FIJI NATIONAL UNIVERSITY

COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY

SCHOOL OF ELECTRICAL & ELECTRONIC ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING

PROGRAMME DOCUMENT

TRADE DIPLOMA IN ELECTRICAL ENGINEERING

This programme document replaces all previous draft versions

Contents

1. INTRODUCTION

1.1 PROGRAMME DETAILS

a. TITLE: **TRADE DIPLOMA IN ELECTRICAL ENGINEERING**.

b. AWARD: **TRADE DIPLOMA IN ELECTRICAL ENGINEERING**

1.2 HISTORY and DEVELOPMENT (RATIONALE)

In 1992 a UK funded project commenced at the Fiji Institute of Technology (FIT) as part of programme of Technical Cooperation between the United Kingdom and Fiji.

The primary objective of the project was to improve the quantity and quality of the technical Graduates from the Engineering schools at the Fiji Institute of Technology. The project team was responsible to the Principal of FIT and comprised of engineering educators from the mechanical, building/civil and electrical engineering fields.

Their main tasks in the area of curriculum development were to:

- establish a unified course structure
- adopt a modular system in curriculum design
- establish a curriculum and examination resource bank.

Following agreement between industry representatives and FIT at the end of 1994, Course duration and structures were finalized and curriculum documents prepared.

These were submitted to and endorsed by the Industry Advisory Committees on 21July, 1995.

1st Revision:

The ***revised*** document was presented and endorsed by the industry Advisory Committee on **14 December 2001**. Again, in accordance to the requirement of the Academic Statute the revised document was presented and endorsed by the Advisory Committee on **20th January 2005.**

The curriculum documents, now being presented for consideration, have been prepared to comply with the requirements of ***The General Academic Statute of the Fiji Institute of Technology***.

2nd Revision:

In 2010, Fiji Institute of Technology and 5 other academic institution merged to establish Fiji National University. The programme was then change from Trade Certificate at level 3 to Certificate IV at level 4. The programme document and unit descriptor was then revised.

The curriculum documents, now being presented for consideration, have been prepared to comply with the requirements of ***The University Academic Student Regulation of the Fiji National University.***

3rd Revision:

In 2013, FNU under the College of Engineering, Science and Technology collectively decided together with other Engineering Schools to run the Programme from Penster mode (8 Weeks) to Trimester mode (14 weeks). In October 2013, the programme document and unit descriptor was then revised to meet new mode of teaching and was submitted to IAC in December, 2013.

The revised curriculum documents, now being presented for consideration, have been prepared to comply with the requirements of ***The University Academic Student Regulation of the Fiji National University.***

1.3. GRADUATE PROFILE

In general, the graduate of the Trade Diploma in Electrical Engineering should possess the knowledge, skills and attributes and be able to perform the tasks and procedures, as specified for level five(5) in ***University Academic and Students Regulation of the Fiji National University.***

More specifically, the graduate should be able to

1.3.1 Apply a combination of highly developed technical skills and appropriate though limited manual skills in the analysis and solution of technical problems in a chosen area of specialization in Electrical/Electronic Engineering.

1.3.2 Apply skills in standard design, testing, commissioning, inspection, plant operation & maintenance, manufacturing or field work.

1.3.3 Employ systematic and logical approaches to problem solving.

1.3.4 Transfer and apply theoretical concepts and technical skills to a range of situations.

1.3.5 Integrate the theoretical concepts and technical aspects of Electrical Engineering.

1.3.6 Make well informed judgments to supervising and managing technical work, after appropriate experience and further information.

1.4. PHILOSOPHY

The Trade Diploma in Electrical Engineering is an initial vocational programme which is intended to prepare persons for employment in the upper middle level/paraprofessional engineering occupations, covering all areas of Electrical Engineering.

The five skilled groups, commonly identified in the modern engineering workforce, are listed below:

- **PROFESSIONAL ENGINEER**
- **ENGINEERING TECHNOLOGIST**
- **ENGINEERING ASSOCIATE**
- **TECHNICIAN**
- **TRADESPERSON**

The term upper middle level and para-professional are commonly used to refer to the **ENGINEERING ASSOCIATE** group in the above list. The term lower middle level is sometimes used to refer to the **TECHNICIAN** group.

The term para-professional is used over a wide range of occupations and in general refers to a person whose role is to support professional activities. In engineering, a para-professional engages in work which is predominantly conceptual and employs a combination of highly developed technical skills and appropriate, though limited manual skills.

Para-professional level skills are usually transferable and relevant to a broad range of industries, at least in the early career stages.

Work at this level is usually performed in accordance with well-established practices and precedents, which are commonly understood by those with expertise in the relevant field.

The total development of a para-professional requires both a component of formal education and an extensive component of practical on-the-job training in industry. A limited formal component of work experience is provided within the Diploma programme; but this must be supplemented by enterprise specific experience, both during and after graduation.

The educational component of the Diploma programme is directed towards the specific requirements of para-professional level engineering personnel and is, therefore, neither an extended trade level programme nor a diluted professional engineering program.

In particular, the content and the delivery of the Diploma in Electrical Engineering emphasize the practical application of scientific and mathematical principles and avoid an inappropriate level of abstraction.

Electrical engineering is largely concerned with invisible phenomena and relies heavily on mathematically based models for circuit/system design and analysis. Instrument reading, used to quantify these phenomena, has to be interpreted in the context of these models, which in turn can only have any practical significance when parametric values have been determined through measurement.

The content and delivery of the Diploma is therefore concerned with developing an integrated approach to 'theory' and 'practice' and to emphasize the interdependence of 'theoretical concepts' and practical skills, based on the use of instruments.

1.5. PROGRAMME AIMS and OBJECTIVES

The main purpose of this programme is to prepare students for employment in middle level/para-professional engineering occupations specializing in electrical/electronic/computer technology. The programme is directed towards occupations with typical job titles such as technical officer, technician engineer, senior technician engineering associate etc.

