Statistics - National Diploma (ND)

Curriculum and Course Specifications

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NATIONAL BOARD FOR TECHNICAL EDUCATION

Produced by the National Board for Technical Education (NBTE)
Plot B, Bida Road, P.M.B. 2239, Kaduna Nigeria.

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GENERAL INFORMATION

1.0 CERTIFICATION AND TITLE OF THE PROGRAMME:

The certificate to be awarded and the programme title shall read:

"NATIONAL DIPLOMA IN STATISTICS"

A transcript showing all the courses taken and grades obtained shall be issued on demand.

2.0 GOALS AND OBJECTIVES

2.1 National Diploma Programme:

The national diploma programme in statistics is aimed at producing assistant statisticians capable of collecting data, analyzing and making inference under supervision.

On the completion of this programme, the diplomate should be able to:

(i) Acquire a good knowledge of basic statistics and statistical methods:

(ii) Understand the applications of statistics in commercial, industrial and scientific environment;

(iii) Acquire a practical skill in data collection, analysis and research methods;

(iv) Understand the use of computers for various purposes.

(v) Set out statistical projects under supervision.

3.0 ENTRY REQUIREMENTS:

3.1 NATIONAL DIPLOMA

Applicants with any of the following qualifications may be considered for admission into the National Diploma programme by direct entry:

(1) Four credit level passes in the West African School Certificate, Senior Secondary School Certificate or General Certificate of Education (GCE) Ordinary level and National Examination Council (NECO), TCII, NTC, in not more than two sittings. The subject must include mathematics and any three of the following: Statistics, Geography, further mathematics, Chemistry, Physics, Biology, Agricultural Science, Economics. At least, pass in English language is compulsory.

(2) Candidates who have successfully completed the Boards recognized Pre-National Diploma (Science and Technology) course. Such students must have passed mathematics, English language and any two subject listed in (1) above.

4.0 CURRICULUM

4.1 The curriculum of the ND programme consists of four main components. These are:

a. General studies/education
b. Foundation courses

c. Professional courses
d. Supervised industrial work experience scheme (SIWES)

4.2 The General Studies/Education component shall include courses in:

Language and Communication - English language and communication. This is compulsory.

and

Social Studies- Citizenship (the Nigeria constitution) is compulsory.

The General Education component shall account for not more than 10% of total contact hours for the programme.

Foundation Courses - Courses in mathematics, computer studies, descriptive geometry and basic statistics. The number of hours will vary with the programme and may account for about 10-15% of the total contact hours.

Professional Courses - Courses which give the student the theory and practical skills he needs to practice his field of calling at the technician/technologist level. These may account for between 60-70% of the contact hours depending on programme.

Supervised Industrial work Experience Scheme (SIWES) shall be taken during the long vacation following the end of the second semester of the first year. See details of SIWES at paragraph 9.0

5.0 CURRICULUM STRUCTURE

5.1 ND Programme:

The structure of the ND Programme consists of four semesters of classroom, laboratory and workshop activities in the college and a Semester (3-4 months) of supervised industrial work experience scheme (SIWES) see details of SIWES at paragraph 9.0. Each semester shall be of 17 weeks duration made up as follows:

15 contact weeks of teaching, i.e. lecture recitation and practical exercises, etc. and 2 weeks for tests, quizzes, examinations and Registration.

SIWES shall take place at the end of the second semester of first year.

6.0 ACCREDITATION

The programme offered shall be accredited by the NBTE before the diplomates shall be awarded the diploma certificate. Details about the processes of accrediting a programme for the award of the ND or HND are available from the Executive Secretary Programmes Department, National Board for Technical Education, Plot 'B' Bida Road, P.M.B. 2239, Kaduna, Nigeria.

7.0 CONDITONS FOR THE AWARD OF THE ND

Institutions offer accredited programmes for the award of the National Diploma to candidates who successfully completed the programme after passing prescribed course work, examinations, diploma project and the supervised industrial work experience. Such candidates should have completed a minimum of between 90% and 100% of credit units depending on the programme. Diploma certificate shall be awarded based on the following classifications:

Distinction - CGPA 3.50-4.0
Upper credit - CGPA 3.00-3.49
Lower Credit - CGPA 2.50- 2.99
Pass - CGPA 2.00-2.49

8.0 GUIDANCE NOTES FOR TEACHERS TECHING THE PROGRAMME

8.1 The new curriculum is drawn in unit courses. This is in keeping with the provisions of the National policy on Education, which stress the need to introduce the semester credit units which will enable a student who so wish to transfer the units already complete in an institution of similar standard from which he is transferring.

8.2 In designing the units, the principle of the modular system has been adopted; thus making each of the professional modules, when completed self-sufficient and providing the student with technician operative skills, which can be used for employment purposes.

8.3 As the success of the credit unit system depends on the articulation of programmes between the institutions and industry, the curriculum content has been written in terms of behavioural objective, so that it is clear to all, the expected performance of the student who successfully completed some of the courses or the diplomates of programme is clearly defined. There is a slight departure in the presentation of the performance based curriculum which required the conditions under which the performance are expected to be carried out and the criteria for the acceptable levels of performance. It is a deliberate attempt to further involve the performance that can take place and to follow that with the criteria for determining an acceptable level of performance. Departmental submission on the final curriculum may be vetted by the academic board of the institution. Our aim is to continue to see to it that a solid internal evaluation system exists in each institution for ensuring minimum standard and quality of education in the programmes offered throughout the polytechnic system.

8.4 The teaching of the theory and practical work should, always where possible, be integrated. Practical exercise, especially those in professional courses and laboratory work should not be taught in isolation from the theory. For each course, there should be a balance of theory to practice depending on the course objectives and content. Life data, case studies, mini-projects and visits to and from available organizations should be incorporated wherever and whenever possible.

9.0 GUIDELINES ON SIWES PROGRAMME

For the smooth operation of the SIWES the following guidelines shall apply:

9.1 Responsibility for placement of students

(i) Institutions offering the ND progamme shall arrange to place the students in industry. By April; 30th of each year, six copies of the establishment where each student has been placed shall be submitted to the Executive Secretary NBTE which shall, in turn, authenticate the list and forward it to the Industrial Training Fund.

(ii) The Placement officer should discuss and agree with industry on the following :

(a) Task inventory of what the students should be expected to experience during the period of attachment. It may be wise to adopt the one already approved for each field.

(b) The industry-based supervisor of the students during the period, likewise the institution-based supervisor.

(c) The evaluation of the student during the period. It should be noted that the final grading of the student during the period of attachment should be weighted more on the evaluation by his industry-based supervisor.

9.2.1 Evaluation of Student During The SIWES

In the evaluation of the student, cognizance should be taken of the following items:

i. Punctuality
ii. Attendance
iii. General attitude to work
iv. Respect for authority
v. Interest in the field/technical area
vi. Technical competence as a potential technician in his field.

9.2.2 Grading of SIWES

To ensure uniformity of grading scales, the institution shall ensure that the uniform grading of students work which has been agreed to by all polytechnic is adopted

9.2.3 The Institution Based Supervisor

The institution-based supervisor should sign the log book during each visit. This will enable him to check and determine to what extent the objectives of the schemes are being met and to assist students having any problems regarding the specific assignments given by their industry-based supervisor.

9.2.4 Frequency of Visit

Institution should ensure that students placed on attachment are visited within one month of their placement. Other visits shall be arranged so that:

i. There is another visit six weeks after the first visit; and
ii. A final visit in the last month of the attachment.

9.2.5 Stipend for Students on SIWES

The rate of stipend payable shall be determined from time to time by the Federal Government after due consultation with the Federal Ministry of Education, the Industrial Training Fund and the NBTE.

9.3 SIWES as a Component of the Curriculum

The completion of SIWES is important in the final determination of whether the student is successful in the programme or not. Failure in he SIWES is an indication that the student has not shown sufficient interest in the field or has no potential to become a skilled technician in his field. The SIWES should be graded on a fail or pass basis. Where a student has satisfied all other requirements but failed SIWES, he may only be allowed to repeat another four months SIWES at his own expense.

CURRICULUM TABLE

STATISTICS (NATIONAL DIPLOMA)
Year one
Semester one: Curriculum Table

S/No	Course code	Course title	L	P	Total	Prerequisite
1	STA 111	Descriptive Statistics I	3	4	7	
2	STA 112	Elementary Probability Theory	2	3	5	
3	MTH 111	Logic and Linear Algebra	2	3	5	
4	MTH 112	Functions and Geometry	2	3	5	
5	COM 10I	Introduction to Computing	3	3	6	
6	STA 113	Technical English I	1	1	2	
7	GNS 111	Citizenship Education I	1	1	2	
		Total	14	18	32	

L- Lecture
P-Practical
TH-Total Hours.

STATISTICS (NATIONAL DIPLOMA)
Year one
Semester two: Curriculum Table

S/No	Course code	Course title	L	P	Total	Prerequisite
1	STA 121	Descriptive Statistics II	3	4	7	STA 111
2	STA 122	Statistical Theory I	2	3	5	STA 112
3	STA 123	Demography I	2	3	5	
4	MTH 121	Calculus I	2	3	5	
5	COM 123	Computer Packages I	2	4	6	
6	GNS 121	Citizenship Education II	1	1	2	
		Total	12	18	30	

STATISTICS (NATIONAL DIPLOMA)
Year two
Semester three: Curriculum Table

S/No	Course code	Course title	L	P	Total	Prerequisite
1	STA 211	Statistical Theory II	2	3	5	STA 122
2	STA 212	Elements of Sampling Theory	2	3	5	
3	STA 213	Economic and Social Statistics	2	3	5	
4	STA 214	Industrial Statistics I	2	3	5	
5	MTH 212	Calculus II	2	3	5	
6	MTH 213	Linear Algebra	2	3	5	
7	COM 215	Computer Packages II	2	4	6	COM 123
		Total	14	22	36	

STATISTICS (NATIONAL DIPLOMA)
Year two
Semester four: Curriculum Table

S/No	Course code	Course title	L	P	Total	Prerequisite
1	STA 221	Design and Analysis of Experiments I	2	3	5	
2	STA 222	Sampling Techniques I	2	3	5	
3	STA 223	Applied General Statistics I	2	3	5	
4	STA 224	Biostatistics I	2	3	5	
5	MTH 222	Mathematical Methods I	2	3	5	
6	COM 224	Management Information Systems	2	3	4	
7	STA 225	Small Business Management I	2	2	2	
8	STA 226	Project	1	5	5	
		Total	13	23	36	

Semester: 1

Course: Descriptive Statistics I (STA 111)

Programme: Statistics (National Diploma)			
Course: Descriptive Statistics I	**Course Code: STA 111**	**Total Hours:**	**7**
Year: 1 Semester: 1	**Pre-requisite:**	**Theoretical:** **Practical:**	**3 hours /week** **4 hours /week**

Goal: This course is designed to enable students to acquire a basic knowledge of descriptive statistics.

General Objectives: On completion of this course the diplomate, should be able to:

1. Understand the nature of statistical data, their types and uses
2. Understand the procedures for collection of statistical data.
3. Understand the difference between total coverage and partial coverage in data collection
4. Understand the methods of data compilation
5. Understand the methods of data presentation

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 111): Understand the nature of statistical data, their types and uses					
1	1.1 Define Statistics 1.2 Identify various sources of statistical data 1.3 State important uses of statistics	Explain the nature of statistics Introduce various sources and discuss how they are used (e.g. social, economic, health, biological, demographic and industrial)	Books of recorded statistics Internet	Locate sources of statistical data Identify sources for specific needs	Encourage investigating sources Encourage use of Internet	Books of recorded statistics Internet Text books
2	1.4 State uses of statistical data 1.5 Explain quantitative data 1.6 Identify various scales of measurement	Explain uses of data Explain nature of quantitative data Discuss various scales (e.g. nominal, interval, ratio and ordinal).	Books of recorded statistics Internet	Decide on use of data found Determine scale of measurement of data found Comment on effectiveness	Encourage investigating sources Encourage use of Internet	Books of recorded statistics Internet Textbooks
	General Objective 2 (STA 111): Understand the procedures for collection of statistical data					
3	2.1 Describe basic sampling techniques: 2.2 Distinguish between the following methods of data collection	Discuss simple random sampling, Discuss systematic sampling Discuss stratified sampling Discuss quota sampling.	Textbooks Lecture notes	Determine the concept of random sampling using simple data	Discuss simple random sampling,	Textbooks Lecture
4	2.3 Design questionnaires and formats for data collection 2.4 Identify the problems and types of errors that arise in data collection.	Explain and discuss the process of carrying out field work to collect data.	Textbooks	Identify types of errors in data collection	Encourage students to carry out field work to collect data.	Textbooks
5	2.5 Collect data on various sources listed in 1.2 above. 2.6 Collect primary and secondary data	Explain and discuss the process of carrying out field work to collect data.	Textbooks	Identify types of errors in data collection	Encourage students to carry out field work to collect data	Textbooks

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
6	2.7 Collect primary and secondary data	Explain and discuss the process of carrying out field work to collect data.	Textbooks Field trip Random number table	Classify data into primary/secondary	Encourage students to carry out field work to collect data	Textbooks
	General Objective 3 (STA 111): Understand the difference between total coverage and partial coverage in data collection					
7	3.1 Distinguish between census and sampling surveys. 3.2 Explain the meaning and purpose of pilot enquires. 3.3 Identify the advantages and disadvantages of sampling.	Explain and discuss the process of undertaking a statistical sample	Field trip	Use examples to illustrate theoretical contents	Encourage students to collect astatistical sample	Field trip
8	3.4 Distinguish between probability and non-probability methods 3.5 Explain the various probability-sampling methods	Explain and discuss the concepts covered	Field trip	Use examples to illustrate theoretical contents	Encourage students to collect astatistical sample	Field trip
9	3.6 Explain the various non-probability sampling method purpose, judgement and quota) 3.7 Explain the use of post enumeration surveys. 3.8 Collect data applying the sampling methods in 3.5 above	Explain and discuss the concepts covered	Random number table	Use examples to illustrate theoretical contents	Encourage students to collect statistical sample	Random number table
	General Objective 4 (STA 111): Understand methods of data compilation					
10	4.1 Identify the different categories of collected data 4.2 Classify the data into the various categories	Explain and discuss the concepts covered	Statistical kits	Show ability to categorise various data collected	Explain and supervise student exercises and assess student work	Statistical kits

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
11	4.3 Verify the sorted data 4.4 Identify the different data storage methods	Explain and discuss the concepts covered	Statistical kits	Use examples to illustrate theoretical contents	Explain and supervise student exercises and assess student work	Statistical kits
12	4.5 Compile of discrete and continuous data	Explain and discuss the concepts covered	Textbooks	Use examples to illustrate theoretical contents	Explain and supervise student exercises and assess student work	Textbooks
	General Objective 5 (STA 111): Understand the methods of data presentation					
13	5.1 Identify the various types of statistical table frequency and contingency tables, simple informative tables, table for reference, complex tables) 5.2 Explain various methods of data presentation (tabular, graphical, pictorial, text etc)	Explain and discuss the concepts covered	Textbooks Statistical tables	Demonstrate, using examples, various methods of data presentation	Explain and supervise student exercises and assess student work	Textbooks Statistical tables
14	5.3 Construct scatter diagrams frequency tables, and graphs. 5.4 Explain merits and demerits of chart/diagrams above.	Explain and discuss the concepts covered	Statistical tables	Demonstrate by examples, charts and tables	Explain and supervise student exercises and assess student work	Statistical tables
15	5.5 Present life data	Explain and discuss the concepts covered	Drawing materials	Demonstrate by examples, charts and tables	Explain and supervise student exercises and assess student work	Drawing materials

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 111)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	50
Test	At least 2 progress tests for feed back.	20
Practical	At least 7 homeworks to be assessed by the teacher	30
Total		100

Recommended Textbooks & References:

Statistics (6^{th} Edition), W. M. Harper

Introduction to Statistical Method, B. C. Brookes, W. F. L. Dick

Course: Elementary Probability Theory (STA 112)

Programme: Statistics (National Diploma)			
Course: Elementary Probability Theory	**Course Code: STA 112**	**Total Hours:**	**5**
Year: 1 Semester: 1	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to introduce the student to the basic concepts of set theory and the theory of probability.

