



FELLOWSHIP GUIDELINES
FOR CANDIDATES APPLYING FOR THE FELLOWSHIP (*FISLT*)
OF THE
NIGERIAN INSTITUTE OF SCIENCE LABORATORY TECHNOLOGY (NISLT)
(Federal Ministry of Science and Technology)

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MARCH, 2020

1. PREFACE

The Nigerian Institute of Science Laboratory Technology (NISLT) recently undergone series of reforms in its various training programmes to meet the members' needs and global challenges. Sequel to this there is need for Supervisors and Fellowship Candidates of the Nigerian Institute of Science Laboratory Technology, Samonda, Ibadan to get more familiar with guidelines for preparation of fellowship Thesis. The existing document has become inadequate in view of recent developments in the Fellowship examination. This document is therefore an update that has provided the missing links, to enable all parties involved in preparation of Courses, Course Curriculum and Thesis to acquaint themselves of current information.

This document provides more information on all aspects of Courses which include: Advanced Research Methods, Advanced Statistical Methods, Entrepreneurship Studies/Laboratory Business Law, Seminar and Research Thesis preparation, particularly nomenclature, title, declaration, certification, abstract, dedication, acknowledgement, table of contents, list of tables, list of figures, list of plates, introduction, literature review, materials and methods, discussion, conclusion, references and appendices

Preparation of Thesis requires a good mastery of English Language as well as adequate statistical knowledge and Fellowship candidates' must be well grounded in his or her area of specialization.

The supervisors are to ensure that the Fellowship Candidates acquire the art of scientific writing and be able to put forward their ideas in an organized manner that is devoid of any ambiguity.

The accepted Language for the Research Thesis is English Language with orderly presentation of findings. It should be error-free and conform to the NISLT guidelines. It is expected to be original, publishable, and should make substantial contribution to scientific knowledge.

Moreover, it is mandatory for all prospective fellowship candidates to purchase a copy of these guidelines at the point of registration and must be followed strictly.

Yemi H. GBADEGESIN, FISLT
Director General/Registrar/ CEO
NISLT, Samonda Ibadan

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CHAPTER ONE

1.0 FELLOWSHIP ADMISSION REQUIREMENTS:

To be admitted into the fellowship programme, prospective candidates must have registered as an Associate for not less than Ten (**10**) years post registration. She/he must be a financial member from the date of first registration with the Institute and has practiced continuously for not less than Six (6) years in recognized laboratory under experienced Laboratory Technologist (Preferably not below the rank of Chief Technologist or SLT based academic staff. Applicant must possess the basic requirements for admission to Associate that is:

- i SSCE pass at credit level or GCE 'O' level in five subjects which must include Mathematics, English Language plus three relevant Science subjects.
- ii HND, Final Diploma or B.Sc/B.Tech in Science Laboratory Technology awarded by recognized institutions.

1.0.1 FELLOWSHIP COURSE LECTURES, GRADING AND PROCESSES:

- (a) All applicants for fellowship are to seat and pass all the courses in the three modules.
- (b) The pass mark for each course shall not be less than 50%.
- (c) Candidate can only proceed to Module 3 (Research Thesis) after passing all the courses in Modules 1 and 2.
- (d) Lectures/Facilitation for courses in Modules 1 shall run for 3Months while the candidates will be given opportunity to prepare and write the Examination for the first Module after 3 months.
- (e) At the resumption of the Module 2, examination for the Module 1 will be written in the first 3 days before commencement of the lectures/facilitation for the Module 2 which will also run for between 1 to 2 weeks.
- (f) The programme Coordinator shall release the time table for the lectures/facilitation at least a month before commencement.
- (g) All Candidates for fellowship awards shall write the same examination at the same venue or at approved centres depending on number of applicants.

NISLT GUIDELINE FOR MEMBERSHIP UPGRADE

1.1 CURRICULUM FOR FELLOWSHIP COURSES

The under listed courses shall be taken and passed by all candidates applying for fellowship award of the Institute

S/N	COURSES	COURSE CODE	UNIT
MODULE 1			
1.	Advanced Research Methodology	F/RES 801	3
2.	Advanced General Laboratory Technique and Laboratory Management	F/GLT 803	4
3.	Advanced Statistical Methods	F/STA 805	3
MODULE 2			
4.	Information Communication Technology in SLT Research	F/ICT 802	3
5.	Entrepreneurship Studies/Laboratory Business Law	F/ESL 804	3
6.	Seminar which should be on the Research topics	F/SEM 806	2
MODULE 3			
7.	Research Thesis	F/RTH 800	6
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1.2 COURSE CONTENT:

MODULE 1

1.2.1 (F/RES 801) ADVANCED RESEARCH METHODOLOGY (3 Unit)

Methods and Techniques

Objective: The objective of this course is to ensure that the candidates

- Understand Research Terminology
- Are aware of the Ethical Principles of Research, Ethical Challenges and Approval Processes
- Describe Quantitative, Qualitative and Methods Approach to Research.
- Identify the Component of a Literature Review Process
- Critically Analyze Published Research
- Become Competent in Planning, Conducting, Evaluating and Presenting Research Project.

