DEPARTMENT OF ELECTRICAL ENGINEERING
POSTGRADUATE PROGRAMME

MASTER OF ENGINEERING (M.Eng), AND DOCTOR OF PHILOSOPHY (Ph.D) DEGREE PROGRAMME

1. PHILOSOPHY

The Electrical Engineering Postgraduate Programme is established to make contributions to the advancement of Electrical Engineering knowledge, skill and practice. These contributions are made by the offering of advanced course programme, the carrying out of research work and the sharing of knowledge and research results through interactions/communications with fellow electrical engineers the world over.

2. OBJECTIVES

The Postgraduate Training is in three major areas namely, Power Devices and Systems, Power Systems and High Voltage Engineering, Automatic Control Systems. The programme is designed to produce proficient higher degree holders in several specialist areas of Electrical Engineering. The postgraduate candidate, before being awarded a higher degree, have to prove himself/herself (by his/her performance in the courses and research work) to have acquired advanced knowledge, skill and research techniques to be professionally competent and/or capable of contributing new ideas and improved methods to the teaching and practice of electrical engineering.

3. ENTRY REOUIREMENTS

The minimum entry requirement for the postgraduate programme in Electrical Engineering is a goodrequisite degree or its equivalent in a recognized institution.

3.1 Master's Programmes

The minimum entry requirement for Master's degree for graduates of the University of Nigeria or of other recognized Universities who obtained the approved degree of bachelor with at least is a good Second Class Honours (Bachelor's) degree in Electrical and/or Electronic Engineering or the equivalent with not less than 2.50 on a 5-point scale, or its equivalent. Candidates deficient in some areas of the discipline will be required to take remedial undergraduate courses approved by the Department.

3.2. Doctor of Philosophy (Ph.D) Programme

Graduates of the University of Nigeria or other recognized Universities who have good Master's degree or its equivalent in Electrical and/or Electronic Engineering are qualified to apply for provisional registration as candidates with the degree of Doctor of Philosophy (Ph.D) in view. Such a candidate should has a minimum GPA of 3.0 on a 4.0 point scale or 3.50 0n a 5.0 point scale in his/her Master' degree. A candidate already registered for the Master's Programme will normally be required to complete the Master's Degree Programme before applying for the Ph.D Programme. However, provisional registration for the Ph.D Programme may be approved for a Master's degree student based on an exceptional performance assessed over a period of at least two semesters of the Master's Programme.

4. SCOPE OF WORK

The scope of work depends on the higher degree in which a candidate is enrolled.
Each higher degree has a stipulated mode of study outlined as follows:

4.1 Mode of Study for the Master of Engineering (M.Eng) Programme

The study for the Master's degree in Electrical Engineering is by course work of 21 credit hours to be examined in written papers together with 6 credit hours for Master's project work while 3 credit hours is for seminar. Similarly,the PG general course PGC 610– Research methodology and ICT in Engineering which is compulsory for every master student is already included in above 21 credit hours but all the students should participate in workshop that will be organized by the PG school as a perquisite for the examination. Hence, the minimum credit hours for master is 30.

4.2 Mode of Study for the Doctor of Philosophy (Ph .D) Programme.

A Ph.D candidate will be required to take 12 credit hours of coursework based on candidate's research topic/area including a 3 unit PGcourse on Synopsis and Research Grant Writing, also 12 credit hours is for the Ph. D thesis. Also, 6 units for two seminars, one presented as Research Proposal at the beginning of the student's research programme and the other, at the end of the research work before the final oral defense. Workshop on Synopsis and Research Grant Writing will be organized by SPGS as a perquisite for examination on the courses. Hence, the total minimum credit hour for Ph.D student in the department is 30.

5.0 DURATION OF PROGRAMMES

(a) Duration of Master's Programme

Full-time: A minimum of 4 semesters
Part-time: A minimum of 6 semesters

(b) Duration of Ph.DProgramme (After Master's Degree)

Full-time A minimum of 6 semesters
Part-time: A minimum of 8 semesters

The first two semesters of the Doctoral programme shall be devoted to course work and written examinations, the remaining sessions for thesis, and seminars

6. EMPLOYMENT OPPORTUNITIES

Employment opportunities in Electrical Engineering are many and varied. This is because of the need for electric power and electric machines/equipment in virtually all establishments. The opportunities include the following:

(a) Research, product/system design and development in manufacturing companies
(b) Research, design, development, installation, operation and maintenance of Electrical Systems (Utility Electrical Power Network, Communication Network, Computer SystemNetwork, Electric Control Centers etc.).