General Objectives: On completion of this course, the diplomate will be able to:

1. Understand the concept of set and set operations
2. Understand mapping, functions and relations
3. Understand the concept of permutations and combinations as used in probability
4. Understand the concept of a sample space
5. Understand the basic concepts of probability

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 112): Understand the concept of set and set operations					
1	1.1 Define a set with set notation '{ }' and examples 1.2 Define a set, a subset, and use set notations such as 'A'. 1.3 Define elements of a set with notation 'a' 1.4 Define a subset of a set-using the notation 'Ì ' 'É'.	Explain and discuss examples to illustrate sets, subsets, and notations for sets and subsets.	Textbooks and lecture notes.	Generate sets of data and classify them as sets, subsets; using appropriate notations for sets and subsets.	Explain and supervise exercises and assess students' work	Dice, coloured bulbs, etc to generate data. Then lecture note.
2	1.5 Write sets using the two different methods:- the set builder method and the roaster method 1.6 Define the null set with set notation 'j' 1.7 Define the universal set with notation 'U'	Explain and discuss examples to illustrate sets, subsets, and notations for sets and subsets.	Textbooks and lecture notes.	Generate sets of data and classify them as sets, subsets; using appropriate notations for sets and subsets.	Explain and supervise exercises and asses students' work	Dice, coloured bulbs, etc to generate data. Then note books.
3	1.8 Define basic set operations such as union 'Ç', intersection 'È', complement, etc 1.9 State the laws of algebra of set 1.10 Illustrate the set operations using Venn diagrams 1.11 Prove some simple set identities	Explain and discuss examples to illustrate basic set operations and set identities.	Venn Diagrams	Demonstrate knowledge of set operations	Explain and supervise exercises and asses students' work	Textbooks Lecture notes.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 2 (STA 112): Understand mapping, functions and relations					
4	2.1 Define mapping and illustrate with examples 2.2 Define a function and illustrate with examples	Explain and discuss examples to illustrate mapping and functions	Textbooks Lecture notes.	Demonstrate the theoretical content of mapping and functions	Supervise and assess exercises on the topic	Textbooks Lecture notes.
5	2.3 Distinguish between mapping and function. 2.4 Define relation and illustrate with examples	Explain and discuss examples to illustrate mapping and functions; and relations	Textbooks Lecture notes.	Demonstrate the theoretical content of mapping and functions; and relations.	Supervise and assess exercises on the topic	Textbooks Lecture notes.
6	2.5 Distinguish between function and relation.	Explain and discuss examples to illustrate functions and relations	Textbooks Lecture notes.	Demonstrate the theoretical content of functions and relations	Supervise and assess exercises on the topic	Textbooks Lecture notes.
	General Objective 3 (STA 112): Understand the concept of permutations and combinations as used in probability					
7	3.1 Review permutations and combinations from the aspects of arrangement and selection 3.2 Distinguish between arrangements and selections 3.3	Explain and discuss examples to illustrate permutation and combination	Textbooks Lecture notes.	Demonstrate the theoretical content of permutation and combination	Supervise and assess exercises on the topic	Textbooks Lecture notes.
8	3.3 Undertake simple experiments involving permutations and combinations	Explain and discuss practical applications of the topic	Life data Textbooks Lecture notes.	Demonstrate the practical content of the topic	Supervise and assess exercises on the topic	Life data Textbooks Lecture notes.
	General Objective 4 (STA 112): Understand the concept of a sample space.					
9	4.1 Define a statistical experiment 4.2 Define a sample space and sample point. 4.3 Construct sample spaces using simple experiments such as the tossing of a coin, rolling of a die, etc.	Explain and discuss simple experiments	Textbooks Lecture notes. Statistical kits	Formulate and perform simple experiments	Supervise and assess simple experiments	Textbooks Lecture notes. Statistical kits

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
10	4.4 Define an event and illustrate with examples 4.5 Distinguish between simple and compound events 4.6 Define mutually exclusive events and illustrate with examples e.g. tossing a coin.	Explain and discuss events and combination of events.	Textbooks Lecture notes. Statistical kits	Generate events from the simple experiments undertaken in the previous week	Supervise and assess the content of the topic	Textbooks Lecture notes. Statistical kits
11	4.7 Define independent events and illustrate with examples e.g. tossing two coins 4.8 Distinguish between mutually exclusive and independent event. 4.9 Define exclusive events and illustrate with examples.	Explain and illustrate operations on events.	Textbooks Lecture notes. Statistical kits	Use events in combined expt. of tossing a coin and throwing a die to illustrate topics covered	Supervise and assess the content of the topic	Textbooks Lecture notes. Statistical kits
	General Objective 5 (STA 112): Understand the basic concept of probability					
12	5.1 Explain the Axiomatic approach 5.2 Explain the relative frequency approach 5.3 Define the probability of an event 5.4 Define probability as a function of the sample space	Explain and illustrate probability using various approaches.	Textbooks Lecture notes. Statistical kits	Demonstrate the derivation of probabilities by simple experiment	Explain and supervise exercises and assess student work	Textbooks Lecture notes. Statistical kits

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
13	5.5 Calculate the probability of an event 5.6 State the properties of probabilities of events 5.7 State and apply the addition laws of probability 5.8 State and apply to multiplication law of probability.	Explain and illustrate properties of probability.	Textbooks Lecture notes. Statistical kits	Demonstrate the derivation of probabilities by simple experiment	Explain and supervise exercises and assess student work	Textbooks Lecture notes. Statistical kits
14	5.9 Define conditional probability (including the use of tree diagram) and illustrate with examples 5.10 State the Bayes' theorem (rule)	Explain and illustrate conditional probability using various approaches.	Textbooks Lecture notes. Statistical kits	Demonstrate the derivation of conditional probabilities by simple experiments	Explain and Supervise exercises and assess student work	Textbooks Lecture notes. Statistical kits
15	5.11 Evaluate conditional probabilities using the Bayes' formula	Explain and illustrate conditional probability using various approaches.	Textbooks Lecture notes. Statistical kits	Demonstrate the derivation of conditional probabilities by simple experiments	Explain and Supervise exercises and assess student work	Textbooks Lecture notes. Statistical kits

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 112)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 home works to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Theory and Problems of Probability, H. L. Lipschutz

An Introduction to Contemporary Statistics, H. L. Koopmans.

Course: Logic and Linear Algebra (MTH 111)

Programme: Statistics (National Diploma)			
Course: Logic and Linear Algebra	**Course Code: MTH 111**	**Total Hours:**	**5**
Year: 1 Semester: 1	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to provide the student with basic knowledge of logic linear algebra

General Objectives: On completion of this course, the diplomate will be able to:

1. Understand the concept of logic and abstract thinking.
2. Understand the concept of permutations and combinations
3. Undertake binomial expansion of algebraic expressions.
4. Understand the algebraic operations of matrixes and determinants

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (MTH 111): Understand the concept of logic and abstract thinking.					
1	1.1 Define the essential connectives, negation, conjunction, disjunction, implication and bi- implication. 1.2 Illustrate the essential connectives define in 1.1 above 1.3 Describe grouping and parenthesis in logic 1.4 Explain Truth tables. 1.5 Define tautology.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
2	1.6 Illustrate types of tautology. 1.7 Define universal quantifier and existential quantifier	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
3	1.8 Translate sentences into symbolic form using quantifiers. E.g. "some freshmen are intelligent" can be stated as "for some x,x is a freshman and x is intelligent" can be translated in symbols as (ix) (f x & ix) 1.9 Define the scope of a quantifier. eg R=Gauss was a contemporary of Napoleon S=Napoleon was a contemporary of Julius Caesar (Thus P, Q and R are true, and S is false Then find the truth value of sentences: (a) (P and Q) = R (b) (P - Q) (c) PAND Q = R - S 1.10 Define bond and "free" variables	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
4	1.11 Define term and formula. 1.12 Explain the validity of formulae	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 2 (MTH 111): Understand the concept of permutations and combinations					
5	2.1 Define permutation's and Combination 2.2 Give illustrative examples of each of 2.1 above 2.3 State and prove the fundamental principle of permutations. 2.4 Give illustrative examples of the fundamental principles of permutations. 2.5 Establish the formula $nPr = \frac{n!}{(n-r)!}$	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
6	2.6 Prove that nPr= (n-r+1) *nP_{r-1} 2.7 Solve problems of permutations with restrictions on some of. the objects 2.8 Solve problems of permutations in which the objects may be repeated. 2.9 Describe circular permutations. 2.10 Solve problems of permutations of N identical objects.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
7	2.11 Establish the formula $nCr = \frac{n!}{r!(n-r)!}$ 2.12 State and prove the theorem nCr-1+ ${}^{n}Cr = {}^{n+1}Cr$ 2.14 Explain problems of combinations with restrictions on some of the objects. 2.15 Solve problems of combination of "n" different objects taken any number of it at a time.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 3 (MTH 111): Undertake the binomial expansion of algebraic expressions.					
8	3.1 Explain with illustrative examples the method of mathematical induction. 3.2 State and prove binomial theorem for positive integral index.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
9	3.3 Describe, with examples, the properties of binomial expansion.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
10	3.4 State the binomial theorem for a rational number. 3.5 State the properties of binomial coefficients	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
11	3.6 Apply binomial expansion in approximations (simple examples only).	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 4 (MTH 111): Understand the algebraic operations of matrixes and determinants					
12	4.1 Define Matrix 4.2 Define the special matrixes of zero matrixes e.g. zero matrix, identity matrix, square matrix, and triangular matrix, symmetric matrix.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
13	4.3 State examples for each of the matrixes in 4.2 above 4.4 State the laws of addition and multiplication of matrixes. 4.5 Illustrate the commutative, associative and distributive nature of the laws stated in 4.4 above. 4.6 Define the transpose of a matrix. 4.7 Determine a determine the minors and cofactors 2 by 2 and 3 by 3 matrixes	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
14	4.7 Define the minors and cofactors of a determinant. 4.8 Explain the method of evaluating determinants.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	4.9 State and prove the theorem "two rows or two columns of a matrix are identical, then the value of its determinant is zero". 4.11 State and prove the theorem "if two rows or two columns of a matrix are interchanged, the sign of the Value of its determinant is changed	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (MTH 111)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Pure Mathematics, J. K. Backhouse (et. al)

Elementary Linear Algebra, Application (7^{th} Edition) (1973), Howard Anton

Course: Functions & Geometry (MTH 112)

Programme: Statistics (National Diploma)			
Course: Functions & Geometry	**Course Code:**	**Total Hours:**	**5**
Year: 1 Semester: 1	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to enable the student to understand basic concepts of functions and geometry

General Objectives: On completion of this course, students will be able to:

1. Understand the concept of function and relations
2. Understand some special properties of functions
3. Understand the algebra of functions
4. Understand the fundamental elements of trigonometry
5. Understand analytic geometry of a straight line
6. Understand the concept of symmetry and their application to comic sections

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (MTH 112): Understand the concept of function and relations					
1	1.1 Form a Cartesian product of two sets X and Y. 1.2 Identify a relation from a set X into a set Y. 1.3 Determine the domain and range of a given function.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
2	1.4 Define a function from the set X into the set Y 1.5 Distinguish between various types of functions; the polynomial; exponential and logarithmic functions etc.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 2 (MTH 112): Understand some special properties of functions					
3	2.1 Distinguish between even and odd functions. 2.2 Identify 1 to1 onto functions using appropriate examples.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
4	2.3 Form a composite function. 2.4 Determine the inverse of a function when it exists	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 3 (MTH 112): Understand the algebra of functions					
5.	3.1 Form the sum, difference product and quotient of two functions	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
6	3.2 Determine the domain of the sum, difference, product and quotient of two functions	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 4 (MTH 112): Understand the fundamental elements of trigonometry					
7	4.1 Define the various trigonometric functions; sine; cosine, tangent; etc. 4.2 Define a radian and convert from radian to degrees and vice versa. 4.3 Derive trigonometric identities.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
8	4.4 State and prove the addition formulae 4.5 Resolve a typical trigonometric equation. 4.6 Resolve a typical trigonometric equation, using the formulae relating to half angles and double angles	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
9	4.7 Draw the graphs of the various trigometric functions 4.8 Express Acos ax + Bsin ax in the form Hsin (ax+B) as a sine wave 4.9 Identify phase shift amplitude and period	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 5 (MTH 112): Understand the analytic geometry of a straight line					
10	5.1 State the distance formula 5.2 Determine the slope of a straight line.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
11	5.3 State the equation of a straight line in various forms. 5.4 State the properties of parallel lines and perpendicular lines.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
12	5.5 Determine the distance from a point to a line	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 6 (MTH 112): Understand the concept of symmetry and their applications to conic sections					
13	6.1 Define reflection and symmetry and illustrate with examples. 6.2 State the general equation of each conic section; circle, parabola and ellipse.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
14	6.3 Translate and rotate axes. 6.4 Solve problems relating to conic sections e.g. find centre, foci, axies of symmetry, vertices eccentricity etc.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	6.5 Draw graph each of the conic sections	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (MTH 112)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

College Mathematics. Vol. I. (2002), H. S. Thung (et. al)

A Survey of College Mathematics, Donald R. Hurver

Course: Introduction to Computers (COM 10I)

Programme: Statistics (National Diploma)			
Course: Introduction to Computers	**Course Code: COM 10I**	**Total Hours:**	**6**
Year: 1 Semester: 1	**Pre-requisite:**	**Theoretical:** **Practical:**	**3 hours /week** **3 hours /week**

Goal: This course is designed to enable students to acquire a basic knowledge of computers

General Objectives: On completion of this course the diplomate, should be able to:

1. Understand the history, classification and impact of computers.
2. Know the concept of computer hardware
3. Know the concept of computer software.
4. Understand computer data processing systems.
5 Know the procedures for computer and data preparation method.
6. Understand security and safety procedures within a computer environment.
7. Understand the concept of a computer network
8. Understand the use of the internet.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (COM 101): Understand the history, classification and impact of computers.					
1	1.1 Define the computer 1.2 Describe the development of computers, in particular abacas, Pascal, Babbage, Hollerith and ENIAC. 1.3 Classify computers according to generations from 1st - 5th generation (any subsequent generation)	Define computer Trace the history of computer. Classify the computer according to generations	White Board. PC loaded with Power point and connected to OHP	Be able to classify computer systems.	Guide students to classify computer systems	Networked PCs loaded with software packages.
2	1.4 Distinguish between analog, digital, and hybrid computers 1.5 Explains the social implication of computers on society in particular privacies and quality of life. 1.6 List the benefits of computers to the society.	Distinguish between types and classes of computers. Highlight the implications of computers to the society. Outline the benefit of computer to the society.	White Board. PC loaded with Power point and connected to OHP	Be able to classify computer systems.	Guide students to classify computer systems	Networked PCs loaded with software packages.
	General Objective 2 (COM 101): Know the concept of computer hardware					
3	2.1 Describe computer hardware configuration. 2.2 List some input and output units 2.3 Describe the function of the out unit.	Discuss the meaning of hardware. Discuss the various components and functions of various hardware units. Discuss computer software programming languages and differentiate between the levels.	White Board. PC loaded with Power point and connected to OHP	Be able to Identify the various components of a computer system	Guide the students on how to identify the various components of a computer system	A DEMO PC showing its components

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
4	2.4 Describe the function of C.P.U. 2.5 List some auxiliary Units. 2.6 Describe the function of the auxiliary memory 2.7 Define bits, byte, nibble, word and storage size.	Discuss the various components and functions of various hardware units. Discuss computer software programming languages and differentiate between the levels.	White Board. PC loaded with Power point and connected to OHP	Be able to Identify the various components of a computer system	Guide the students on how to identify the various components of a computer system	A DEMO PC showing its components
	General Objective 3 (COM 101): Know the concept of computer software.					
5	3.1 Explain software and its various types 3.2 Distinguish between the low - level and high - level languages. 3.3 Explain source and object programmes.	Discuss software and its various types. Explain computer packages and its various types.	White Board. PC loaded with Power point and connected to OHP	Be able to load computer packages on computer system	Demonstrate how to load various computer packages on computer systems	Networked PCs loaded with different computer packages
6	3.4 Define a translator. 3.5 Explain types of translators: assembler, compiler, and interpreter. 3.6 Explain the use of package programs.	Discuss software and its various types. Explain computer packages and its various types.	White Board. PC loaded with Power point and connected to OHP	Be able to load computer packages on computer system	Demonstrate how to load various computer packages on computer systems	Networked PCs loaded with different computer packages
	General Objective 4 (COM 101): Understand computer data processing systems.					
7	4.1 Explain different processing modes.	Explain offline and online concepts Define batch processing, real time, time sharing and distributed processing	White Board. PC loaded with Power point and connected to OHP	Be able to recognize life problems requiring the application of the various modes	Guide the students on how to identify real life problems requiring the various data processing techniques	Networked PCs loaded with different computer packages

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
		Differentiate between batch processing, real time processing, time-sharing and distributed processing system.				
	General Objective 5 (COM 101): Know the procedures for computer and data preparation method.					
8	5.1 Be able to explain how to operate a computer system	Discuss the principles and procedures of operating the computer system, the fix up, start up and shut-down systems	White Board. PC loaded with Power point and connected to OHP Diskettes	Be able to boot and shut down computer system Format diskettes	Guide the students on how to operate the computer. Show different storage media to students	Networked PCs and storage media such as diskette.
9	5.2 Understand the initialization and formatting of storage media.	Discuss initialization and formatting of storage devices such as disks and diskettes	White Board. PC loaded with Power point and connected to OHP Diskettes	Be able to boot and shut down computer system Format diskettes	Guide the students on how to operate the computer. Show different storage media to students	Networked PCs and storage media such as diskette.
	General Objective 6 (COM 101): Understand security and safety procedures within a computer environment.					
10	6.1 Understand data control techniques, operating procedure of a computer installation, safety regulation in computer installation, method of preventing hazards such as fire, flooding and sabotage	Explain data control techniques. Describe standard operating procedures of a computer installation. Explain the need for computer room security. Explain computer system auditing	White Board PC loaded with relevant software packages and connected to OHP	Be able to formulate passwords.	Guide students on how to formulate simple password that they could easily remember	Networked PCs and storage media such as diskette.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
		Explain methods of preventing hazards fire, flooding sabotage etc.				
11	6.2 Understand security methods in computer installation and the need for users passwords	Describe file security methods in computer installations. Explain the need for file security in computer installation. Explain the user passwords and user name.	White Board PC loaded with relevant software packages and connected to OHP	Be able to formulate passwords.	Guide students on how to formulate simple password that they could easily remember	Networked PCs and storage media such as diskette.
	General Objective 7 (COM 101): Understand the concept of a computer network					
12	7.1 Define and explain network, 7.2 Describe different types of network organization such as star, ring and bus.	Define computer network. Explain different types of network organization such as star, ring, bus etc.	White Board PC loaded with power point and connected to OHP	Be able to identify various computer topologies Find out different organizations using the different topologies.	Guide the students on how to identify various network topologies.	Networked PCs and storage media such as diskette.
13	7.3 Explain LAN and WAN.	Describe different types of network: LAN, WAN	White Board PC loaded with power point and connected to OHP	Be able to identify various computer topologies Find out different organizations using the different topologies.	Guide the students on how to identify various network topologies.	Networked PCs and storage media such as diskette.
	General Objective 8 (COM 101): Understand the use of the internet					
14	8.1 Define internet and describe its resources 8.2 Explain the processes involved in searching the internet for materials.	Define internet Describe resources of internet	White Board. PC loaded with power point and internet browser	Be able to Search for materials on the internet.	Guide students on how to search for materials on the internet.	Networked PCs connected to the internet.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
		Explain the processes involved in browsing and searching the internet. Explain the meaning of ISP.	and connected to OHP			
15	8.3 Explain the concept of E-mail	Explain the concept of e-mail address. Describe the processes of acquiring an e-mail address. Describe the process of sending and receiving an e-mail.	White Board. PC loaded with power point and internet browser and connected to OHP	Compose and send E-mail.	Demonstrate how to compose and send E-mail.	Networked PCs connected to the internet.

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (COM 101)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Course: Technical English I (STA 113)

Programme: Statistics (National Diploma)			
Course: Technical English I	**Course Code: STA 113**	**Total Hours:**	**2**
Year: 1 Semester: 1	**Pre-requisite:**	**Theoretical:** **Practical:**	**1 hour /week** **1 hour /week**

Goal: This course is designed to provide the student with the skills required to write statistical reports and communicate professionally in good English.

General Objectives: On completion of this course, the diplomate will be able to:

1. Write reports, including statistical input, by using good English and appropriate layouts (formats)
2. Engage in professional correspondence
3. Write a full report on a statistical investigation in an accepted format
4. Construct a poster on a statistical topic.
5. Deliver a short lecture on a statistical topic

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 113): Write reports, including statistical input, by using good English and appropriate layouts (formats)					
1	1.1 Students understand how to write in good English	Give examples of good and bad English.	Classroom resources	Students write a 2 page article, including statistical input at ND level, in the style of a newspaper article for a general audience.	Provide suitable data and oversee writing	Workshop resources (writing and library resources)
2	1.2 Students understand that reports conform to specific formats	Give examples of good reports including statistical input	Classroom resources	Students write a short technical report, with statistical input at ND level	Provide suitable data and oversee writing	Workshop resources (writing and library resources)
3	1.3 Students know how to vary the formats for the different topics and needs	Give examples of good reports including statistical input	Classroom resources	Students write a short technical report, with contrasting statistical input at ND level	Provide suitable data and oversee writing	Workshop resources (writing and library resources)
	General Objective 2 (STA 113): Engage in professional correspondence					
4	2.1 Students understand how to write to sources to request information	Explain rules of letter writing and professional letter writing and Give examples	Classroom resources	Students are able to write to sources to request information and to engage in professional correspondence	Provide suitable assignments and pair up students for letter writing	Workshop resources (writing and library resources)
5	2.2 Students know the rules and etiquette for engaging in a short exchange of letters with another statistician discussing a statistical topic	Explain rules of letter writing and professional letter writing and Give examples	Classroom resources	Students are able to write to sources to request information and to engage in professional correspondence	Provide suitable assignments and pair up students for letter writing	Workshop resources (writing and library resources)
	General Objective 3 (STA 113): Write a full report on a statistical investigation in an accepted format					
6	3.1 Students understand the rules for writing a full statistical report.	Explain accepted format(s) for statistical reports. Explain free standing abstract, introduction, methods, results, discussion, and references	Classroom resources	Students can write a full report on a statistical topic at ND level	Provide data and sets individual assignments	Workshop resources
7	3.1 (continued) Students understand the rules for writing a full statistical report.	Explain accepted format(s) for statistical reports. Explain free standing abstract, introduction, methods, results, discussion, and references	Classroom resources	Students can write a full report on a statistical topic at ND level	Provide data and sets individual assignments	Workshop resources

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 4 (STA 113): Construct a poster on a statistical topic.					
8	4.1 Understand how to construct a poster	Explain rules and Give examples	Classroom resources and posters	Students construct a poster on a statistical topic at ND level	Help students choose topics and supervise construction	Stationary for posters and workshop resources
9	4.1 (continued) Understand how to construct a poster	Explain rules and Give examples	Classroom resources and posters	Students construct a poster on a statistical topic at ND level	Help students choose topics and supervise construction	Stationary for posters and workshop resources
	General Objective 5 (STA 113): Deliver a short lecture on a statistical topic					
10	5.1 Understand how to prepare a lecture and speak in public	Provide advice	Workshop resources, overhead projector powerpoint	Students prepare for giving a ten minute lecture on a statistical topic at ND level	Help students select topics and support preparation of lectures	Workshop resources, overhead projector powerpoint
11	5.1 (continued) Understand how to prepare a lecture and speak in public	Provide advice	Workshop resources, overhead projector powerpoint	Students prepare for giving a ten minute lecture on a statistical topic at ND level	Help students select topics and support preparation of lectures	Workshop resources, overhead projector powerpoint
12	5.1 (continued) Understand how to prepare a lecture and speak in public	Provide advice	Workshop resources, overhead projector powerpoint	Students prepare for giving a ten minute lecture on a statistical topic at ND level	Help students select topics and support preparation of lectures	Workshop resources, overhead projector powerpoint

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
13	5.1 (continued) Understand how to prepare a lecture and speak in public	Provide advice	Workshop resources, overhead projector powerpoint	Students prepare for giving a ten minute lecture on a statistical topic at ND level	Help students select topics and support preparation of lectures	Workshop resources, overhead projector powerpoint
14	5.1 (continued) Understand how to prepare a lecture and speak in public	Provide advice	Workshop resources, overhead projector powerpoint	Students prepare for giving a ten minute lecture on a statistical topic at ND level	Help students select topics and support preparation of lectures	Workshop resources, overhead projector powerpoint
15	5.1 (continued) Understand how to prepare a lecture and speak in public	Provide advice and feedback on presentation	Workshop resources, overhead projector powerpoint	Students give a ten minute lecture on a scientific topic at ND level	Evaluate presentation	Workshop resources, overhead projector powerpoint

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Project %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 113)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	0
Test	0 progress test	0
Practical / Project	Article	10
	Short reports (2)	10
	Letters (2)	10
	Full report	20
	Poster	10
	Lecture	40
	all to be assessed by the teacher	
Total		100

Recommended Textbooks & References:

Semester: 2

Course: Descriptive Statistics II (STA 121)

Programme: Statistics (National Diploma)			
Course: Descriptive Statistics II	**Course Code: STA 121**	**Total Hours:**	**7**
Year: 1 Semester: 2	**Pre-requisite: STA 111**	**Theoretical:** **Practical:**	**3 hours /week** **4 hours /week**

Goal: The course is designed to enable the student to acquire knowledge of basic descriptive statistics

General Objectives: On completion of this course, diplomates will be able to:

1. Understand measures of central tendency.
2. Understand the measure of positional values.
3. Understand the measure of variability.
4. Understand the concepts of skew ness and kurtosis.
5. Understand the concept of time series.
6. Understand the concept of index numbers.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 121): Understand measures of central tendency					
1	1.1 Explain central tendency 1.2 Define the various measures of central tendency: mean, median, mode 1.3 Compute mean, median and mode for ungrouped and grouped data 1.4 State and prove the properties of the arithmetic mean. 1.5 Compute the mean using change of origin (assumed mean) and coding methods	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
2	1.6 Apply Harmonic and Geometric means to simple problems 1.7 Estimate median and mode using graphs 1.8 Compare and contrast the various measures in 1.2 above. 1.9 Compute central tendency using live data 1.10 Interpret the result in 1.9	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
	General Objective 2 (STA 121): Understand the measure of positional values.					
3	2.1 Define the various positional measures, quartiles, deciles, percentiles etc.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
4	2.2 Compute the measure in 2.1 above using appropriate formulae. 2.3 Interpret the results in 2.1 and 2.2 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 3 (STA 121): Understand the measure of variability.					
5	3.1 Explain variability 3.2 Define the various measures of variability (range, quartile deviation, percentile range, mean deviation, variance and standard deviation). 3.3 Compute and interpret the measures in 3.2 above for ungrouped and grouped data	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
6	3.4 State and prove the properties of variance 3.5 Compute the variance and standard deviation applying the properties in 3.4 above. 3.6 Compare and contrast the various relative measures of variability	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
7	3.7 Define, compute and interpret various relative measures of variability: variation and quartile deviation. 3.8 Compute measures of variability using live data 3.9 Interpret the results of 3.8	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
	General Objective 4 (STA 121): Understand the concepts of skew ness and kurtosis					
8	4.1 Define and compute moments of various degree (up to the 4^{th} moment) about the mean. 4.2 Define skewness 4.3 Compute and interpret the various measures of skewness	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
9	4.4 Define kurtosis 4.5 Identify the various types of kurtosis 4.6 State, compute and interpret the measures of kurtosis 4.7 Define, compute and interpret concentration ratio.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
	General Objective 5 (STA 121): Understand the concept of time series.					
10	5.1 Define and give examples of time series 5.2 Graph time series data 5.3 Identify the four basic components of time series: trend, seasonal, cyclical and irregular movements	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
11	5.4 Interpret the linear trend of the type Y = a + bx 5.5 Define moving averages 5.6 Remove seasonal variation and obtain seasonal index using moving averages.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
12	5.7 Compute the parameters involved in 5.2 - 5.6 5.8 Interpret the results in 5.7	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
	General Objective 6 (STA 121): Understand the concept of index numbers					
13	6.1 Explain index numbers 6.2 State the various types of index numbers	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
14	6.3 State the uses of index numbers 6.4 Construct and interpret various types of index numbers: simple and weighted averages, simple aggregative (Paasche and Laspeyre indexes), and fisher's ideal index.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
15	6.5 Compute and interpret the weighted average using life data	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 121)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	50
Test	At least 2 progress tests for feed back.	20
Practical	At least 7 homeworks to be assessed by the teacher	30
Total		100