Course Outline

i. Introduction to Research Methods:

- o Theory of Science
- o Meaning of Research
- o Objectives of Research
- o Motives of Research
- o Types of Research
- o Significance of Research
- o Research Methods versus Methodology
- o Research and Scientific Method
- o Importance of Knowing How Research is Done
- o Research Process
- o Criteria of Good Research
- o Problems Encountered by Researchers in Nigeria

ii. Introduction to Research Problem:

- o Theory of Science
- o What is a Research Problem?
- o Selecting the Problem
- o Necessity of Defining the Problem
- o Technique Involved in Defining a Problem
- o Research Problems and Strategies in special needs

iii. Research Design:

- o Meaning of Research Design
- o Need for Research Design
- o Introduction to qualitative and quantitative research Design & Methods,
- o Instrumentation
- o Research Ethics

iv. Methods of Data Collection:

- o Collection of Primary Data

- o Observation Method
- o Interview Method
- o Collection of Data through Questionnaires
- o Collection of Data through Schedules
- o Difference between Questionnaires and Schedules
- o Some Other Methods of Data Collection
- o Collection of Secondary Data
- o Selection of Appropriate Method for Data Collection
- o Principles and Techniques of Statistical Analysis
- o Conceptualizing and Conducting Research Proposals

1.2.2 (F/STA) 805 STATISTICAL METHODS (3.0 UNIT)

This course provides a theoretical basis of statistical concepts and methods that are required for a good research work.

Objective of the Course

- Learn to know the basics of statistics and statistical distribution as well as being able to apply the correct distribution
- Understand hypothesis testing and different method for hypothesis testing as well as the strengths and weaknesses of the methods.
- Understand parameter estimation based on maximum likelihood and least square methods as well as the strengths and weaknesses of the methods.
- Being able to apply methods of hypothesis testing and parameter estimation as well as make the correct statistical interpretation
- Familiar with data analysis and interpretation
- To know the appropriate software in data analysis for a research work.

Course Content

i. Introduction to Probability

- o Probability theory

ii. Processing and Analysis of Data o Processing Operations

- o Some Problems in Processing
- o Elements/Types of Analysis
- o Statistics in Research
- o Measures of Central Tendency
- o Measures of Dispersion
- o Measures of Asymmetry (Skewness)
- o Measures of Relationship
- o Simple Regression Analysis
- o Multiple Correlation and Regression
- o Partial Correlation
- o Association in Case of Attributes
- o Other Measures: Statistical inference, Interval; estimation

iii. Statistical Analytical tools o

- o Introduction to SPSS and/or other Statistical Analysis tools etc
- o Sampling technique

iv. Data analysis and Interpretation; method of analysis, parametric and non-parametric test.

Hypotheses Testing

a. Testing of Hypotheses-I (Parametric or Standard Tests of Hypotheses)

- o What is a Hypothesis?
- o Basic Concepts Concerning Testing of Hypotheses
- o Procedure for Hypothesis Testing
- o Flow Diagram for Hypothesis Testing
- o Measuring the Power of a Hypothesis Test
- o Tests of Hypotheses
- o Important Parametric Tests
- o Hypothesis Testing of Means
- o Hypothesis Testing for Differences between Means
- o Hypothesis Testing for Comparing Two Related Samples
- o Hypothesis Testing of Proportions
- o Hypothesis Testing for Difference between Proportions
- o Hypothesis Testing for Comparing a Variance to Some Hypothesized Population Variance
- o Testing the Equality of Variances of Two Normal Populations
- o Hypothesis Testing of Correlation Coefficients
- o Limitations of the Tests of Hypotheses
- o Chi-square Test
- o Chi-square as a Test for Comparing Variance
- o Chi-square as a Non-parametric Test
- o Conditions for the Application of χ^2 Test
- o Analysis of Variance and Covariance
- o Analysis of Variance (ANOVA)
- o What is ANOVA?
- o The Basic Principle of ANOVA
- o ANOVA Technique
- o Setting up Analysis of Variance Table
- o Short-cut Method for One-way ANOVA
- o Coding Method
- o Two-way ANOVA
- o Analysis of Co-variance (ANOCOVA)
- o ANOCOVA Technique

b. Testing of Hypotheses-II (Nonparametric or Distribution-free Tests)

