PHY102

Atomic structure: Experimental basis of quantum theory: Black body radiation; electrons and quanta; Charge quantization, Mass spectra, the plum pudding model, Rutherford model and Bohr models of the atom, Hydrogen spectra, Magnetic moment and Angular momentum of an atom, Electron spin, Pauli Exclusion Principle and electronic configuration, X-ray spectra, De Broglie hypothesis, the uncertainty principle; Wave-particle duality, Schrodinger's equation and simple applications; Nuclear Structure: nomenclature, binding energy and stability, Radioactivity, The radioactive series, Accelerators, Detectors. Bohr's theory of atomic structure.

PHY 204: ELECTROMAGNETISM (2 UNITS)

PREREQUISITES:PHY102, Macroscopic properties of dielectrics: polarisation, Gauss's law in a dielectric, the displacement vector, boundary conditions on **D** and **E**, dielectric strength and breakdown; Capacitor: capacitance, the parallel plate capacitor, effect of a dielectric, energy stored in a dielectric medium, capacitors in series and parallel, practical capacitors; Microscopic properties of dielectrics:

microscopic picture of a dielectric in a uniform electric field, determination of local field, Clausius-Mossotti equation, behaviour of dielectric in alternating fields; Magnetism of materials: response of various substances to a magnetic field, magnetic moment and angular momentum of an atom, diamagnetism and paramagnetism, Lamor precession, magnetization of paramagnets, ferromagnetism, magnetic field due to a magnetized material, magnetic intensity, relationship between **E** and **H** for magnetic material, magnetic circuits.

development.

PHY 206: OPTICS I (2 UNITS)
Nature of light: the corpuscular model, the wave model, light as an electromagnetic wave; Reflection and refraction of light: electromagnetic waves at the interface separating two media, idealization of waves as light rays, Fermat's principle; Perception of light: human vision, colour vision; Polarization of light: simple states of polarized light, principles of producing linearly polarized light, wave plates.

STT 211: PROBABILITY DISTRIBUTION I (3 UNITS) PRE-REQUISITE - STT 102

Discrete sample spaces: Algebra and probability of events, combinatorial analysis. Sampling with and without replacement. Conditional probability, Bayes theorem and stochastic independence. Discrete distributions: Binomial, Poisson, negative binomial-hyper geometric and multinomial. Normal approximation to binomial and Poisson, Poisson approximation to binomial. Random variables and expectations: mean, variance, covariance. Probability generating function and moment generating function. Cheycher's inequality. Continuous joint distributions: marjind as conditional density. Expectations: movement, movement generating functions. Uniform normal, beta Cauchy and hop-normal distributions.

MTH 300 ABSTRACT ALGEBRA I: (3 Units) (L30: P0: T 15) Pre-requisite -MTH 101, 203 Group: definition, examples including permutation grounds. Subgroups, cosets. Legranges theorem and applications. Cyclic, groups. Rings: definition examples including Z, Zn, rings of polynomials and matrices. Integral domains, fields.

Polynomial rings, factorization. Euclidean algorithm for polynomials H.C.F. and L.C.M. of polynomials.

MTH 301 METRIC SPACE TOPOLOGY: (3 Units) (L30: P 0: T 15)
Sets, matrics, and examples. Open spheres (or balls). Open sets and neighbourhoods. Closed sets. Interior, exterior, frontier, limit points and closure of a set. Dense subsets and separable space. Convergence in metric space homeomorphisms. Continuity and compactness, connectedness. Pre-requisite -MTH 202.

MTH 302 ORDINARY DIFFERENTIAL EQUATIONS: (3Units) [L30: P 0: T 0 15] Pre-requisite.- MTH 202. Ordinary differential equations: linear dependence, wronskian, reduction order, variation of parameters, series solution about ordinary and regular points. Special functions: Gamma, Beta, Bessel, lengendre, Hyper geometric. Laplace transform and applications to initial value problems

MTH 303 VECTOR AND TENSOR ANALYSIS: (3 Units) (L30: P0: T 15]
Pre-requisite -MTH 201, 204 Vector algebra. Vector, dot and cross Products. Equating of curves and surfaces. Vector differentiation and applications. Gradient, divergence and curl. Vector integrate, line surface and volume integrals Greens Stoke's and divergence theorems. Tensor products of vector spaces. Tensor algebra. Symmetry. Gartesian tensers.

MTH 304 COMPLEX ANALYSIS I: (3 Units) (L30: P 0: T 15) Pre-requisite -MTH 203, 207 Functions of a complex variable. Limits and continuity of functions of a complex variable. Derivating the Cauchy-Riemann equations. Analytic functions. Bilinear transformations, conformal mappling Contour integrals. Cauchy's theorems and its main consequences, Convergence of sequences and series of functions of a complex variable. Power series. Taylor series.

MTH 305 COMPLEX ANALYSIS II (3Units) (L30: P 0: T 15) Pre-requisite -MTH 203, 207 Co-requisite -MTH 307
Laurent expansions. Isolated singularities and residues. Residue theorem Calculus of residue, and application to evaluation of integrals and to summato of series. Maximum Modulus principle. Argument principle. Rouche's theorem. The 141
fundamental theorem of algebra. Principle of analytic continuation. Multiple valued functions and Riemann surfaces. fundamental theorem of algebra. Principle of analytic continuation. Multiple valued functions and Riemann surfaces.

MTH 306. ABSTRACT ALGEBRA II: (3 Units) (L30: P0: T 15) Pre-requisite -MTH 203, 206 Normal subgroups and quotient groups. Monomorphic isomorphism theorems. Cayley's theorems. Direct products. Groups of sma1l order. Group acting on sets. Sylow theorems. Ideal and quotient rings. P.I.D. 8, U.F.D 'S euclides rings. Irreducibility; Field extensions, degree of an extension, minimum polynomial. Algebraic and transcendental extensions. Straight edged and compass constructions.

MTH 307 REAL ANALYSIS II: (3 Units) (L30: P0: T 15) Pre-requisite -MTH 207 Riemann integral of functions R…..) R, continous monopositive functions. Functions of bounded variation. The Riemann Strieltjes integral. Pointvise and uniform convergence of sequences and series of functions R….) R. Effects on limits (sums) when the functions are continuous differentiable or Riemann integrable power series.

MTH 308 INTRODUCTION TO MATHEMATICAL MODELLING: (3 Units) Pre-requisite -MTH 201, 202, 204 (L 30: P 0: T 15) Co-requisite -MTH 302, 303 Methodology of model building; Identification, formulation and solution of problems, cause-effect diagrams Equation types. Algebraic, ordinary differential, partial differential, difference, integral and functional equations. Application of mathematical models to pluprical, biological, social and behavioural sciences.

MTH 310 MATHEMATICAL METHODS II (L30: P.O. T 15)
Sturm – Liouville problem. Orthogonol polynomios and functions. Fourier series and integrals. Partial differential equations: general and particular solutions. Linear equations with constant coefficients, first and second order equations, solutions of the heat, wave and laplace equations by the method of separation of variables. Eigen function expansions. Methods of variation of parameters. Fourier transforms.

