UNIVERSITY OF ESWATINI

FACULTY OF SCIENCE AND ENGINEERING

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

OFFICIAL CURRICULUM AND REGULATIONS FOR THE

BACHELOR OF ENGINEERING DEGREE

IN

ELECTRICAL AND ELECTRONIC ENGINEERING

1.0 BACKDGROUND

In today's world, the progress of a nation is closely linked to the strength and development of its industrial sector. At the heart of this development lies the quality of technical education provided by universities and technical institutions. Around the globe, successful economies have built strong partnerships between academia and industry, recognizing that universities are often the birthplace of new technologies. These institutions not only create innovative solutions but also work hand-in-hand with industry to apply them effectively. In doing so, they play a crucial role in producing the skilled workforce needed to drive economic growth.

At the University of Eswatini, the Department of Electrical and Electronic Engineering (EEE) has been a key contributor to national development. For many years, it has trained the majority of the country's electrical and electronic engineers, professionals who now serve in critical roles across energy, communication, industrial, and commercial sectors.

The core Strategy of the Department is to pursue its vision and mission to enhance its research, linkage with industry, academic and scholarly activities and become a center of excellence for its programs, thereby improving its eminence in national and regional rankings.

Vision Statement

The EEE Department envisions to build a strong foundation for future engineers, equipping them with the skills and knowledge to address local and global challenges while promoting sustainable societal impact.

Mission Statement

The mission of the department is:

"To deliver a high-quality engineering education that encourages innovation, entrepreneurship, and ethical responsibility-responding to national and global needs through teaching, research, and community engagement for sustainable development."

Electrical and Electronic Engineering remains a cornerstone of national growth. Eswatini's expanding infrastructure in power, telecommunications, and automation requires competent engineers. Our graduates have taken up key positions across the country, working in design,

installation, testing, and research, as well as in sales and support for complex electrical systems.

Alumni from the department are currently contributing to organizations such as:

- Eswatini Electricity Company
- Eswatini Post and Telecommunications
- Royal Eswatini Sugar Corporation
- ESWACA
- And various other industrial and commercial enterprises.

Recognizing the direction in which modern industries are heading, the department has introduced four areas of specialization to be gradually implemented during the final two to three semesters of the B.Eng. Engineering program:

1. Power Engineering
2. Electronics and Communication Engineering
3. Instrumentation and Control Engineering
4. Avionics

These streams aim to provide students with focused knowledge and practical skills that align with industry demands and prepare them for leadership in a fast-changing world.

2.0 IMPORTANT ACADEMIC REGULATIONS

The following selected regulations shall apply to all students enrolled in the Bachelor of Engineering programme.

010.31 Registration shall take place at the beginning of each semester or at such time as may be prescribed by the senate

010.46 Any assignments and test submitted by an unregistered person shall be declared null and void, nor shall he/she be entitled to register and/or to write the examination. The University shall upon discovering that any person who is not properly registered attends lectures, required the person to leave the University.

010.80 (vi) A transfer student is a student who is registered with the University after transferring from another programme within the University or equivalent institution. Such a student may be exempted from a course(s) equivalent approved by the Senate on the recommendation of the relevant Faculty.

Total credits transferred by a student from another recognised institution shall not exceed fifty percent (50%) of the total credits required for the programme, and are subject to acceptance by the Senate on the recommendation of the relevant Faculty. Grade points are not transferable, and the Cumulative GPA of transfer students will be computed on the basis of the work done at the University of Eswatini.

011.42 Normally, a student shall be required to register for a project in one of the subject majors. However, a student in the Faculty of Science and Engineering, Department of Electrical and Electronic Engineering, must take a Design project.

Special Regulation for Design Project (542.34): A student can only register for EEE599 (Design Project) when he/she has passed all core courses from Levels 1 – 4.

011.80 The following shall constitute misconduct in assignments, practical reports, project reports and other academic work:

(a) Plagiarism, which is copying all or part of another person's work, material, publication, report, data, computer files and listings, assignment, results of an experiment(s), project and/or other academic work without due acknowledgement of the source of that information.

(b) Engaging someone else to wrote an assignment or a practical report or a project report or any other academic work for you, and submitting it as your own work.

013.41 A student who has received three(3) Consective Academic Warnings would be deemed to have failed and shall be discountinuted from his/her programme

013.71 A completing student, who receives an "I" in a project, Field Attachement or Industrial Attachment or Internship or Teaching Practice, shall be allowed a period of six weeks, after the release of semester results, to complete the course. Failure to complete the course will normally results in a Fail grade.

013.90 IGNORANCE OF THESE REGULATIONS IS NO EXCUSE

3.0 PREAMBLE

Subject to the provisions of the General regulations, the following Special regulations of the Bachelor of Engineering in Electrical and Electronic Engineering shall apply.

3.1 ENTRANCE REQUIREMENTS

The entrance requirements shall be the requirements stipulated in the Special Regulation.

A. SGCSE/IGCSE Admission

In addition to the requirements stipulated in the Academic General Regulations, an applicant must have a C grade or better in Mathematics/Additional Mathematics, a pass (D) or better (A-C) in English, and THREE subjects drawn from the following subjects.

Additional Mathematics*	Mathematics
Biology	Chemistry
Combined Science	Geography
Physical Science	Physics
Information and Communication Technology	Design andTechnology

* Will not count if used in the minimum requirement of mathematics/additional mathematics

B. GCE O' Level Admission

In addition to the requirements stipulated in the Academic General Regulations, an applicant must have a C grade or better in Mathematics/Additional Mathematics, a pass (D) or better (A-C) in English and THREE subjects drawn from the subjects below. The subjects include:

Additional Mathematics*	Additional Combined Science
Combined Science	Biology
Physics	Physical Science
Chemistry	Geography
Information and Communication Technology	

* Will not count if used in the minimum requirement of mathematics/additional mathematics

C. A recognized equivalent qualification

D. A' Level Admissions

As stipulated in the Academic General Regulations.

E. Mature Age Entry Admission

As stipulated in the Academic General Regulations.