- o Important Nonparametric or Distribution-free Test
- o Relationship between Spearman's r_s and Kendall's W
- o Characteristics of Distribution-free or Non-parametric Tests

c. Multivariate Analysis Techniques o Growth of Multivariate Techniques

- o Characteristics and Applications
- o Classification of Multivariate Techniques
- o Variables in Multivariate Analysis
- o Important Multivariate Techniques

- Important Methods of Factor Analysis
- Rotation in Factor Analysis
- R-type and Q-type Factor Analyses
- Path Analysis
- Data Analysis and Presentation.

d. Simple linear regression (regression with more than one covariate),

e. Correlation analysis

1.2.3 (F/GLT 803) ADVANCE GENERAL LABORATORY TECHNIQUE AND MANAGEMENT (4 Units)

Course Objectives: This course will examine the fundamental areas of practical general laboratory techniques and management. The objective of this course is to ensure that the candidate

- ✓ Understand the management of laboratory operation and quality assurance process
- ✓ Have the ability to control cost and understand financial management

Course Content

1. Laboratory Design & Planning

- Various type of laboratory (ies): Industries, Health, Schools, Science, research & teaching
- Organization, design and layout
- Installation of suitable essential services, fixtures and fittings to achieve the desire and specialized rooms.

ii. Store Management

- Types and design of stores
- Purchase and receipts of good ordering
- Store keeping procedures
- Physical Management of stock and materials
- Storage of animal radioactive sources, explosives and corrosive materials.
- Inventory and stock taking, reasons and purposes, procedures, spot-checks, stock valuation & inspection
- Health and safety, accident prevention, stockyards and warehouses
- Storage and preservation of apparatus chemicals.
- Biological specimen in the physics, chemistry and biological laboratories.

iii. Laws affecting Laboratory Practice.

- Risk encountered in laboratories and their causes.
- Preventive measure and precaution factories Acts
- Fire Precaution Acts
- Legal requirement for handling of poisons, alcohol, radioactive materials
- Laws relating to experiment on animal.
- Regulation of governing importation and exportation of laboratory equipment.

iv. Laboratory Documentation and Records

- Types of laboratory records
- Recording and procedures
- Observation and results obtained from experiment
- Filing methods, indexing of catalogue
- Document copying inventories and equipment movement records.
- Record data analysis & presentation.

v. General Laboratory Maintenance

- Periodic inspection, Laboratory Auditing, Verification and Accreditation Procedures
- General Laboratory facility and Equipment Repairs, replacement and installation processes
- Modification of existing structures.
- Troubleshooting

vi. Laboratory Personnel Management, Training and Development

- Introduction to Management
- Writing and Communication Skills-
- Introduction to Personnel Management and Industrial Relations
- Manpower training and Development
- Nigeria Labour Law

MODULE 2

1.2.4 (F/ESL 804) Entrepreneurship Studies/Laboratory Business Law (3.0 UNIT)

Course content

- i. What is Entrepreneurship?
 - General overview
 - Types of business Enterprise
- ii. Entrepreneurship Areas in SLT
 - Relevant business ventures in SLT
 - Process of establishing business venture in Nigeria
 - Laws guiding business operation in Nigeria
- iii. Financial Management
 - Introduction to accounting & costing
 - Budgeting and Budgetary control
 - Employees management
 - Grant sourcing
- iv. Marketing and Strategic Business Operation
 - Market design & planning
 - Sales, procurement & supply
 - Ethics of business operation
- v. Corporate Social Responsibility
 - Understanding CSR
 - Understanding environmental law
 - International best practices
 - Business Law
 - Government and Nigeria Legal system
- vi. NISLT Act, Rules and Regulations
- vii. Science, Technology and innovation
- viii Regulations governing Laboratory Registration and Accreditation
 - What is Laboratory accreditation?
 - What are the Differences between Verification and Accreditation?
 - What are the Verification and Accreditation tools?
 - The Role of NISLT in Management of Laboratory Equipment, Chemicals and Reagents
 - Supplies in Nigeria.
 - Basic requirements for registration of Laboratory Equipment, Chemicals and Reagents Suppliers
 - Laws relating to Entrepreneurship in SLT
 - NISLT and other regulatory agencies registration Procedures for Laboratory Equipment, Chemicals and Reagents suppliers in Nigeria