MTH 312 OPTIMIZATION THEORY: (4 Units) (L45 P0: T15)
Linear programming models. The simplex Method: formulation and theory. Quality integer programming; Transportation problem. Two-person zero-sum games. Nonlinear programming: quadratic programming Kuhn-tucker methods. Optimality criteria. Simple variable optimization. Multivariable techniques. Gradient methods. MTH 201, 202, 302, 303.

MTH 313 GEOMETRY: (3 Units) (L30: P 0: T 15) Co-ordinate in R3. Polar co-ordinates; Distances between points, surfaces and curve in space. The plane, straight line. Basic projective Geometry, Affine and Eucidean Geometries.

MTH 314 ANALYTICAL DYNAMICS: (3 Units) (L30: P0: T 15)
Degrees of freedom. Holonomic and holonomic constraints. Generalised co-ordinates lagrange's equations for holonomic systems; face dependent on co-ordinates only, force obtainable from a potential. Impulsive force.

MTH 315 DYNAMICS OF A RIGID BODY: (3 Units) (L 30: P0: T 15) General motions of a rigid body as a translation plus a rotation. Moment, and products of inertia in three dimensions. Parallel, and perpendicular axes theorems. Principal axes, Angular momentum, kinetic energy of a rigid body. Impulsive motion. Examples involving one and two dimensional motion of simple systems. Moving frames of reference; rotating and translating frames of reference. Coriolis force. Motion near the Earth's Surface. The Foucault's pendulum. Euler's dynamical equations for motion of a rigid body with one point fixed. The symmetrical top. Procession.

MTH 316 INTRODUCTION TO OPERATION RESEARCH: (3 Units) (L 30: P0: T 15) Phases of operation Research Study. Classification of operation Research models, linear; Dynamic and integer programming. Decision Theory. Inventory Models, Critical Path Analysis and project Controls.

MTH 319 NUMERICAL ANALYSIS I: 3 Units) (L 30: PO T 15) Polynomial and splines approximation. Orthogunal polynomials and chebysev approximations. Direct and interactive methods for the solution of systems of linear equations. Eigen value problem – power methods, inverse power methods. Pivoting strategies.

STT 316: MULTIVARIATE ANALYSIS AND APPLICATION (3 UNITS)

PRE-REQUISITE – STT 311

Vector random variables. Expectations of random vectors and matrices. Multivariate normal distribution and distribution of quadratic forms. Application to linear models: Tests of general linear hypothesis and estimation. Least square theory: Guass-Markoff and general linear hypothesis with applications to regression and experimental design models. Estimation: partial and multiple correction coefficients, mean vector and co-variance matrix. Hatelting's T^2 and Wishart distribution: multivariate ANOVA.

MTH401 THEORY OF ORDINARY DIFFERENTIAL EQUATIONS 3 Units

Differential equations: existence and uniqueness theorems dependence of solution on initial data and parameters. Properties of solutions. Sturm comparison and Sonin-Polya theorems. Linear and non-linear systems. Floguet's theory and stability theory. Integral equations: classification, volterra and fredlhom types Neumann series. Fredholm alternative for degenerate Hilbert – Schmidt kernels. Reduction of ordinary differential equations to integral equations. Sysmmetric kernels, eigen function expansion with application.

MTH 402 THEORY OF PARTIAL DIFFERENTIAL EQUATIONS 3 UNITS

Theory and solutions of first-order and second order linear equations. Classification, characteristics, cononial forms, Cauchy problems. Elliptic equations; laplace's and posson's formulase, properties of harmonic functions. Hyperbolic equations; wave equations, retarded potential; transmission line equation, Riemann method. Parabolic equation. Diffusion equation, singularity function, boundary and initial – value problem.

MTH 403 FUNCTION ANALYSIS 3 Units

Hilbert Spaces, bounded linear functionals, operators an Banach spaces, topological vector spaces, Banach algebra

MTH 405 GENERAL TOPOLOGY: (3 Units) (L30: P0: T 15) Pre-requisite -MTH 301. Topological spaces, definition, open and closed sets neighbourhoods. Coarser, and finer topologies. Basis and sub-bases. Separatic axioms, compactness, local compactness, connectedness. Construction of new topological spaces from given ones; Sub-spaces, quotient spaces. Continuous functions, homeomorphons, topological invariants, spaces of continuous functions: Pointivise and uniform convergence.

MTH 406 LEBESGUE MEASURE AND INTEGRALS (3 Units) (L30: P0: T 15) Pre-requisite -MTH 207, MTH 307. Lebesgue measure; measurable and non-measurable sets. Measurable functions. Lebesgue integral: Integration of non-negative functions, the general integral convergence theorems.

MTH 407 MATHEMATICAL METHODS: (3 Units) (L30: P0: T 15) Calculus of variation: Lagrange's functional and associated density. Necessary condition for a weak relative extremum. Hamilton's principles. Lagrenge's equations and geodesic problems. The Du Bois-Raymond equation and corner conditions. Variable end-points and related theorems. Sufficient conditions for a minimum. Isoperimeric problems. Variational integral transforms. Laplace, Fourier and Hankel transforms. Complex variable methods convolution theorems.

Application to solution of differential equations. MTH -201, 301, 405, 406.

MTH 499: PROJECT

Individual or Group projects of approved topics related to the current research interests in the department.

18.0 OUTLINE PROGRAMME PROPOSAL (OPP)

OUTLINE OF COURSE STRUCTURE MATHEMATICS AND COMPUTER SCIENCE PROGRAMME

B.SC. MATHEMATICS AND COMPUTER SCIENCE REGISTRABLE COURSES

100 Levels 1st Semester

Course Code	Course Title	Unit(s)	Status
BIO101	General Biology I	2	C
BIO191	General Biology Practical I	1	C
CHM101	Introductory Inorganic Chemistry	2	C
CHM103	Introductory Physical Chemistry	2	C
CHM191	Introductory Practical Chemistry I	1	C
CIT104	Introduction to Computer Science	2	C
MTH101	Elementary Mathematics I	3	C
MTH103	Elementary Mathematics II	3	C
PHY101	Elementary Mechanics, Heat and Properties of Matter	2	C
PHY191	Introductory Practical Physics I	1	C
GST101	Use of English and Communication Skills	2	C
GST107	The Good Study Guide	2	C
	Total Credit Units	**23**	

100 Level 2nd Semester

Course Code	Course Title	Unit(s)	Status
BIO102	General Biology II	2	C
BIO192	General Biology Practical II	1	C
CIT102	Software Application Skills	2	C
CHM102	Introductory Organic Chemistry	2	C
CHM192	Introductory Practical Chemistry II	1	C
MTH102	Elementary Mathematical II	3	C
STT102	Introductory Statistics	2	C
PHY102	Electricity, Magnetism and Modern Physics	3	C
PHY192	Introductory Physics Laboratory II	1	C
GST102	Use of English and Communication Skills II	2	C
	Total Credit Units	**19**	