F. Other Admissions

A candidate who has completed a Diploma in Design and Technology Education or Education from a recognized institution may be eligible for admission to the programme

3.2 DEGREE STRUCTURE

LEVEL 1

Semester I

Core Courses

Code	Course Title	L	P	Cr	N.hr.Cr.
MAT111	Algebra, Trigonometry and Analytical Geometry	3	2	3.7	12
PHY101	Introductory Physics I	3	3	4.0	12
CHE153	Chemistry for Engineers	3	3	4.0	12
CSC111	Introduction to Computer Science	3	3	4.0	12

Required Courses		L	P	Cr	N.hr
ACS111	Academic Communication Skills: English for Academic Purposes	2	2	2.2	8
STA141	Introduction to Statistics	3	0	3.0	10
GSC113	Emerging Technologies, Environmental and Social Issues	0	3	1.0	6
Total				**21.9**	**72**

Semester II

Core Courses

Code	Course Title	L	P	Cr	N.hr.Cr.
EEE104	Engineering Mechanics	3	3	4.0	12
EEE172	Programming Techniques I	3	3	4.0	12
PHY102	Introductory Physics II	3	3	4.0	12

Required Courses		L	P	Cr	N.hr.
ACS112	Academic Communication Skills: English for Academic Purposes	2	2	2.2	8
MAT112	Introduction to Calculus	3	2	3.7	12
MAT122	Linear Algebra for Scientists and Engineering	3	2	3.7	12
Total				**21.6**	**68**

LEVEL 2

Semester I

Core Courses

Code	Course Title	L	P	Cr	N.hr.Cr.
EEE201	Workshop Practice	0	3	1.0	6
EEE203	Engineering Graphics Communication	0	3	1.0	6
EEE211	Professional Communication	0	3	1.0	6
EEE251	Electric Circuits	3	3	4.0	13
EEE271	Programming Techniques II	3	3	4.0	13

Required Courses		L	P	Cr	N.hr.Cr
MAT213	Calculus for Science & Engineering	3	2	4.7	12
MAT217	Vector and Complex Analysis for Science & Engineering	3	2	4.7	12
Total				**20.4**	**68**

Semester II

Core Courses		L	P	Cr	N.hr.Cr.
EEE202	Thermofluids	3	1.5	3.5	12
EEE222	Fundamentals of Electronics	3	3	4.0	13
EEE224	Digital Systems	3	3	4.0	13
EEE252	Fundamentals of Power and Machines	3	1.5	3.5	12
EEE272	Engineering Computing	0	3	1.0	8

Required Courses		L	P	Cr	N.hr.Cr.
MAT214	Differential Equations for Science and Engineering	3	2	4.0	12
Total				**20.0**	**70**

LEVEL 3

Semester I

Core Courses		L	P	Cr	N.hr.Cr.
EEE301	Probability and Random Variables	3	0	3.0	10
EEE321	Analogue Electronics	4	3	5.0	13
EEE331	Signals and Systems	4	3	5.0	13
EEE341	Electromagnetic Fields	3	1.5	3.5	12
EEE391	Electrical and Electronics Design Lab I	0	3	1.0	8

Required Courses		L	P	Cr	N.hr.Cr.
MAT311	Numerical analysis	3	0	3.0	10
Total				**20.5**	**66**

Semester II

Core Courses		L	P	Cr	N.hr. Cr.
EEE324	Programmable Arrays and Microcontrollers	3	3	4.0	13
EEE382	Fundamentals of Measurements and				

	Instrumentation	3	1.5	3.5	12
EEE344	Communication Systems I	3	1.5	3.5	12
EEE352	Electrical Machines	3	1.5	3.5	12
EEE354	Power Generation, Transmission and Distribution	3	1.5	3.5	12
Total				**18.0**	**61**

LEVEL 4

Semester I

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE411	Professional Practice	0	3	1.0	8
EEE413	Engineering Economics and Management	3	0	3.0	10
EEE431	Control Engineering I	3	3	4.0	13
EEE433	Industrial Automation	3	1.5	3.5	12
EEE441	Digital Signal Processing	3	1.5	3.5	12
EEE435	Artificial Intelligence for Engineers	3	1.5	3.5	12
Total				**18.5**	**67**

Semester II

Electrical Power

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE452	Power Electronics	3	1.5	3.5	12
EEE454	Power System Analysis	4	1.5	4.5	13
EEE456	Power System Operation and Control	3	1.5	3.5	12
EEE482	Instrumentation Systems	3	1.5	3.5	12
EEE472	Computer Networks and Information Security	3	1.5	3.5	12
EEE492	Electrical and Electronic Design Lab II	0	3	1.0	8
Total				**19.5**	**68**

Semester II

Electronics and Communications

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE422	Microelectronic Devices and Circuit	3	1.5	3.5	12
EEE442	Communication Systems II	4	1.5	4.5	13
EEE452	Power Electronics	3	1.5	3.5	12
EEE482	Instrumentation Systems	3	1.5	3.5	12
EEE472	Computer Networks and Information Security	3	1.5	3.5	12
EEE492	Electrical and Electronic Design Lab II	0	3	1.0	8
Total				**19.5**	**68**

Semester II

Instrumentation and Control

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE422	Microelectronic Devices and Circuit	3	1.5	3.5	12
EEE432	Introduction to Mechatronics	4	1.5	4.5	13
EEE452	Power Electronics	3	1.5	3.5	12
EEE482	Instrumentation Systems	3	1.5	3.5	12
EEE472	Computer Networks and Information Security	3	1.5	3.5	12
EEE492	Electrical and Electronic Design Lab II	0	3	1.0	8

Total				**19.5**	**68**

Semester II

Avionics

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE452	Power Electronics	3	1.5	3.5	12
EEE462	Introduction to Aviation Systems	4	1.5	4.5	13
EEE464	Radio Navigation System	3	1.5	3.5	12
EEE482	Instrumentation Systems	3	1.5	3.5	12
EEE472	Computer Networks and Information Security	3	1.5	3.5	12
EEE492	Electrical and Electronic Design Lab II	0	3	1.0	8
Total				**19.5**	**68**

LEVEL 5

Semester I

Electrical Power

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE500	Industrial Attachment	0	0	3.0	8
EEE511	Digital Innovation and Entrepreneurship	0	3	1.0	6
EEE551	Electrical Drives	4	1.5	4.5	13
EEE553	Switchgear and Protection	3	1.5	3.5	12
EEE599	Design Project	0	7.5	5.0	13
Minimum of any one course from the following:					
EEE555	Smart Power Grids	3	1.5	3.5	12
EEE533	Robotics and Industrial Automation	3	1.5	3.5	12
EEE531	Control Engineering II	3	1.5	3.5	12
Total				**20.5**	**66**