Recommended Textbooks & References:

Statistics Concepts & Application, Frank H. Aithoeu

Course: Statistical Theory I (STA 122)

Programme: Statistics (National Diploma)			
Course: Statistical Theory I	**Course Code: STA 122**	**Total Hours:**	**5**
Year: 1 Semester: 2	**Pre-requisite: STA 112**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: To introduce the student to the concept of random variable and the application of probability concepts to discrete random variables and distributions**.**

General Objectives : On completion of this course, the diplomate will be able to:

1. Understand the concept of random variable.
2. Understand discrete probability distribution.
3. Understand the concept of mathematical expectation.
4. Understand the distributions of the function of discrete random variables.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 122): Understand the concept of random variables.					
1	1.1 Define a random variable 1.2 Define discrete random variable with examples.	Explain and discuss the concepts covered	Imrovised visual aids of list of discrete variables	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
2	1.3 Define discrete random variable with examples.	Explain and discuss the concepts covered	Imrovised visual aids of list of discrete variables	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Real life data from data producers
	General Objective 2 (STA 122): Understand discrete probability distribution					
3	2.1 Define discrete probability mass function (p.m.f) and illustrate with examples. 2.2. State the properties of a probability mass function	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
4	2.3 Define some common discrete probability functions: Bernoulli, Binomial, Hypergeometric,	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Note
5	2.4 Define a discrete cumulative distribution function (c.d .f.). Poisson, Uniform 2.5 State properties of the c.d.f.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
6	2.6 Define the c.d.f. of the p.m.fs in 2.3 above e.g. Negative Binomial etc.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 3 (STA 122): Understand the concept of mathematical expectation					
7	3.1 Explain the concept of mathematical expectation.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
8	3.2 Define the expectation of a discrete random variable. 3.3 State and prove the properties of the expectation of a discrete random variable	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
9	3.4 Compute mean and variance of a discrete random variable using the method of expectation.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
10	3.5 Compute the mean of the various discrete distributions in 2.3above using the method of expectation	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
11	3.6 Illustrate with examples the application of mathematical expectation to practical life situations of the distributions in 2.3 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 4 (STA 122): Understand the distributions of the function of discrete random variables.					
12	4.1 Define the functions of a random variable	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
13	4.2 Compute the means and variances of the functions of discrete random variables.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
14	4.3. Apply the method in 4.2 above to solve practical problems.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	4.3. (Continued) Apply the method in 4.2 above to solve practical problems	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 122)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Statistics (6^{th} Edition), W. M. Harper

Course: Demography I(STA 123)

Programme: Statistics (National Diploma)			
Course: Demography I	**Course Code: STA 123**	**Total Hours:**	**5**
Year: 1 Semester: 2	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to introduce the student to the basic concept of population statistics.

General Objectives: On completion of this course, the diplomate will be able to:

1. Understand meaning and nature of demography.
2. Understand basic demographic concepts.
3. Understand basic measures of fertility.
4. Understand basic measure of mortality.
5. Understand the life table.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 123): Understand the meaning and nature of demography					
1	1.1 Define demography. 1.2 Explain demography 1.3 State and illustrate the types of demographic data: vital statistics, household data, educational data, statistics, etc.	Explain and discuss the concepts covered	Official statistics Data publications	Demonstrate understanding of the concepts covered	Give lucid examples with real life data to cover the concepts. Assess student work	Textbooks Lecture Notes Official statistics Data publications
2	1.4 State the sources of demographic data; population census, registration of virtual events, demographic sample surveys etc 1.5 State the types and sources of errors in demographic data	Explain and discuss the concepts covered	Official statistics Data publications	Demonstrate understanding of the concepts covered	Give lucid examples with real life data to cover the concepts. Assess student work	Textbooks Lecture Notes Official statistics Data publications
3	1.6 Define and illustrate the state and structure of a population by age and sex, social status etc. 1.7 Present demographic data population pyramids, graphs, etc, using statistical methods.	Explain and discuss the concepts covered	Official statistics Data publications	Demonstrate understanding of the concepts covered	Give lucid examples with real life data to cover the concepts. Assess student work	Textbooks Lecture Notes Official statistics Data publications

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 2 (STA 123): Understand basic demographic concepts					
4	2.1 Define ratios, rates, proportions and percentages 2.2 Distinguish between crude and specific rates.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
5	2.3 Define and explain the concepts of: cohort, generation, household, family, emigration, immigration, and net migration.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students work.	Life data.
6	2.4 Define life-birth, still-birth, foetal deaths, etc.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students work.	Life data.
	General Objective 3 (STA 123): Understand basic measures of fertility					
7	3.1 Define crude birth-rate, general fertility rate, child-woman ratio, age specific fertility rate, total fertility rate, cumulative fertility rate, complete fertility rate, parity rate.	Explain and discuss the concepts covered	Official government fertility data	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students' work.	Life data.
8	3.2 Compute crude birth rate, general fertility rate and Child-woman ratio.	Explain and discuss the concepts covered	Official government fertility data	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students' work.	Life data.
9	3.3 Compute age-specific fertility rate, total fertility rate cumulative fertility rate, complete fertility rate and parity rate	Explain and discuss the concepts covered	Official government fertility data	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students' work.	Life data.
	General Objective 3 (STA 123): Understand basic measures of mortality					
10	4.1 Define crude death rate, specific death rate, infant mortality rate, neonatal mortality rate maternal mortality rate.	Explain and discuss the concepts covered	Official government mortality data	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students' work.	Textbook
11	4.2 Compute crude death rate, age specific death rate and mortality by cause death.	Explain and discuss the concepts covered	Official government mortality data	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students' work.	Life data
12	4.3 Compute infant mortality rate, neo-natal mortality rate and maternal mortality rate.	Explain and discuss the concepts covered	Official government mortality data	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students' work.	Life data

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 5 (STA 123): Understand the life table					
13	5.1 Explain the basic components of a life table	Explain and discuss the concepts covered	Textbooks Lecture notes	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students' work.	Textbooks Lecture notes
14	5.2 Construct and interpret of life table	Explain and discuss the concepts covered	Textbooks Lecture notes	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students' work.	Textbooks Lecture notes
15	5.3 Define the mean expectation of life at birth 5.4 State the limitations of a life table.	Explain and discuss the concepts covered	Textbooks Lecture notes	Demonstrate understanding of the concepts covered	Explain and supervise exercises and assess students' work.	Textbooks Lecture notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 123)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Course: Calculus I (MTH 121)

Programme: Statistics (National Diploma)			
Course: Calculus I	**Course Code: MTH 121**	**Total Hours:**	**5**
Year: 1 Semester: 2	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: The course is designed to introduce the student to the knowledge of differential calculus and develop the ability to use differential calculus to solve practical problems.

General Objectives On completion of this course, the diplomate will be able to to:

1. Understand the concept of limits.
2. Understand the concept of continuity.
3. Understand the techniques of differentiation.
4. Understand the various application of derivations.
5. Understand integration as the reverse of differentiation.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (MTH 121): Understand the concept of limits					
1	1.1 Define a limit with illustrated examples 1.2 State and prove the basic theorems on limits such as those relating to a sum, difference, product, quotient and composite of two functions.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
2	1.3 Evaluate limits of given functions 1.4 Determine points at which a limit does not exist and explain why.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 2: Understand the concept of continuity					
3	2.1 Define a continuous function 2.2 List examples of continuous functions using polynomials. 2.3 Distinguish between a continuous function and a discontinuous functions.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
4	2.4 Identify reasons for discontinuity 2.5 Remove discontinuity whenever possible by redefining the function	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
5	2.6 State and prove the basic theorems of continuity such as those relating to a sum, difference, product, quotient and composite of two functions. 2.7 Identify continuous functions using the basic theorems in 2.6 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 3 (MTH 121): Understand the techniques of differentiation.					
6	3.1 Carry out differentiation from first principle 3.2 State and prove the basic theorems on differentiation such as those relating to the derivatives of a sum, difference, product and quotient	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
7	3.3 Carry out differentiation using the basic rules. 3.4 Differentiate a composite function using the chain rule.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
8	3.5 Differentiate logarithmic, exponential and trigonometric functions. 3.6 Carryout successive differentiation using Leibnitz theorem.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
9	3.7 Carry out implicit differentiation. 3.8 Carry out partial differentiation	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 4 (MTH 121): Understand the various applications of derivations.					
10	4.1. Interpret derivative as a rate of change 4.2 Solve problems on maxim and minima.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
11	4.3 Make approximations and determine errors. 4.4 Sketch curves applying derivatives.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 5 (MTH 121): Understand integration as the reverse of differentiation					
12	5.1 Define integration 5.2 Verity that integration is the reverse of differentiation	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
13	5.3 Solve indefinite integrals using the first fundamental theorem of calculus	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
14	5.4 Explain with examples integration by substitution or change of variables.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	5.5 Integration by parts and partial fractions.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (MTH 121)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Engineering Mathematics, K. A. Stroud

Calculus (6^{th} Edition), Larson (et. al)

Course: Computer Packages I (COM 123)

Programme: Statistics (National Diploma)			
Course: Computer Packages I	**Course Code: COM 123**	**Total Hours:**	**6**
Year: 1 Semester: 2	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **4 hours /week**

Goal: This course is designed to introduce the student to basic computer packages.

General Objectives: On completion of this course, the diplomate will be able to:

1. Know the existing application packages.
2. Understand word processing packages.
3. Know electronic spread sheets.
4. Know the fundamentals of accounting packages.
5. Understand presentation packages.
6. Know how to use education, medical and other packages.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (COM 123): Know the existing application packages.					
1	1.1 Understand the difference between systems software, program generators and application packages	Explain the difference between systems software, program generators and application packages	White board PC Loaded with different packages and connected to an OHP	To be able to view different software packages and know their features	To assist student view different software packages and know their features	White board PC in a networked laboratory loaded with different packages and connected to internet.
2	1.2 Identify the modes of package acquisition 1.3 State the criteria for package acceptability	Identify the modes of package acquisition State the criteria for package acceptability	White board PC Loaded with different packages and connected to an OHP	To be able to view different software packages and know their features	To assist student view different software packages and know their features	White board PC in a networked laboratory loaded with different packages and connected to internet.
	General Objective 2 (COM 123): Understand word processing packages.					
3	2.1 Understand a word processing package	Explain meaning of a word processor State the advantages and use of word processors. Explain the features of the main, help and other menus.	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different assignments in word processing as may be determined by the lecturer.	Assist student carry out different assignments in word processing	White board PC in a networked laboratory loaded with different packages and connected to internet.
4	2.1 (continued) Understand a word processing package	Identify functions of word processors in other professional packages like in desk top publishing (Core/draw, PageMaker, etc) Explain use of document and non-document text processing including mail merging.	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different assignments in word processing as may be determined by the lecturer.	Assist student carry out different assignments in word processing	White board PC in a networked laboratory loaded with different packages and connected to internet.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
5	2.1 (continued) Understand a word processing package	Explain the import of graphics and the creation of drawing objects, Explain sharing of data with other users	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different assignments in word processing as may be determined by the lecturer.	Assist student carry out different assignments in word processing	White board PC in a networked laboratory loaded with different packages and connected to internet.
	General Objective 3 (COM 123): Know electronic spread sheets.					
6	3.1 Understand the concept of a spread sheet. 3.2 Understand the use of a spread sheet in a forecasting project, financial analysis, production scheduling and control and other forms of modelling.	List the types of existing spread sheets. Introduce spread sheet concepts. Explain the use of spread sheet in a forecasting project, financial analysis, production scheduling and control and other forms of modelling.	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different assignments in spreadsheets as may be determined by the lecturer.	Assist student carry out different assignments in spreadsheets	White board PC in a networked laboratory loaded with different packages and connected to internet.
7	3.3 Understand the use of spread sheet to carry out general statistical functions using cell references in a spreadsheet.	Explain carrying out general statistical functions using cell references in a spreadsheet.	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different assignments in spreadsheets as may be determined by the lecturer.	Assist student carry out different assignments in spreadsheets	White board PC in a networked laboratory loaded with different packages and connected to internet.
8	3.4 Understand the use of a spread sheet to perform specific accounting functions and highlight data security requirements on spread sheet data. 3.5 Transfer information and graphics between applications.	Explain performing specific accounting functions using spread sheets and highlight data security requirements on spread sheet data. Explain formatting worksheets and working with formulas.	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different assignments in spreadsheets as may be determined by the lecturer.	Assist student carry out different assignments in spreadsheets	White board PC in a networked laboratory loaded with different packages and connected to internet.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
		Explain transfer of information and graphics between applications.				
	General Objective 4 (COM 123): Know the fundamentals of accounting packages.					
9	4.1 Understand areas in accounting and financial management prone to using accounting packages. 4.2 Understand existing accounting packages highlighting facilities that make each package unique (Peach tree, DacEasy, Sage, Quick brooks	Explain accounting and financial management Identify areas in accounting to using accounting packages. Describe an overview of the various types of available existing accounting packages highlighting facilities that make each package Explain payroll, job costing, invoicing and order processing.	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different assignments in accounting and payroll as may be determined by the lecturer.	Assist student carry out different assignments in accounting and payroll	White board PC in a networked laboratory loaded with different packages and connected to internet.
10	4.3 Understand the following accounting system: general ledger system, accounts receivable, accounts payable, 4.4 Understand payroll, job costing, invoicing and order processing.	Explain accounting and financial management Identify areas in accounting to using accounting packages. Describe an overview of the various types of available existing accounting packages highlighting facilities that make each package Explain payroll, job costing, invoicing and order processing.	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different assignments in accounting and payroll as may be determined by the lecturer.	Assist student carry out different assignments in accounting and payroll	White board PC in a networked laboratory loaded with different packages and connected to internet.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 5 (COM 123): Understand presentation packages.					
11	5.1 Understand the functions of a presentation package using power point to illustrate.	Explain the functions of a presentation package using power point. Explain types of presentation	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different presentation assignments as may be determined by the lecturer.	Assist student carry out different presentation assignments	White board PC in a networked laboratory loaded with different packages and connected to internet.
12	5.2 Understand types of presentation presentations on strategies, sales promotion, training, marketing plan, company meetings using the auto content wizard and templates.	Create presentations on strategies, sales promotion, training, marketing plan, company meetings using the auto content wizard and templates.	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different presentation assignments as may be determined by the lecturer.	Assist student carry out different presentation assignments	White board PC in a networked laboratory loaded with different packages and connected to internet.
13	5.3 Understand the use of slides to illustrate different views presentations.	Use slides to illustrate different views presentations.	White board PC Loaded with different packages and connected to an OHP	Show ability to carry out different presentation assignments as may be determined by the lecturer.	Assist student carry out different presentation assignments	White board PC in a networked laboratory loaded with different packages and connected to internet.
	General Objective 6 (COM 123): Know how to use education, medical and other packages.					
14	6.1 Undertake a general overview of educational, medical and other packages	Explain an overview of educational, medical and other packages	White board PC Loaded with different packages and connected to an OHP	Carry out an assignment using a medical package	Assist student to carry out an assignment using a medical package	White board PC in a networked laboratory loaded with different packages and connected to internet

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
15	6.1 (continued) Undertake a general overview of educational, medical and other packages	Explain an overview of educational, medical and other packages	White board PC Loaded with different packages and connected to an OHP	Carry out an assignment using a medical package	Assist student to carry out an assignment using a medical package	White board PC in a networked laboratory loaded with different packages and connected to internet

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (COM 123)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 1 progress test for feed back.	20
Practical / Projects	To be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Semester: 3

Course: Statistical Theory II (STA 211)

Programme: Statistics (National Diploma)			
Course: Statistical Theory II	**Course Code: STA 211**	**Total Hours:**	**5**
Year: 2 Semester: 3	**Pre-requisite: STA 122**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to enable the student to acquire a better understanding of theories of statistics.