200 Level 1st Semester- Compulsory Courses

Course Code	Course Title	Unit(s)	Status
CIT237	Programming and Algorithms	3	C
MTH281	Mathematical Methods I	3	C
MTH211	Introductory Set theory and Abstract Algebra	3	C
MTH213	Numerical Analysis I	3	C
MTH241	Introductory Real Analysis	3	C
GST201	Nigerian Peoples and Culture	2	C
GST203	Introduction to Philosophy and Logic	2	C
	Elective Course	3	
	Total Credit Units	**22**	

Elective Courses

CIT211	Introduction to Operating Systems	3	E
CIT215	Introduction to Programming Languages	3	E
MTH210	Introduction to Complex Analysis	3	E
	Total Credit Units	**3**	

200 Level 2nd Semester- Compulsory Courses

Course Code	**Course Title**	**Unit(s)**	**Status**
MTH212	Linear Algebra II	3	C
MTH232	Elementary Differential Equations	3	C
MTH282	Mathematical Methods II	3	C
CIT208	Information Systems	2	C
CIT212	Systems Analysis and Design	3	C
CIT246	Introduction to Computer Organization	2	C
GST202	Fundamentals of Peace Studies and Conflict Resolutions	2	C
	Elective Course	2	E
	Total Credit Units	**20**	

Elective Courses

CIT292	Computer Laboratory	2	E
STT211	Probability Distribution I	3	E

300 Level 1st Semester- Compulsory Courses

Course Code	**Course Title**	**Unit(s)**	**Status**
CIT333	Software Engineering I	2	C
CIT341	Data Structures	3	C
CIT351	C# Programming	2	C
MTH301	Functional Analysis I	3	C

MTH341	Real Analysis	3	C
GST301	Entrepreneurial Studies	2	C
	Elective Courses	6	E
	Total Credit Units	**21**	

Elective Courses

CIT311	Computer Networks	3	E
CIT309	Computer Architecture	3	E
STT311	Probability Distribution II	3	E

300 Level 2nd Semester -Compulsory Courses

Course Code	Course Title	Unit(s)	Status
MTH312	Abstract Algebra II	3	C
CIT342	Formal Languages & Automata Theory	3	C
CIT322	Introduction to Internet Programming	3	C
CIT389	Industrial Training/SIWES	6	C
	Elective Course	3	E
	Total Credit Units	**18**	

Elective Courses

CIT344	Introduction to Computer Design	3	E
CIT371	Introduction to Computer Graphics & Animations	3	E

400 Level 1st Semester- Compulsory Courses

Course Code	Course Title	Unit(s)	Status
MTH401	General Topology I	3	C
MTH411	Measure Theory & Integration	3	C
CIT403	Seminar on Emerging Technologies	3	C
CIT425	Operation Research	3	C

CIT465	Network Administration	2	C
CIT461	Internet Architecture & Communication	3	E
	Total Credit Units Compulsory Courses	**17**	

Elective Courses

CIT461	Internet Architecture& Communication	3	E

400 Level 2nd Semester- Compulsory Courses

Course Code	**Course Title**	**Unit(s)**	**Status**
MTH402	General Topology II	3	C
MTH412	Functional Analysis II	3	C
CIT478	Artificial Intelligence	3	C
MTH499	Project	6	C
	Elective Course	2	E
	Total Credit Units	**17**	

Elective Courses

CIT474	Introduction to Expert System	2	E
CIT432	Software Engineering II	3	E

Students to take one elective course

19.0 SYNOPSES OF COURSES AND DETAILED PROGRAMME PROPOSAL (DPP) FOR B.SC. MATHEMATICS AND COMPUTER SCIENCE PROGRAMME

BIO101: GENERAL BIOLOGY I (2 UNITS)
Characteristics of living things; cell as the basic unit of living things, cell structure, organization, cellular organelles, tissues, organs and systems.
Classification of living things, general reproduction and concept of inter-relationships of organism. Heredity and evolution. Elements of ecology (introduction) and habitats.

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BIO102 GENERAL BIOLOGY II (2 UNITS)
Systematic studies of diversity of life including monera, protista, plants (Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and angiosperms) and animals (Protozoa, Platyhelminthes, Annelids, Arthropods, Fishes, Amphibians, Reptiles, Birds and Mammals) based on similarities and differences in external morphology. Taxonomic divisions of plant and animal kingdoms. Ecological adaptations of these forms.

BIO191 GENERAL BIOLOGY PRACTICAL I (1 UNIT) What practical work in biology involves. Laboratory organization. Handling common laboratory equipment. Microscopic handling and maintenance. Making microscopic measurements. Procuring animal materials for practicals. Killing, preserving and maintaining animal materials. Procuring plant materials. External features of plants (differences and similarities). Preparation of temporary slides. Preparation of stains and reagents. Techniques for microbial culture and grain staining. Setting up demonstration for physiological processes in plants. Setting up apparatus for demonstrating physiological processes in animals. Preparation required for dissection.

BIO192 GENERAL BIOLOGY LABORATORY II (1 UNIT) Observation and description of the morphological and diagnostic features as well as the differences among the different phyla of the plant, animal, archebacteria, eubacteria, fungi and protista kingdoms. Identification of the taxonomic hierarchy of the members of the above groups. Study of the structure and functions of their parts and habitats

specifications

CHM101: INTRODUCTORY INORGANIC CHEMISTRY (2 UNITS)

Hypothesis, theory and law with appropriate illustrations, Nature of matter – 3 states of matter, Atomic structure, electronic energy levels and orbital. Periodic classification of elements and its relationship to their electronic configurations, Chemical bonding, Survey of properties and trends in groups I, II, IV, VI and transition metal,

CHM102: INTRODUCTORY ORGANIC CHEMISTRY (2 UNITS)

Simple reactions of hydrocarbons, alcohols, and acids. Petroleum chemistry, Oils and fats, hydrogenation of oils, polymer and biologically important molecule.

CHM103: INTRODUCTORY PHYSICAL CHEMISTRY (2 UNITS)

Mole concepts and calculations based on it, methods of expressing concentrations, Chemical Kinetics and equilibrium, and related calculations, Important application of equilibrium – pH, solubility products and solubility of ionic solids, Thermo chemistry and simple calculations based on Hess's law, Electrochemistry and working of various cells, Brief mentions of corrosion; chemical thermodynamics; $\Delta G = \Delta H - T\Delta S$

CHM191: INTRODUCTORY PRACTICAL CHEMISTRY I (1 UNIT)

Practical based of CHM 101 and CHM 103: Cations and anions – identification, Acid- base titrations, Redox reactions and determinations

CHM192: INTRODUCTORY PRACTICAL CHEMISTRY II (1 UNIT)

Practical based on general chemistry CHM 101 and introductory organic chemistry I CHM 102- Determination of melting and boiling points and reaction of functional groups.

GST101: USE OF ENGLISH AND COMMUNICATION SKILLS I (2 UNITS)

Listening enabling skills, listening and comprehending comprehension, note taking and information retrieval. Including data, figures, diagrams and charts. Listening for main idea, interpretation and critical evaluation. Effective reading. skimming and scanning. Reading and comprehension at various speed levels. Vocabulary development in various academic contexts. Reading diverse texts in narratives and expository. Reading and comprehension passages with tables, scientific texts. Reading for interpretation and critical evaluation.