Semester I

Electronics and Communications

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE500	Industrial Attachment	0	0	3.0	8
EEE511	Digital Innovation and Entrepreneurship	0	3	1.0	6
EEE541	Antennas and Radio Wave Propagation	4	1.5	4.5	13
EEE599	Design Project	0	7.5	5.0	13
Minimum of any two courses from the following:					
EEE521	Real Time Embedded Systems	3	1.5	3.5	12
EEE543	Digital Communication Systems	3	1.5	3.5	12
EEE545	Wireless and Mobile Communication Systems	3	1.5	3.5	12
EEE547	Satellite Communication systems	3	1.5	3.5	12
EEE555	Smart Power Grids	3	1.5	3.5	12
Total				**20.5**	**64**

Semester I

Instrumentation and Control

Core Courses	**L**	**P**	**Cr**	**N.hr.Cr.**

EEE500	Industrial Attachment	0	0	3.0	8
EEE511	Digital Innovation and Entrepreneurship	0	3	1.0	6
EEE531	Control Engineering II	4	1.5	4.5	13
EEE599	Design Project	0	7.5	5.0	13

Minimum of any two courses from the following:

EEE521	Real Time Embedded Systems	3	1.5	3.5	12
EEE533	Robotics and Industrial Automation	3	1.5	3.5	12
EEE581	Biomedical Instrumentation systems	3	1.5	3.5	12
EEE555	Smart Power Grids	3	1.5	3.5	12
Total				**20.5**	**64**

Semester I

Avionics

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE500	Industrial Attachment	0	0	3.0	8
EEE511	Digital Innovation and Entrepreneurship	0	3	1.0	6
EEE561	Aviation Standards, Regulation, Certifications and Human Factor	4	0	4.0	13
EEE599	Design Project	0	7.5	5.0	13

Minimum of any two courses from the following:

EEE563	Aircraft Electronics	3	1.5	3.5	12
EEE565	Air Traffic Management and Data Systems	3	1.5	3.5	12
EEE531	Control Engineering II	3	1.5	3.5	12
EEE547	Satellite Communication Systems	3	1.5	3.5	12
EEE567	Aeronautical Surveillance Systems	3	1.5	3.5	12
Total				**20.0**	**64**

Semester II

Electrical Power

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE532	Digital Control Systems	3	0	3.0	10
EEE599	Design Project	0	7.5	5.0	13

Minimum of any two courses from the following:

EEE552	Power Quality	3	1.5	3.5	12
EEE554	Renewable Energy and Environmental Sustainability	3	1.5	3.5	12
EEE556	Selected Topics in Electrical Power Engineering	3	1.5	3.5	12
Total				**15.0**	**49**

Semester II

Electronics and Communications

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE532	Digital Control Systems	3	0	3.0	10
EEE599	Design Project	0	7.5	5.0	13

Minimum of any two courses from the following:

EEE524	Wireless and Sensor Networks	3	1.5	3.5	12
EEE544	Optics and Optical Communication Systems	3	1.5	3.5	12
EEE554	Renewable Energy and Environmental Sustainability	3	1.5	3.5	12
EEE526	Selected Topics in Electronic Engineering	3	1.5	3.5	12
EEE546	Selected Topics in Communication Engineering	3	1.5	3.5	12
Total				**15.0**	**49**

Semester II

Instrumentation and Control

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE532	Digital Control Systems	3	0	3.0	10
EEE599	Design Project	0	7.5	5.0	15

Minimum of any two courses from the following:

EEE554	Renewable Energy and Environmental Sustainability	3	1.5	3.5	12
EEE536	Selected Topics in Control Engineering	3	1.5	3.5	12
EEE586	Selected Topics in Instrumentation Engineering	3	1.5	3.5	12
Total				**15.0**	**49**

Semester II

Avionics

Core Courses		**L**	**P**	**Cr**	**N.hr.Cr.**
EEE532	Digital Control Systems	3	0	3.0	10
EEE599	Design Project	0	7.5	5.0	15

Minimum of any two courses from the following:

EEE562	Radar Systems	3	1.5	3.5	12
EEE564	Aircraft Flight Dynamics	3	1.5	3.5	12
EEE544	Optics and Optical Communication Systems	3	1.5	3.5	12
EEE566	Selected Topics in Avionics	3	1.5	3.5	12
Total				**15.0**	**49**

Level	**Semester**	**Credit hours**	**Notional hours credit points**
1	SEMESTER I	21.9	78
	SEMESTER II	21.6	71
2	SEMESTER III	20.4	80
	SEMESTER IV	20.0	73
3	SEMESTER V	20.5	72
	SEMESTER VI	18.0	61
4	SEMESTER VII	18.5	67
	SEMESTER VIII	19.5	71
5	SEMESTER IX	20.5	70
	SEMESTER X	15	49
Total		**181.40**	**759**

3.3 COURSE DESCRIPTIONS

MAT111 Algebra, trigonometry and Analytic geometry

Exponential and Lagorithmic Functions. Arithmetic and Geometric Progressions. Mathematical Induction. The Binomial Theorem. Polynomials. Trigonometric Functions. Complex Numbers. Plane Geometry. Introduction to Matrix Algebra (3L, 2P).

PHY101 Introductory Physics I

Vectors, Kinematics, Forces, work and energy, momentum, rotational motion, elasticity of solids, fluid statics and dynamics, heat and the first law of thermodynamics (3L, 3P).

CHE153 Chemistry for Engineers

The course introduces basic chemistry concepts such as matter, measurements, nomenclature, electronic structure, stoichiometry, reactions in aquesous media, thermochemistry, chemical equilibrium and electrochemistry. It also provides a necessary background for many of the laboratory experiments usually performed in general chemistry (3L, 3P).

CSC111 Introduction to Computer Science

Hardware and Software Concepts; Principles of Operating System software and file management; Basic application software skills :Word Processing, Presentation, Spreadsheet and Database software; Internet and Electronic Mail basics; Computers and Society issues; Structure of a general purpose computer. Number systems and data representations. File organizations. Preliminaries and notations. Problem solving and algorithm development implementation. Design and execution, visualization (3L).

GSC113 Emerging Technologies, Environmental and Social Issues

This is a general education course developed for science students with the aim of equipping them with behavioral and social skills, emerging technologies, sustainable development, basic business and entrepreneurship skills (3P).

EEE104 Engineering Mechanics

This course is an introduction to learning and applying the principles required to solve engineering mechanics problems. It addresses the modeling and analysis of static equilibrium

problems and introduction to dynamics with an emphasis on real world engineering applications and problem solving. The course also discusses kinematics of particles; kinetics of particles, Newton's second law, energy, momenta, impact dynamics (3L, 3P).