General Objectives: On completion of this course, the diplomate will be able to:

1. Understand the concept of continuous random variables
2. Understand the concept of continuous probability distributions.
3. Understand the normal distribution and its applications
4. Understand the concept of the expectation of continuous random variables
5. Understand moments and on moment generating function of probability distributions

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 211): Understand the concept of continuous random variables					
1	1.1 Define Continuous Random Variable. 1.2 Distinguish between continuous and discrete random variables.	Explain and discuss the concepts covered	Textbooks Lecture Notes Table of Random Numbers	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Table of Random Numbers
	General Objective 2 (STA 211): Understand the concept of continuous probability distributions.					
2	2.1 Define probability density function (pdf). 2.2 State the properties of probability density function and distribution. 2.3 Define a distribution function or a continuous random variable.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
3	2.4 State the properties of cumulative distribution function (c.d.f). 2.5 State the properties of uniform and exponential distributions. 2.6 State the properties of exponential distributions. 2.7 Illustrate with example, the practical applications of the distributions in 2.5 and 2.6 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 3 (STA 211): Understand the normal distribution and its applications					
4	3.1 Define normal distribution. 3.2 State the properties of a normal distribution.	Explain and discuss the concepts covered	Textbooks Lecture Notes Normal distribution table	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Normal distribution table
5	3.3 Define the standard normal distribution. 3.4 Explain the normal distribution table.	Explain and discuss the concepts covered	Textbooks Lecture Notes Normal distribution table	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Normal distribution table
6	3.5 Apply normal distribution to solve practical problems.	Explain and discuss the concepts covered	Textbooks Lecture Notes Normal distribution table	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Normal distribution table
7	3.6 Explain the normal approximation to the binominal and Poisson distribution.	Explain and discuss the concepts covered	Textbooks Lecture Notes Normal distribution table	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Normal distribution table

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
8	3.7 Apply the approximations in 3.6 above to solve practical problems. 3.8 Understand the concept of the expectation of continuous random variables	Explain and discuss the concepts covered	Textbooks Lecture Notes Normal distribution table	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Normal distribution table
	General Objective 4 (STA 211): Understand the concept of the expectation of continuous random variables					
9	4.1 Define expectation of continuous random variables. 4.2 Compute the expectations for the continuous probability distributions uniform, normal, exponential etc.	Explain and discuss the concepts covered	Textbooks Lecture Notes Normal distribution table	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Normal distribution table
10	4.3 Compute the variances of distributions in 4.2 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes Normal distribution table	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Normal distribution table
11	4.4 Apply 4.2 to solving practical problems	Explain and discuss the concepts covered	Textbooks Lecture Notes Normal distribution table	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Normal distribution table

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 5 (STA 211): Understand moments and on moment generating function of probability distributions					
12	5.1 Define moments 5.2 Compute the moments of continuous random variables about the origin and the mean.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
13	5.3 Define moment generating function. 5.4 State properties of moment generating function.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
14	5.5 Compute moments of discrete and continuous random variables and probability distributions applying moment generating function. 5.6 State the relationship between expectation and moment.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
15	5.7 Compute the mean and the variance of discrete and continuous random variables and probability distribution using moments	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 211)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homework to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Statistics Concept & Application, Frank H. Aithoeu

Course: Elements of Sampling Theory (STA 212)

Programme: Statistics (National Diploma)			
Course: Elements of Sampling Theory	**Course Code: STA 212**	**Total Hours:**	**5**
Year: 2 Semester: 3	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to introduce the student to sample theory and sampling distributions and to develop ability to apply these in simple estimation problems.

General Objectives: On completion of this course, the diplomate should be able to:

1. Understand the concept of sampling.
2. Understand the use of the normal, student's t, chi-square and f-distributions in sampling theory.
3. Understand the concept of sampling distributions for samples draw from Normal population.
4. Understand the concept of the central limit theorem.
5. Understand the concept of estimation theory.
6. Understand the methods of point estimation theory.
7. Understand the construction of confidence intervals for means standard deviation and proportions.
8. Understand the concept of simple test of hypothesis.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 212): Understand the concept of sampling.					
1	1.1 Explain the meaning of a universe and a sample. 1.2 Distinguish between finite and infinite populations. 1.3 Distinguish between sampling with and without replacement. 1.4 State the advantages and disadvantages of sampling. 1.5 Distinguish between a parameter and a statistic.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
	General Objective 2 (STA 212): Understand the use of the normal, student's t, chi-square and f-distributions in sampling theory					
2	2.1 Define the Normal, student's t, chi-squared and F- distributions. 2.2 Explain the concept of 'degrees' of freedom. 2.3 State the properties of the distribution in 2.1 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
3	2.4 Explain the relationship between the normal distribution and the following: student's t, chi-squared and F-distributions. 2.5 Apply the tables of the distribution in 2.1 to solve problems.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 3 (STA 212): Understand the concept of sampling distributions for samples draw from Normal population					
4	3.1 Explain the meaning and use of sampling distributions. 3.2 Distinguish sampling distributions for samples from finite and infinite populations. 3.3 Explain standard error. 3.4 Distinguish between standard error and standard deviation.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
5	3.5 State the sampling distribution of the mean; when standard deviation is known and when it is unknown. 3.6 Apply 3.4 above to solve problems. 3.7 Explain the sampling distribution of differences between two means. 3.8 Explain the meaning and use of pooled variance. 3.9 State and apply the sampling distribution of the variance.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
	General Objective 4 (STA 212): Understand the concept of the central limit theorem.					
6	4.1 State the central limit theorem for the sample mean. 4.2 State the uses of Central Limit Theorem. 4.3 Apply CLT (Central Limit Theorem) to solve problems involving sample means and the differences between two sample means.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
7	4.4 Explain the sampling distribution of proportion and difference between two proportions. 4.5 Solve CLT problems involving sample proportion and difference between two sample proportions	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
	General Objective 5 (STA 212): Understand the concept of estimation theory					
8	5.1 Explain the meaning of estimation. 5.2 Define point estimate and interval estimate. 5.3 Distinguish between an estimate and estimation.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
9	5.4 State the advantages and disadvantages of estimator. 5.5 State and illustrate the properties of good estimates unbiassedness, consistency, efficiency and minimum variance.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
	General Objective 6 (STA 212): Understand the methods of point estimation theory					
10	6.1 Enumerate various methods of point estimate: Maximum likelihood, least squares method of moments. 6.2 Define Maximum Likelihood Estimate (MLE). 6.3 Illustrate with simple examples, the properties of MLE.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
11	6.4 Define Least-Squares Estimation (LSE). 6.5 Illustrate with examples, the properties of LSE	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 7 (STA 212): Understand the construction of confidence intervals for means standard deviation and proportions					
12	7.1 Define confidence limits, confidence coefficients and level of significance. 7.2 Construct confidence intervals for mean, variance for sample drawn from normal distribution.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
13	7.3 Construct confidence intervals for mean, variance and proportion for large samples. 7.4 Apply live data on 7.3.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
	General Objective 8 (STA 212): Understand the concept of simple test of hypothesis.					
14	8.1 Define statistical hypothesis. 8.2 Distinguish between simple and composite hypothesis. 8.3 Distinguish between null and alternative hypothesis.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
15	8.4 Distinguish between one-tailed and two tailed tests. 8.5 Distinguish between type I and type II errors. 8.6 Explain the procedures for testing statistical hypotheses	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 212)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	50
Test	At least 2 progress tests for feed back.	20
Practical	At least 7 practical works to be assessed by the teacher	30
Total		100

Recommended Textbooks & References:

Sampling Techniques, W.G. Cochran (Wiley)

Fundamentals of Statistics, H. Mulholland

Course: Economic and Social Statistics I (STA 213)

Programme: Statistics (National Diploma)			
Course: Economic and Social Statistics I	**Course Code: STA 213**	**Total Hours:**	**5**
Year: 2 Semester: 3	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to introduce the student to the application of statistics in economic and social information and analysis.

General Objectives: On completion of this course, the diplomate should be able to:

1. Understand the organization of a statistical system with emphasis in Nigeria.
2. Understand the nature and importance of economic and social statistics.
3. Understand the application of index numbers.
4. Understand standardization of rates
5. Understand economic time series.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 213): Understand the organization of a statistical system with emphasis on Nigeria.					
1	1.1 Define a statistical system. 1.2 Distinguish between centralized and decentralized statistical system. 1.3 Explain the role of statistical system.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
2	1.4 Identify Federal Statistical Agencies: FOS, NPC etc. 1.5 Identify State Statistical Agencies: Statistics divisions in the State ministries.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
3	1.6 Identify quasi Governmental Statistical Agencies: NPA, NISSER, CBN, NRB, NNPC etc 1.7 Identify Statistical Coordinating Bodies in Nigeria: (i) National Council on Statistics. (ii) National Advisory Committee on Statistics. (iii) National Consultative Committee on Statistics.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
4	1.5 Identify some foreign Statistical Agencies operating in Nigeria. 1.6 Classify the above Statistical agencies as Producers, users of statistics	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 2 (STA 213): Understand the nature and importance of economic and social statistics.					
5	2.1 Distinguish between economic and social data with examples. 2.2 Identify the sources of economic and social data.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
6	2.3 State the uses of economic and social data. 2.4 State the limitations of social and economic data.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
	General Objective 3 (STA 213): Understand the application of index numbers.					
7	3.1 Compare and contrast different index numbers.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
8	3.2 Test the adequacy of index number formulae.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
9	3.3 Apply index numbers to various economic and social data.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
	General Objective 4 (STA 213): Understand standardization of rates.					
10	4.1 State the need for standardization. 4.2 Explain ratios and proportions and their uses.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
11	4.3 Explain the standardization of rates.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
12	4.4 Apply standardized rates to problems.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
	General Objective 5 (STA 213): Understand Economic time Series					
13	5.1 Explain Time series for economic and social data. 5.2 State the components of a Time series.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
14	5.3 Explain the method of moving averages and calculation of trend equation. 5.4 Calculate trend equation using least squares method.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes
15	5.5 Estimate seasonal variation and cyclical variation. 5.6 Apply Time series analysis as a prediction tool.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 213)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Survey methods in social investigations, C.A. Moser (Heinemann)
Mastering Statistics**,** Tim Hannabau

Course: Industrial Statistics I (STA 214)

Programme: Statistics (National Diploma)			
Course: Industrial Statistics I	**Course Code: STA 214**	**Total Hours:**	**5**
Year: 2 Semester: 3	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to provide the student with a knowledge of the application of statistics in planning and production processes in industries.

General Objectives: On completion of this course, the diplomate should be able to:

1. Understand the importance of statistics in industry.
2. Understand the concept of process control.
3. Understand the constructions of control charts
4. Understand acceptance sampling schemes.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 214): Understand the importance of statistics in industry					
1	1.1 Explain the uses of Statistics in industry	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered with specific reference to an industry known to the student	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals
2	1.2 State the various statistical techniques used in industry: statistical quality control, analysis of variance etc	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered with specific reference to an industry known to the student	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals
3	1.3 State the various statistical techniques used in industry: statistical quality control, analysis of variance etc	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered with specific reference to an industry known to the student	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals
	General Objective 2 (STA 214): Understand the concept of process control					
4	2.1 Define assignable causes of variation. 2.2 Detect assignable causes of variation using histogram.	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered with specific reference to an industry known to the student	Amplify the concepts with examples from industries.	Textbooks Lecture Notes Journals
5	2.3 Detect assignable causes of variation using probability paper. 2.4 Define Process variability. 2.5 Define Specification limits.	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered with specific reference to an industry known to the student	Amplify the concepts with examples from industries.	Textbooks Lecture Notes Journals

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
6	2.6 State the relationship between Process Variability and Specification limits	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered with specific reference to an industry known to the student	Amplify the concepts with examples from industries.	Textbooks Lecture Notes Journals
7	2.7 State the relationship between Process Variability and Specification limits with specific reference to industry.	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered with specific reference to an industry known to the student	Amplify the concepts with examples from industries.	Textbooks Lecture Notes Journals
	General Objective 3 (STA 214): Understand the construction of control charts					
8	3.2 Describe a process of Control Chart.	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals
9	3.1 Identify various types of Statistical Quality Control Charts such as X - Chart, Range chart, Chart for fraction defective and chart for number of defectives.	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals
10	3.2(continued) Identify various types of Statistical Quality Control Charts such as X - Chart, Range chart, Chart for fraction defective and chart for number of defectives.	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
11	3.3 Construct and Interpret the Charts in 3.2 above	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals
	General Objective 4 (STA 214): Understand acceptance sampling schemes.					
12	4.1 Define acceptance sampling. 4.2 Describe the different types of acceptance sampling viz: single, double, multiple and sequential sampling schemes	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals
13	4.2(continued) Describe the different types of acceptance sampling viz: single, double, multiple and sequential sampling schemes.	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals
14	4.3 State the importance of the different inspection sampling plans described in 4.2 above in quality control.	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals
15	4.4 Design the various sampling inspection Schemes Stated in 4.2 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes Journals	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work.	Textbooks Lecture Notes Journals

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 214)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 practical works to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Course: Calculus II (MTH 212)

Programme: Statistics (National Diploma)			
Course: Calculus II	**Course Code: MTH 212**	**Total Hours:**	**5**
Year: 2 Semester: 3	**Pre-requisite: MTH 121**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to provide the student with understanding of the theory of calculus and further develop their ability to solve problems on calculus.