GST102: USE OF ENGLISH AND COMMUNICATION SKILLS II (2 UNITS)

Writing paragraphs: Topic sentence and coherence. Development of paragraphs: illustration, Description, cause and effect including definitions. Formal letters; essential parts and stylistic forms, complaints and requests; jobs, ordering goods, letters to government and other organizations. Writing reports; reporting event, experiments. Writing summaries: techniques of summarizing letters and sounds in English, vowels and consonants. Interviews, seminar presentation, public speech making, articles, concord and sentences including tenses. Gerund, participles, active, passive and the infinitive. Modal auxiliaries.

GST105 HISTORY AND PHILOSOPHY OF SCIENCE (2 UNITS)

Nature of science, scientific methods and theories; Law of nature; History of science. Lost sciences of Africa, science, technology and inventions. Nature and scope of philosophy in science. Man, nature and his origin. Man, environment and resources. Great Nigerian Scientists.

GST107: THE GOOD STUDY GUIDE. (2 UNITS)

Getting started: How to use the book, why read about skills, getting yourself organised; what is studying all about, reading and note taking; Introduction, reactions to reading, your reading strategy, memory, taking notes, conclusion. Other ways of studying: Introduction, learning in groups, talks and lectures, learning from TV and radio broadcasts, other study media. Working with numbers; Getting to know numbers, describing the world, describing with the tables, describing with diagrams and graphs; What is good writing? The Importance of writing, what does an essay look like, what is a good essay? Conclusion. How to write essays: Introduction, the craft of writing, the advantages of treating essay writing as a craft, making your essay flow, making a convincing case, the experience of writing. Preparing for examination.

MTH101 ELEMENTARY MATHEMATIC I: (3 Units)

(ALGEBRA AND TRIGONOMETRY)

Elementary set theory, subsets, union, intersection, complements, venn diagrams. Real numbers; integers, rational and irrational numbers, mathematical induction, real sequences and series, theory of quadratic equations, binomial theorem. Complex numbers; algebra of complex numbers; the Argand Diagram. Re Moivre's theorem, nth roots of unity. Circular measure, trigonometric functions of angles of any magnitude, addition and factor formalae.

MTH102 ELEMENTARY MATHEMATICS III: (3 UNITS) CALCULUS

Function of a real variable, graphs, limits and idea of continuity. The derivative as limit of rate of change, Techniques of differentiation, Extreme curve sketching. Integration as an inverse of differentiation, Methods of integration, Definite integrals; Application to areas and volumes

MTH103 ELEMENTARY MATHEMATICS III: (3 Units) PRE-REQUISITE - MTH 101

(VECTORS, GEOMETRY AND DYNAMICS)

Geometric representation of vectors in 1-3 dimensions, components, direction cosines. Addition and Scalar multiplication of vectors and linear independence. The Scalar and vector products of two vectors. Differentiation and integration of vectors with respect to a scalar variable. Two-dimensional co-ordinate geometry. Straight lines, circles, parabola, ellipse, hyperbola. Tangents, normals.

STT102 INTRODUCTORY STATISTICS (2UNITS)

Measures of Central Tendency and dispersion, (grouped and ungrouped); mean: - arithmetic and geometric, harmonic, median, mode quartiles, deciles, modes, relative and absolute dispersion, sample space and events as sets. Finite probability space properties of probability. Statistical independence and conditional probability. Tree diagram. Bayes theorem. Discrete and continuous random variables. Expectation, independent Bernoulli trials. Binomial Poisson and Normal distributions. Normal approximation to binomial and Poisson distribution, Hyper geometric.

PHY101: ELEMENTARY MECHANICS, HEAT AND PROPERTIES OF MATTER (3 Units)

Space and Time: Physical quantities: Units and dimensions of physical quantities; Kinematics: Uniform velocity motion, uniformly accelerated motion; Dynamics: Newton's laws of motion; Impulse and Linear Momentum, Linear Collision, Newton's universal law of gravitation; Work, energy and power; Conservation laws; Concept of mechanical equilibrium; Centre of mass and centre of gravity; Moment of a force; Rotational kinematics and dynamics: Torque; Moment of Inertia; angular momentum; Total mechanical energy. Simple harmonic motion

Heat and temperature, work and heat, Quantity of heat: heat capacities, latent heat; Thermal expansion of solids, liquids and gases; Gas laws, heat transfer; Laws of thermodynamics: Isothermal and Adiabatic

changes, Carnot cycle; Application kinetic theory of gases; van der Waals gas.

Classification of matter into (solids, liquids and gases, forces between atoms and molecules, molecular theory of matter, Elasticity, plasticity, Hook's Law, Young's Shear and bulk Moduli) Crystalline and non-crystalline materials, Hydrostatics: pressure, buoyancy, Archimedes' principle; Hydro-dynamics-streamlines, Bernouli and Continuity equations, turbulence, Reynold's number, Viscosity, laminar flow, Poiseuille's equation; Surface tension, adhesion, cohesion, capillary, drops and bubbles.

PHY102: ELECTRICITY, MAGNETISM AND MODERN PHYSICS (3 UNITS)

Electrostatics: Coulomb's law, Gauss's law, potential and capacitance, dielectrics, production and measurement of static electricity. Current: Ohm's law, resistance and resistivity, heating. Galvanometers, Voltmeters and Ammeters; D.C. circuits: sources of emf and currents, Kirchhoff's laws; Electrochemistry; The Earth's magnetic field; Magnetic fields and induction, Faraday's and Lenz's laws; Force on a current-carrying conductor. Biot-Savart law. Flemming's right and left-hand rules, motors and generators. A.C. Theory. Atomic structure; Production and properties of X-rays; Radioactivity; Photoelectric emission.

PHY191: INTRODUCTORY PRACTICAL PHYSICS I (1 UNIT)

Graphs, Measurement, Error Analysis, Determination of Acceleration due to Gravity by Means of Simple Pendulum, Determination of force constant of a spiral spring, Determination of effective mass of a spiral spring and the constant, Determination of surface tension of water, Determination of specific latent heat of fusion of ice, Determination of the co-efficient of limiting static friction between two surfaces, Determination of the co-efficient of static friction on two surfaces using an inclined plane, Determination of Relative Density of kerosene using the specific Gravity Bottle, Determination of the Relative Density of a Granular substance not soluble in water using the specific gravity bottle.

PHY192: INTRODUCTORY PRACTICAL PHYSICS II (1 UNIT)

Refraction through the glass block; Image formed by a concave mirror; Determination of the focal length of the convex mirror; Refraction through the triangular prism; Determination of the focal length of a converging lens and the refractive index of groundnut; Determination of resistance of resistors in series and in parallel in simple circuits; Determination of internal resistance of a dry cell using a potentiometer; To compare the E.M.F. of cells using potentiometer; Determine the unknown resistance of a resistor using Wheatstone Bridge; To determine the relationship between current through a Tungsten and a potential applied across it.