EEE172 Programming Techniques I

This is an entry level course whose sole aim is to equip students with theory and practice on problem solving techniques by using the structured programming approach. Students are required to develop programs using C programming language, in order to solve simple to moderate problems. The course covers the following: variables, data types operators, expressions and Conditionals, pre-processor directives, input and output statements, text files, control structures: sequential, selection and iterative, functions, recursion, arrays and pointers, structures and bitwise operators (3L, 3P).

PHY102 Introductory Physics II

Oscillatory motion and sound, geometrical optics, electrostatics, electrical current, magnetic fields, AC currents, Introduction to modern physics (3L, 3P).

MAT112 Introduction to Calculus

Limits: Definition, properties, methods of evaluation. Derivatives: Definition, properties, techniques. Applications: Tangents and Normals, Related Rates, Optimisation problems, Curve sketching. Integration: Indefinite, Techniques. Applications: Area between curves (3L, 2P).

MAT122 Linear Algebra for Scientists and Engineering

This course covers: Matrix Algebra, Systems of Linear Equations, Vector Spaces, Determinants, Linear Transformations, Eigenvalues and Eigenvectors, Orthogonal Matrices (3L, 2P).

EEE201 Workshop Practice

This course is designed to introduce students to the fundamental concepts, principles, and devices involved in domestic wiring, insulation, impedance testing & measurements, and industrial control of motors. Students will also develop the skills necessary for wiring basic motor control and selecting the required pilot devices, safety components and cable jointing.

Also includes troubleshooting electrical circuitry and understanding standards and regulations. The course is examined by coursework only (3P).

EEE203 Engineering Graphics Communication

Engineering graphical communication; importance of drawings, free hand sketching and lettering, title box and engineering drafting. Computer-Aided drafting, 2D and 3D-isometric drawings, 3D perspective drawings. Simple geometric drawings, dimensioning; scale; Interpretation of three-view drawing layout; auxiliary views; hidden detail, sections and cross-hatching. Interpenetration of assembly drawings. Block diagrams and flow diagrams as communication tools (3P).

EEE211 Professional Communication

This course introduces writing and business communication skills at workplace. This includes communication methods, communication in a group setting, process of letter writing, letter format and types, and resume or CV. The writing skills are extending to include technical report, reports (Feasibility, Lab/test, and status), final project report, and white papers. To equip student's technical writing skills, presentations and posters writing skills, the students are introduced to a high-quality typesetting system. The students are also introduced into data visualization tools that improves the document write-up. Lastly, they are taught how to write a Technical Paper for a conference or journal using the typesetting tool (3P).

EEE251 Electric Circuits

Covers DC and AC fundamentals, which include Ohm's law, power dissipation, Kirchhoff's laws, and linear circuit theorems, such as Thevenin equivalence, Norton equivalence, and superposition. Introduces analysis of networks of series, parallel, and series-parallel linear circuits with various sources. Describes fundamental energy storage components. Explore transient and steady state responses and power dissipation of RC, RL, and RLC linear reactive circuits with a sinusoidal source, Q-factor and power factor. Use terminal equations to describe two-port circuits. Discusses star-delta connections (3L, 3P).

EEE271 Programming Techniques II

This course covers the fundamental principles of object-oriented programming and provides the student with techniques of solving problems using object-oriented programming. Topics

covered include classes, operator overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, templates, and exceptions. C++ programming language is used to teach all the highlighted topics (3L, 3P).

MAT213 Calculus for Science & Engineering

This course covers: Sequences and series: Define sequences and series and analyse convergence properties, Power Series. Applications of Differentiation: Rolle's theorem and the Mean Value Theorem, L'Hopital's rule. Applications of Integration: Area under curves with applications in velocity, acceleration, displacement etc, Application in work done, Arc length. Multivariable calculus: Differential calculus of functions of several variables, Integral calculus of functions of several variables (4L, 2P).

MAT217 Vector and Complex Analysis for Science & Engineering

This course covers: The dot product and cross product. The gradient, divergence, curl, scalar function of several variables. Multivariable integration. Polar, cylindrical and spherical coordinates (without proof). Line and surface integrals. The gradient. Green, Gauss and Stoke's theorems with only application. Elementary functions of a complex variable. Complex limits, continuity and differentiation. Analytic function. Cauchy-Riemann Equations and Polar form (without proof). Conditions for a function to be Analytic (without proof) and Harmonic functions. Cauchy-Gousat theorem (only statement and applications). Cauchy integral formula (without proof). Taylor's and Laurent's series (without proof). Radius and circle of convergence. Zeros and singularities of complex valued functions. Residues. Residue theorem and its application in evaluation of real integrals around unit and semi-circle. Introduction of Z- transform to solve difference equation (4L, 2P).

EEE202 Thermofluids

Covers the basic concepts of thermodynamics, including the first and second laws, and the ideal gas equation of state. These concepts are applied to engineering problems such as: heat transfer; mechanical work; energy balance; heat engines; refrigerators; and heat pumps. Apply the laws of thermodynamics in the design and optimisation of basic energy conversion processes within various power plants. Analyse fundamental thermodynamic properties including cycle efficiency (3L, 1.5P).

EEE222 Fundamentals of Electronics

This course cover basics in electronics where we cover PN junction and Zener diodes. This is extended to include BJT (biasing networks, small signal analysis, single transistor amplifiers), MOSFET (biasing networks, small signal analysis, single transistor amplifiers), CMOS digital circuits (3L, 3P).

EEE224 Digital Systems

This course covers the design and application of digital logic circuits, Boolean algebra and their implementations using logic gates, SSI, MSI, and LSI chips, combinational and sequential logic circuits, how logic circuits are used to solve engineering problems, how logic circuits are analysed, designed, verified, and tested and the Introduction to analogue-to-digital conversion (ADC) (3L, 3P).

EEE252 Fundamentals of Power Engineering

In this course the representation and analysis of three-phase electrical circuits is introduced including per-unit system of analysis. It explores the fundamentals of common electrical machines. The energy conversion is treated in which the mechanism of force and torque production in various electrical machines is discussed. It Analyses the steady state operation of single-phase and three-phase electrical transformers, DC machines and stepper motors. Star- and delta connected balanced and unbalanced loads (3L, 1.5P).

EEE272 Engineering Computing

This course is intended to equip students with basic computational skill using mathematical tools such as MATLAB and Python, in the context of multiple engineering disciplines with scientific applications. The topics that are covered include language syntax, environments and basic libraries, numerical analyses, data analytics, knowledge discovery, data visualization, intelligent systems communications (3P).