1.2.5 (F/ICT 802) INFORMATION COMMUNICATION TECHNOLOGY IN SLT RESEARCH (3.0 UNIT)

- Introduction to Computer
 - o What is Computer
 - o Brief Historical development of computer systems
 - o Generations of Computer system
 - o Types of Computers
 - o What is a Bit?
 - o Combining Bits
- The Computer numbering system
 - o Base 10 verses Base 2
 - o Hexadecimal
- Application software: common application software;
 - o Using Microsoft Word;
 - o Using Microsoft Excel;
 - o Features of Database Applications and Microsoft Access;
 - o Statistical Analysis Applications; Using SPSS software;

1.2.6 (F/SEM 806) SEMINAR (2.0 UNIT)

- i. Research Proposal,
 - o Methods of Writing research Proposals
- ii. Data Collection
 - o Methods of data collection,
- iii. Report writing
 - Layout of the Research Report
 - o Types of Reports
 - o Interpretation and Report Writing
 - o Meaning of Interpretation
 - o Why Interpretation?
 - o Technique of Interpretation: Precaution in Interpretation
 - o Mechanics of Writing a Research Report
 - o Precautions for Writing Research Reports
 - o Significance of Report Writing
 - o Different Steps in Writing Report
- iv. Citation, Referencing and Ethics of research.
 - o What is Citation?
 - o Why should I cite sources?
 - o How do I cite sources?
 - o Referencing styles
 - o Using Window (Microsoft) referencing tools.
 - o Mendeley referencing
 - o Methods of Research Publications.
- v. Plagiarism
 - o What is Plagiarism
 - o Types of Plagiarism
 - o What are copyright laws?
 - o What are the punishments for plagiarism
- vi. Seminar Presentation/Oral Presentation

MODULE 3

1.2.7 (F/RTH 800) RESEARCH THESIS (6.0 UNIT)

This is the last stage of the Fellowship training.

1.3 NOMENCLATURE OF RESEARCH REPORTS

In the Nigerian Institute of Science Laboratory technology (NISLT), Samonda Ibadan the nomenclature for Fellowship research treatises shall be Thesis. The independent research project shall consist of theoretical/experimental investigation in any areas of Science Laboratory Technology.

The research to be investigated shall be determined in consultation with an approved supervisor by the institute. The final report of the research work (Thesis) shall be examined internally and externally as directed by the Fellowship committee of the Institute.

1.4 RESEARCH AREAS:

- Biology
- Biochemistry
- Chemistry
- Physics with Electronics
- Energy system
- Equipment Testing and Calibration
- Microbiology
- Physiology and Pharmacology
- Geology and Mining
- Laboratory Equipment designs, Instrumentation
- Laboratory facility designs and Construction
- Laboratory Management system
- Laboratory marketing strategies
- Laboratory Regulations and Laws
- Laboratory Hazard, Safety and Accident
- Any other approved Areas of Science Laboratory Technology

NISLT GUIDELINE FOR MEMBERSHIP UPGRADE

1.5 DURATION:

Stage	ITEMS	TIME
One:	Course Work (Module 1 and 2)	Six Months
Two:	Submission of Research Proposal/Research Topic Selection of Supervisor(s)	One Month
Three:	Fellowship Committee meet to decide on Research Proposal and Topics	One Month
Communication of Approval/Denial of Approval		
Four:	Commencement of Field / Bench Work	Six to Nine Months
Five:	Analysis of Result and Thesis Report writing and Submission	Three to Four months
Six:	Internal and External Examiner's report	Three Months
Seven:	Oral defence	
Eight	Correction and Binding	One Month

A candidate for the Award of Fellowship (FISLT) of the Nigerian Institute of Science Laboratory Technology will be required to complete the programme within a minimum of Twenty Two (22) calendar month and a maximum of Thirty Six (36) calendar month.

CHAPTER TWO

2.0 PREPARATION OF THESIS

In preparing Thesis, Candidates should take note of the following:

- (i) The title of the Thesis should not be more than 24 words.
- (ii) The abstract should not be more than 500 words and should not be paragraphed.
- (iii) Every table, figure and plate must come immediately after it is mentioned in the text; and there must be one table, figure, or plate per page and must be labeled correctly and sourced.
- (iv) Tables, figures, and plates must be numbered continuously e.g. Table 1, 2, 3, 4, etc.
- (v) Tables, figures, and plates are not to be cited in the discussion.
- (vi) The full and final Thesis shall not be less than 120 pages.