CIT 208: INFORMATION SYSTEMS

Introduction & Basic SQL Project Introduction. Advanced SQL. Conceptual Modelling and Schema Design. Database Programming, JDBC, Regular Expressions. Functional Dependencies E2: Functional Dependency & Relational Algebra. Relational Algebra. Introduction to XML. XML and XQuery. Web Services. Transactions. Recovery. Database Heterogeneity.

CIT 211: INTRODUCTION TO OPERATING SYSTEM

Definition of an operating system; Types of operating systems; and real time (single-user/multi-user), timesharing; Examples of operating systems; DOS, CP/M, UNIT/ZENITH,/LINUX, MS/9798/2000, etc. Components of an operating system; Supervisor, memory manager, I/O handlers, file system, etc. Operating system interface with the hardware; interrupts, i/o channel, multiplexer, registers, status words. Operating system interface with other systems softwares; linkers, translators, libraries, etc. storage organization and protection.

CIT 212: SYSTEMS ANALYSIS & DESIGN

General systems concepts: Systems project team organisation; Overview of systems development process; Project identification and selection; system requirements analysis and feasibility study; fact finding techniques; Systems design; Analysis techniques and tools e.g. Jackson System Development (JSD) techniques etc. Data flow

diagrams, HIPO charts. Business system design; procurement, site preparation, system installation, system testing, system conversions; system project, report writing, and presentation; system documentation; post installation evaluation; compilation of a real-life system analysis team project to provide experience in applying the principles and techniques presented above

CIT 215: INTRODUCTION TO PROGRAMMING LANGUAGES

FORTRAN programming language; Comparison of various versions of the language. Programming exercises using FORTRAN with emphasis on scientific application problems. Elements of Pascal language. Exercises in Pascal Program structures and programming concepts; Structured design principles; abstraction, modularity, stepwise refinement, structured design techniques teaching of a structured programming language, e.g. PASCA/JAVA, C^{++}.

CIT 246: INTRODUCTION TO COMPUTER ORGANIZATION

Number systems; Number representation; Computer arithmetic; Basic instruction cycle; Data types; Instruction types; Addressing modes; Assemblers, linkers, loader; Subroutines, stacks; I/O, traps, interrupts; Floating-point instructions; Instruction set design; Virtual machines, compilation/interpretation.

MTH 210: INTRODUCTION TO COMPLEX ANALYSIS

Complex number, the topology of complex plane. Limits and continuity of function of complex variables, properties and example of analytic functions, branch-points, Cauchy-Riemann equations. Harmonic function.

MTH 211: INTRODUCTION TO SET THEORY AND ABSTRACT ALGEBRA

Set: Binary operations, mapping, equivalence relations integers: Fundamental theorem of arithmetic, congruence equations, Euler's function (n) Group Theory: Definition and examples of groups. Subgroups, coset decomposition, Lagrange's theorem. Cyclic groups.

Homonorphisms, isomorphism. Odd and even permutations, Cayley's theorem. Rings: Definition and examples of rings. Commutative rings. Integral domain. Order, well-ordering principles. Mathematical induction.

MTH 213: NUMERICAL ANALYSIS I

Interpolation: Lagrange's and Hermite interpolation formulae, divided differences and difference schemes. Interpolation formulas by use of divided differences. Approximation: Least-square polynomial approximation, chebychev polynomials continued fraction and rational fraction orthogonal polynomials. Numerical Integration: Newton's-cotes formulae, Gaussian Quadrature.Solution of Equations: Graeffe's method. Bernoulli's method, Newton's method, Bairstow's method (iterative method) Matrices and Related Topics: Definitions, Eigenvalue and Eigenvectors, Algebraic Eigenvalue problems-power method, Jacobi method.

Systems of linear Equations: Gauss elimination, Gauss-Jordan method. Jacobi iterative method, Gauss-field iterative method.

MTH 241: INTRODUCTION TO REAL ANALYSIS

Set: Cartesian products, functions and mappings direct and inverse images. Countable sets. Limits: Elementary properties of limits. Upper and lower bounds, supremum, infimum, convergence of sequences. Limit of monotone functions and sequences. Cauchy's convergence principles. Continuity: Real-Valued functions of a real variable; Monotone functions, periodic functions, bounded functions. Continuity of functions using neighbourhood. Elementary properties of continuous functions. Uniform continuity. Series: convergence of series, tests for convergence, absolute convergence, power series, uniform convergence.

MTH 212 LINEAR ALGEBRA II

Vector spaces. Liner independence. Basis, change of basis and dimension. Linear equations and matrices. Linear maps. The diagonal, permutation, triangular matrices. Elementary matrix. The inverse of a matrix. Rank and nullity. Determinants. Adjoint,

cofactors, inverse matric. Determinantial rank. Crammer's rule. Canonical forms, similar matrics, Eigen values and vectors, quadratic forms.

MTH 232 ELEMENTARY DIFFERENTIAL EQUATION

Introduction, equation of first order and first degree, separable equations, homogeneous equations, exact equations, linear equations, Bernoulli's and Riccati equations. Applications to mechanics and electricity. Orthogonal and oblique trajectories. Second order equations with constant coefficients.

MTH 251 MECHANICS

Static: System of live vectors. Coyoles and wrenches. Principles of virtual work. Stability of equilibrium. Dynamics of systems of particles: Elastic strings. Hooks law. Motion in resisting media. Changing mass. Motion along a curve. Frenets formulae.

MTH 281: MATHEMATICAL METHODS I

Sequences and Series: Limits, continuity, Differentiability, implicit functions, sequences. Series, test for convergence sequences and series of functions. Calculus: partial differentiation, total derivatives, implicitly functions, change of variables. Taylor's theorem and maxima and minima functions, of two variables. Langrangian multiplier. Numerical Methods: Introduction to iterative methods, Newton's method applied to finding roots. Trapezium and Simpson's rules of integration.

MTH 282 MATHEMATICAL METHODS II (3 UNITS)

Elementary Vector Algebra, Vector and Tripplre vector Products (more application solution of vector equation, plain curves and space curves. Geometrical equation of lines and planes. Linear independence of vectors; components of vectors, direction cosines; position vector and scaler products; senent frenent formulae; differential definition of gradients, divergent and simple multiplication) curvilinear coordinates. Complex Numbers: The algebra and geometry of complex numbers; de'moivre's theorem. Elementary transcendental functions. The n^{th} root of unity and of a general complex number.

STT 211: PROBABILITY DISTRIBUTION I (3 UNITS)

Discrete sample spaces: Algebra and probability of events, combinatorial analysis. Sampling with and without replacement. Conditional probability, Bayes theorem and stochastic independence. Discrete distributions: Binomial, Poisson, negative binomial-hyper geometric and multinomial. Normal approximation to binomial and Poisson, Poisson approximation to binomial. Random variables and expectations: mean, variance, covariance. Probability generating function and moment generating function. Chebychev's inequality. Continuous joint distributions: marjind as conditional density. Expectations**:** movement**,** movement generating functions. Uniform, normal, beta Cauchy and hop-normal distributions.