(c) Teaching/Research and Consultancy Services in Public Institutions and Private Establishments.

7.0 AREAS OF SPECIALIZATION

Postgraduate courses are in five major areas as follows:

7.1 Power Electronics, Drives and New Energy Systems

7.2 Electrical Machines and Drives

7.3 Electromagnetic Fields and Applications

7.4 Power Systems and High voltage Engineering

7.5 Automatic Control Systems

8.1 Selection of Courses

There are compulsory courses for the Master's Programme while the rest of the courses are selected based on the student's area(s) of interest. Depending on the students' research interest, courses can be selected from related disciplines such as Electronics Engineering, Computer Science etc. All selected courses must have the approval of the students' academic supervisor(s) and the Department.

8.2 Research/Project

A research/project topic is selected with the cooperation and advice of the academic supervisor. There will be seminars (at least one for the Master's Programme, and at least two for the Ph.DProgramme) to appraise on-going research/project work before the submission of a final write-up on the research work for examination.

9.0 LIST OF APPROVED SUPERVISORS AND THEIR SPECIALIZATION

PROFESSORS

E. C. Ejiogu B.Eng, M.Eng(Nig) Ph.D(Shinshu, Japan) **(Supervising M.Eng&Ph.D)**	Industrial Electronics (Including Power Electronics), Electric Motor Drives and New Energy Systems
T. C. Madueme M.Sc (Sweden), Ph.D(Nig) **(Supervising M.Eng&Ph.D)**	High Voltage Engineering, Power Systems and Energy Studies
S. E. Obe B.Eng, M.Eng.Ph.D (Nig) **(Supervising M.Eng&Ph.D)**	Electrical Machines and Drives
L. U. Anih	Electrical Machines and Drives

B.Eng(ASUTECH), M.Sc (Ife), Ph.D (Nig)
(Supervising M.Eng&Ph.D)

SENIOR LECTURERS

C. I. Odeh — Power Electronics and Electric Motor Drives and New Energy Systems
B.Eng, M.Eng., Ph.D (Nig)
(Supervising M. Eng)

C.A. Nwosu — Power Electronics, and Electric Motor Drives Control and New Energy Systems
B. Eng, M. Eng., Ph.D (Nig)
(Supervising M. Eng)

D. B. N. Nnadi — Power Electronics, Drives and New Energy Systems
B.Eng, (ESUT), M.Eng.(ESUT), Ph.D (Nig)
(Supervising M. Eng)

LECTURER I

S. E. Oti — Electrical Machines and Drives
B.Eng, M.Eng., Ph.D (Nig)
(Supervising M. Eng)

C. U. Ogbuka — Electric Machines, and Drives
B.Eng, M.Eng., Ph.D (Nig)
(Supervising M. Eng)

10.0 COURSE OUTLINE

10.1 Digit Identification of Stress Areas

Second Digit	**Stress Area of Course No.**
0	General/Compulsory
1	Power Electronics and Devices
2	Electrical machines
3	Power Systems& High Voltage Engineering
4	Automatic Control Systems
5	M.Eng Project Report
6	Ph.D Thesis

10.2 **Listing of Courses and Research Types**

First Semester

a) **Compulsory Course(s)**

Course No.	**Title**	**Credit Unit**
EEE 601	Advanced Methods of Analysis in Electrical Engineering	3
PGC601	Research Methodology and ICT in Engineering	3
EEE 602	Seminar	3

b) **Optional Courses**

i. **Power ElectronicsDevicesand New Energy Systems Option**

First Semester (Compulsory Course)

Courses No.	**Title**	**Credit Unit**
EEE 612	Advanced Semiconductor Power Circuits	3
(Candidate should choose any one of EEE631 or EEE 621)		3

Second semester(compulsory Course)

Courses No.		
EEE 614	Electric Drives	3
EEE 616	Logic Control Circuits in Power Engineering	3
EEE 613	Electro-heat Processes	3

Elective Courses

EEE 617	Electromagnetic Fields Analysis	3
EEE 619	Special Applications of Electromagnetic Fields	3

ii Electrical Machines (Option)

First Semester

Courses No.		
EEE 611	Theory and Modeling of Electrical Machines	3
(Candidate should choose any one of EEE631 or EEE 621)		3