The general characteristics of the programme are as outlined in Schedule 3 of **The University Academic & Student Regulation of the Fiji National University** and, more specifically, the programme aims to provide a broad based, initial vocational programme for the para-professional engineering technical workforce, specializing in electrical/electronic/computer technology.

In achieving this aim, the programme incorporates:

a) the common core elements required by all such personnel

b) the range of units to enable specialization in aspects of electrical/electronic/computer technology such as:

(i) power generation, transmission, distribution and utilization

(ii) electronic communications technology and systems

(iii) computer/microprocessor technology, systems and related software

(iv) instrumentation technology and systems

(v) control technology and systems

(vi) industrial electronics

On completion of this programme the student should

1.5.1 have acquired a base of knowledge and manual skills which will

a) facilitate adaptation to changes in methods and technology
b) provide a basis for further study and facilitates independent learning

c) be appropriate for middle level occupations

1.5.2 have acquired analytic and diagnostic skills and be able to apply this to:

a) diagnose and rectify faults

b) employ a logical and a systematic approach to problem solving

c) undertaken effective prototype testing, evaluation and minor design modifications

d) undertaken effective commissioning, calibration, maintenance and testing of equipment and systems.

1.5.3 demonstrate an integrated approach to the practical and theoretical aspects of engineering

1.5.4 have acquired and be able to apply skills in the use of instruments and measurement techniques to evaluate systems, circuits and components.

1.5.5 have acquired and be able to apply skills in oral and written communication and in the r retrieval and interpretation of information, with particular emphasis on:

a) the use of libraries and other resource centers to obtain information

b) the correct use and interpretation of engineering terminology

c) the interpretation and preparation of engineering documents, drawings and diagrams

d) the conduct and reporting of engineering investigation

1.5.6 have completed a component of formal work experience and have demonstrated an ability to transfer skills and knowledge to and from the workplace.

2. PROGRAMME STRUCTURE

2.1. AWARD OF CERTIFICATE

The **TRADE DIPLOMA IN ELECTRICAL ENGINEERING** is a unit based programme, which is awarded at **level 5** and requires the attainment of a total of **250** credits, which are to be obtained as follows:-

LEVEL	TYPES of UNIT	NUMBER	CREDITS
4	**FNU BASED**	**24**	**131**
5	**FNU BASED**	**21**	**119**
	INDUSTRIAL ATTACHMENT - Final		
	TOTALS	**45**	**250**

2.2. UNIT DETAILS

The units in the programme are listed below.

2.2.1 Trimester – 1 Units

Serial No.	Unit Code	Unit Title	Lecture	Tutorial	Pract/Laboratory	Total Contact Hrs. per Trimester [12weeks]	Self-Directed Learning Hrs.	Total Learning Hrs.	Credit Points [15hrs=one credit point]
1	MTH405	Engineering Mathematics I	4	2		72	78	150	10
2	MEC450	Engineering Graphics	3	1		48	12	60	4
3	CHM406	Engineering Chemistry	2	1		36	69	105	7
	PHY416	Engineering Physics	2	1		36	69	105	7
4	CIN445	Introduction to Computer Programming	2	1		36	54	90	6
	EEE460	Introduction to Electrical and Electronic Engineering	2	1		36	54	90	6
5	OHS402	Occupational Health & Safety	2	1		36	54	90	6
	ETH401	Introduction to Ethics and Governance	3	1		48	27	75	5
6	COM401	Technical Communication	2	1		36	39	75	5
7	MEC470	Engineering Graphic Laboratory			4	48	42	90	6
8	CHM470	Engineering Chemistry Laboratory			3	36	9	45	3
	PHY470	Engineering Physics Laboratory			3	36	9	45	3
9	CIN470	Introduction to Computer Programming Laboratory			3	36	9	45	3
	EEE470	Introduction to Electrical and Electronic Engineering Laboratory			3	36	9	45	3
			15	**7**	**10**			**750**	**50**
Total Hours per Week					**32**				

2.2.2 Trimester – 2 Units

Serial No.	Unit Code	Unit Title	Lecture	Tutorial	Pract/Laborato	Total Contact Hrs. per Trimester [12weeks]	Self-Directed Learning Hrs.	Total Learning Hrs.	Credit Points [15hrs=one credit point]
1	MTH504	Engineering Mathematics II	4	2		72	78	150	10
2	MEC451	Engineering Mechanics	2	1		36	54	90	6
3	MEC452	Workshop Practice	1		3	48	27	75	5
4	PHY416	Engineering Physics	2	1		36	69	105	7
	CHM406	Engineering Chemistry	2	1		36	69	105	7
5	EEE460	Introduction to Electrical and Electronic Engineering	2	1		36	54	90	6
	CIN445	Introduction to Computer Programming	2	1		36	54	90	6
6	ETH401	Introduction to Ethics and Governance	3	1		48	27	75	5
	OHS402	Occupational Health & Safety	2	1		36	54	90	6
7	MEC472	Engineering Mechanic Laboratory			3	36	9	45	3
8	PHY470	Engineering Physics Laboratory			3	36	9	45	3
	CHM470	Engineering Chemistry Laboratory			3	36	9	45	3
9	EEE470	Introduction to Electrical and Electronic Laboratory			3	36	9	45	3
	CIN470	Introduction to Computer Programming Laboratory			3	36	9	45	3
			16	**6**	**12**			**750**	**50**
Total Hours per Week					**34**				