GST 201 NIGERIAN PEOPLES AND CULTURE (2 UNITS)

Nigerian history, culture and arts in pre-colonial times; Nigerians' perception of their world; culture areas of Nigeria and their characteristics; evolution of Nigeria as a political unit; indigene/settler phenomenon; concepts of trade; economic self- reliance; social justice; individual and national development; norms and values; negative attitudes and conducts (cultism and related vices); re-orientation of moral and national values; moral obligations of citizens; environmental problems.

GST 202: FUNDAMENTALS OF PEACE STUDIES & CONFLICT RESOLUTIONS (2)

Basic Understanding of Conflict; Definitions, Causes and Types of Conflict, Conflict Theories, Phases in Conflict, Conflict Analysis & Transformation. Dynamics of Conflict; Relationship between Perception and Conflict, Language Barriers in Conflict and Resolution, Early Warning and Early Response Mechanism, Arms Control and Demilitarization, Peace and Education. Trends in Global Issues: International, Continental and Regional Organizations in the Pursuance of World Peace, Peaceful Methods of Conflict Resolution, Coercive Means of Conflict Resolution, Gender Issues and Humanitarian Intervention.

GST 203: PHILOSOPHY AND LOGIC (2 C)

Fundamentals of logic and critical thinking; types of discourse; nature of arguments; validity and soundness; techniques for evaluating arguments; distinction between inductive and deductive inferences; etc. Illustrations from familiar texts, including literature materials, novels, law reports and newspaper publications

GST 301: ENTREPRENEURSHIP STUDIES

Definition of Entrepreneurship, Relationship Between Entrepreneurship and Small Business Management, Factors of Entrepreneurship; Dealing with External Factors of Entrepreneurship; Factors of Production; Profit and Other Objectives of an Entrepreneur, the Business Environment, Understanding Viability Study; Needs and Characteristics of Consumers; Mission and Enterprise Objectives; Export Market Shares; Target Market; Income Determination; Break-even Point, Size of the Business, Location Factors; Financial Requirements Forms of Ownership; Business Plan. Risk Analysis; Legal Requirements; Staffing, Purchasing; Production; Management.

MTH 301 FUNCTIONAL ANALYSIS I

Metric Spaces – Definitions and examples. Open Sphere of (balls) closed sets, interior, exterior, frontier, limit points and closure of a set. Dense subsets and separable space. Convergence in metric space, homeomorphism, continuity and compactness.

MTH 381: MATHEMATICAL METHODS III

Functions of several variables: Jacobian, functional dependence and independence. Multiple integrals, line integrals. Improper integrals. Vector Field theory: Relations between vector field functions. Integral theorems. Gauss's, Stoke's and Green's theorems. Elementary tensor calculus. Functions of a complex variable: The Cauchy-Riemann equations. Integration of complex plane. Cauchy's theorem Cauchy's inequality. The residue theorem and the evaluation of integrals. Integral Transforms: Fourier and Laplace transforms. Convolution properties and their applications.

STT301: STATISTICAL INFERENCE

Sampling and sampling distributions. Point and interval estimation. Principles of hypothesis testing. Testing of hypothesis concerning population means, proportions and variances for large and small samples, large and small sample cases. Goodness-of-fit-test. Analysis of variance.

STT 311: PROBABILITY DISTRIBUTION II

Probability spaces measures and distribution. Distribution of random variable spaces. Product probabilities. Independence and expectation of random variables. Convergence of random variables. Week convergence almost everywhere, laws of large numbers. Characteristic function and inversion formula.

STT 313: STOCHASTIC PROCESSES I

Random at walk and run problems, fluctuations in coin tossing, mark or chains: classification of states; ergodic properties, applications. Generating functions convolutions; first passage times; partial fractions expansions, bivariate generating functions. Recurrent events.

STT 316 MULTIVARIATE ANALYSIS AND APPLICATION

Vector random variables. Expectations of random vectors and matrices. Multivariate normal distribution and distribution of quadratic forms. Application to linear models: Tests of general linear hypothesis and estimation. Least square theory: Guass-Markoff and general linear hypothesis with applications to regression and experimental design models. Estimation: partial and multiple correction coefficients, mean vector and co-variance matrix. Hatelting's T^2 and Wishart distribution: multivariate ANOVA.

STT 321: SAMPLE SURVEY DESIGN

The role of sampling. Principle steps in sample surveys. Sampling with and without replacement. Theory of estimation of mean, variance, proportion and regression estimates in simple random, stratified,

systematic, multistage and cluster sampling. Determination of sample sizes and optimum allocation.

CIT 333: SOFTWARE ENGINEERING I

Top-DOWN design, modularity, technical and managerial problem of software development design representations; e.g. pseudo code HIPO diagrams CASE tools and Programming Environments.

CIT 309: COMPUTER ARCHITECTURE

Introduction, basic computer organization; Instruction formats, instruction sets and their design; ALU design: Adders, subtracters, logic operations; Boolean Algebra; Karnaugh Maps; Datapath design; Control design: Hardwired control, microprogrammed control; More on arithmetic: Multiplication, division, floating point arithmetic; RISC machines; Pipelining; Memory systems and error detection and error correction coding; Caches; Memory; I/O and Storage; Multiple Issue; Dynamic Scheduling; Data-Level Parallelism and Vectors; Shared-Memory; Multiprocessors; Multithreading

CIT 311: COMPUTER NETWORKS

Basic models of communication; data communication and networks; protocols and their basic architecture; idea for standardization; transfer of data; tools and mediums for transfer; data coding; data communication interfaces; control of data connections; multiplexing; local area networks; technology, architecture and systems; wide area networks; types of commutation; integrated digital services; internetwork communication; network level; basics of OSI and Internet architecture and referent models; Internet protocols; traffic control; Types of network protocols; transport protocols; application level; system aspects network security; distributed applications; basic network services; network management; OSI and Internet models for management; definition of system servers: from addresses and names to services.

CIT 331: THEORY OF COMPUTATION

Finite Automata, Turing machine, Recursively enumerable sets, Halting Problem. Computability and Decidability. Predicate Logic,

Validity Problem, Deduction, Herband's procedures, Robinson's resolution rule. Program Verification; Formal Semantics.

CIT 341: DATA STRUCTURES

Basic data structure including lists and trees, constructs for specifying and manipulating data types. List structures, Binary, AVL and other trees, traversal algorithm, graphs, rings, recursive programming, storage managements; stacks, queues, language features affecting static and dynamic data structures, fixed and variable sized blocks, best-fit, first-fit, etc. garbage collection, fragmentation, buddy system, block compaction and relocation hash tables, programming exercises involving the implementation and use of data structures.