Second Semester

EEE 615	Special Topics in Electrical Machines	3
EEE 614	Electric Drives	3
EEE 618	Advanced Electric Machine Design	3

iii. **Power Systems and High Voltage Engineering** **Credit Unit**

First Semester

Courses No.		
EEE 621	Power System Analysis	3
(Candidate should choose any one of EEE611 or EEE 612)		3

Second Semester

EEE 628	High Voltage Engineering	3
EEE 625	Economic Operation of Power System	3
EEE 623	Power System Planning and Optimization	3

Elective Courses

EEE 622	Power System Control and Protection	3
EEE 624	Power System Distribution	3
EEE 626	Power System Dynamics	3
EEE 627	DC Transmission	3

iv. **Automatic Control Systems** **Credit Unit**

First Semester (Compulsory Course)

EEE 631	Advanced Theory of Control Systems	3
EEE 611	Theory and Modeling of Electrical Machines	3

Second Semester

Candidates should choose either EEE616 or EEE614		3
Candidate should choose any of the two, EEE 634, EEE635or EEE 637		6

Elective Course

EEE 632	Optimal Control Theory	3
EEE 633	Introduction to Stochastic Control	3
EEE 634	Discrete Time Control Systems	3
EEE 635	Non-Linear and Time Varying Control Systems	3
EEE 636	Real Time Computer Control	3
EEE 637	Special Topics in Control System Design	3

iv) **Research Work**

Course No.	**Title**	**Credit Unit**
EEE 651	M. Eng. Project Report	6

For Ph.D

a) **Compulsory Course(s)**

Course No.	Title	Credit Unit
PGC701	Synopsis and Research Grant Writing	3
EEE 701	Special Topics in Static A.C Machine Control	3
EEE703	Seminar I (Proposal)	3
EEE 704	Seminar II	3

i. **Power Electronics Devices and New Energy Systems Option** **Credit Unit**

First Semester

EEE 712	Advanced Application of Power Converters	3
EEE 713	Advanced Electro-heat processes	3

ii Electrical Machines (Option) **Credit Unit**

EEE 711 – Advanced Theory & Modeling of Electrical Machines	3
EEE 715 – Advanced Special Topics in Electrical Machines	3

iii. **Power Systems and High Voltage Engineering** **Credit Unit**

EEE 724	Advanced Power System Distribution	3
EEE 726	Advanced Power System Dynamics	3

iv. **Automatic Control Systems** **Credit Unit**

EEE 737	Special Topics in Control System Design	3
EEE 736	Advanced Real Time Computer Control	3

v. **Research Work**

Course No.	Title	Credit Unit
EEE 751	Ph.D Thesis	12

11.1 MASTER'S COURSE DESCRIPTION

EEE 601 – Advanced Methods of Analysis in Electrical Engineering
Review of Matrices.Time domain and transfer techniques for linear continuous and discrete-timesystems.State variable methods.State transition matrix for time- invariant and time-varyingcontinuous and discrete systems.Adjoint Systems.Singularityfunctions and superpositionintegrals for linear systems.Fourier,Laplace, Z-transform and generalized transform techniques.Introduction to controllability,observability, and stability.Distributed parameter system analysis. Transfer function, integralequation representation, and state model for selected control systems. Selected numericalanalysis methods and applications —3 credits

PGC 601: Research Methodology and ICTIn Engineering
Use of advanced analytical tools like MATLAB/SIMULINK, SCILAB/XCOS, etc. for solution of engineering problems and their applications *(Application of these soft wares depends on the various problems formulated in different departments).*Information literacy, information sources (media, publishers, agreggators); validity of information, plagiarism and legal aspects.
Information search – search engines, journal repositories, academic (social) networks, search strategies, personal contacts, tools for managing references.
Integrating information literacy in research, cloud computing, audiovisual tools, e.g powerpoint presentations.
Literature review: Reading and summarizing relevant articles, critical analysis and evaluation of research, identification of themes and comparators, writing review documents and identification of research (or knowledge) gaps.
Scientific method and nature of evidence: Experimental methods and design methods *(as may be applicable to individual departments and research areas)*, data collection and management of quantitative data. Human participants – expert reviews, focus groups, questionnaires and interviews.
Project management and report writing: project planning, report structure and style, general report writing techniques. **– 3 Credit Units**

EEE 611 – Theory & Modeling of Electrical Machines
Equivalent circuits of complex magnetic systems, transformer frequency-dependent equivalentcircuits, inrush currents, DQ representation of AC. Machines (induction machines, synchronousmachines, reluctance machines etc.)AC machine dynamics using dq models. Special characteristic features of dc and ac machines. **–3 credits Units**