MAT214 Differential Equations for Science and Engineering

This course covers: Ordinary Differential Equation: First Order Differential Equations, Second Order Constant Coefficient Linear Equations, Laplace Transforms, First Order Systems, Series Solutions. Partial Differential Equation: First order PDEs, Second order PDEs - Canonical forms and D’Alembert Solution, Fourier Series, Second order

Homogenous PDEs (separation of variables) - Wave equations, Heat Equation and Laplace Equation, Laplace Transform for PDEs - Wave equations and Heat Equation (4L, 2P).

EEE301 Probability and Random Variables

Probability and its axioms, conditional probability, independence, counting, random variables and distributions, functions of random variables, expectations, linear regression, correlation functions and spectra with applications to communications, control, Basic Statistics and other tools (e.g. R) for describing and managing uncertainty in electrical and computer engineering (3L).

EEE321 Analogue Electronics

This course covers op-amp circuits and energy storage elements. Negative feedback.Oscillators, waveform generators and phase-locked loops. Power amplifiers classes. Multi-transistor configurations and circuits. Differential amplifier (4L, 3P).

EEE331 Signals and Systems

This course covers continuous and discrete signals and systems, classifications and operations of signals, convolution, Linear time invariant (LTI) systems, Fourier series, Continuous time Fourier transform (CTFT), properties of CTFT, sampling of analogue signals, Discrete time Fourier transforms (DTFT), Properties of DTFT, Laplace Transform and properties, Z-Transform and properties. Introduction to Amplitude modulation (4L, 3P).

EEE341 Electromagnetic Fields

Transmission line equations, wave propagation, input impedance, power flow; Electrostatics, charge and current, laws of Coulomb and Gauss, scalar potential, properties of materials, boundary conditions, capacitance, Magnetostatics, laws of Biot-Savart and Ampère, magnetic properties of materials, boundary conditions; Plane wave propagation, polarisation, power density; Wave reflection and transmission, normal and oblique incidence (3L, 1.5P).

EEE391 Electrical and Electronics Design Laboratory I

Introduction to engineering design. Literature survey. Formulation of practical engineering problems. Problem analysis. Engineering design process. Modeling, implementation, and evaluation using computer design tools. Report writing, presentation skills, and team work (3P).

MAT311 Numerical Analysis

Error Analysis. Roots of Nonlinear Equations. Polynomial interpolation. Numerical Integration. Introduction to Numerical Linear Algebra (3L).

EEE324 Programmable Arrays and Microcontrollers

This course covers overview of the Hardware Description Language (HDL), Combinational logic, sequential logic, Assembler, Designing digital logic circuits, CPU/microcontroller architecture, Embedded software development using the C/C++ programming language, and the use of external peripherals (3L, 3P).

EEE382 Fundamentals of Measurement and Instrumentation

In this course the basic terminology for measurement and instrumentation are introduced. Measurements And Measurement Systems; Characteristics Of Instruments And Measurement Systems; Errors In Measurements And Their Statistical Analysis ; Design of Analog Instruments: Galvanometers, Analog Ammeters, Voltmeters And Ohmmeters, Instrument Transformers; Measurement Of Power And Wattmeter's ; High Voltage Measurements And Testing ; Electronic Instruments; Signal Analysers; introduction to Transducers, and Signal conditioning (3L, 1.5P).

EEE344 Communication Systems I

This course introduces the elements of communication systems, coding, modulation, channels. Moreover, it covers analogue modulation and digital communication schemes. It extends to include information theory, Error detection and correction coding (3L, 1.5P).

EEE352 Electrical Machines

In this course the construction, operation and testing of three-phase electrical machines are explored. The physical concepts and basic laws in electromechanical energy conversion to produce torque in rotating and cylindrical machines are introduced. Analyses, operates and tests three-phase induction machines are included. It covers investigation the performance, design, operation, and testing of the three-phase synchronous machine and transformers (3L, 1.5P).

EEE354 Power Generation, Transmission and Distribution

This course introduces the layout, main components, and characteristics of common electrical power generation plants. Thermal and Hydro power plants layout, components and characteristics are presented. The impact on the environment of power transmission process from generation to distribution is evaluated. Expressions for resistance, inductance and capacitance of high-voltage power transmission lines are determined. The equivalent circuit of short, medium and long three-phase transmission line is analysed. HVDC transmission system is introduced. Concepts of electrical power distribution. Power factor and power factor improvement (3L, 1.5P).

EEE411 Professional Practice

This course aims to provide an in-depth understanding of the processes involved in engineering design and practice as well as develop relevant professional skills. Project management, leadership, security in engineering, engineering ethics, diversity, equality, inclusion and sustainability (SDGs). Case studies (3P).

EEE413 Engineering Economics and Management

The course will cover the following areas: fundamental of economics analysis (cost concepts and design economics, cost-estimation techniques, time value for money, single and multiple investments, evaluating a single project), definitions of management (introduction, types of management, management levels, management styles), importance of engineering management (why engineering management, engineer manager), business environment (the organization, legal and ethical considerations), strategy & decision making (strategy formulation, decision making, information presentation, mathematics in decision making, forecasting), production & operations management (project planning and control, manufacturing operations), financial management (financial environement, control through costing, investment decisions), marketing and sales management (markets and marketing, product management, sales and distribution), magement skills (leadership & motivation, team building, effective communication, time management) (3L).

EEE431 Control Engineering I

This course provides an understanding of control systems, modelling, analysis, and design of feedback control systems. Analysis and design techniques for SISO control systems up to second order: Differential equations, Laplace transforms, transfer functions, poles and zeros,

stability, steady-state errors, root locus, Bode plots, transient response analysis for first and second order systems, PID control and lead-lag compensation (3L, 3P).

EEE433 Industrial Automation

Review of Computers in Process Control, Data loggers, Data Acquisition Systems (DAS), Direct Digital Control (DDC). Supervisory Control and Data Acquisition Systems (SCADA), sampling considerations. Programmable Logic Controller (PLC) Basics, PLC Intermediate Functions, Interface and Backplane Bus Standards for Instrumentation Systems, Field bus. HART protocol: MOD bus, Profibus, RS-485 Transmission Technology, IEC 1158-2 Transmission Technology. Distributed Control Systems, Definition, Local Control Unit, architecture, case studies in DCS (3L, 1.5P).

EEE435 Artificial Intelligence for Engineers

This course introduces artificial intelligence with engineering applications. The topics covered include evolution of key AI technologies, relationship between AI and collective intelligence, machine learning, Neural networks, Computer perception and robotics, speech understanding, fuzzy logic, Principles of intelligent agents, reactive, goal-based, and utility-based agents, application of AI in engineering systems (3L, 1.5P).