CIT 351: C# PROGRAMMING

Introduction to programming: Algorithms and flowcharts; Data types in C#; Operators and expressions in C#; Decision Structures in C#; control structures; Pointers and Arrays; Functions; File and Structs, Union and Bit-fields;

CIT 363: INTRODUCTION TO INTERNET PROGRAMMING

Introduction to current programming models in generating and supporting rich real-world web based applications. Internet architecture and organization. Internet services, electronic mail, data transfer, dial-up, connection protocols. Connection to Internet: modem connection, dial-up servers. Modern protocols for multimedia communication: Common Gateway Interface (CGI), multimedia messaging, protocols for multimedia communication – hypertext. HTML programming language: HTML tags and concepts such as tables, frames, forms and cascading style sheets; hypertext design. Web services and servers, examples and design of web pages, search engines and indexing. Elements of programming language: JavaScript, dynamic HTML pages. Development and the future communication using Internet. New technologies.

CIT 342: FORMAL LANGUAGES AND AUTOMATA THEORY

Introduction to language structures; languages and their representations; Grammars; formal notations, types, Chomsky's language hierarchy; sentence generation and recognition; derivations; Ambiguity and syntax and finite state automata; context-free grammars; simplification of context-free grammars; Chomsky, Greibach Normal Forms Push-Down automata, LR(K) grammars, Recursive languages; semantics. Lab. exercises.

CIT 345: INTRODUCTION TO COMPUTER DESIGN

Introduction to numbers and codes. Combinational logic design and applications: adders, decoders, multiplexers, etc. Sequential logic design and applications: registers, flip-flops, etc., and general finite state machines. Memory devices: read-only memory (ROM), random access memory (RAM). Introduction to microprocessors: arithmetic logic unit (ALU), basic CPU architecture, addressing modes and program execution. Assembly language programming: programs for simple tasks; branching, loops, and subroutines.

CIT 321: COMPUTER OPERATIONAL SYSTEMS I

Historical developments of operating systems and computer hardware, Operating systems types; necessary hardware requirement and operating characteristics, concurrent programming, batch versus time-sharing, multi-processing systems; the supervisor, resources allocation and deallocation, interrupts and interrupts handling, device handlers, memory organization virtual memory and virtual machine, remote job entry, pipeline processing, command languages more about DOS/VS/JCL in respect of maintenance of libraries and job organization.

CIT 371: COMPUTER GRAPHIC & ANIMATIONS

Raster Graphics: Introductions, Display technologies, Java Overview, Pixels, a Raster Object, Images, Sprites, Raster-ops, and Bitblts, Color (models, and frame-buffer structure), Line drawing (DDAs, Bresenham's), Curve drawing (circle, conics, Area filling),

Scan Conversion of Triangles and Interpolation, 2-D geometric transformations and dithering, User Interface design, Interaction Models. **3D Graphics**: Transformations, Homogeneous Coordinates, Viewing and Projection, Modeling primitives and hierarchies, 3D Clipping, Visible-surface determination, Illumination and Shading, Ray Tracing, Textures and Animation, Radiosity and Global Illumination.

CIT 389: INDUSTRIAL TRAINING (3 UNITS)

Six months of Industrial Training Students' experience will be documented and presented in a logbook. The training experience will also be presented in a report this together with the logbook, dully signed and graded by the students' supervisor will be submitted to the CIT unit, SST NOUN for final vetting and recording of the grade.

MTH 341 REAL ANALYSIS

Integration: The integral as the area of the ordinate set of a function. Definition of the Riemann integral of bounded functions. Conditions for integrality. Properties of the integral. Relations between integrals and derivatives. Approximation to integrals by sum.

The Riemann Integral: Riemann-Sieltejes integral. Properties, functions of bounded variation and extension to the notion of integration. Sequences and Series of Functions: Convergence of sequences and series of functions. Uniform convergence. Continuity of sum of a uniform convergent series of continuous functions. Terms by term integration and differentiation of a series of continuous functions. Applications to power spaces metric spaces.

MTH 382 MATHEMATICAL METHODS IV

Ordinary Differential Equations: The concept of existence and uniqueness of solutions. Operational methods of solution of linear equations. Sturm-Lionvelle theory, Green's functions, series solution. Special functions and some of their elementary properties; Gamma and Beta functions. Partial Differential Equations: Solutions of boundary and eigenvalue problems of partial differential equations by various

methods which include: Separation of variables, transform techniques. Sturn-Lionville theory; Green's functions; method of characteristics.

MTH 312 ABSTRACT ALGEBRA II

Normal subgroups and quotient groups. The isomorphism theorem. Symmetric groups, automorphism, conjugate classes, Normalisers. The sylow theorems. Normal and composition series. The Jordan-Holder theorem. Direct product. Solvable group. Isomorphism theorems for rings. Ideals and quotient rings. Commutative ring, maximal ideals. Euclidean rings, principal ideal domain and unique factorization domain.

MTH 401 GENERAL TOPOLOGY 1

Point Set Topology: The space R" Euclidean metric. Metrics, open spheres, metric topologies, metric spaces, properties of metric topologies Equivalent metric. Heine-Borel theorem. B olano-wirestree theorem. Properties of separable, complete, compact, locally-compact and connected spaces. Cantor's set. Continuity and uniform continuity of mappings on metric space Topological spaces: Definitions, examples, accumulation points, closes set, closure, interior, exterior and boundary of a set Neighbourhoods and neighbourhood systems. Coarser and finer topologies, subspaces and relative topologies. Base for a topology sub bases.

MTH 402 GENERAL TOPOLOGY II

Separation axioms: T-spaces, Huasdorff spaces, Regular spaces, Normal spaces, Urgsohn's lemma. Category and seperability: Dense sets, nowhere dense sets. Sets of the first and second categories. Perfectly separable spaces, separable spaces. The axiom of countability. Compactness: Covers, compact sets, subset of compact spaces. Sequentially, countably and locally sets. Compactification. Product spaces: product topology. Base for a finite product topology. Tychonoff product theorem. Connectedness: separated sets, connected sets, connected spaces. Connectedness of the real line. Components. Locally-connected spaces. Homotopic paths. Homotopy relations. Simple connected spaces.

MTH 411 MEASURE THEORIES AND INTEGRATION

Measure Theory: Measure of open, closed sets. Outer and inner measure. Measurable sets. Properties of measure. Non-measurable sets. Measurable in the scene of Borel. Measurable space. Measurable functions. Simple function Algebra. The Lebesgue integral: Lebesgue measure. Integral of non-negative function. Integral as measure of ordinate set, as a limit of approximate sums, Integral of an unbounded function, Integral over an infinite range. Simple properties of the integral Sequences of integral (Positive functions; functions with positive and negative values) Lesbesgue monotone convergence theorem. Fatou's Lemma, Dominated convergence. Bepo's Lemma-Bounded Convergence. Sets of measure zero, Integration by parts. Fubini theorem and applications to multiple integrals.

STT 411 PROBABILITY THEORY

Probability space measures and distribution. Distribution of random variables as measurable functions. Product spaces; product of measurable space, product probabilities. Independences and expectation of random variables. Convergence of random variables; weak convergence almost everywhere, convergence in path mean. Central limit theorem, laws of large numbers. Characteristic function and Inversion formula.