2.1 CONDITIONS FOR REGISTRATION OF THESIS

- a. All fellowship Candidates are required to obtain a registration form with Referees and fellowship guidelines from the NISLT Headquarters, Ibadan. This form must be duly completed by the candidate and submitted with relevant credentials.
- b. Admission letter for commencement of the programme shall be issued.
- c. Candidates will register for Courses of each Module separately with necessary credentials.
- d. **Selection of Supervisor:** A candidate's supervisor must be a PhD holder and not less than position of a **Senior Lecturer** or its equivalent in a recognized tertiary institution or Research Institute in the relevance field.
- e. Candidate will be expected to submit at least five copies of research Proposal after passing the courses in the second Module duly signed by the candidate's supervisor.
- f. The Thesis proposal shall not be more than Ten (10) pages and must be approved by NISLT Fellowship Board. The written approval from the Registrar shall be communicated to the candidate before the commencement of the Thesis.
- g. The candidate must be a current registered member of NISLT as Associate member for not less than Ten (10) years post registration and must be a financial member for not less than Six (6) years with working experience in recognized laboratory under an experienced Laboratory Technologist (Preferably not below the rank of Chief Technologist or SLT based academic staff. Applicant must possess the basic requirements for admission to Associate that is:
- h. Candidate is expected to submit four copies of bounded soft cover of the Thesis through the Registrar to the NISLT fellowship board. Only Thesis approved by the NISLT Fellowship Board would be eligible for Oral Examination.
- i. The NISLT Registrar shall do the appointment of External Examiners Three months to the end of the programme.
- j. After oral presentation, the candidate is expected to make necessary corrections to the satisfaction of the External Examiner and Candidate is expected to submit four copies of bounded hard cover of the Thesis through the Registrar to the NISLT Governing Council for the approval for award of fellow of the Nigerian Institute of Science Laboratory Technology (FISLT).

2.2

THESIS COVER

2.2.1 Colour, type of cover and dimensions

The approved colour for FNISLT Thesis covers in Wine Red. The Thesis must be bounded hard cover, with a square spiral on which the summary title of the Thesis will be written in a format as specified below in Section 6.3. The dimensions of the covers should be 28 cm by 20 cm.

2.2.2 Front cover title format

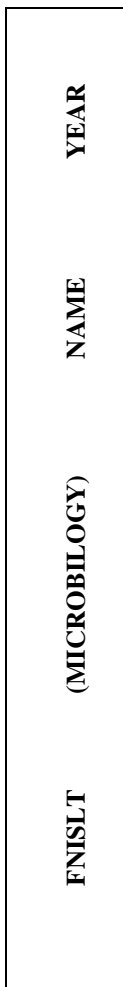
The Cover of the Thesis should carry the Thesis title in the format shown below:

<p>Biological Control of Soil-Borne Fungal Pathogens of Cowpea Isolated in the Northern Guinea Savannah Cowpea Based Cropping System</p> <p>Name of Candidate</p> <p>Nigerian Institute of Science Laboratory Technology Samonda, Ibadan</p> <p>August 11, 2020</p>

2.2.3 Format of Spine Title

The title on the cover spine should consist of the award with the specialization in bracket, followed by the Candidate's surname and initials, and year of Thesis defense, as shown below:

FNISLT (MICROBIOLOGY) NAME YEAR



2.2.4 TITLE PAGE FORMAT

The title page is the first page of the Thesis following the blank page used to attach the cover to the inside pages. This page carries the Thesis title, full names of the Candidate, a statement on the Award for which the Thesis is meant, the Nigerian Institute of Science Laboratory Technology to which the Thesis is being submitted, and the year of submission, according to the format below:

**Biological Control of Soil-Borne Fungal Pathogens of Cowpea
Isolated in the Northern Guinea Savannah Cowpea Based
Cropping System**

BY

**Name of Candidate
AISLT 2001**

A Thesis submitted to the Nigerian Institute of Science Laboratory Technology
Samonda, Ibadan in partial fulfillment of the requirements for the award of

Fellow of the Institute in Microbiology

August 11, 2020

2.3. DECLARATION PAGE

The Declaration Page contains a statement by the Candidate that is emphatic and explicit on the originality of the observations, results and deductions reported in the Thesis that can be admitted in evidence in a legal transaction and acknowledgment of sources of information utilized, according to the format below:

<p>DECLARATION</p> <p>I hereby declare that this Thesis has been written by me and is a record of my own research work. It has not been presented in any previous application for an award of this or any other Institute. All citations and sources of information are clearly acknowledged by means of references.</p> <p>Name of Candidate</p> <p>.....</p> <p style="text-align: right;">Signature and Date</p>

2.4

CERTIFICATION PAGE

The Certification Page should be limited to the candidate and the supervisor and should read,

CERTIFICATION	
This Thesis entitled “Biological Control of Soil-Borne Fungal Pathogens of Cowpea Isolated in the Northern Guinea Savannah Cowpea Based Cropping System” was carried out by under my supervision.	
_____ Name of Supervisor & Signature	_____ Date
_____ Name of External Examiner & Signature	_____ Date
_____ Registrar/CEO NISLT	_____ Date

2.5

ABSTRACT

An abstract is a brief summary of a thesis generally stating little **Introduction** on the subject matter **Specific objectives** of the research the **Hypotheses** tested, a brief description of the **Methods** used and the **Conclusions** obtained. An abstracts allows one to quickly preview the thesis, and often used to help the reader quickly ascertain the thesis's purpose.

The Thesis is expected to contain an abstract of about 500 words displayed immediately after the Certification page. This should report in a concise manner the objectives of the research and the major findings and conclusions. It should report the latter's essential facts, and should not exaggerate or contain material that is not in the Thesis. Its purpose is to act as a reference tool (for example in an international library abstracting services), enabling the reader to decide whether to read the full text. It should not be paragraphed.

ABSTRACT

Little introduction on the subject matter

Specific objectives of the research

Research methodologies used to achieving these objectives

The major findings, contribution to knowledge and conclusions

2.6

DEDICATION PAGE

Dedication page refers to the proper setting a part of something by way of a solemn declaration. The act of binding yourself (intellectually or emotionally) to a course of action; as prescriptions in a Thesis and that which is addressed to another person that is, it is dedicated to another person. The dedication is optional and could come after the Abstract page. It should generally be brief and convey the message in a concise manner.

DEDICATION

This Thesis is dedicated to my mother, Madam K. Elizabeth, for her love and encouragement at all time; and without whose financial support this study would not have been possible

2.7

ACKNOWLEDGMENT PAGE

The acknowledgment page is to show an expression of gratitude to all those who played significant roles in support of the study during the course of study, research and write-up.

ACKNOWLEDGMENT

My profound gratitude goes to my supervisor, for his/her encouragement and constructive criticisms throughout the conduct of this research. My sincere gratitude also goes to

2.8 TABLE OF CONTENTS FORMAT

The Table of Contents is very important as it provides an insight into the organization of the whole Thesis. It should therefore be carefully complied. To aid quick comprehension, listing of sub-sections should be indented from sections as shown below:

TABLE OF CONTENTS	
	Page
Title Page	i
Declaration	ii
Certification	iii
Abstract	iv
Dedication	v
Acknowledgments	vi
Table of Contents	vii
List of tables	viii
List of figures	ix
List of plates	x
List of Appendices	xi
CHAPTER ONE	1
1.0 INTRODUCTION	1
1.1 Background to the Study	1
1.2 Statement of the Problem	2
1.3 Purpose of the Study	2
1.4 Research Questions (Optional)	2
1.5 Hypotheses (Optional)	3
1.6 Significance of the Study	3
1.7 Scope and Delimitation of the Study	3
CHAPTER TWO	4
2.0 LITERATURE REVIEW	4
2.1 Origin and distribution of cowpea	6
2.2 Cowpea Taxonomy	7
2.3 Threats to cowpea production and conservation	8
2.4 Cowpea diseases and pests	10
2.5 Biocontrol of soil-borne fungal pathogens of cowpea.....	12
2.6 Constraints to biological control of soil-borne pathogens	19
CHAPTER THREE	25
3.0 MATERIALS AND METHODS	25
3.1 Research Design	30
3.2 Population of the Study	30
3.3 Sample and Sampling Technique	30
3.4 Research Instruments	40
3.5 Validity and Reliability of Instruments	40
3.6 Collection of samples	40
3.7 Collection of microbial pesticides (Bio pesticides)	40
3.8 Collection of cowpea germplasm	41
3.9 Field screening for diseases incidence and severity	40
3.10 Data collection and Method of data analysis	50