EEE452 Power Electronics

This course introduces control, protection and commutation of power switching devices which includes the diode, thyristor, MOSFET, and IGBT. Various methods for converting electrical power for resistive and inductive loads are presented, including AC to DC converters, controlled rectifiers, AC to AC converters, single phase and three phase AC voltage controllers, choppers for DC to DC power conversion, inverters, single phase and three phase pulse width modulation (PWM) techniques, and square-wave inverters (3L, 1.5P).

EEE454 Power System Analysis

This course equips students with the ability to analyze and solve problems commonly encountered in electrical power systems. The course includes a revision of complex power calculations, per-unit system of analysis, and electrical network calculations. Topics include system modelling, load flow analysis, symmetrical components theory, reliability analysis, load prediction and fault analysis (4L, 1.5P).

EEE456 Power System Operation and Control

This course prepares students to have the capability to evaluate and analyze operation and control problems in power systems. The course covers transmission capacity, compensation techniques in transmission systems. It includes economic operation of power system, power system controls power system stability, FACTS controllers, SCADA systems and Energy Management systems (EMS) (3L, 1.5P).

EEE482 Instrumentation Systems

Introduction to instrumentation systems; Design of Displacement measurement systems; Strain, force, and torque measurement systems; Fluid flow and level measurement systems; Pressure measurement systems; Optoelectronic measurement systems; Temperature measurement systems; Design of signal conditioning circuits, Design of P/I and I/P converters, Design of smart transmitters, Design of 2 and 4 wire transmitters; Design of pneumatic and electronic controllers; Design of instrumentation servomechanism; Design of annunciators, Earthing and Shielding (3L, 1.5P).

EEE472 Computer Networks and Information Security

The course provides an introduction to computer networks and data system protection, with a special focus on the Internet architecture and protocols. Topics includes OSI-Internet model, data link layer, network layer, application layer, wireless and mobile networks, multimedia networking, security foundations (CIA: confidentiality, integrity, availibility for prioritization of critical security resources), cryptography, security principles, governance, risk and compliance, protecting and defending assests, auditing and monitoring, managing incidents and operations (3L, 1.5P).

EEE492 Electrical and Electronic Design Laboratory II

Group work and/or individual design of selected problems in electrical and/or electronic engineering. Simulate, using any simulation software. Build, test and demonstrate the solution in the lab. Detailed design reports to be written and oral/poster presentations may be required (3P).

EEE422 Microelectronic Devices and Circuit

This course introduces integrated circuit technology: CMOS fabrication' Bi-CMOS technology, transconductance and output conductance, the n-MOS inverter, CMOS inverter

and its characteristics, design style, Scaling models and scaling factors. Then, it extend to cover combinational circuit design, sequential circuit design, design considerations, design automated layout generation, placement, floor planning, routing, Parasitic Extraction, Field Programmable Gate arrays (FPGA), Configurable Logic Block (CLB), Application-Specific Integrated Circuits (ASICs), design for stability, faults types and Models, AD HOC Design Techniques, Scan-Based Techniques, BIST Techniques, Current Monitoring I DDQ Test (3L, 1.5P).

EEE442 Communication Systems II

This course reviews of random variables and stochastic processes, mathematical representation of noise in amplitude modulation systems, frequency modulation systems, pulse code modulation, digital modulation. This extends to cover channel equalization, signal detection and optimum receivers designs in digital communications, error rate performance analysis, data compression, and new trends in digital communications (4L, 1.5P).

EEE432 Introduction to Mechatronics

Introduction to mechatronic systems, Switching Devices, Electro-pneumatic actuators, Programmable logic controllers, Stepping motors Measuring Solid Mechanical Quantities, Measuring temperature, Measuring fluid flow rate, Introduction to Digital Systems Characteristics of Measurement Systems (4L, 1.5P).

EEE462 Introduction to Aviation Systems

Introduction to the practices & procedures of modern aviation systems, aviation history, civil and military aviation, human factors, airspace and air traffic control systems, airport management, and aviation safety. Theory and practice of flight control systems. Fundamentals and applications of avionics (aviation electronics), technology essential for aircraft communication, aircraft navigation and communication. Involves some visits to KMIII Airport and Matsapha airport (4L, 1.5P).

EEE464 Radio Navigation Systems

This course covers the fundamentals of Aviation Radio Navigation Systems which includes; Instrument Landing Systems (ILS) concepts, Distance Measuring Equipment (DME) concepts, Doppler Very High Frequency Omni directional Radio Range (DVOR), Non Directional Radio Beacon (NDB), Global Positioning System (GPS)which includes Ground

Based Augmentation System GBAS and Satellite Based Augmentation System SBAS, Future Air Navigation Systems (FANS) concepts, and Performance Based Navigation (PBN) concepts (3L, 1.5P).

EEE 500 Industrial Attachment

Students will be attached to an approved industrial, service or training establishment for on-the-job practical training for a period of 10 weeks. Each student shall keep a log book in which he/she shall record his/her daily activities in the work place over the attachment period. Students shall be visited during the same period to advice and assess them on practical knowledge acquired and on such other things as work attitude, discipline at work and record keeping. At the end of the attachment, each student shall submit a technical report to the department for evaluation. The course is evaluated based on industrial supervisors report, Logbook, final report and presentation .

EEE511 Digital Innovation & Entrepreneurship

This course provides a broad overview of the role of entrepreneurial thinking and innovation in advancing IT-focused businesses. Students will examine how these skills can be leveraged to create new IT-driven businesses as well as to create competitive advantage for existing businesses via new IT products and services (i.e., intrapreneurship). This course provides a broad overview of the role of entrepreneurial thinking and innovation in advancing IT-focused businesses and familiarizes students with the processes and tools used to conceptualize and plan new innovative products and/or services that leverage IT as a core component of their business model. Students will be introduced to concepts, tools, and principles of business management including business strategy, finance, marketing, human resources, and leadership within the context of IT business models. This will be a very hands-on active class. Students will have the opportunity to work in teams to practice skills related to identifying novel ideas, assessing market opportunities, defining customer segments, identifying key partners, and building IT-based business models (3P).

EEE551 Electrical Drives

The theory and control methods for DC and AC electrical drive systems are applied in a laboratory setting. Various methods for controlling the DC and AC motors are presented and mathematical models are used to implement linear control techniques. Various

implementations and designs are modeled with the associated control mechanisms using a simulation package, such as MATLAB Simulink, in order to investigate and test the overall DC and AC drive system performance under various operating conditions (4L, 1.5P).