2.2.3 Trimester – 3 Units

Serial No.	Unit Code	Unit Title	Lecture	Tutorial	Pract/Laboratory	Total Contact Hrs. per Trimester [12weeks]	Self-Directed Learning Hrs.	Total Learning Hrs.	Credit Points [15hrs=one credit point]
1	EEE464	Electronic Measurement & Component	2	1	2	60	60	120	8
2	EEE465	Electrical and Mechanical Workshop	1		4	60	60	120	8
3	EEE466	Circuit Analysis	2	1		36	69	105	7
4	EEE467	Electrical Principles	2	1		36	69	105	7
5	EEE468	Engineering Computing	2	1	2	60	45	105	7
6	MEC557	Fundamentals of Mechanical Engineering.	2	1		36	69	105	7
7	EEE471	Circuit Analysis Laboratory			3	36	9	45	3
8	EEE472	Electrical Principles Laboratory			3	36	9	45	3
9	MEC558	Fundamentals of Mechanical Engineering Laboratory			3	36	9	45	3
			11	**5**	**17**	**396**	**354**	**750**	**50**
Total Hours per Week					**33**				

2.2.4 Trimester – 4 Units

Serial No.	Unit Code	Unit Title	Lecture	Tutorial	Pract/Laboratory	Total Contact Hrs. per Trimester [12weeks]	Self-Directed Learning Hrs.	Total Learning Hrs.	Credit Points [15hrs=one credit point]
1	EEE585	Engineering Management	3	1		48	42	90	6
2	EEE542	Project I - Electrical	1		4	60	75	135	9
3	EEE543	Digital & Analog Electronic Engineering	2	1	2	60	45	105	7
4	EEE544	Renewable Energy Technologies	2	1	2	60	45	105	7
5	EEE545	Electrical Machines	2	1		36	69	105	7
6	EEE554	Computer System	2	1	2	60	45	105	7
7	EEE547	Programmable Logic Controllers(PLC) & SCADA	2	1		36	69	45	7
8	EEE548	Electrical Machine Laboratory			3	36	9	45	3
9	EEE558	Programmable Logic Controller (PLC) & SCADA Laboratory			3	36	9	45	3
			13	**6**	**16**	**420**	**330**	**750**	**50**
Total Hours per Week					**35**				

2.2.5 Trimester – 5 Units

Serial No.	Unit Code	Unit Title	Lecture	Tutorial	Pract/Laboratory	Total Contact Hrs. per Trimester [12weeks]	Self-Directed Learning Hrs.	Total Learning Hrs.	Credit Points [15hrs=one credit point]
1	EEE570	Project II - Electrical	1		4	60	60	120	8
2	EEE571	Electrical Power Networks & Theorems	2	1	2	60	30	90	6
3	EEE572	Electrical Power Generation	2	1		36	54	90	6
4	EEE573	Electrical Power Transmission & Distribution	2	1	2	36	54	90	6
5	EEE574	Power Controls Electronic	2	1		36	54	90	6
6	EEE575	Electrical Power Utilisation & Design	2	1		36	54	90	6
7	EEE576	Electrical Circuit Design and Application	2	1	2	60	30	90	6
8	EEE577	Electrical Power Generation Laboratory			3	36	9	45	3
9	EEE578	Power Controls Electronic Laboratory			3	36	9	45	3
			13	**6**	**16**	**396**	**354**	**750**	**50**
Total Hours per Week					**35**				

PRACTICUM **Note:** *Practicum shall be taken in-between trimesters (sandwich mode) or after trimester 3 depending on whichever is preferable/or convenient.*

2.3. DELIVERY MODES

2.3.1 Normal Full Time Attendance

For full time students, the normal pattern of attendance allows the programme to be completed over **THREE SEMESTER**. Students are recommended to obtain work experience between trimesters; but may proceed directly to the next trimester, subject to the requirements specified for industrial attachment. Sponsored students normally attend on a *'trimester release'* basis and obtain work experience between trimesters.

The normal unit allocation for each block will be as follows:-

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TRIMESTER 1

NO.	UNIT CODE	UNIT NAME
1	MTH405	ENGINEERING MATHEMATICS I
2	MEC450	ENGINEERING GRAPHICS
3	CHM406 PHY416	ENGINEERING CHEMISTRY ENGINEERING PHYSICS
4	CIN445 EEE460	INTRODUCTION TO COMPUTER PROGRAMMING INTRODUCTION TO ELECTRICAL AND ELECTRONIC ENGINEERING
5	OHS402 ETH401	OCCUPATIONAL HEALTH & SAFETY INTRODUCTION TO ETHICS AND GOVERNANCE
6	COM401	TECHNICAL COMMUNICATION
7	MEC470	ENGINEERING GRAPHICS LABORATORY
8	CHM470 PHY470	ENGINEERING CHEMISTRY LABORATORY ENGINEERING PHYSICS
9	CIN470 EEE470	INTRODUCTION TO COMPUTER PROGRAMMING LABORATORY INTRODUCTION TO ELECTRICAL AND ELECTRONIC ENGINEERING LABORATORY

TRIMESTER 2

NO.	UNIT CODE	UNIT NAME
1	MTH504	ENGINEERING MATHEMATICS II
2	MEC451	ENGINEERING MECHANICS
3	MEC452	WORKSHOP PRACTICE
4	PHY416 CHM406	ENGINEERING PHYSICS ENGINEERING CHEMISTRY
5	EEE460 CIN445	INTRODUCTION TO ELECTRICAL & ELECTRONIC ENGINEERING INTRODUCTION TO COMPUTER PROGRAMMING
6	ETH401 OHS402	INTRODUCTION TO ETHICS AND GOVERNANCE OCCUPATIONAL HEALTH AND SAFETY
7	MEC472	ENGINEERING MECHANICS LABORATORY
8	PHY470 CHM470	ENGINEERING PHYSICS LABORATORY ENGINEERING CHEMISTRY LABORATORY
9	EEE470 CIN470	INTRODUCTION TO ELECTRICAL & ELECTRONIC ENGINEERING LABORATORY INTRODUCTION TO COMPUTER PROGRAMMING LABORATORY