EEE 612 – Advanced Semiconductor Power Circuits
Two pulse, six pulse, twelve pulse and twenty-four pulse rectifier circuits. Fixed and variablefrequency AC controllers. DC to DC step-up or step-down converters.Adjustable voltageadjustable frequency inverters. Pulse-width modulated inverters. Current-fed inverters.Elimination of undesired harmonics in power converters. **– 3 credit Units**

EEE 613 Electro-Heating Processes
Resistance heating.Three-phase and two-phase electrode arc furnaces.Types of inductionheating furnaces. Frequency selection in induction heating power supplies: mains frequency,mains frequency triplers, motor generator sets and variable frequency inverters andcyclo-inverters.
– 3 credit units.

EEE 614 – Electric Drives
Rectifier-fed DC motors. Chopper-fed DC motors. Design and applications of DC drives.Classification, analysis and control of AC drives.Design and applications of AC drives.Microprocessors in industrial drives. **- 3 credit units.**

EEE 615 – Special Topics in Electrical Machines
Some special transformation devices such as instrument transformers, direct current transducersand saturable reactors. Permanent magnet dc motors. Synchros. Linear induction motors. Ironcoredand air-cored linear synchronous motors. Variable reluctance and permanent magnetstepping motors.Field pattern plotting methods in electrical machines. **- 3 credits Units**

EE 616 – Logic Control Circuits in Power Engineering
Digital logic families, linear integrated circuit components, small signal discrete components andtheir main specifications. Common transducers, Microprocessor programmed logic. Design offiring/gating logic circuits for controlled rectifiers, inverters, choppers and cyclo-converters.Design of voltage, current, power and frequency regulation circuits for motor drives and powersupplies. Microprocessor-based logic control methods **– 3 credit units.**

EEE 617 – Electromagnetic Field Analysis
Review of Vector arithmetic, vector algebra and vector calculus. Electric field calculations.Energy and potential due to distributed and line charges. Conductor and dielectric properties andboundary conditions.Experimental field mapping methods.Poisons and Laplace equations. Thesteady magnetic field, magnetic forces materials and inductance. Time varying fields andMaxwell's equations.The Poynting vector and power considerations.Field propagation in goodconductors and skin effect.Use of field equations in determining transmission line parameters.
–3 credit units.

EEE 618 – Advanced Electric Machine Design.
Magnetic Core Material types, characteristics and .applications; M insulation types andapplications; Electric machine cooling methods.Elements of inductor design and construction;Transformer design and construction. DC and AC machine design techniques. **- 3 credit units.**

EEE 619 – Special Applications of Electromagnetic fields
Computer aided steady state and transient solutions of selected field problems in inductiondevices. Electric induction pumps. Methods of Electromagnetic stirring.transportation

andpouring of molten metals for continuous casting. Levitation principles. Eddy current distributionin and power transferred to a work piece in contactless heating. Metal circulation and inducedcurrents in electrode arc furnaces. Current, force and/or velocity distributions in channel andcoreless furnaces. **– 3 credit units.**

EEE 621 – Power System Analysis

The Power Flow Problem:- numerical methods for solution of AC and DC models of the powersystem. Analysis of faulted power systems: balanced and unbalanced faults, Symmetrical Components, Sequence impedances of power system components - transmission lines,synchronous, machines, and transformers; series and shunt faults, simultaneous faults.Power System Stability:- Analysis of steady-state stability of simple and complex powersystems.

-3 credit units.

EEE 622 – Power System Control and Protection

Relay principles and types, instrumentation for system parameters, relay characteristics, andresponses, system component, protection, solid-state relaying, under frequency relays, load-shedding,elements of high power circuit interruption, circuit breakers, types and problems.Power system control principles and communications. **- 3 credit units**.

EEE 623 – Power System Planning and Optimization

Power system components functions, application and performance. Relative cost and scalingparameters, over-all planning problem considering present worth and cost-benefit principles,system reliability, load forecasting. Non-linear programming- unconstrained and constrainedminimization methods. Lagrange multi-pliers, Kuhn-Tucker conditions, Linear, quadratic andinteger programming. Applications of optimization techniques to power systems - e.g. economicdispatch, optimal load shedding, transmission planning etc**.** **- 3 credit units.**

EEE 624 – Power System Distribution:

Objectives and basic definitions.Standard specifications of cables, transformers and distributionvoltages.Code applications with regards to conductors, protection and equipment.Utility systemdistribution. Consumer premises distribution. Engineering problems and environmentalconsiderations.Power measurements and billings.Trends for the future. **- 3 credit units.**

EEE 625 – Economic Operation of Power Systems

Concepts of economic operation — Unit characteristics and economical operation, transmissionloss coefficients, general loss formula, generator scheduling - automatic economic loaddispatch, Models for inter-change and for multi-area dispatch, operating security, Resourcemodeling and hydro-thermal coordination.