EEE553 Switchgear and Protection

This course introduces power system protection fundamentals, arc phenomena and arc theory, basic design requirements, and principles of operation for over-current, overvoltage, and under-voltage protection schemes for various power system components. Three-phase short-circuit currents are analysed under various conditions and used as a basis to select circuit breaker types and ratings. Various protective devices, such as over current and earth leakage, differential, distance, over voltage, and under voltage relays, are applied as appropriate. Unit protection, back up protection, and protection coordination are introduced (3L, 1.5P)**.**

EEE599 Design Project [*see academic regulation 011.42*]

Each student is given a major design project to conduct which may involve literature research, analysis, design and construction, software development, laboratory and/or field investigation. Assessment will be based on oral presentation, laboratory/on-line simulation presentation and a written report. This course lasts two semesters (7.5P).

EEE555 Smart Power Grid

In this course students will be able to investigate Smart Grid definition, characteristics, benefits, technologies, and challenges. This course includes smart grid components, techniques and tools used in generation, transmission, distribution, storage and end-users (3L, 1.5P).

EEE533 Robotics and Industrial Automation

Introduction to robotics, Common Kinematic arrangements, Rotations, Composition of Rotations, Properties, Homogeneous Transformation Robot sensors, desirable features of sensors, magnetic sensors, fibre optic, tactile sensors, proximity and non- proximity sensors. Construction of manipulators, types of actuators, grippers, Actuator dynamics. Feed forward Control and Computed Torque, Forward, inverse and velocity kinematics Denavit-Hartenberg Representation, Euler Lagrange Equations, Expressions for kinetic and potential energy, Equation of Motions, Common configuration, Newton Euler Formulation. Robot machine

vision, image processing and analysis, Lead through programming methods. Robot programming languages-examples. Robot applications in manufacturing, robot cell design, machine interface, multiple robots, robot in assembly and inspection (3L, 1.5P).

EEE531 Control Engineering II

This course covers State-Space Systems: The State Variables of a Dynamic System, The State Vector Differential Equation, The Time Response and the Transition Matrix, Solving Linear, Time-Invariant State Equation, State-space Representations of Transfer-Functions, Signal Flow Graph State Models, The Stability of Systems in the Time Domain, Controllability and Observability. Pole Placement, Introduction to advanced control methods: Optimal Control, Adaptive Control (3L, 1.5P).

EEE541 Antennas and Wave Propagation

This course covers antenna basics & dipole antennas, VHF, UHF, Micro strip Antennas, Rectangular patch antennas, reflector antennas, antenna arrays & measurements, wave propagation, and new trends (4L, 1.5P).

EEE521 Real Time Embedded Systems

This covers the following topics: Characteristics of embedded computing applications, Concept of real time system, challenges in embedded system design, Microprocessor architectures, Instruction execution cycle, designing of Embedded computing platform, Basic features of an operating system, kernel features, processes and threads, context switching, scheduling, Inter-process communication, power optimization strategies for processes, Internet-Enabled systems, and wireless applications. Linux operating system. strategies for processes, Internet-Enabled systems, and wireless applications (3L, 1.5P).

EEE543 Digital Communication Systems

This course introduces the basics in digital communication systems. Topics covered includes signal and noise theory, modulation and spectra, digital baseband signaling, digital bandpass modulation, signal space representation, effect of noise on communication systems, matched filter receivers, optimum detection and detection performance, signal to noise ratio, bit-error-rate in digital links, bandwidth and power requirements, error correction coding, Symbol/frequency acquisition and tracking wireless communication systems (3L, 1.5P).

EEE 545 Wireless and Mobile Communication Systems

This course introduces wireless and mobile communication systems. The topics include wireless fundamentals, cellular concepts, Cell Splitting and Cell Sectoring, Handoff, Cellular network evolutions, Mobility and Mobile data management, Standards, Emerging technologies (3L, 1.5P).

EEE547 Satellite Communication Systems

Satellite communications: Geo-synchronous orbit, geo-stationary orbit, space link, access methods, satellite services, satellite transponders, antenna systems and gain, Capacity constraints, transponders, antennas, satellite link design, modulation and multiplexing techniques used in satellite communication systems, multiple access (FDMA, TDMA, CDMA) (3L, 1.5P).

EEE581Biomedical Instrumentation Systems

Analytical and optical instruments: Radiation Sources, Monochromator: Prism, Diffraction Gratings, Holographic Gratings, Optical Filters. UV Visible IR. Spectrophotometers: Calorimeters, Flame Photometers. NMR Spectroscopy, Principles, Applications. Mass Spectrometers: Principle, operation Type, Quadruple Mass Spectrometer Ionization Methods, Ion Detectors. Chromatography, X Ray Spectrometers. Fiber optic fundamentals and Measurements: OTDR, Laser Doppler velocimeter (3L, 1.5P).

EEE561 Aviation Standards, Regulations, Certifications and Human Factor

The course covers overview of international aviation standards (e.g. FAA), ICAO regulations and certification procedures; regulatory areas, namely, training/testing, air traffic procedures, aircraft systems design and airworthiness; ESWACAA regulations; Human factors; Incident Attributed to Human Factors, Statistics of Incident Related to Human Factors; development process for new regulations and criteria for certification (4L).

EEE563 Aircraft Electronics

Overview of aircraft electrical and electronic systems and equipment; including wiring installation and related electrical protection, flight and engine instrumentation, and electrical power generation, including control and supply, VHF and HF communication and navigation systems (3L, 1.5P).

EEE565 Air Traffic Management and Data Systems

This course considers the main facets of corporate airline management, and begins with airline organizational practice, management's visions and objective setting, business planning, schedule planning, fleet planning and external relationships such as outsourcing; the economics of running the airport as a business, including costs, revenues, subsidies and performance indicators, and general airport administration; Digital data processing systems, Aeronautical Meteorology equipment, Communication - data - network technologies (3L, 1.5P).

EEE567 Aeronautical Surveillance Systems

Under this course, students could be taught the basic Aviation Surveillance Systems used these include: Radar based surveillance techniques; Multilateration: LAM-WAM; Automatic Dependent Surveillance; Surveillance processing and application; First Notion of Assessment of Sensors in Surveillance; Anti-collision system Surveillance: Human Machine Interface (HMI) - ATCO HMI - surveillance data - technology and protocols, Data processing (3L, 1.5P).