TRIMESTER 3

NO.	UNIT CODE	UNIT NAME
1	EEE464	ELECTRICAL MEASUREMENT & COMPONENT
2	EEE465	ELECTRICAL AND MECHANICAL WORKSHOP
3	EEE466	CIRCUIT ANALYSIS
4	EEE467	ELECTRICAL PRINCIPLES
5	EEE468	ENGINEERING COMPUTING
6	MEC557	FUNDAMENTALS OF MECHANICAL ENGINEERING
7	EEE471	CIRCUIT ANALYSIS LABORATORY
8	EEE472	ELECTRICAL PRINCIPLES LABORATORY
9	MEC558	FUNDAMENTALS OF MECHANICAL ENGINEERING LABORATORY

TRIMESTER 4

NO.	UNIT CODE	UNIT NAME
1	EEE585	ENGINEERING MANAGEMENT
2	EEE542	PROJECT I - ELECTRICAL
3	EEE543	ANALOG AND DIGITAL ELECTRONIC ENGINEERING
4	EEE544	RENEWABLE ENERGY TECHNOLOGY
5	EEE545	ELECTRICAL MACHINES
6	EEE554	COMPUTER SYSTEM
7	EEE547	PROGRAMMABLE LOGIC CONTROLLERS(PLC) & SCADA
8	EEE548	ELECTRICAL MACHINES LABORATORY
9	EEE558	PROGRAMMABLE LOGIC CONTROLLERS(PLC) & SCADA LABORATORY

TRIMESTER 5

NO.	UNIT CODE	UNIT NAME
1	EEE570	PROJECT II - ELECTRICAL
2	EEE571	ELECTRICAL POWER NETWORK AND THEOREMS
3	EEE572	ELECTRICAL POWER GENERATIONS
4	EEE573	ELECTRICAL POWER TRANSMISSION & DISTRIBUTION
5	EEE574	POWER CONTROL ELECTRONICS
6	EEE575	ELECTRICAL POWER UTILISATION AND DESIGN
7	EEE576	ELECTRICAL CIRCUIT DESIGN and APPLICATION
8	EEE577	ELECTRICAL POWER GENRATION LABORATORY
9	EEE578	POWER CONTROL ELECTRONICS LABORATORY

PRACTICUM – TRIMESTER BREAK

2.3.2 Alternative Mode

This programme can also be run in the evening classes for working people if sufficient numbers of students are enrolled. Other patterns of attendance are possible, subject to student demand, staff availability and compliance with specified pre-requisites.

2.4 PRE-REQUISTE TABLE

2.4.1 GENERAL GUIDELINES

The order of delivery is governed by the **TABLE OF PRE-REQUISITES** shown in Table attached here with.

Unit No.	Unit Code	Name of the unit	Level	Pre-requisite	Class Room Contact Hours	Self-directed Learning Hours	CP
1	MTH405	ENGINEERING MATHEMATICS I	4	Form 6 MATHS Completion	72	78	10
2	MEC450	ENGINEERING GRAPHICS	4	Form 6 TECH DRAWNG Completion	24	36	4
3	CHM406	ENGINEERING CHEMISTRY	4	Form 6 CHEMISTRY Completion	72	33	7
4	CIN445	INTRODUCTION TO COMPUTER PROGRAMMING	4	Form 6 COMPUTING Completion	72	48	8
5	OHS402	OCCUPATIONAL HEALTH AND SAFETY	4	Form 6 PASS	36	39	5
6	COM401	TECHNICAL COMMUNICATION II	4	Form 6 ENGLISH Completion.	36	39	5
7	MEC470	ENGINEERING GRAPHICS LABORATORY	4	Form 6 Completion	36	48	6
8	CHM470	ENGINEERING CHEMISTRY LABORATORY	4	PASS F6 CHEMISTRY	36	9	3
9	CIN470	INTRO. TO COMPUTER PROGRAM LABORATORY	4	Form 6 COMPUTING Completion	24	6	2
10	MTH504	ENGINEERING MATHEMATICS II	5	Pass MTH405	72	78	10
11	MEC451	ENGINEERING MECHANICS	4	PASS F6 PHYSICS	72	48	8
12	MEC452	WORKSHOP PRACTICE	4	Pass MEC450	60	15	5
13	PHY416	ENGINEERING PHYSICS	4	PASS F6 PHYSICS	72	33	7
14	EEE460	INTRO. TO ELECTRICAL & ELECTRONIC ENGINEERING	4	PASS F6 PHYSICS	36	54	6
15	ETH401	INTRODUCTION TO ETHICS AND GOVERNANCE	4	PASS COM401	24	51	5
16	MEC472	ENGINEERING MECHANICS LABORATORY	4	PASS F6 PHYSICS	24	6	2
17	PHY470	ENGINEERING PHYSICS LABORATORY	4	PASS F6 PHYICS	24	6	2
18	EEE470	INTRODUCTION TO ELECTRICAL & ELECTRONIC ENG. LABORATORY	4	PASS F6 PHYSICS	36	9	3
19	EEE464	ELECTRICAL MEASUREMENT & COMPONENT	4	PASS EEE460 & EEE470	60	60	8
20	EEE465	ELECTRICAL AND MECHANICAL WORKSHOP	4	PASS EEE460 & MEC451	60	60	8
21	EEE466	CIRCUIT ANALYSIS	4	PASS MTH504 & EEE460	36	69	7

22	EEE467	ELECTRICAL PRINCIPLES	4	PASS EEE460	36	69	7
23	EE468	ENGINEERING COMPUTING	4	PASS CIN445	60	45	7
24	MEC557	FUNDAMENTALS OF MECHANICAL ENGINEERING	5	PASS MEC451	36	69	7
25	EEE471	CIRCUIT ANALYSIS LABORATORY	4	PASS MTH504 & EEE460	36	9	3
26	EEE472	ELECTRICAL PRINCIPLES LABORATORY	4	PASS EEE460	36	9	3
27	MEC558	FUNDAMENTALS OF MECHANICAL ENGINEERING LABORATORY	5	PASS MEC451	36	9	3
28	EEE585	ENGINEERING MANAGEMENT	5	PASS STAGE 3	48	42	6
29	EEE542	PROJECT I - ELECTRICAL	5	PASS EEE466 & EEE467	60	75	9
30	EEE543	ANALOG AND DIGITAL ELECTRONIC ENG.	5	PASS EEE460	60	45	7
31	EEE544	RENEWABLE ENERGY TECHNOLOGIES	5	PASS EEE467 & EEE469	60	45	7
32	EEE545	ELECTRICAL MACHINES	5	PASS EEE467	36	69	7
33	EEE554	COMPUTER SYSTEM	5	PASS EEE468	60	45	7
34	EEE547	PROGRAMMABLE LOGIC CONTROLLERS (PLC) AND SCADA	5	PASS EEE468	36	69	7
35	EEE548	ELECTRICAL MACHINE LABORATORY	5	PASS EEE467	36	9	3
36	EEE549	PLC AND SCADA LABORATORY	5	PASS EEE468	36	9	3
37	EEE570	PROJECT II – ELECTRICAL	5	PASS EEE542	60	75	9
38	EEE571	ELECTRICAL POWER NETWORK & THEOREM	5	PASS EEE467 & EEE545	60	30	6
39	EEE572	ELECTRICAL POWER GENERATION	5	PASS EEE467 & EEE545	36	54	6
40	EEE573	ELECTRICAL POWER TRANSMISSION & DISTRIBUTION.	5	PASS EEE467 & EEE545	60	30	6
41	EEE574	POWER CONTROL ELECTRONICS	5	PASS EEE543	36	54	6
42	EEE575	ELECTRICAL POWER UTILISATION & DESIGN	5	PASS EEE467 & EEE545	36	54	6
43	EEE576	ELECTRICAL CIRCUIT DESIGN & APPLICATION	5	PASS EEE466 & EEE545	60	30	6
44	EEE577	ELECTRICAL POWER GENERATION LABORATORY	5	PASS EEE467 & EEE545	36	9	3
45	EEE578	POWER CONTROL ELECTRONICS LABORATORY	5	PASS EEE543	36	9	3
PRACTICUM							
TOTAL CP							**250**

Table 1.

3. PROGRAMME REGULATIONS

3.1 ADMISSION REQUIREMENTS

MINIMUM admission requirements are:

3.1.1 A Pass in the Fiji School Leaving Certificate (FSLC) examination or equivalent, with a pass grade in English, Mathematics, Physics and/or any other science or technology related subject.

OR

3.1.2 Completion of at least two years relevant industrial experience for mature age applicants who are at least 25 years of age with and who, on the basis of maturity and work experience are considered likely to be able to succeed.

OR

3.1.3 Modular **delivery**: Since this is a unitized programme, units can therefore be offered as individual modules to meet the demand in areas of urgent needs and up-skilling on two conditions:

(i) the students meet the programme minimum admission requirements.

(ii) the request is economically viable.

3.2 CREDIT VALUE

The **TRADE DIPLOMA IN ELECTRICAL ENGINEERING (ELECTRICAL & RENEWABLE ENERGY)** is awarded at **level 5** and requires the attainment of a total of **250 credits**.

3.3 PROGRAMME DURATION

The minimum duration of the programme is two **years** when delivered on a fulltime trimester basis and the maximum duration is four (4) years. Part-time studies minimum duration is five (5) years and maximum duration is seven (7) years.

3.4 CROSS CREDITING

Credit Transfer and Recognition of Prior Learning Credits are governed by ***The University Academic and Students Regulations of the Fiji National University*** and by regulations and procedures established by the Board of Studies.

3.5 PROGRESSION REQUIREMENTS

In general, progression within the programme is governed by ***The University Academic and Students Regulations of the Fiji National University*** and by regulations and procedures established by the Board of Studies. In particular,

3.5.1 progression must be consistent with specified pre-requisites

3.5.2 Students may not proceed beyond level 4 units without the completion of the ***MID PROGRAMME INDUSTRIAL ATTACHMENT*** and a satisfactory 'Industrial Training Report'. Normally, this work experience will be obtained between semesters. The report must demonstrate the completion of tasks at **level 5** or above.

3.5.3 Students must complete at least TWELVE, LEVEL 4 units before commencing the ***FINAL INDUSTRIAL ATTACHMENT***. The report must provide evidence of the completion of tasks at **level 5**.

4. ORGANISATION OF CONTENT

4.1 PROGRAMME COMPONENTS

The programme comprises 45 compulsory FNU based units and 1 industrial attachment unit.

4.2 PURPOSE OF COMPONENTS

4.2.1 COMPULSORY UNITS

These are the common core elements, which must be completed by all students, irrespective of the area of specialization.

4.2.2 INDUSTRIAL ATTACHMENT - GENERAL REQUIREMENTS

Industrial attachment requires a formal contract between student, employers and FNU; so that the attachment has stated learning outcomes related to the application of principles and skills to the workplace.

All attachments require a written report, which is to describe the work undertaken and provide evidence that specified objectives have been achieved.

In particular the reports should demonstrate

a) a clear understanding of the nature, structure and dynamics of the workplace

b) a clear understanding of the relative roles of the different levels of technical personnel in an engineering environment.

c) an ability to perform engineering work at the appropriate level.

4.2.3 MID PROGRAMME INDUSTRIAL ATTACHMENT

Students may proceed beyond level 5 units without the completion of relevant work experience and the satisfactory completion of an 'Industrial Training Report'.

Normally, this work experience shall be obtained between semesters.

The report must demonstrate the completion of tasks at **level 5** or above.

4.2.4 FINAL INDUSTRIAL ATTACHMENT

Students must complete at least all of the compulsory units before commencing the final industrial attachment. The report must provide evidence of the completion of tasks at **level 5**.

5. STUDENT ASSESSMENT

5.1 PURPOSES OF ASSESSMENT

Although all student assessment is characterized by the evaluation of learning outcomes; this evaluation is used for a number of distinct purposes, which can be broadly classified in two ways.

5.1.1 Summative assessment

Summative Assessment is used to identify those assessment events which affect the granting of credits for a unit. In summative assessment, the extent to which specified learning outcomes have been achieved is measured and the results of this measurement are compared with the criteria specified in the assessment policy for each unit.

5.1.2 Formative assessment

Formative Assessment is used to aid decisions related to instructional processes. It facilitates effective teaching and learning, by providing feedback to lecturers and students about the extent to which learning outcomes are being achieved.

It is not directed towards assessing a student's suitability for the award of credits.

5.2 ASSESSMENT PHILOSOPHY

5.2.1 FORMATIVE ASSESSMENT

The planning and implementation of formative assessment is a major professional responsibility of the lecturer who must take into account his/her unique teaching style and the specific differences of each group of students.

For this reason formative assessment requirements are not prescribed in unit syllabus documents.

Formative assessment is not restricted to a quantitative measurement of learning outcomes and will generally include various forms of qualitative evaluation.

5.2.2 SUMMATIVE ASSESSMENT

In this programme, summative assessment is not restricted to testing at the end of the unit; but involves continuous assessment, which means that a representative sampling of student achievement takes place at regular intervals and in ways which are valid, reliable and fair.

Because of the need for consistency in the granting of credits, summative assessment requirements are specified in unit syllabus documents.

The diversity of learning outcomes in the programme requires a range of assessment instruments, the use of which is governed by the nature of the outcomes being measured.

5.3 METHODS OF ASSESSMENT

The following assessment methods will be used

5.3.1 ASSIGNMENTS

The term, ***ASSIGNMENT***, is used in this context to refer to work which is done by students, outside of normal class time, and which will normally be presented on paper, in graphical and/or written form.

Assignments are used to measure a wide range of outcomes.

However, they will concentrate on those tasks which cannot be assessed adequately within the constraints imposed by a supervised written test or exam.

These include detailed analysis and problem solving and those time consuming activities which are not feasible in the limited time available for a test.

5.3.2 CLASS EXERCISES

This term is used to describe assessed work which is done in normal class time under the control of and with the possible assistance of the lecturer.

In some units, class exercises will involve short tasks, which assess outcomes similar to those in 5.3.1; but, because of time limits, coverage is less detailed and extensive than is possible with ***Assignments***.

In others, such as workshop and drawing units, tasks will be more extensive and this method of assessment is specified because of the need for access to facilities, which are not available to students outside of FNU.

5.3.3 CLASS TESTS

These are supervised tests, which are conducted progressively throughout the period of instruction, in normal class time.

They sample those outcomes which can be evaluated, validly and reliably, by a written test and each test is restricted to a specific range of topics.

Class Tests are different from those tests which may be used for formative purposes and will not be set until students have been given adequate time to develop the relevant competencies.

Collectively, ***Class Tests*** enable individuals to be evaluated, under 'exam' conditions with a broader sampling of outcomes than is possible in a ***Final Examination***.

5.3.4 FINAL EXAMINATION

When a final examination is specified, it will be of two hours duration, with ten minutes reading time and held after classroom tuition for the unit is finished.

Final examinations cover a sample of those outcomes which can be assessed by a written test.

Examination questions will be limited in type and extent to those which can be validly, reliably and fairly asked in the time available.

Because class attendance is most cases related to the achievement of learning outcomes, eligibility to sit for a final examination and final assessment of non-examinable units will be dependent on achievement at least **75% or over in Attendance** and the **minimum Coursework of 50%.**

Because the various assessment instruments are restricted to the evaluation of the range outcomes for which they are suitable, eligibility to sit for the final examination may depend on a course work' mark derived from other assessment events.

5.3.5 LABORATORY ASSIGNMENTS

These assess outcomes which require the direct 'hands-on' use of laboratory based equipment (e.g. instruments, computers, equipment etc.).

In many units, they will involve the use of instruments and measurement techniques to evaluate the performance of systems, circuits and components.

Laboratory Assignments used for summative assessment are different from laboratory exercises which are used in the teaching and formative assessment of skills related to the use of equipment.

Students will be given the opportunity to learn and practice skills before being assessed through ***Laboratory Assignments***.

Because they are time consuming and require the use of special equipment, laboratory assignments should not be used for outcomes which can be effectively measured in other ways.

5.3.6 PRACTICAL TESTS

In many cases, equipment limitations require ***Laboratory Assignments*** to be performed by groups of students.

Therefore, in some units, ***PRACTICAL TESTS*** are specified and, in these, **INDIVIDUAL** students demonstrate the achievement of outcomes of the type covered by ***Laboratory Assignments***.

When equipment limitations and/or the effective supervision of such tests require a low student/lecturer ratio, coverage will be restricted and will concentrate on key skills, e.g. the use of instruments and basic testing methods.

Practical Tests are also specified for Drawing, Workshop & Computing units and, in these, students are required to use tools/equipment; so that 'practical' skills can be evaluated on an INDIVIDUAL basis and under test conditions.

In such units, these tests may also include the evaluation of outcomes of the type covered by ***Class Tests.***

5.3.7 PROJECTS

The term, **PROJECT,** is used in this context to describe an activity through which the student is expected to demonstrate independent learning and the ability to source information.

Project requirements vary considerably in breadth and depth and are governed by the level of the unit in which they are used. These requirements range from some form of investigation with results presented in a written form to more extensive tasks, such as the construction and testing of a circuit or system, with a report of circuit/system performance. In higher level units, ***Projects*** involve the integration of a number of topic areas and require the student to demonstrate the ability to plan and prioritize. In many cases, specific project requirements will be determined by negotiation between students and staff.

5.4 CRITERIA FOR ASSESSMENT

5.4.1 REQUIREMENTS FOR AWARD OF UNIT CREDITS

a) Total Mark

For all units, a **TOTAL MARK** is obtained by combining the results derived from each of the **SUMMATIVE** assessment components, using the **WEIGHTING** specified in the unit syllabus document and summarized in the table 2 in 5.4.2.

Appropriate standardization procedures will be used in obtaining this **TOTAL**.

b) Minimum Requirements

In **ALL UNITS** a **TOTAL** of **AT LEAST 50%** is required for a student to be considered for a **PASS**.

In units with a ***FINAL EXAMINATION***, a specified **MINIMUM** exam mark must also be obtained before a student can be considered for a **PASS**.

In some units, a specified **MINIMUM** level must **ALSO** be obtained in **OTHER ASSESSMENT COMPONENTS**, before a student can be considered for a **PASS**.

In such cases, the **TOTAL** and **EXAMINATION** marks, on their own, do not provide sufficient information, from which eligibility for a **PASS** can be determined.

A **MINIMUM** level is set in those cases where the outcomes being evaluated have a critical influence on the predictive validity of the unit in relation to other units and overall program aims.

For example, **MINIMUM** levels are set for ***Practical Tests*** & ***Projects*** to ensure that key 'practical' and independent learning skills are acquired, before progression is allowed to other units, which require these skills.

MINIMUM requirements are specified in the unit syllabus and these are summarized in the table 2 in 5.4.2.

c) Summary

For **ALL** units, eligibility for a **PASS** requires a **TOTAL** of **AT LEAST 50%** AND ALSO the attainment of **AT LEAST** the **MINIMUM** mark specified for any other assessment components.

d) Recording of Assessment Outcomes

Assessment outcomes will be recorded in accordance with section 24.3 of *University Academic and Students Regulation of the Fiji National University.* In the table in 5.4.2, M is used to indicates those units in which results will be specified as in 24.3(a) [i.e. MASTERY is required].

The results for most units, as indicated by **(a)** in 5.4.2, will be graded according to the level of achievement, as specified in section 24.3(b) of the ***University Academic and Students Regulation of the Fiji National University.***

SPECIAL CASES: Fail – exclude
The Exam Board may recommend to the Academic Board that a student be excluded from the programme at any time if it considers that the student can gain no further benefit by continuing at FNU despite remedial work and counseling.

5.4.2 RE-ASSESSMENT OF UNITS

a) Repeat of a Unit

Students are required to repeat a unit, if failure is based on a **TOTAL** mark of less than **50% but is 44%** or higher. This will normally require the completion of work specified for **ALL** assessment components.

However, in the case of a satisfactory result in a relatively 'stand-alone' assessment component (e.g. a project), the Examination Board may recommend that this assessment component does **NOT** have to be repeated.

b) Re-assessment in Individual Assessment Components

If the **TOTAL** mark is at least equal to **50%** and a pass is not awarded because of failure to reach the **MINIMUM** level in any of the individual assessment components, the Examination Board may recommend that the student be given the opportunity to satisfy the requirements of this component; without the need to repeat the whole unit.

This is particularly appropriate where assessment requirements can be satisfied by allowing a student to complete work which has already been commenced (e.g. ***Projects***).

Section 2.54 of the ***University Academic and Students Regulation of the Fiji National University*** covers the particular case where the **MINIMUM** level for a final examination has not been reached.

If a re-sit is recommended, it will not be a special exam; but will be provided during the next scheduled exam period for the particular unit. Students will be given appropriate remedial tuition before being allowed to re-sit an examination or re-assessed in test based assessment components.

5.4.3 ASSESSMENT PROCEDURES AND REGULATIONS

All assessment will be performed and results processed in accordance with the relevant sections of the ***University Academic and Students Regulation of the Fiji National University*** and with **other** procedures and regulations specified by relevant bodies, such as the Senate.

5.5 FAIRNESS, VALIDITY AND RELIABILITY

5.5.1 ***Validity*** refers to the accuracy of a specific prediction or interpretation which has been made from the results of an assessment event. That is, it is concerned with the extent to which a measurement of learning outcomes serves the purpose for which it is intended.

Content validity requires an assessment event to sample those learning outcomes, which are within the scope of the unit or section of the unit being assessed. The determination of content validity requires a thorough examination of the items being used and an evaluation of the extent to which these are consistent with the learning outcomes and performance criteria specified in the unit descriptors.

Predictive validity is concerned with determining the extent to which assessment event results accurately predict performance in a following unit and/or success of graduates in the workplace. The determination of predictive validity requires the correlation of results between dependent units and a review of graduate performance 'on-the-job'.

5.5.2 ***Reliability*** refers to the extent to which the results of an assessment event are consistent and the degree of confidence which can be placed in the results.

Reliability is NECESSARY **BUT NOT SUFFICIENT** condition for validity.

Reliability is essentially a statistical concept and can be expressed by means of a ***Reliability Coefficient*** or through the ***Standard Error of Measurement.***

5.5.3 ***Fairness*** refers to a number of factors which influence the quality of assessment.

Fairness requires that students be given appropriate time and circumstances to demonstrate the achievement of learning outcomes.

Fairness requires that test questions avoid areas of the unit which have not been taught.

Fairness requires that questions have an appropriate level of difficulty and the precise wording of instructions and questions.

5.5.4 ***Fairness, validity and reliability*** will be promoted as follows:

a) The Board of Studies will organize and monitor the progressive development of validated item banks and marking guides for class tests and final examinations.

b) The Board of Studies will organize and monitor the progressive development of non-test items such as laboratory assignments and project specifications.

c) All final examinations will be moderated, by both an internal or external moderator, who will check the suitability of the exam before it is printed and check that student's exam scripts are accurately and consistently marked.

d) External examiners and moderators will be appointed in accordance with the requirements of sections 22 and 23 of ***University Academic and Students Regulation of the Fiji National University.***

e) The Academic Board will organize the analysis of items used in class tests and exams evaluate the results of this analysis and determine if items need to be changed.

f) The Academic Board will facilitate the maintenance of assessment standards by monitoring and evaluating the performance of students in both test and non-test assessment events.

6. MONITORING, EVALUATION and REVIEW

6.1 ACADEMIC BOARD

The membership and responsibilities of the Academic Board will be in accordance with section 6.2 of ***the University Academic and Students Regulation of the Fiji National University.***

The Academic Board will meet at least once per semester

6.2 EXAMINATION BOARD

The membership and responsibilities of the Examination Board will be in accordance with section 2.1.20, 2.1.47 and 4.0 of the ***University Academic and Students Regulation of the Fiji National University.*** The Examination Board of will meet at least once per semester

6.3 MONITORING

Programme review and monitoring will be undertaken in accordance with section 17 of *The* ***University Academic and Students Regulation of the Fiji National University.***

6.4 EXTERNAL MODERATION

6.4.1 External examiners and moderators will be appointed and perform duties in accordance with the sections 22 and 23 of *The* ***University Academic and Students Regulation of the Fiji National University.***

6.4.2 The Industry Advisory Committee will be appointed and perform duties in accordance with the section 12 of *The* ***University Academic and Students Regulation of the Fiji National University.***

7. TEACHING and LEARNING METHODS

7.1 INTRODUCTION

A variety of teaching methods will be used to facilitate the achievement of specified learning outcomes. Recently the biomedical engineering is characterized by frequent changes in technology and students can be exposed to only a limited range of circuits, systems and equipment during the course of the Certificate programme.

Teaching methods will therefore reflect the need to develop generic skills which can be applied to a range of situations and facilitate adaptation to changing methods and technologies.

This will require the teaching of technical principles and analytical techniques at an appropriate but limited level of generality, which provides an appreciation of their universality, while ensuring that students develop skills in applying these to typical practical situations.

Teaching methods will of necessity depend on the learning skills of students and the availability of resources. Although the Certificate program will encourage students to work independently, the current lack of self- directed learning skills in students entering the programme will require a structured didactic approach in the lower level units.

The current lack of learning materials and basic educational technology still requires a large amount of classroom contact time to be used for the conveying of information.

To facilitate effective learning, the following general principles will be progressively adopted:

7.1.1 The amount of classroom time devoted to the relaying of basic factual information will be minimized

7.1.2 The amount of classroom time devoted to information processing, the development of comprehension, the application of knowledge and problem solving will be increased

7.1.3 The availability of texts, references and other written resource material will be increased.

7.1.4 Overhead projectors and computers will be used to display circuit diagrams and other graphical information, copies of which will be given to students to enable them to concentrate on understanding rather than transcribing material

7.1.5 Formative and summative assessment will concentrate on the testing of comprehension, application and problem solving and will **NOT** be based on rote learning and the memorization of verbal stereotypes.

7.1.6 Graded Projects will be used to facilitate the development of learning skills and the ability to source information.

7.1.7 Students will be expected to write and speak accurately, logically and precisely.

7.1.8 Computer based simulations and other analytical tools will be used to remove much of the computational burden, which previously imposed major constraints on the problem solving process and required significant amounts of energy to obtain solutions.

These simulations will enable students to concentrate on the often ignored aspects of problem formulation and interpretation and also facilitate student directed learning by enabling them to readily observe the effects of changing circuit/system parameters.

7.1.9 Time based delivery methods will be reduced; so that emphasis is placed equal learning outcomes rather than equal instruction times.

7.2 TEACHING STRATEGIES

The main specific teaching strategies will be:-

7.2.1 CLASSROOM BASED MODIFIED LECTURE

This will be teacher managed and supported by written and visual learning resources.

The amount of time used to relay basic factual information will be minimized.

The teacher will concentrate on developing and evaluating understanding, application and analytical and problem solving skills.

Students will be expected to be active participants; rather than passive listeners as is usual in a 'traditional' lecture. This will be achieved through guided questions and interactive class exercises.

Educational technology will be used to enable students to concentrate on critical outcomes and to minimize time consuming computational and transcription processes.

7.2.2 CLASSROOM BASED TUTORIAL

This provides an opportunity for skills to be practiced and for difficulties to be discussed and resolved.

7.2.3 LABORATORY BASED SESSIONS

These are used for teaching and assessing those learning outcomes which require the direct 'hands-on' use of laboratory based equipment.

In many units, these outcomes are concerned with the use of instruments and measurement techniques to evaluate the performance of systems, circuits and components.

In these sessions, the essential linkage between measurement, analysis and diagnosis will be emphasized and activities will be structured to ensure that no dichotomy develops between laboratory and theory based skills.

Where appropriate, computer based simulations will be used to analyse circuits and systems; so as to provide a basis of comparison with measured results.

7.2.4 WORKSHOP BASED SESSIONS

These are used for teaching and assessing those learning outcomes which require the direct 'hands-on' use of hand and machine tools and which are concerned with the development of psychomotor skills related to electrical installations and the construction and maintenance of electrical equipment.

7.2.5 FIELD VISIT

This involves a visit to an off-campus site to investigate the operation of equipment relevant to particular units.

8. PROGRAM UNITS DESCRIPTORS

8.1 TRIMESTER-1 UNIT DESCRIPTORS

8.2 TRIMESTER-2 UNIT DESCRIPTORS

8.3 TRIMESTER-3 UNIT DESCRIPTORS

8.4 TRIMESTER-4 UNIT DESCRIPTORS

8.5 TRIMESTER-5 UNIT DESCRIPTORS