General Objectives: On completion of this course, the diplomate should be able to:

1. Understand summations of finite double series
2. Understand the meaning of convergence of infinite series**.**
3. Understand the concept of a power series.
4. Understand more about limits

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (MTH 212): Understand summations of finite double series					
1	1.1 Rewrite a series of the form: $\sum_{l=1}^{m}\sum_{k=1}^{n} a_{jk}$ Without summation notations.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
2	1.1 Write a finite double series using the summation notation. 1.2 Show that $\sum_{l=1}^{m}\sum_{k=1}^{n} a_{jk} = \sum_{k=1}^{n}\sum_{l=1}^{m} a_{jk}$	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
3	1.3 Prove simple properties of finite sum such as (a) Additive property: $\sum_{l=1}^{m}\sum_{k=1}^{n}(a_{jk}+b_{ik}) = \sum_{l=1}^{m}\sum_{k=1}^{n} a_{jk} + \sum_{l=1}^{m}\sum_{k=1}^{n} b_{ik}$ (b) Homogeneous property: $\sum_{l=1}^{m}\sum_{k=1}^{n} ca_{jk} = c\sum_{l=1}^{m}\sum_{k=1}^{n} a_{jk}$	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 2 (MTH 212): Understand the meaning of convergence of infinite series					
4	5.1 Define Convergence or Divergence of an infinite series.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
5	2.1 Consider tests for convergence such as (a) The comparison test. (b) Ratio test. (c) D Alebert's test. (d) Cauchy's root test.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
6	2.3 Define alternating series. 2.4 Test for convergence of an alternating series.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 3 (MTH 212): Understand the concept of a power series					
7	3.1 Distinguish a power series from series of other types.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
8	3.2 Write the formulae for Taylor and Maclaurin's series.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
9	3.3 Derive tests for maximum and minimum values using Taylor's series.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
10	3.4 Write the Taylor and Maclaurin's expansions of given functions	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
11	3.5 Apply 3.3 above in evaluating maximum/minimum values of simple functions	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 4 (MTH 212): Understand more about limits					
12	4.1 Identify indeterminate forms.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
13	4.2 State L'Hospital's rule.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
14	4.3 Apply L'Hospital's rule to indeterminate forms.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	4.4 Further application of L'Hospital's rule to indeterminate forms.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (MTH 212)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Theory and Problems of Advanced Calculus, SI, Metric Edition. M. R. Spiegel

Course: Linear Algebra (MTH 213)

Programme: Statistics (National Diploma)			
Course: Linear Algebra	**Course Code: MTH 213**	**Total Hours:**	**5**
Year: 2 Semester: 3	**Pre-requisite: MTH 111**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to provide the diplomate with a good knowledge of matrix algebra and its applications

General Objectives: On completion of this course, the diplomate should be able to:

1. Understand more about matrices and their algebra
2. Understand more about determinants
3. Understand solutions of systems of linear equation using matrices and numerical methods.
4. Understand the basic concepts and manipulations of vectors and their application to engineering problems.
5. Understand eigen values and eigen vectors.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (MTH 213): Understand more about matrices and their algebra					
1	1.1 Review matrices. 1.2 Review types of matrix (null, square, rectangle, diagonal etc.) 1.3 Review carrying out algebraic operations on matrices	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
2	1.4 Define the rank of a matrix. 1.5 Explain with examples the rank of a matrix in terms of column vectors.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 2 (MTH 213): Understand more about determinants					
3	2.1 Review the determinant of a matrix. 2.2 State properties of Determinants.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
4	2.3 Compute determinants of matrices of orders 2 and 3 2.4 Compute the transpose, adjugate and cofactor of a matrix .	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
5	2.5 Define and compute the inverse of a matrix	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 3 (MTH 213): Understand solutions of systems of linear equations using matrices and numerical methods					
6	3.1 Define a aystem of linear equations. 3.2 State the fundamental theorem for the existence and consistency of solutions of a system of linear equations.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
7	3.3 Perform elementary row operations on matrix. 3.4 Solve linear simultaneous equations using matrices.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
8	3.5 Solve system of linear equations by Gaussian elimination method. 3.6 Solve system of linear equations by Cramer's rule.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 4 (MTH 213): Understand the basic concepts and manipulations of vectors and their application to engineering problems					
9	4.1 State the definitions and representations of vectors 4.2 Define a position vector. 4.3 Define limit vector. 4.4 Explain scalar multiple of a vector.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
10	4.5 List the characteristics of parallel vectors. 4.6 Identify qualities that may be classified as vector e.g. displacement, velocity, acceleration, force etc. 4.7 Compute the modulus of any given vector up to 2 and 3 dimensions. 4.8 State the parallelogram law for addition and subtraction of vectors.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
11	4.9 Apply the parallelogram law in solving problems including addition and subtraction of vectors. 4.10 Explain the concept of components of a vector and the meaning of orthogonal components. 4.11 Resolve a vector into its orthogonal components. 4.12 List characteristics of coplanar localized vectors. 4.13 Define the resultant or composition of coplanar vectors. 4.14 Compute the result of coplanar forces acting at a point using algebraic and graphical methods	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
12	4.15 Apply the techniques of resolution and resultant to the solution of problems involving coplanar forces. 4.16 Apply vectoral techniques in solving problems involving relative velocity. 4.17 State the scalar product of two vectors. 4.18 Compute the scalar product of given vectors.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
13	4.19 Calculate the direction ratios of given vectors. 4.20 Define the cross product of the vector product of two vectors. 4.21 Calculate the angle between two vectors using the scalar product	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 5 (MTH 213): Understand eigen values and eigenvectors					
14	5.1 Define eigen values of a matrix. 5.2 Define eigen vectors of matrix.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	5.3 Compute eigen values and eigenvectors from matrices of order one and two	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (MTH 213)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	210
Total		100

Recommended Textbooks & References:

Linear Equations and Matrices, W. Bolton

Course: Computer Packages II (COM 215)

Programme: Statistics (National Diploma)			
Course: Computer Packages II	**Course Code: COM 215**	**Total Hours:**	**6**
Year: 2 Semester: 3	**Pre-requisite: COM 123**	**Theoretical:** **Practical:**	**2 hours /week** **4 hours /week**

Goal: This course is designed to enable the student to acquire a better understanding of standard computer packages.

General Objectives: On completion of this course, the diplomate will be able to:

1. Understand common graphics packages
2. Understand the concept of computer aided design.
3. Understand database management.
4. Understand a data analysis package.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (COM 215): Understand common graphics packages					
1	1.1 Obtain awareness of different types of graphic representation e.g. pictures, drawings, charts in computer system.	Illustrate Graphics using pictures, drawings, charts and graphs.	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.
2	1.2 Obtain appreciation of the difference between DTP and computer aided design. 1.3 List the types and uses of graphics packages (e.g. drawing packages, painting, computer aided design, charting packages)	Show examples of DTP and computer aided design Carryout an overview of graphic packages in existence and if possible identify merits and demerits of each	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.
3	1.4 Obtain ability to understand how to use graphic software to produce a newsletter and flyers, certificates or other one page publication.	Collect documented samples of a newsletter, flyers and certificates and let students design to exact specification. Highlight omissions and errors.	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
4	1.5 Design brochures and letter heads.	Collect documented samples of brochures and letterheads and let students design to exact specification. Highlight omissions and errors.	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.
5	1.6 Design greetings cards, invitations and folders	Collect samples of greetings cards and similar items.	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.
6	1.7 Creating, opening and saving card presentations. 1.8 Work in different views and with slides.	Let students design using samples from templates and clip arts.	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources CorelDraw, PageMaker Windows Operating System etc.
	General Objective 2 (COM 215): Understand the concept of computer aided design.					
7	2.1 Understand layout planning and plotting 2.2 Understand how to create 3D images.	Explain the basics of AutoCAD Explain drawing with precision using the AutoCAD package. Explain controlling the drawing display in AutoCAD.	Classroom computer resources AutoCAD software	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources AutoCAD software

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
8	2.3 Understand the use of blocks, attributes and external references 2.4 Understand how to create layer, projection types and solid modelling.	Explain applying dimensioning and tolerancing techniques to drawing	Classroom computer resources AutoCAD software	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources AutoCAD software
9	2.5 Aquire ability to carry the following using AutoCAD: (a) plan a layout and carryout plotting. (b) create three- dimensional images (c) use blocks, attributes and external references (d) create layering, projection types and solid modelling.	Explain use of manual creations to draw, plan, create and produce a complete architectural design using AutoCAD software.	Classroom computer resources AutoCAD software	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources AutoCAD software
	General Objective 3 (COM 215): Understand database management.					
10	3.1 Understand the functions of any DBMS e.g Microsoft Access.	Explain variable, constant, datatype objects, collection, and events. Give examples of DBMS activities (update, sorting, etc.)	Classroom computer resources Access software	Apply Access to work with sets of records such as: (a) personnel records (creation and retrieval) (b) medical records (creation and retrieval) (c) library records (creation and retrieval)	Oversee practical application of topics covered	Classroom computer resources Access software

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
11	3.2 Understand data base structure.	Explain variable, constant, data type objects, collection, and events.	Classroom computer resources Access software	Carry out the following: using the above records Find and sort data Work with queries and forms	Oversee practical application of topics covered	Classroom computer resources Access software
12	3.2 (continued) Understand data base structure.	Give examples of DBMS activities (update, sorting, etc.)	Classroom computer resources Access software	Share data between other applications Create macros Generate reports Handle run time errors and secure your data.	Oversee practical application of topics covered	Classroom computer resources Access software
	General Objective 4 (COM 215): Understand a data analysis package.					
13	4.1 Understand the functions of data analysis packages (SPSS, SSIDM) 4.2 Understand the definition of data analysis 4.3 Acquire an overview of data analysis packages	Explain data analysis Explain various functions of a data analysis package Give an overview of data analysis packages.	Classroom computer resources SPSS software	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources SPSS, software
14	4.4 Understand the basics of a data analysis package. 4.5 Understand build and execute commands	Present an overview of how to use build and execute commands and read, write and code data.	Classroom computer resources SPSS software	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources SPSS, software

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
15	4.6 Understand reading, writing and code of data. 4.7 Understand the presentation of statistical graphs, freer distribution and correlation analysis.	Explain (a) statistical graphs, (b) frequency distributon (c) corelation analysis (d) comparison of means (e) construction of report summary of and reproduction of statistical reports.	Classroom computer resources SPSS software	Show understanding of topics covered	Oversee practical application of topics covered	Classroom computer resources SPSS, software

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (COM 215)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 1 progress test for feed back.	20
Practical / Projects	To be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Semester: 4

Course: Design and Analysis of Experiments I (STA 221)

Programme: Statistics (National Diploma)			
Course: Design and Analysis of Experiments I	**Course Code: STA 221**	**Total Hours:**	**5**
Year: 2 Semester: 4	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**
Goal: This course is designed to enable students be able to design experiments and analyse data and results **General Objectives**: On completion of this course the diplomate should be able to: 1. Understand the principles of planning simple statistical experiments. 2. Understand simple experimental designs. 3. Understand the role of analysis of variance in experimental design.			

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 221): Understand the principles of planning simple statistics experiments					
1	1.1 Define a simple statistical experiment. 1.2 Distinguish between statistical survey and experiment.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
2	1.3 Distinguish between sample statistics and population parameters. 1.4 Explain treatments, experimental units, factors and replicates.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
3	1.5 Explain randomization, pairing and replication. 1.6 State the reasons for randomization, pairing and replication.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
4	1.7 Identify random variations and experimental errors. 1.8 Determine appropriate sample size for a given situation.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
5	1.9 Compute standard error for differences between two treatments	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 2 (STA 221): Understand simple experimental design					
6	2.1 Explain some types of simple experimental design techniques like completely randomized and candomized blocks design.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
7	2.2 Plan a simple statistical experiment.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
8	2.3 Plan simple Experiments for tests concerning one mean.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
9	2.4 Design experiments for tests concerning difference involving paired and unpaired samples.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
10	2.4 (continued) Design experiments for tests concerning difference involving paired and unpaired samples.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 3 (STA 221): Understand the role of analysis of variance in experimental design					
11	3.1 Define fixed effects and random effects models. 3.2 Distinguish between the two models in 3.1 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
12	3.3 Describe a one - way classification and illustrate with examples.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
13	3.4 Explain analysis of variance (ANOVA) concept.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
14	3.5 Partition sums of squares for ANOVA.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	3.6 Apply fixed - effects models to one - way analysis of variance.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 221)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	50
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	30
Total		100

Recommended Textbooks & References:

Fundamental Concept in the Design of Experiments, C. K. Hicks

Course: Sampling Techniques I (STA 222)

Programme: Statistics (National Diploma)			
Course: Sampling Techniques I	**Course Code: STA 222**	**Total Hours:**	**5**
Year: 2 Semester: 4	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to enable the student to carry out sampling.

General Objectives: On completion of this course, the diplomate should be able to:

1. Understand the statistical universe and the sample.
2. Understand methods of sampling.
3. Understand the planning of a sample survey.
4. Understand the execution of a sample survey.
5. Understand the analysis of sample survey results.
6. Understand errors and biases of sample surveys.
7. Understand how to estimate population parameters under simple random sampling.
8. Understand methods of regression and ratio estimation.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 222): Understand the statistical universe and the sample.					
1	1.1 Define statistical universe (population). 1.2 Distinguish between census and sample survey. 1.3 Distinguish between population parameter and sample statistics. 1.4 State when complete enumeration is necessary. 1.5 State advantages and disadvantages of taking a sample. 1.6 Identify a sampling frame.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 2 (STA 222): Understand methods of sampling.					
2	2.1 Distinguish between probability sampling and non-probability sampling. 2.2 State and illustrate types of non-probability sampling. 2.3 Identify types of probability sampling (SRSWOR, SRSWR, stratified sampling, systematic sampling, cluster sampling).	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
3	2.4 State the advantages and disadvantages of the types of sampling in 2.2 and 2.3 above. 2.5 Apply random number tables in probability sampling.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 3 (STA 222): Understand the planning of a sample survey.					
4	3.1 Identify the objectives of Sample Survey. 3.2 Define Target Population. 3.3 Identify methods for data collection (Direct Observation, Interview, Mail-questionnaire, e.t.c.). 3.4 State Advantages and Disadvantages of the Methods In 3.3 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
5	3.5 Design a good questionnaire or record schedules. 3.6 Decide on the Method of Sampling. 3.7 Selecting and training of enumerators.	Explain and discuss the concepts covered	Textbooks Lecture Notes Media Internet	Introduce issue of current concern upon which a questionnaire will be designed	Explain and supervise student in discussion of chosen issue	Textbooks Lecture Notes Media Internet
	General Objective 4 (STA 222): Understand the execution of a sample survey.					
6	4.1 Select and identify sample units 4.2 Collect the required information from sample units	Explain and discuss the concepts covered	Textbooks Lecture Notes Media Internet	Undertake questionnaire on chosen issue	Explain and supervise student and assess student work	Textbooks Lecture Notes Media Internet

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
7	4.3 Follow up non-response cases 4.4 Edit the results of sample survey	Explain and discuss the concepts covered	Textbooks Lecture Notes Media Internet	Undertake questionnaire on chosen issue	Explain and supervise student and assess student work	Textbooks Lecture Notes Media Internet
	General Objective 5 (STA 222): Understand the analysis of sample survey results					
8	5.1 Sort out the result of a sampling survey. 5.2 Apply the appropriate tabulation to the sorted out data. 5.3 Draw appropriate diagrams of the data from a survey.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
9	5.4 Compute the point estimate of population parameter e.g. mean, variance, proportion, etc. for simple random sampling. 5.5 Estimate sample sizes for the parameters in 5.4 above. 5.6 Calculate the intervals estimates for the parameters in 5.4 above. 5.7 Carry out tests of significance on the parameters in 5.4 above	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 6 (STA 222): Understand errors and biases of sample surveys					
10	6.1 Distinguish between non-sampling and sampling errors 6.2 Identify the sources of sampling errors	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
11	6.3 Distinguish between response errors and non-response errors 6.4 Explain methods of minimising sampling and non-sampling errors	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 7 (STA 222): Understand how to estimate population parameters under simple random sampling					
12	7.1 Estimate the mean, the total, the variance and proportion under SRSWR 7.2 Estimate the mean, the total, the variance and proportion under SRSWOR	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
13	7.3 Estimate confidence intervals for the mean and proportion	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 8 (STA 222): Understand methods of regression and ratio estimation					
14	8.1 State reasons for regression and ratio estimation 8.2 Estimate regression population, mean and total	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	8.3 Estimate population mean and total by ratio method	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 222)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	50
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	30
Total		100

Recommended Textbooks & References:

Course: Applied General Statistics I (STA 223)

Programme: Statistics (National Diploma)			
Course: Applied General Statistics I	**Course Code: STA 223**	**Total Hours:**	**5**
Year: 2 Semester: 4	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to enable students to acquire knowledge of application of statistics.