-3 credit units.

EEE 626 - Power System Dynamics
The dynamic characteristics and control requirements of power systems are introduced. Consideration is given to the detailed modeling of synchronous machines and its controls such as excitation systems and turbine-governor; power system loads; load-frequency control; power exchange between networks etc. Time scales and reduced order models; non-linear and linear multi-machine models etc. The modeling and control requirements will be discussed for small and large disturbances as well as voltage stability studies. Methodologies, tools and techniques for performing these studies will be introduced **- 3 credit units.**

EEE 627 – DC Transmission
Advantages of dc systems; converter bridge circuits and system parameters; compounding andregulation; fault consideration and system protection; application of dc transmission as aneconomic system component, and method of improving a.c. system dynamics**. – 3 credit units.**

EEE 628 – High Voltage Engineering
High Voltage generation and measurements: testing transformer set, d.c. multiplier circuits.Impulse generation analysis and testing, safety practices. Dielectric phenomena dielectric lossevaluation, discharge detection and measurement. Elements of high power circuit interruption,circuit and physical phenomena, circuit breakers, types and problems.**– 3 credit units.**

EEE 631 – Advanced Theory of Control System.
Review of the techniques of obtaining the time response of linear systems, Nyquist and Routh-Hurwits stability criteria, Bode diagrams, Analysis of piecewise linear system and second ordernon-linear system, method of Isoclines, describing functions and Tsypkin locus, generalization oflyapunov function by lurie and variable gradient techniques; Popov criteria. **- 3 credit hours.**

EEE 632 – Optimal Control Theory
Formulation of optimal control problems, performance indices, necessary conditions foroptimum control of continuous system, principles of optimality, Calculus of variation, Hamilton-Jacobi theory Fontryagin's maximum principle and dynamic programming. Time-optimal controlproblems, Optimal control of linear plants — the optimal regulation problems with bounded statevariables and bounded controller, singular control problems. Computational techniques

- 3credit units.

EEE 633 – Introduction to Stochastic Control
Stochastic processes – probability theory and random processes. Introduction to the designproblem for systems perturbed by random inputs.Minimization of the mean square error,Estimation of system parameters in the presence of noise. Stochastic differential equations,Gaussinn, Markov, and Veiner-Levy processed. The matched filter.Introduction to adaptivecontrol. **- 3 credit hours.**

EEE 634 – Discrete Time Control Systems
Classical analysis and design of sampled data control system; Z-transform, sampling ofcontinuous time functions, data system. State variable formulation of linear and non-lineardiscrete time systems.Stability of discrete time systems, Application of Lyapunov's secondmethod.Optimal control of discrete systems, Discrete time maximum principle; sensitivity.Computer solutions. **- 3 credit units.**

EEE635 – Theory of Non-Linear and Time Varying Systems
Analysis of periodic linear time-varying systems - Floquet Theory.Analysis of non-linearconservative systems .Lyapunov stability theorems.The Aizerman problem.Frequency domainstability criteria. Popov's criteria, sustained oscillation; graphical methods by Lienard andVander-Pol; limit cycles. Optimization of non-linear systems.Controllability and observability.Synthesis of sub-optimal controllers by means of Lyapunov's functions**. -3 credit units**.

EEE 636 – Real Time Computer Control
Architectural features of the microprocessor. Assembly language and addressingmodes. Interface techniques. Difference equations.Programmed filters, compensators and controllers.Classical and space computer control. Techniques for improving system responsespeed.

-3 credit units.