EEE532 Digital Control Systems

This course covers the design and analysis of discrete-time control systems (mainly model-based), suitable for implementation on digital computers. Both frequency-domain and time-domain methods are used to design digital control schemes that meet system performance criteria. The emphasis in this course is on approaches suitable for discrete-time, state-space models. Following an introduction to state-space modeling, the design of feedback control laws using pole placement, state observers, and optimal control for satisfying the principle of optimality are studied. Practical issues such as digital control of continuous-time system and actuator constraints are also discussed (3L).

EEE552 Power Quality

This course introduces the power quality terms definition, causes, IEEE standards and examples of poor power quality. It is explorer voltage distortion, harmonic current sources and harmonic current effects. This course includes correction for power quality techniques and power quality measurements (3L, 1.5P).

EEE554 Renewable Energy and Environmental Sustainability

This course covers the principles of photovoltaics/wind turbines and how to effectively incorporate the systems with emphasis on stand-alone systems with a brief introduction to grid connected electrical systems. The content of the course includes system advantages and

disadvantages, site evaluation, component operation, system design and sizing, installation requirements and recommended practices for important applications. Topics include: **thermal power plants** (Forms of energy, oil, gas and coal. Combustion processes, energy cycles. Steam generators and their component design, turbines, load curves), s**olar** (Introduction to Photovoltaic Systems, Solar Radiation, Site Surveys and Preplanning for Photovoltaic Systems, Photovoltaic System Components and Configurations, Cells, Modules, and Arrays for Photovoltaic Systems, Batteries, Charge Controllers ,and Inverters , Photovoltaic System Sizing, Photovoltaic Systems Mechanical Integration, Photovoltaic Systems Electrical Integration, Installation, Commissioning, Maintenance, and Troubleshooting, Photovoltaic Systems Economic Analysis), **wind** (Wind characteristics, boundary layer, turbulence, surface roughness, and measurements. Loads on static structures, wind tunnel modeling, wind induced vibrations, flutter, buffeting), **environmental issues** (overview of issues, batteries and the environmental issues, pollution control, environmental risk and decision, environmental policy, case studies) (3L, 1.5P).

EEE556 Selected Topics in Electrical Power Engineering

Presents a theoretical or practical topic in electrical power engineering proposed by the faculty beyond what is offered in existing courses. Recent developments in this area (3L, 1.5P).

EEE524 Wireless and Sensor Networks

This course introduces wireless networks, architectures and technologies. The topics includes Wireless sensor network platforms, Enabling Technologies Architectures, Sensor Network Scenarios, Networking sensors, Communication architecture and protocols for WSN, Energy management, Sensor data acquisition, processing and handling, Signal processing, target localization and tracking, self-organization, Modeling and Simulation of WSN, Application case studies (health, environmental monitoring, smart home), Challenges for Wireless Sensor (3L, 1.5P).

EEE544 Optics and Optical Communication Systems

This course reviews the optics including photon-matter interaction, interference, diffraction, coherence, polarization. In addition, it covers the following topics: geometrical optics, Optical waveguides and optical fibers, Optical devices, Operating principles of optical multiplexers and demultiplexers, Review of important concepts of digital communications including TDM, WDM and DWDM, Overview of the design process of a point-to-point optical link (3L, 1.5P).

EEE526 Selected Topics in Electronic Engineering

Presents a theoretical or practical topic in electronics engineering proposed by the faculty beyond what is offered in existing courses, Recent developments in this area (3L, 1.5P).

EEE546 Selected Topics in Communication Engineering

Presents a theoretical or practical topic in communication engineering proposed by the faculty beyond what is offered in existing courses, Recent developments in this area (3L, 1.5P).

EEE536 Special Topics in Control Engineering

Presents a theoretical or practical topic in control engineering proposed by the faculty beyond what is offered in existing courses, Recent developments in this area (3L, 1.5P).

EEE586 Special Topics in Instrumentation Engineering

Presents a theoretical or practical topic in instrumentation engineering proposed by the faculty beyond what is offered in existing courses, Recent developments in this area (3L, 1.5P).

EEE562 Radar Systems

Course includes nature of Radar and Applications, Simple form of Radar Equation, Radar Block Diagram and Operation, Prediction of Range Performance, Minimum Detectable Signal, Radar Receivers, Transmitter Power, CW and Frequency Modulated Radar, MTI and Pulse Doppler Radar, Tracking Radar, Detection of Radar Signals in Noise (3L, 1.5P).

EEE564 Aircraft Flight Dynamics

The course includes basic flight control and flight dynamics principles. Aircraft dynamic equations and performance data, Axes Systems: Earth axes, aircraft body axes, Euler angles, Aerodynamic reference geometry; Static Equilibrium: longitudinal, lateral and directional stability; Equations of motion of a rigid symmetric aircraft. Transfer functions & state-space equations; Aerodynamic stability and control derivatives; Reduced order models: longitudinal, lateral dynamics; Handling qualities (3L, 1.5P).

EEE 566 Selected Topics in Avionics

Presents a theoretical or practical topic in avionics proposed by the faculty beyond what is offered in existing courses, Recent developments in this area (3L, 1.5P).

4.0 CURRENT ACADEMIC STAFF IN THE ELECTRICAL AND ELECTRONIC DEPARTMENT

Table 1: *Academic staff in the Electrical and Electronic Department*

Specialisation	**Member of Staff**	**Qualification**	**Position**
Communications	Dr. M.A. Mulatu	Ph.D in Electrical Engineering	Senior Lecturer
Communications	Dr. T. Dlamini	Ph.D in Information Engineering	Senior Lecturer
Controls and Avionics	Dr. Z.Z Dlamini	Ph.D in Electronic Engineering	Lecturer
Communications	Dr. M. Lupupa	Ph.D in Electronic Engineering	Lecturer
Communications	Mr. W. Nyembe	MSc. in Electrical Engineering	Lecturer
Communications	Mr. M.J. Khumalo	MSc. in Telecommunications Engineering	Lecturer
Electronics	Mr. B. B. Maseko	MSc. in Electrical and Electronic Engineering	Lecturer
Power Systems	Mr. J.S. Mahlalela	MSc. in Electrical Power Systems Engineering	Lecturer
Power Systems	Mr. S. Dlamini	MSc. in Electrical Power Engineering	Lecturer
Power Systems	Mr. L. Dube	MSc. in Electrical and Electronic Engineering	Lecturer
Power Systems	Ms. N. Siphepho	MSc. in Electrical and Electronic Engineering	Lecturer