MTH 412 FUNCTIONAL ANALYSIS II

Normal Linear Space: Definition and examples. Convex sets. Norms. Holders Minkowski's inequalities. Riese-Fisher theorem. Linear Operations on finite dimensional spaces. Linear functionals spaces Banach spaces, examples. Quotient spaces. Linear product spaces. Topological linear spaces. Hilbert space, examples. Linear operators in Hilbert spaces. Adjoint operators. Hermitian operators. Orthogonality; orthogonal complement projections in Hilbert spaces.

STT 411 PROBABILITY THEORY

Probability space measures and distribution. Distribution of random variables as measurable functions. Product spaces; product of measurable space, product probabilities. Independences and

expectation of random variables. Convergence of random variables; weak convergence almost everywhere, convergence in path mean. Central limit theorem, laws of large numbers. Characteristic function and Inversion formula.

CIT 411: MICROCOMPUTERS AND MICROPROCESSORS

Review of basic concepts in digital electronic; Microprocessors; functions; operations and architecture; comparison of current microprocessors, multi-chip and single chip; i/o organization, assembler language; comparison of instruction sets; address modes, stack operation; subroutines I/O data transfer; bus control; daisy chaining, handshaking etc; interrupt structures programmed transfer, DMA microcomputer systems; types of microprocessors; uses of microprocessors, microcomputer design for specific applications; microcomputer networking interfacing microcomputer real-time control; laboratory exercise using an assembly language.

CIT 425: OPERATIONS RESEARCH

The nature of operation research; Linear programming, simplex method, Transportation problem, allocation problems; Quadratic and Goal programming; Inventory control; Network Analysis; Replacement Analysis and Simulation; maintenance and reliability problems. Dynamic programming; sequencing and co-ordination.

CIT 445: PRINCIPLE AND TECHNIQUES OF COMPILERS

Recapitulation of formal grammars; source code and target code structure of typical compiler, comparative compiling techniques. Lexical analysis syntax analysis; simple precedence; operator precedence, LR(K) parsers; semantics, Run time storage allocation; code generation and code optimization. Compiler-compilers. Pragmatics of Compiler writing; Translator writing; Error recovery and Optimization problems; Laboratory exercises leading to the productions of major parts of a compiler for an actual programming language.

CIT 461: INTERNET ARCHITECTURE & COMMUNICATIONS

History of the internet protocols (IP, FTP, HTTP, TCP) Network topologies Renters, Bridges Gate ways, Backbones. World wide web (www) TTP Site and examples Internet Browsers (Internet explorer, Netscape) Role of ISP's Internet Connectivity Requirements. E-mail, E-Business. Websites design and Hosting Engineers.

CIT 462: WEB SERVER TECHNOLOGY

Review of XHTML (Extensible Hypertext Markup Language) and CSS (Cascading Style Sheets). Introduction to client-side scripting languages such as JavaScript in Web application development. Use a client-side programming language such as JavaScript to develop interactive Web content including forms, style sheets, data validation, and animation. Introduction to Web server technology and Web-based applications. Survey of server-side programming languages such as CGI-Perl and PHP. Introduction to XML (Extensible Markup Language). An overview of database operations. Introduction to the deployment of applications to a Web server. Complete an integrated Web application that integrates a database along with client-side and server-side applications.

CIT 463: MULTIMEDIA TECHNOLOGY

Introduction: What is multimedia, Multimedia systems, Quality of service, Synchronization & orchestration, Standards, Convergence, Value chain. Hardware: Multimedia computers, Video and graphics, Audio, Telephone, video conference, and networks, CD and DVD, USB and FireWire, Processors, Video for Windows, DirectX, and ActiveMovie. Software: Browser based software architecture, Distributed software, Servers, Network, Terminals. Audio and Video: Digital audio; Psycho acoustics, Digital presentation of sound, Digital images, JPEG, Video signal, Camera sensors, Colors, Color television, Equipment, Compression systems, Basics of video compression, Methods, Algorithms. Interchange Formats: Application areas, Requirements, Track and object model, Real-time transfer, Different transfer formats, Comparison. Authoring Tools: Production process, Tools, Barriers, Development areas. Communications: QoS, ATM,

QoS implementations, Integrated Services, Differentiated Services. Multicast: Group control, Routing, Real-time transfer and control protocols, Resource reservation, Session control, MBone. Video Conference: Standards, Products, Internet telephony, CTI (Computer Telephony Integration). Access Networks: Cable television, Digital subscriber lines, UMTS, Digital television.

CIT 465: NETWORK ADMINISTRATION

Introduction to Network Administration: scope, goals, philosophy & standards. IT System Components and Network Structures, technology and protocols. System Administration: host computer and user management. Network Administration methods and Standards. Managing devices using SNMP and RMON. Management issues: planning, implementation, fault diagnosis and recovery. Network Simulation as a management tool. Network Documentation. Network Security and Administration.

CIT 469: PROTOCOLS DESIGN AND PROGRAMMING

Introduction. Stages in Protocols design: Problem definition, requirements analysis, protocol design and implementation in software. Protocol design tools. Overhead: bandwidth, CPU, etc. Protocol life cycle. Preparing for future versions of the protocol: version numbers, reserved bit fields, forwards and backwards compatibility. Parameters setting. Desirable protocol features: autoconfiguration, robustness (simple, self-stabilization and Byzantine robustness. Documentation and standardization. Planning an upgrade path for future versions. Mobility. Ubiquitous computing. Comprehensive security: Nano-computing, bio-computing.

CIT 474: INTRODUCTION TO EXPERT SYSTEMS

Study of different classes of expert systems, e.g. Rule Based: MYCIN or PROSPECTOR, Blackboard; HEARSAY or CRYSLIS, Expert System shells e.g. Rule-Based: e.g. P-MYCIN, EXPERT. S.I. Frame Based e.g. KEE, KL-ONE Merit and Demerits of natural language interface for expert systems. Extensive independent study of recent development in the field and the submission of a group proposal for the application of Expert System in different areas.

CIT 478: ARTIFICIAL INTELLIGENCE

Basic AI issues, attention Search, Control Game trees, knowledge representation, Application of AI techniques in natural language, scene analysis, expert systems, KBCS robot planning. Lab. Exercise in I lang. e.g. LISP/Prolog.

CIT 481: WEBSITE DESIGN

What is HTML; Basic Tags of HTML; HTML Tag TITLE Tag Body Tag Formatting of Text, Headers, Formatting Tags, Pre-Tag FONT TAG Special Characters Working with Images META Tag; Links: Anchor Tag, Lists; unordered lists ordered lists, definition lists, tables: TABLE, TR and TD Tags Cell spacing and cell padding colspan and Rowspan Frames: Frameset frame Tag, NOFRAMES Tag Forms: FORM and INPUT Tag,; Text Box Radio Button, checkbox. Select tag and pull down. Lists hidden submit and Reset. Some special Tags: COLGROUP, THREAD, TBODY, TFOOT, blank self, parent top, IFRAME LABEL TEXTAREA. INTRODUCTION TO Java Script: Java script variables and data types. Statement and operators, control structures object based programming message box in Javascript, Javascript with HTML forms

MTH 499: RESEARCH PROJECTS

Individual or Group projects of approved topics related to the current research interests in the department.