EEE 637 – Special Topics in Control System Design
Transducer Types, characteristics and applications, position, speed; flow rate pressure, andtemperature control methods and applications. Computer aided optimization techniques for thetransient response of classical and modem feedback control techniques**. - 3 credit units.**

11.2Ph.DPROGRAMME

11.2.1 Ph.D COURSE DESCRIPTION

PGC 701: Research Grant Technical/Synopsis Writing
Choice of broad research area with considerations of interdisciplinary topics, Identification of research/ knowledge gaps and research objectives.
Role of technical reports in engineering projects. Fundamental principles of technical writing.Format of different types of reports, outlines, purpose and scope, technical discussion details, role of appendix, function of figures, equation editors, tables and illustration.Literature search, references (citing's and listings).Nature of recommendations and conclusions.Guides for writing memoranda, business letters.Oral presentation of technical reports and thesis. Synopsis writing
Developing long-term research plan, Identification of potential funding agencies and their requirements.Research objectives in relation to interests of the funding agencies.Estimating

research timelines, Budget preparation, manpower requirements and availability, research facilities, legal issues, etc. **-3 Credit Units**

EEE 701 Special Topics in Static A.C Machine Control

Direct and Indirect torque and speed control, Field orientation in induction and synchronous motor drives, Sensor-less motor drive techniques, Permanent and brushless DC motor drive techniques. **– 3 Credit Units**

EEE712 Advanced Application of Power Converters

Special converter circuits, modular connected converters, Low and High power converters, Static VAR compensators, Renewable Energy in Distributed Utility Systems. -3 Credits Units

EEE 713 Advanced Electro-heat processes

Characteristics of Medium frequency induction heating, Radio- frequency induction heating, Electric-field based theory of induction heating, Heat transfer in induction heating, Economic and thermal efficiencies of induction heating sources. Special applications of induction heating.
-3 Credit Units

EEE 711 –Advanced Theory& Modeling of Electrical Machines
The theory of Winding Functions and its applications to Inductance calculations.Finite element modeling of magnetic circuits. Theory of reference frames as they apply to high phase order ac machines. Modelling of qual winding electrical machines.Fault-tolearant electrical machines.Field weakning operation of electrical machines.Development of Equivalent circuits of complex magnetic systems. **– 3 credits Units**

EEE 715 – Advanced Special Topics in Electrical Machines
Some special transformation devices such as instrument transformers- Current Transformers & Voltage transformers, direct current transducers and saturable reactors. Permanent magnet dc motors. Synchros. Linear induction motors. Ironcored and air-cored linear synchronous motors. Variable reluctance and permanent magnet stepping motors.Field pattern plotting methods in electrical machines. **- 3 credits Units**

EEE 724 – Advanced Power System Distribution:
Regulations concerning power distribution, Standard specifications of cables, transformers and distribution voltages.Code applications with regards to conductors, protection and equipment.Utility system distribution. Consumer premises distribution. Engineering problems and environmental considerations.Power measurements and billings.Trends for the future.
- 3 credit units.

EEE 726 - Power System Dynamics

The dynamic characteristics and control requirements of power systems are introduced. Consideration is given to the detailed modeling of synchronous machines and its controls such as excitation systems and turbine-governor; power system loads; load-frequency control; power exchange between networks etc. Time scales and reduced order models; non-linear and linear multi-machine models etc. The modeling and control requirements will be discussed for small and large disturbances as well as voltage stability studies. Methodologies, tools and techniques for performing these studies will be introduced **- 3 credit units**

EEE 736 – Real Time Computer Control

Architectural features of the microprocessor. Assembly language and addressing modes. Interface techniques. Difference equations.Programmed filters, compensators and controllers.Classical and space computer control. Techniques for improving system response speed.

-3 credit units.

EEE 737 – Special Topics in Control System Design

Transducer Types, characteristics and applications, position, speed; flow rate pressure, and temperature control methods and applications. Computer aided optimization techniques for the transient response of classical and modem feedback control techniques**.**

- 3 credit units.

EEE751 Thesis

Each candidate for a Doctoral degree shall be assigned a suitable research project approved by the Departmental Postgraduate Studies Committee. The research topic should be ground breaking, thought provoking and must contribute veritably to existing frontiers of knowledge in the area of candidates choice. The results of the research shall be embodied in the thesis.

-12 Credits Units

EEE703 Seminar I – Proposal

It is expected that each doctoral candidate shall present at least first three chapters of the thesis in a proposal detailing the problem of syudt, the study background, main aim, objectives, literature review, and the methodology to be adopted for the study. In applicable cases, a very clear model of the system or sitiiation to be studied is presented.

- **3 Credit Units**

EEE704:Seminar 2 – Research Findings

A second seminar detailing the results obtained (research findings) from EEE 703 and maing useful contributions and valued added to the existing knowledge is presented here. The entire complete thesis would have been submitted to the department for reading in which all grey areas should be cleared. Candidate will then write a synopsis and proceed for oral examinations by the external examiner.