TABLE OF CONTENTS	
	Page
CHAPTER FOUR	54
4.0 DATA ANALYSIS, INTERETATION AND DISCUSSION OF RESULTS	54
4.1 Field screening for disease incidence and severity	54
4.2 Seed health testing for the 300 genotypes	55
4.3 VAM root colonization of cowpea genotypes	56
4.4 Laboratory <i>in-vitro</i> antagonistic experiments.....	68
CHAPTER FIVE	80
5.0 SUMMARY, CONCLUSION AND RECOMMENDATION	80
5.1 Summary of Findings	130
5.2 Contributions to Knowledge	130
5.3 Conclusion	130
5.4 Recommendations	130
5.5 Limitations to the study	130
5.6 Suggestions for further Research	130
REFERENCES	133
APPENDICES	150

Note:

Chapter Two: LITERATURE REVIEW

The Literature Review should cover all the various variables mention in the topic which should include the Independent, Dependent, Moderating Variables etc. It should also cover the theoretical frame where applicable.

2.9 LIST OF TABLES FORMAT

All the tables in the Thesis must be serially numbered and a table compiled to show their page location within the text as indicated below:

LIST OF TABLES	
Table	Page
1 Microorganisms isolated from infected cowpea	56
2 VAM colonization of cowpea root in 2007/2008	60
3 Effects of biopesticide on the fungal mycelial radial growth	65
4 Cumulative effect of biopesticides on the fungal pathogens	66

Note: All tables should be Auto fit to window.

2.10 LIST OF FIGURES FORMAT

LIST OF FIGURES

Figure Page

1. Map of Nigeria showing the experimental site 54
2. Percentage germination of the 300 cowpea genotypes 58
3. Percentage VAM root colonization in cowpea genotypes 64
4. Effect of *B. subtilis* on soil/root-borne fungal pathogens 68

2.11

LIST OF PLATES FORMAT

Generally the List of Figures as well as the List of Plates follows the same format as for list of Tables:

LIST OF PLATES		
Figure		Page
1. Production of VAM inoculum in the growth chamber		34
2. Antagonistic in-vivo experimental set-up		36
3. Diseased seedling showing typical multiple infection		57
4. Micrograph of VAM colonization of cowpea genotypes		67

2.12. DISCUSSION

In discussion, the Candidate is expected to relate his findings together to make one continuous thought. To achieve this, the discussion should not be segmented but worked into one inseparable idea where all the findings flow into one another to make a complete sense.

2.13. CONCLUSION AND RECOMMENDATION

The **Conclusion** is the summary of your thoughts, to demonstrate the importance of your ideas, findings, and to propel your reader to a new view of the subject. It is also your opportunity to make a good final impression and to end on a positive note. While **Recommendation** is the stage in the research process, during which the alternative approach to best solve a problem or issue is presented. These two are always presented together and must be very brief.

2.14. HANDLING OF REFERENCES

The Reference style to use is American Psychology Association (APA) Seventh Edition. It is very important to use the correct format always for citing references within the text: Where not more than two authors are involved in a citation, the surnames only, followed by the year of publication of the work being cited should be used viz:

Although, many review stated different biocontrol mechanisms such as mycoparasitism (Odebode, 2006); antibiosis (Czusi, 1978; Doherty and Preece, 1988; Mohammed and Amusa, 2003), competition for nutrients or space, tolerance to stress through enhanced root and plant development (Harman, 2000), volatilization and sequestration of inorganic nutrients, induced resistance, inactivation of the pathogen's enzymes.

For citations involving more than two authors, the surnames of all the authors must be cited in the first instance thus, Doherty, Herman, Lorita and Odebode 2006. Subsequently in the thesis only the surname of the first author followed by the *et al.*, should be used. Thus Doherty *et al*, 2006.

Cell-wall degrading enzymes may be required in the mycoparasitism and hypermycoparasitism on all the five root and soil-borne cowpea fungal pathogens as reported by some researchers (Lorito *et al.*, 1993 and Harman *et al.*, 1993).