General Objectives: On completion of this course the diplomates, should be able to:

1. Understand the theory of linear regression.
2. Understand association and correlation between two variables.
3. Understand simple contingency table (m x n).
4. Understand simple non-parametric tests.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 223): Understand the theory of linear regression					
1	1.1 Explain the meaning of linear regression. 1.2 State and interpret a simple linear regression model. 1.3 Estimate the parameters of a regression equation using the free-hand methods and centroid method.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
2	1.4 State the limitation of 1.3 above. 1.5 Estimate the parameters of a regression equation by the methods of least square.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
3	1.6 Interpret the coefficients of linear regression. 1.7 State the distribution of estimates of linear regression coefficients.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
4	1.8 Construct confidence intervals for regression coefficients. 1.9 Carry out tests of significance for regression coefficients.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 2 (STA 223): Understand association and correlation between two variables.					
5	2.1 Explain association between two variables. 2.2 Define and interpret correlation.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
6	2.3 Distinguish between sample correlation coefficient (r) and population correlation coefficient (ñ). 2.4 Derive a formula for computing correlation coefficient (r).	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
7	2.5 Test hypothesis for correlation coefficient.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
8	2.6 Construct confidence intervals for ñ	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 3 (STA 223): Understand simple contingency table (m x n).					
9	3.1 Explain m x n contingency table. 3.2 Prepare simple contingency table.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
10	3.3 Compute expected values from contingency tables.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
11	3.4 Carry out tests for independence using chi-squared statistic. 3.5 State the assumptions underlining the use of the chi-square	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 4 (STA 223): Understand simple non-parametric tests					
12	4.1 Define non-parametric statistics 4.2 Distinguish between parametric and non-parametric statistics	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
13	4.3 Apply the median test for solving simple problems 4.4 Apply the Wilcoxon sign test for solving sample problems	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
14	4.5 Define the rank space sum tests 4.6 Apply rank space sum tests for solving one sample problems	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	4.7 Explain Spearman's rank correlation coefficient. 4.8 Compute the estimate of e using Spearman's rank correlation formulae.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 223)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	50
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	30
Total		100

Recommended Textbooks & References:

Course: Biostatistics I (STA 224)

Programme: Statistics (National Diploma)			
Course: Biostatistics I	**Course Code: STA 224**	**Total Hours:**	**5**
Year: 2 Semester: 4	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: This course is designed to enable students apply statistics to biological data and medicine.

General Objectives: On completion of this course, the diplomate will be able to:

1. Understand the importance of statistics in biology and medicine.
2. Understand the concept of vital and health statistics.
3. Understand standardised rates.
4. Understand simple genetics and bioassays.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 224): Understand the importance of statistics in biology and medicine					
1	1.1 Explain the scope and uses of statistics in biology and medicine.	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
2	1.2 State types and sources of biological and medical data such as states and National Health Services and agricultural returns.	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
3	1.3 State problems associated with collection of biological and medical statistics. 1.4 Suggest various ways of tackling the problems identified in 1.3 above.	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
4	1.5 State various types of variability associated with bio-medical data, e.g. response and reactions to drugs	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 2 (STA 224): Understand the concepts of vital and health statistics					
5	2.1 Classify vital and health statistics.	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
6	2.2 Define basic vital statistical indices.	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
7	2.3 Enumerate the uses of the indices in 2.2 above	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
	General Objective 3 (STA 224): Understand standardized rates					
8	3.1 Define standardized rates.	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
9	3.2 Distinguish between direct and indirect methods of standardization of rates.	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
10	3.3 Illustrate methods in 3.2 above with examples	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
11	3.3 (cont.) Illustrate methods in 3.2 above with examples	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
	General Objective 4 (STA 224): Understand simple genetics and bioassays					
12	4.1 Explain the meaning of genetics.	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
13	4.2 Define simple Mendelian ratio.	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
14	4.3 Explain the fundamental principles of bioassay. 4.4 State the concepts of ED 50 and LD 50. (- effective dose, - letter dose)	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics
15	4.5 Explain relative potency. 4.6 Describe simple assays: direct and parallel lines	Explain and discuss the concepts covered	Textbooks Lecture Notes Secondary data from hospitals / clinics	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes Secondary data from hospitals / clinics

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 224)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	50
Test	At least 2 progress tests for feed back.	20
Practical	At least 7 homeworks to be assessed by the teacher	30
Total		100

Recommended Textbooks & References:

Statistical Methods in Agriculture & Experimental Biology, Mead, Curnow

Course: Mathematical Methods I (MTH 222)

Programme: Statistics (National Diploma)			
Course: Mathematical Methods I	**Course Code: MTH 222**	**Total Hours:**	**5**
Year: 2 Semester: 4	**Pre-requisite:**	**Theoretical:** **Practical:**	**2 hours /week** **3 hours /week**

Goal: To introduce the student to the study of ordinary differential equations and develop their ability to use equations to solve statistical and other application problems.

General Objectives: On completion of this course, the diplomate should be able to:

1. Understand the meaning of a complex number
2. Understand the algebra of complex numbers.
3. Understand the nature of a differential equation
4. Understand exact differential equations of first order.
5. Understand the theory of linear differential equations.
6. Understand the properties of plane and space vectors.
7. Understand scalar and vector products
8. Understand applications of the concept of vectors to plane geometry.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (MTH 222): Understand the meaning of a Complex number					
1	1.1 State simple definitions such as those of complex number, complex conjugate, and magnitude or absolute values of a complex number. 1.2 Determine the magnitude of a complex number. 1.3 Put a complex number in polar form. 1.4 Draw argand diagrams.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 2 (MTH 222): Understand the algebra of complex numbers					
2	2.1 Carry out addition, subtraction, multiplication, and division as defined for complex numbers.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 3 (MTH 222): Understand the nature of a differential equation					
4	3.1 Define a differential equation stating clearly what is meant by the order and the degree of such an equation. 3.2 Define an ordinary linear differential equation with constant (variable) coefficients.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
5	3.3 Explain what is meant by a solution to a differential equation and verify with some examples.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 4 (MTH 222): Understand exact differential equations of first order					
6	4.1 Define an exact differential equation of first order and give examples. 4.2 State necessary and sufficient conditions for the differential equation	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	M (x, y) dx +M (x, y) dy = 0 to be exact and illustrate with examples. 4.3 Define an integrating factor.					
7	4.4 Transform a non-exact differential equation to an exact one using an integrating factor. 4.5 Solve an exact differential equation, and plot some of its integral curves.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 5 (MTH 222): Understand the theory of linear differential equations					
8	5.1 Distinguish between a homogeneous and non homogeneous linear differential equations. 5.2 Solve first order linear differential equations using integrating factors and by substitution.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
9	5.3 Use linear ordinary differential equation to solve application problems such as compound Interest problems and problems of growth and decay etc.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objective 6 (MTH 222): Understand the properties of plane and space vectors.					
10	6.1 Define a vector. 6.2 State the difference between a vector and a scalar. 6.3 Represent a vector geometrically.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
11	6.3 Determine the magnitude of a vector. 6.4 Identify position vectors.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 7 (MTH 222): Understand scalar and vector products					
12	7.1 Compute the scalar product of two vectors written in cartesian form. 7.2 Compute the vector product of two vectors.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
13	7.3 Show the vector product as a determinant. 7.4 State and prove simple properties of scalar and vectors products. 7.5 State and apply the Cauchy-Schwarz inequality.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
	General Objectives 8 (MTH 222): Understand applications of the concept of vectors to plane geometry					
14	8.1 Determine the angle between two vectors. 8.2 Apply the concept of angle between two vectors to Pythagoras's theorem from the cosine rule. 8.3 Add vectors geometrically by the triangle or parallelogram law.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes
15	8.4 Prove that each side of a triangle can be seen as the sum or difference of other two sides considered as vectors. 8.5 Represent product in the form $V_a \rightarrow U_x$ $n_b \rightarrow UcosQ$ where V = n = U = b and where Q is the angle between the vector → a and → b 8.6 Define perpendicularity in terms of zero dot product and justify this definition.	Explain and discuss the concepts covered	Textbooks Lecture Notes	Demonstrate understanding of the concepts covered by solving examples	Explain and supervise student exercises and assess student work	Textbooks Lecture Notes

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (MTH 222)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	60
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	20
Total		100

Recommended Textbooks & References:

Engineering Mathematics, K. A. Stroud

Introduction to Differential Equations, F. Braucek

Course: Management Information Systems (COM 224)

Programme: Statistics (National Diploma)			
Course: Management Information Systems	**Course Code: COM 224**	**Total Hours:**	**4**
Year: 2 Semester: 4	**Pre-requisite:**	**Theoretical** **Practical:**	**2 hours /week** **2 hours /week**

Goal: This course is designed to enable introduce students to management information systems

General Objectives: On completion of this course the diplomate should be able to:

1. Know different systems.
2. Understand systems theory.
3. Understand the concept of management information.
4. Know the features of management information systems (MIS)
5. Understand the concept of transaction processing.
6. Understand the concept of office automation.
7. Understand the different applications of MIS.
8. Understand the principles of decision making
9. Know the development cycle of an MIS
10. Understand the principles of project management.
11. Understand total systems.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (COM 224): Know different systems.					
1	1.1 Understand a system and its characteristics. 1.2 Understand the taxonomy of systems; deterministic, probabilities, static, dynamic etc. 1.3 Understand organization and business education as make up of systems or subsystems	Define a system State the characteristics of a system. Explain the taxonomy of a system: deterministic, probabilistic, static, dynamic etc. Explain organizations, business, education, etc as made up of systems or subsystems	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
	General Objective 2 (COM 224): Understand systems theory.					
2	2.1 Understand closed and open loop systems. 2.2 Understand feedback control n a system 2.3 Understand a system model 2.4 Understand how to represent a system	Distinguish between closed and open loop systems. Explain feed back control in system. Define a system model List types of models Represent systems as models.	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
	General Objective 3 (COM 224): Understand the concept of management information.					
3	3.1 Understand management and it's functions	Define management List the functions of management	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
4	3.2 Understand information needs of management levels. 3.3 Understand attributes of information	Explain the information needs of management levels. Explain and give attributes of information	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
	General Objective 4 (COM 224): Know the features of management information systems (MIS)					
5	4.1 Understand an information system and it's characteristics. 4.2 Understand a management information system. 4.3 Appreciate the importance of MIS to business organizations. 4.4 Recognise features of information systems	Define information system. Explain the characteristics of an information system. Define management information system. Explain the importance of MIS to business organization. Explain the features of an information system.	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
	General Objective 5 (COM 224): Understand the concept of transaction processing.					
6	5.1 Understand the concept of data and information 5.2 Understand data capture 5.3 Understand verification and validation 5.4 Understand data processing stages 5.5 Understand the concept of a database management system (DBMS), including insertion , delete and update operations.	Explain concept of data and information. Explain data processing stages. Explain the concepts of data capture, verification and validation. Explain concepts of a database management system (DBMS) Explain insertion, deletion and update operations	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 6 (COM 224): Understand the concept of office automation.					
7	6.1 Understand office automation and it's components, e-mail, voice mail, fax machine, teleconferencing 6.2 Understand telecommuting 6.3 Understand the importance of office automation (OA) to an organization	Define office automation. Explain components of office a Automation i.e. e-mail, voice-mail fax machine, teleconferencing, Explain telecommuting. Explain the importance of office automation (O.A.) to an organization.	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
	General Objective 7 (COM 224): Understand the different applications of MIS.					
8	7.1 Understand various types of information systems and their objectives. 7.2 Recognise the elements required for any information system 7.3 Understand reports required for any types of information system	List the various types of information system. Explain the objectives of each type of information system Explain the elements required for any information system. Explain the nature of reports required for each type of information system.	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
9	7.4 Understand sources of data for each type of information system 7.5 Understand the information needs, strategic technical and operational advantages of MIS	Identify sources of data for each type of information system. Identify information needs: strategic, technical, and operational. Identify some advantages of MIS	A flip chart. OHP connected to PC. A white board	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 8 (COM 224): Understand the principles of decision making					
10	8.1 Understand the stages in decision making 8.2 Understand various approaches to decision making 8.3 Undertake application of some decision making techniques	Explain decision making. Teacher to represent this diagrammatically. Teacher to explain the approaches to decision making. Teacher to give students a case study on decision making techniques	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
	General Objective 9 (COM 224): Know the development cycle of an MIS					
11	9.1 Understand the need for information system development	Explain the need for information system development	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
12	9.2 Understand the phases and importance in the development cycle of MIS	Identify the phases in the development cycle of MIS State the importance of each phase Describe each of the phases of the development cycle of an MIS.	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
	General Objective 10 (COM 224): Understand the principles of project management.					
13	10.1 Understand project management and its objectives. 10.2 Understand some tools used in project management and their application	Define project management Explain the objectives of project management. Identify tools to be used in project management. Apply the tools	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 11 (COM 224): Understand total systems.					
14	11.1 Understand the objectives of a total system. 11.2 Understand rationalization of information flows, timing and accuracy of destination of output.	State the objectives of a total system Explain rationalizing information flows, timing and accuracy of destination of output.	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.
15	11.3 Understand the effect of time lag on inputs 11.4 Understand the effect of deviating from standards.	Explain the effect of time lag on inputs. Explain the effect of deviating from standards. Develop an MIS.	A flip chart. OHP connected to PC. A white board.	To be able to develop a simple MIS	To assist student in developing a simple MIS	OHP connected to PC in a networked laboratory.

