Certificate IV in Mechanical Plant Engineering

1. INTRODUCTION

1.1 Rationale

Mechanical Plant Engineering is one of the most fundamental disciplines in the developing economy. Its practitioners are in demand over a wide field of businesses and organisations providing infrastructure. Indeed, any installed process plant requires maintenance experts to manage its day-to-day running and execute repairs in a timely and efficient manner. Industries as diverse as textile manufacturers to food and pharmaceutical producers to energy suppliers and to the hospitality industry all require suitably qualified personnel in this field of engineering.

1.1.0 In 2010 the Fiji Institute of Technology became part of the Fiji National University and there was a need to review the current courses and the designing of a new syllabus for the Mechanical Plant Engineering.

1.2 Graduate Profile

A successful graduate will be able to make a contribution within a wide range of activities, both on site and in the workshops. Technical knowledge will allow graduates to:

- Break problems of some complexity, down into routines and standard procedures

- Solve problems within a limited range of predicable solutions which involve selection, basic comparison and routine decision making.

- Use well developed practical skills to perform a wide variety of tasks to meet specific standards and quality control requirements.

- Follow general instruction under minimal supervision, and take responsibility for other team members; and

- maintain and set up tools/equipment to perform a range of standard tasks in a safe and workmanlike manner.

1.3 Philosophy

The philosophy of the course is based on student outcomes and the production of a portfolio of work including both practical and theoretical assignments to demonstrate competencies. This portfolio will include examples of both institutional and industrial work.

The program is offered provides a recognisable qualification and a sound base for mechanical engineering students intending to specialise trade practices in Plant Maintenance Engineering. The training develops student skills and knowledge of the processes involved.

The course aims to develop the maintenance aspect of heat engines, Dynamic & Positive displacement pumps, power transmission devices, hydraulics', pneumatic, boiler plants, compressors, Industrial Instrumentation controls, PLC automation, building services and mechanical handling of equipment.

1.4 Aims and Objectives

Aims:

I To provide a basic technical skills course for industry which forms the basis for employment as a tradesman in Plant Maintenance work.

II To provide industry with adequate number of capable and trained personnel who have acquired a sound knowledge and understanding of the principles and processes of Maintenance Engineering trade skills.

III To provide a core of technical knowledge to students who may wish to extend their studies to higher qualifications and specialisation in plant maintenance and other mechanical fields.

IV To develop the craft skills of the student to enable them to make a positive contribution to the standards and quality of plant maintenance work in their field of employment.

Objectives:

I To provide the course student with a sound core of skills based on a broad analysis of essential competencies for employment as plant maintenance foremen within industry

II To provide the student with a sound core of skills based on a broad analysis of essential competencies for employment as a maintenance worker within industry. Particular attention being drawn to safety, good working practices, quality of workmanship, materials selection, numeracy and other skills such as drafting and measurement. Emphasis is also placed on quality control and the maintenance standards.

III To further provide the student with the basic technical knowledge and competencies essential for employment

within the engineering industry and related occupations.

IV To provide the theoretical input to balance the practical experience and development of the student engaged in related industrial activities.

V To support and cooperate with industry and relevant training agencies in the development of competent craft skills to meet employment needs.

2. PROGRAM REGULATIONS

~~2.1 Admission Requirements:~~

~~(a) Fiji School Leaving Certificate with 50% in Mathematics and a Physical Science subject and at least 35% in English.~~

~~(b) Indentured applicants with less than the above requirements but at least two years industrial experience can be considered.~~

2.2 Credit Value of Program

The total credit value for the 22 units is 150 credits. One unit = 3min to 10 max credit points. The credit value for 1 equivalent full time student is 150 credits.

2.3 Duration of Program

The program should be completed in 2 years, including the mandatory minimum of twelve-month industrial attachment.

2.4 Cross Crediting

There are common units in the programme that is fully cross-creditable to common units with Certificate IV in Fitting and Machining.
All other units common to other School of Mechanical Engineering programs are fully cross-creditable.
No time or grading limitations other than pass apply at the current time.

2.5 Award of Certificate

The general requirements for award of the qualification are laid down in the latest issue of the University Academic Student Regulations (UASR).

3. PROGRAM STRUCTURE

3.1 General

The three stages are ideally interspersed with relevant industrial experience. The student will be expected to maintain a record of experience during periods of employment to demonstrate industrial application of the full range of core skills.

The course consists of twenty two units drawn mainly from Level 3 and Level 4. The study time allocated to each unit will vary from 15min hours to 78max hours depending on the unit structure. The total instruction or contact time allocated will be 1260 hours and the student will be programmed for a further 990 hours of self-directed learning and private study. This time will be used both inside and outside the institute on assignments and projects. Students will be expected to demonstrate their ability to organise and progress work as part of the underlying core skills required of a responsible employee.

3.2 Compulsory Components
All units are compulsory. The Program might be changed from time to time to suit the requirements of industry.

3.3 Optional Components
Additional units might be offered as free choice options in the future.

3.4 Special Requirements
Students must complete a minimum of 12 to 18 months industrial practice before they can be considered for the Trade Certificate award. The work experience attachments are done in between blocks.

3.5 Delivery Mode
The program is sandwich-type full-time trimester based on15-weeks. Students attend trimesters 1 (stage1), 2 (stage2), and 3 (stage3), and are released for 12 months industry attachment.

3.6 Order of Delivery
Students normally attend alternate trimesters and must progress through the three stages respectively. Units are time tabled according to the chronological order of the Program Descriptor. Content material instruction is delivered chronologically as itemised in the Unit Descriptors.

4. ASSESSMENT

4.1 Assessment Philosophy
Assessment is broken down into formative and summative components. Details are expanded below.

4.2 Methods of Assessment
Formative assessment takes the form of workshop projects and assignments, classroom exercises and laboratory

practicals. Summative assessment takes the form of formal tests. Theoretical units also carry a final examination marked (E).

In addition to assessments during the formal study program the student must also demonstrate appropriate industrial experience for the required duration by way of a suitably completed Work Experience Record Book (WERB).

4.3 Criteria for Assessment

Skills assessed are: cognitive, communication and motor through tests, assignments and practical work respectively. Projects are used as a gauge for planning and organisational skills as well as self collective motivation.

4.4 Fairness, Validity and Reliability

The program contains a balance of examinable and non-examinable units in order to provide fair assessment across a wide range of practical and academic abilities. Examinable units provide a high degree of objectivity whereas the non-examinable units provide a measure of non-quantifiable personality factors through a more subjective approach such as a student's conscientiousness, inter-relations with peers and superiors and general attitude towards work.

Quantifiable assessment criteria and validation are explained in full in the University Academic Student Regulations (UASR).

5. TEACHING AND LEARNING METHODS

5.1 Introduction

A variety of teaching methods are used as detailed below to cater for different learning styles and to promote guidance to learning in both structured and unstructured situations.

5.2 Student Centred Learning

This is catered for in assigned tasks and projects as well as gaining experience in the industry attachment periods.

5.3 Methods

Information lectures coupled with workshop instruction and workshop practicals to develop hands-on skills and knowledge. Drawing practicals should be emphasised to develop representational abilities. Tutorials for practicing problem solving and other analytical skills and project work to develop initiative and teamwork.

6. MONITORING, EVALUATING AND REVIEW OF PROGRAM

6.1 School Board

The School Board (as detailed in the USAR) sits to review, discuss and amend individual results by consensus at the end of every stage.

6.2 Academic Board

The Academic Board (as detailed in the USAR) sits to review pass rate statistics and approve results by consensus at the end of every stage following the School Board.

6.3 On-going Monitoring

Progressive monitoring of the program is exercised in the following ways:

(I) Discussions within the Section's staff meetings, the School Board and the Academic Board, frequency: monthly;

(ii) Feedback from the IAC, individual employers and employer groups, trade and student unions and external moderators, frequency: approx. quarterly;

(iii) An established roster for staff vocational training locally and overseas, frequency: approx bi-annually;

(iv) Introductions of new technologies and industrial practices legislation, frequency periodic and

(v) Reviews by internal and external consultants, frequency: periodic.

The monitoring process is implemented by the application of TQM procedures which ensure timely scheduling and

recording of various meetings, regular calls to employer groups, launching and recording questionnaires, setting of internal and external reviews and maintaining close liaisons with industries, governments and educational bodies locally and abroad.

6.4 External Moderation

The unit assessments are not externally moderated but the program is reviewed and approved by the IAC.

6.5 Industry Advisory Committee (IAC)

Composition at the time of publication:

Chairman: Uate Tukana (FEA)
Secretary: Head of School of Mechanical Engineering
Members: Representatives from:

1. FEA	5. FIT		
2. Telesource	6. Fletcher Steel		
3. Fiji Ships Ltd.			
4. TPAF			

Cert IV Plant Maintenance Engineering 2014 (Proposed name: Cert IV Mechanical Plant Engineering)

Trimester 1 (stage1)

	Code	Unit name	L	T	P	**Total Contact Hours in a Trimester (12Weeks)**	**Self-directed learning hours**	CP	Total learning hrs
1	FMG317	Basic Machining Process and Practice	1	1	4	72	48	8	120
2	PLM303	Bearings, Lubrication and Installation	1	1	4	72	48	8	120
3	MEN303	Engineering Drawing	4			48	42	6	90
4	MEN306	Engineering Material	2		2	48	42	6	90
5	OHS401	OHS	1	1		24	21	3	45
6	CIN102	Application of Computer Technology in Communication	2	1		36	24	4	60
7	PLM407	Lifting and Material Handling	1	1	3	60	60	8	120
8	EVG301	Ethics	1	1		24	21	3	45
9	MEN304	Workshop Calculation	2	1		36	24	4	60
		Total	**15**	**7**	**13**	**420**	**330**	**50**	**750**
		Student Total Contact hrs	**35**						

Trimester 2 (stage2)

	Code	Unit name	L	T	P	**Total Contact Hours in a Trimester (12Weeks)**	**Self-directed learning hours**	CP	Total learning hrs
1	PLM406	Principles of Heat Engines	1	1	4	72	63	9	135
2	PLM409	Electro Hydraulics and Pneumatics	1	1	4	72	63	9	135
3	ACR228	Building Services	1	1	2	48	12	4	60
4	MEN305	Introduction to Mechanics	2	1	2	60	15	5	75
5	PLM410	Industrial Instrumentation and PLC Control	1	1	3	60	75	9	135
6	MEN418	AutoCAD and Introduction to Solid Works	1		4	60	60	8	120
7	FWG302	Welding Process & Practice	1		3	48	42	6	90
		Total	**8**	**5**	**22**	**420**	**330**	**50**	**750**
		Student Total Contact hrs	**35**						

Trimester 3 (stage3)

	Code	Unit name	L	T	P	**Total Contact Hours in a Trimester (12Weeks)**	**Self-directed learning hours**	CP	Total learning hrs
1	PLM404	Plant Operation and Maintenance Management	1	1	3	60	75	9	135
2	PLM403	Plant Engineering Technology	1	1	5	84	51	9	135
3	PLM405	Steam Plant	1	1	4	72	78	10	150
4	PLM408	Mechanical Power Transmission	1	1	5	84	51	9	135
5	EEE329	Electrical and Electronic Principles and Testing Equipment	2	1	2	60	15	5	75
6	MEN419	3D-CAD Using Solid Works	1		4	60	60	8	120
		Total	**7**	**5**	**23**	**420**	**330**	**50**	**750**
		Student Total Contact hrs	**35**						