All references cited within the body of the Thesis must be listed alphabetically by authors and chronologically within authors in a Reference section at the end of the Thesis (APA style):

REFERENCES

- Adandonon, A., Aveling, T.A.S. and Tamo, M. (2004). Occurrence and distribution of cowpea damping-off and stem rot and associated fungi in Benin. *The journal of Agricultural Science* **142**: 561-566.
- Allen, M.F. (1996). The ecology of arbuscular mycorrhizas: A look back into the 20th century and a peek into the 21st. *Mycological Research* **100**: 769-782.
- Baker, E. F. and Cook, R.J. (1974). Biological control of plant pathogens. W.H. Freeman & Co. Sanfransisco, 433pp.
- Vestberg, M., Kukkonen, S., Saari, K. (2004). Microbial inoculation for improving the growth and health of micropropagated strawberry. *Applied Soil Ecology* **27**: 243-258.
- Weller, D.M. (1988). Biological Control of Soilborne Plant Pathogens in the Rhizosphere with Bacteria. *Annual Review of Phytopathology* **26**: 379-407.

2.15.

APPENDIX

These are supplementary materials that is collected and appended at the back of Thesis. When appendices are included in the Thesis, they should also be numbered serially as the tables. Unless references are made to them in the Thesis, appendices may not be necessary.

2.16

EQUATIONS

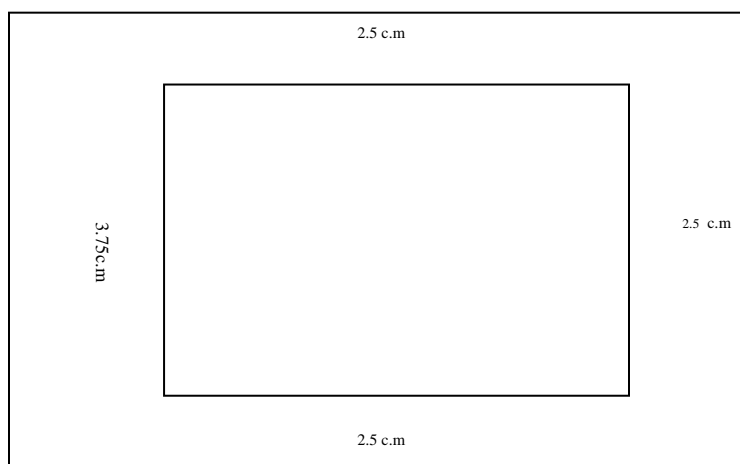
Equation Editors must be used for all equations in the thesis. All equals should be numbered sequentially.

CHAPTER THREE

3.0. GENERAL INFORMATION

3.1 Typing, margins, line spacing, paging, type and size of paper

The body of the Thesis should be typed double-spaced on one side of the paper only. The paper should be white, 60-90 gsm and A4-sized (210 x 297 mm). The character-set used for typing should preferably be Times New Roman font of size 12 point typing should be in black ink. A margin of 2.5cm should be left all rounds except on the left margin which should be 3.75cm wide as shown below:



All pages of the Thesis should carry page numbers centered within the bottom margin of the page. The prefatory pages should be numbered using Roman numerals (i, ii..., ix). All pages of the main text of the Thesis starting with the Introduction (Chapter One) should be consecutively numbered with Arabic numerals (1, 2, 3...to the last page). Typing of the Thesis should be done with a computer, it must be double spacing and the printing should be done with a good printer (preferably by Laser Jet printer).

3.2 Submission of Final Thesis for Oral Examination

Four soft cover spirally bonded copies of the Thesis are expected to be submitted by the Candidate to the NISLT Fellowship Board through the Registrar. Candidates are advised to ensure submission of clean good copies, as dirty copies would be rejected.

The Registrar shall distribute the Thesis copies for review as follow:

One copy each to:

- a. The NISLT Registrar/ CEO
- b. The External Examiner
- c. The Internal Examiner
- d. A member of the board who is well grounded in that candidate's field of specialization

3.3 Invitation of Candidate for Thesis Oral Examination

The Registrar shall invite the candidate for the Oral Examination based on the recommendation of the external examiner.

3.4 Corrections after Thesis Oral Examination

Where minor corrections are required following Thesis Oral Examination, these should be neatly done limiting corrections to affected pages. However, for major corrections, it is usually better to re-type entire pages. Rough Thesis copies will not be accepted by the NISLT Registrar/CEO.

3.5 Submission of Clean Thesis Copies

Four clean copies of the final corrected version of the Thesis should be submitted to the NISLT National Headquarters by the Candidate, who would be given an acknowledgment slip. The Candidate should ensure that the Supervisor, before final submission of the Thesis to the NISLT headquarters, duly signs the certification page. The Thesis copies will be distributed as follows, after signing by the NISLT Registrar/CEO:

Two copies to: The NISLT Library
One copy each to The Supervisor
 The Candidate