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (COM 224)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	50
Test	At least 2 progress tests for feed back.	20
Practical	At least 5 homeworks to be assessed by the teacher	30
Total		100

Recommended Textbooks & References:

Course: Small Business Management I (STA 226)

Programme: Statistics (National Diploma)			
Course: Small Business Management I	**Course Code: STA 226**	**Total Hours:**	**2**
Year: 2 Semester: 4	**Pre-requisite:**	**Theoretical:** **Practical:**	**1 hour /week** **1 hour /week**

Goal: This course is designed to provide the student with the basic knowledge on the various tools used in the management of small-scale businesses.

General Objectives: On completion of this course, the diplomate will be able to:

1. Understand the nature of small-scale enterprises.
2. Understand the legal framework for small-scale enterprises.
3. Understand the role of governments in small-scale enterprises in Nigeria
4. Understand a business plan for a small-scale business enterprise.
5. Understand marketing management in a small business enterprise
6. Understand the general concept of production management
7. Know human capital needs for an enterprise

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 226): Understand the nature of small-scale enterprises.					
1	1.1 Define the range and scope of a small business. 1.2 Explain the importance of a small business. 1.3 Describe the problems associated with small business operations.	Explain range, scope and importance of a small scale business. Explain problems associated with small business operations.	Text Books Journals Publications	Select a small business enterprise and indicate its signs of success and failures. Use case studies based on a local organisation.	Guide students in identifying range, scope and importance of a small scale business.	Internet and relevant websites Guest speaker on small businesses
2	1.4 Describe types of businesses that could be run on a small scale. 1.5 Describe the merits and demerits of being self-employed 1.6 Identify the starting problems and signs of failure of a small business	Explain types of businesses that could be run on small scale, their associated problems and signs of failure during operations. Explain wage employment and self employment. Explain the merits and demerits of self employment.	Text Books Journals Publications	Select a small business enterprise and indicate its signs of success and failures. Use case studies based on a local organisation.	Guide students in identifying types of businesses that could be run on small scale, their associated problems and signs of failure during operations.	Internet and relevant websites Guest speaker on small businesses
	General Objective 2 (STA 226): Understand the legal framework for small-scale enterprises.					
3	2.1 Explain the types of business organization. 2.2 Identify the legal form of business.	Explain the types of business organization Explain legal formation and regulatory status of small business. Explain environmental factors of business.	Text Books Journals Publications	Use CAMB to explain the regulatory frame work of small business. Group work to set up a small business - realistic scenarios Use of relevant documentation taken from the internet.	Guide students to identify the legal formation and regulatory status of small business.	Internet and relevant websites

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
4	2.3 Describe the environmental factors of business - law of sales, licenses, failure signs, etc. 2.4 Explain regulatory status and formation of small business.	Explain legal formation and regulatory status of small business. Explain environmental factors of business.	Text Books Journals Publications	Use CAMB to explain the regulatory frame work of small business. Group work to set up a small business - realistic scenarios Use of relevant documentation taken from the internet.	Guide students to identify the environmental factors of business.	Internet and relevant websites
	General Objective 3 (STA 226): Understand the role of governments in small-scale enterprises in Nigeria					
5	3.1 Explain government policies for small enterprises development. 3.2 Explain the effects of government policies on direct and indirect assistance to small businesses	Explain government policies for small enterprises development and effects of the policies on direct and indirect assistance to these enterprises.	Text Books Journals Publications	Identify government policies and their effects on small scale business.	Guide students to evaluate the contributions of the promoting bodies (IDC, NASA, NERFUND, NDE, NAPEP etc to growth of small business in Nigeria.	Internet and relevant websites
6	3.3 State the role of the following institutions in promoting small enterprises (a) Industrial Development Centre (IDC) (b) State Ministries of Commerce and Industries. (c) State Export Promotion Committees. (d) Centre for Management Development (CMD)	Explain the following institutions and their roles in promoting small scale enterprises. - IDC, State Ministries of Commerce, State Export Promotion Committees, CMD, NDE, NAPPEP, CIRD NERFUND NACRDB, NEPC NASSI, NASME, etc	Text Books Journals Publications	Identify and explain beneficiaries of the bodies. Promotion SME in Nigeria.	Guide students to evaluate the contributions of the promoting bodies (IDC, NASA, NERFUND, NDE, NAPEP etc to growth of small business in Nigeria.	Internet and relevant websites

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	(e) National Directorate of Employment (NDE) (f) NAPPEP (g) CIRD (h) NERFUND (i) NACRDB, NEPC (j) NASSI, NASME, etc					
	General Objective 4 (STA 226): Understand a business plan for a small-scale business enterprise.					
7	4.1 Explain business plan. 4.2 Explain the purpose of business plan 4.3 Identify the components of a business plan from project development up to project cost.	Explain business Plan, its purpose and components from project development to project cost.	Text Books Journals Publications	Identify business plan. Identify how to plan in small business. Formulate a business plan for a particular project.	Guide students to:- Work in pairs to develop a relevant business plan. Refer to business planning information on the internet Present the plans and justify the goals	Internet and relevant websites
8	4.4 State the necessary steps in carrying out financial analysis and planning for a small business 4.5 Compare personal goal and business goals. 4.6 Identify influences of family goals in business goals	Explain steps in carrying out financial analysis and planning for a small business. Explain personal goals and business goals. Explain influences of family goals in business goals. Invite a successful entrepreneur to give a talk.	Text Books Journals Publications	Identify business plan. Identify how to plan in small business. Formulate a business plan for a particular project.	Guide students to:- Work in pairs to develop a relevant business plan. Refer to business planning information on the internet Present the plans and justify the goals	Internet and relevant websites
	General Objective 5 (STA 226): Understand marketing management in a small business enterprise					
9	5.1 Understand the basic concept of marketing. 5.2 Identify the steps in	Explain basic concepts of marketing. Explain steps in conducting	Text Books Journals Publications	Identify the process of conducting a marketing survey.	Guide students to use the internet to identify the marketing needs of small business enterprises.	Internet and relevant websites

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	conducting market surveys to determine demand and supply for particular products. 5.3 Identify markets for specific products.	marketing survey to determine demand and supply for particular products. Explain how to identify markets for specific products.		Identify appropriate training strategies for products produced on a small scale.		
10	5.4 Identify channels of distribution for a selected product or service. 5.5 Explain the promotional and sales activities for a selected product or service 5.6 Explain appropriate pricing strategies	Explain channels of distribution for a selected product or service. Explain promotional and sales activities for a selected product or service Explain appropriate pricing strategies	Text Books Journals Publications	Identify the process of conducting a marketing survey. Identify appropriate training strategies for products produced on a small scale.	Guide students to use the internet to identify the marketing needs of small business enterprises.	Internet and relevant websites
	General Objective 6 (STA 226): Understand the general concept of production management					
11	6.1 Explain the basic concepts of production 6.2 Explain choice of appropriate technology 6.3 Identify types and sources of machinery and equipment. 6.4 Explain the installed capacity. 6.5 Explain the utilized capacity.	Explain the basic concepts of production Explain choice of appropriate technology Explain types and sources of machinery and equipment, their installed and utilized capacity.	Text Books Journals Publications Sample business	Identify appropriate technology for different types of SME. Identify sources of machinery and material from the internet. Identify appropriate locations and their problems for SMES	Guide students to prepare a case study on the location of an industry and factory layout Oversee group work and guide reference to relevant web sites	Internet and relevant websites

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
12	6.6 Identify sources of raw materials. 6.7 Describe factory location and factors in the selection of site. 6.8 Describe factory layout. 6.9 Explain plant and machinery maintenance. 6.10 Explain Plan and scheduling.	Explain sources of raw materials. Explain factory location, its layout and safety measures. Explain Plant and machinery maintenance. Explain plan and scheduling.	Text Books Journals Publications Sample business	Identify appropriate technology for different types of SME. Identify sources of machinery and material from the internet. Identify appropriate locations and their problems for SMES	Guide students to prepare a case study on the location of an industry and factory layout Oversee group work and guide reference to relevant web sites	Internet and relevant websites
13	6.11 Explain quality control issues. 6.12 Explain factory safety measures. 6.13 Identify problems of production in the Nigerian situation. 6.14 Explain how to cope with production problems in Nigeria.	Explain quality control. Explain problems of production in the Nigerian situation and how to cope with them. Organise a field trip to a successful small business establishment.	Text Books Journals Publications Sample business	Identify appropriate technology for different types of SME. Identify sources of machinery and material from the internet. Identify appropriate locations and their problems for SMES	Guide students to prepare a case study on the location of an industry and factory layout Oversee group work and guide reference to relevant web sites	Internet and relevant websites
	General Objective 7 (STA 226): Know human capital needs for an enterprise					
14	7.1 Identify human capital needs for an enterprise. 7.2 Explain recruitment procedures. 7.3 Explain need for training	Explain human capital management and its needs for small business enterprises. Explain recruitment procedures	Text Books Journals Publications Cardboard	Identify the recruitment compensation and training procedures of workers in SMES. Identify problems of human capital	Guide students to prepare organizational charts for SME and how to forecast their employment needs.	Internet and relevant websites

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	of workers. 7.4 Explain how to motivate workers.			management and how to solve them in SMEs		
15	7.5 Explain how to compensate workers. 7.6 Explain organization of work force, organizational chart. 7.7 Explain problems of human capital management in small business enterprises. 7.8 Explain how to cope with the problems of human capital management.	Explain need for training of workers. Explain how to motivate. and compensate workers Explain organization of work force. Guide students to prepare organizational, chart for a small business enterprise. Explain problems of human capital management in small business enterprises and how to cope with them.	Text Books Journals Publications Cardboard	Identify the recruitment compensation and training procedures of workers in SMES. Identify problems of human capital management and how to solve them in SMEs	Guide students to prepare organizational charts for SME and how to forecast their employment needs.	Internet and relevant websites

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Project %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 226)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	0
Test	At least 1 progress test for feed back.	25
Practical / Project	Project with group (25%) and individual (50%) components to be assessed by the teacher	75
Total		100

Recommended Textbooks & References:

Course: Project (STA 226)

Programme: Statistics (National Diploma)			
Course: Project	**Course Code: STA 226**	**Total Hours:**	**5**
Year: 2 Semester: 4	**Pre-requisite:**	**Theoretical:** **Practical:**	**0 hours /week** **5 hours /week**

Goal: This course is designed to enable the student to undertake an individual project and write a report on it.

General Objectives: On completion of this course, the diplomate should be able to:

1. Research a chosen topic at ND level from available sources.
2. Collect data on the chosen topic.
3. Produce a report on the chosen topic.

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
	General Objective 1 (STA 226): Research a chosen topic at ND level from available sources.					
1	1.1 Choose, under guidance, an appropriate topic of interest.	Provide guidance in finding suitable topics.	Textbooks Lecture Notes Internet	Selection of a topic of interest.	Provide guidance in finding suitable topics.	Textbooks Lecture Notes Internet
2	1.2 Research a chosen topic from available sources.	Provide guidance in finding suitable sources.	Textbooks Lecture Notes Internet	Demonstrate research ability	Provide guidance in finding suitable sources.	Textbooks Lecture Notes Internet
3	1.2 (continued) Research a chosen topic from available sources.	Provide guidance in finding suitable sources.	Textbooks Lecture Notes Internet	Demonstrate research ability	Provide guidance in finding suitable sources.	Textbooks Lecture Notes Internet
4	1.2 (continued) Research a chosen topic from available sources.	Provide guidance in finding suitable sources.	Textbooks Lecture Notes Internet	Demonstrate research ability	Provide guidance in finding suitable sources.	Textbooks Lecture Notes Internet
	General Objective 2 (STA 226): Collect data on the chosen topic.					
5	2.1 Collect data on the chosen topic from available sources.	Provide guidance in collecting data	Textbooks Lecture Notes Internet	Demonstrate ability to collect data	Provide guidance in collecting data.	Textbooks Lecture Notes Internet
6	2.1 (continued) Collect data on the chosen topic from available sources.	Provide guidance in collecting data	Textbooks Lecture Notes Internet	Demonstrate ability to collect data	Provide guidance in collecting data.	Textbooks Lecture Notes Internet
7	2.1 (continued) Collect data on the chosen topic from available sources.	Provide guidance in collecting data	Textbooks Lecture Notes Internet	Demonstrate ability to collect data	Provide guidance in collecting data.	Textbooks Lecture Notes Internet
8	2.1 (continued) Collect data on the chosen topic from available sources.	Provide guidance in collecting data	Textbooks Lecture Notes Internet	Demonstrate ability to collect data	Provide guidance in collecting data.	Textbooks Lecture Notes Internet

Theoretical Content				Practical Content		
Week	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**	**Specific Learning Outcomes**	**Teacher's activities**	**Resources**
9	2.1 (continued) Collect data on the chosen topic from available sources .	Provide guidance in collecting data	Textbooks Lecture Notes Internet	Demonstrate ability to collect data	Provide guidance in collecting data.	Textbooks Lecture Notes Internet
	General Objective 3 (STA 226): Produce a report on the chosen topic.					
10	3.1 Produce a report on the chosen topic.	Provide guidance in report writing	Textbooks Lecture Notes Internet	Demonstrate ability in report writing	Provide guidance in report writing	Textbooks Lecture Notes Internet
11	3.1 (continued) Produce a report on the chosen topic.	Provide guidance in report writing	Textbooks Lecture Notes Internet	Demonstrate ability in report writing	Provide guidance in report writing	Textbooks Lecture Notes Internet
12	3.1 (continued) Produce a report on the chosen topic.	Provide guidance in report writing	Textbooks Lecture Notes Internet	Demonstrate ability in report writing	Provide guidance in report writing	Textbooks Lecture Notes Internet
13	3.1 (continued) Produce a report on the chosen topic.	Provide guidance in report writing	Textbooks Lecture Notes Internet	Demonstrate ability in report writing	Provide guidance in report writing	Textbooks Lecture Notes Internet
14	3.1 (continued) Produce a report on the chosen topic.	Provide guidance in report writing	Textbooks Lecture Notes Internet	Demonstrate ability in report writing	Provide guidance in report writing	Textbooks Lecture Notes Internet
15	3.1 (continued) Produce a report on the chosen topic.	Provide guidance in report writing	Textbooks Lecture Notes Internet	Demonstrate ability in report writing	Provide guidance in report writing	Textbooks Lecture Notes Internet

Assessment: Give details of assignments to be used:
Coursework/ Assignments %; Course test %; Practical %; Projects %; Examination %

Type of Assessment	Purpose and Nature of Assessment (STA 226)	Weighting (%)
Examination	Final Examination (written) to assess knowledge and understanding	0
Test	0 progress tests	0
Practical	Report of 20 - 30 pages length	100
Total		100

Recommended Textbooks & References: