



**COLLEGE OF ENGINEERING, SCIENCE &
TECHNOLOGY**

SCHOOL OF MECHANICAL ENGINEERING

Certificate IV in Fitting and Machining

**Programme Details
&
Units Descriptions**

2014

College of Engineering, Science and Technology

School of Mechanical Engineering

Certificate IV in Fitting and Machining

Background

An articulation with both government and private industries was done regarding the make-up of the Fitting and Machining syllabus content and requirements. Furthermore, a committee was formed and named as the Industry Advisory Committee to scrutinize, authorize and also implement further new changes periodically as technology advanced both locally and globally.

Just this year, 2013, the Fitting and Machining syllabus and requirements had been aligned to the Fiji National Qualifications Framework (FNQF) to ensure standards are implemented, in place and followed accordingly. In aligning with the FNQF, it ensures that our graduates have more opportunities available to them both locally and globally regarding work commitments thus raising the profile of their marketability and also the genuine recognition of our courses that were both developed and conducted here in Fiji.

Rationale

Fitting and Machining is a fundamental discipline of engineering in the developing economy. It is intended to provide comprehensive trade training leading to the award of a Trade Certificate / Certificate IV. The training develops the student knowledge and practical skills embracing various techniques in production using a wide range of machine tools. Its practitioners are in demand over a wide range of industries and should not be associated solely with engineering. Many manufacturing industries require fitter/machinists as do vehicle workshops, food / drinks process industries, ship repairers, public works, power generation, timber industries and sugar industries.

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.
- To 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.

Program 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 offered provides a recognizable qualification and a sound base for mechanical engineering students intending to specialize trade practices in fitting & machining. The training develops student's skill and knowledge of the processes involved.

Aims and Objectives

Aims:

- I. To provide a basic technical skills course for industry which forms the basis for employment as a tradesman in fitting & machining 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 fitting & machining trade skills.
- III. To provide a core of technical knowledge to students who may wish to extend their studies to higher qualifications e.g. Diploma in Mechanical Engineering.
- IV. To develop the craft skills of the student to enable them to make a positive contribution to the standards and quality of fitting & machining 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 mechanical fitters and machinists within industry
- II. To provide the student with a sound core of skills based on a broad analysis of essential competencies for employment as an engineering tradesman. 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. PROGRAMME REGULATIONS

2.1 Admission Requirements:

~~(a) Fiji School Leaving Certificate with 50% in Mathematics, Technical Drawing and a Physical Science subject and at least 35% in English. **If one has failed FSLC, he/she is still eligible for admission provided the above units have been attempted.**~~

(b) Matured applicants with less than the above requirements can be considered.

2.2 Credit Value of Program

1 unit = 3 to 11 credits and 1 credit point = 15 working hours.

The programme has 21 units; therefore a student should achieve 150 credits to complete the program

2.3 Duration of Program

The program should be completed in two years, including the mandatory minimum of twelve-month industrial attachment normally attained before or after completing Trimester 3.

2.4 Cross-Crediting

All units common to other section programs in the School of Mechanical Engineering 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 and Student Regulation. Grades A+ to E are allocated according to the level of achievement.

3. PROGRAMME STRUCTURE

3.1 General

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

The students will be completing Stages 1 to 3 in year 1, before going for industrial attachment in year 2. **They need to complete at least a minimum of 12 months industrial experience before sitting for a practical trade test and once successful will they then be eligible for graduation.**

The course consists of twenty one units drawn mainly from Level 3 to Level 4. The study time allocated to each unit differs. The total instruction time allocated will be 750 hours per Trimester. This time will be used both inside and outside the College on classroom/workshops, assignments, projects and industrial visits. Students will be expected to demonstrate their ability to organize and progress work as part of the underlying core skills required of a responsible employee.

Program Descriptor					
Code	Unit name	Pre- requisite	Credit value	Timetable Hrs/week	Learning Hrs/Trimester
F&M 1					
FMG321	Fitting and Machining Process 1	Completed FSLC	8	6	127
OHS401	OHS	Completed FSLC	3	2	45
MEN316	Engineering Drawing	Completed FSLC	6	4	40
FWG312	Welding Process & Practice	Completed FSLC	6	4	96
FMG322	Fitting and Machining Practice 1	Completed FSLC	11	7	168
FMG323	Sheetmetal Fitting Practice 1	Completed FSLC	8	7	114
ETH301	Fundamentals of Ethical Practice	Completed FSLC	3	2	45
MEN318	Engineering Workshop Calculation	Completed FSLC	4	3	60
			50	35	745
F&M 2					
FMG324	Fitting and Machining Process 2	FMG321,FMG322	8	5	120
FMG423	Applied Engineering Drawing	MEN316	8	5	120
COM301	Technical Communication	Completed FSLC	4	3	60
PLM421	Fundamentals of Heat Engines	MEN318	9	6	135
EEE312	Electrical and Electronic Principles and Testing Equipment	Completed FSLC	5	5	75
FMG325	Machining Practice 2	FMG321& FMG322	11	6	160
MEN315	Introduction to Mechanics	MEN318	5	5	75
			50	35	745
F&M 3					
FMG426	Specialized Machining Processes including CNC	FMG324	7	6	102
FMG419	Applied Engineering Material Process	MEN323	10	6	144
FMG425	Applied Measurement and Inspection	FMG324	4	4	66
FMG428	Diagnostics and Maintenance	PLM421	11	7	168
FMG427	Specialized Machining Practice	FMG324 & FMG325	10	7	150
MEN428	AutoCAD and Introduction to Solid Works	FMG423	8	5	120
			50	35	750
			150	105	2240

Program Schedule

	Trimester 1	Trimester 2	Trimester 3		
Year1	Stage 1.	Stages 1 & 2.	Stages 1, 2 & 3.		
Year2	Industrial Attachment				
Year 3	Industrial Attachment			Submit WERB	April Graduation
				Submit WERB	December Graduation

Trimester 1 - Stages 1.
 Trimester 2 - Stages 1 & 2.
 Trimester 3 - Stages 1, 2 & 3.

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 months industrial practice **and pass a practical trade test** before they can be considered for the Trade Certificate / Certificate IV.

3.5 Delivery Mode

The program is sandwich-type full-time Trimester based on three 15-week stages. Students who are firm apprentices attend alternate Trimesters on release from industry. Therefore they normally attend one Trimester per year which is decided from their date of intake.

3.6 Order of Delivery

Units are timetabled according to the chronological order of the Programme Descriptor above. Content material instruction is delivered chronologically as itemized in the Unit Descriptors.

There is a considerable degree of flexibility tolerated for students who wish to break their studies, have to resit examinations or repeat units. The only stipulations being

- (a) Prerequisites must be satisfied before proceeding to advanced units and
- (b) Re-sits and repeats can only be taken when the unit is next offered officially.

The final outcome for graduation must be the accumulation of 21 appropriate units plus the mandatory 6 - 12 months industrial experience.

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 projects and assignments, classroom exercises and laboratory practical. Summative assessment takes the form of formal tests. Theoretical units also carry a final examination. Marking weightings for the various components are detailed in each Unit Descriptor.

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). **Furthermore, on the completion of their industrial experience, a practical trade test would need to be completed and passed in order to be eligible for Certificate IV graduation**

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.

For all Examinable units, a minimum of 75% attendance and 50% Coursework are to be attained by the student, to enable him/her to sit for the final examination. A student should pass the final examinations to pass the unit.

4.4 Fairness, Validity and Reliability

The programme contains mainly examinable units in order to provide fair assessment across a wide range of academic abilities. Examinable units provide a high degree of objectivity whereas the few 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.

Each unit carries at least one summative test. Marks for these and other forms of course work are entered onto the program record spreadsheet which is submitted to the Examination Board for scrutiny. Examinable units have their papers moderated prior to sitting and afterwards, the marking is assessed. Results are scrutinized by the School Examination Board prior to submission to the College Academic Board.

Definitions of Boards and other quantifiable assessment criteria and validation are explained in full in the University Academic and Student Regulations.

5. TEACHING AND LEARNING METHODS

5.1 Introduction

A variety of teaching and blended learning 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 Centered Learning

This is catered for in assigned tasks, researches and project work as well as gaining experience in their industrial attachment.

5.3 Methods

An appropriate blend of classroom instruction coupled with workshop instruction, demonstration, simulation videos' and practicals to develop hands-on skills. Drawing office practicals to develop representational abilities. Tutorials for practicing problem solving and other analytical skills. Project work to develop initiative and teamwork. In addition, occasional laboratory practicals are conducted for science units. Visiting large and small manufacturing industries is a must for all students to observe and keep them updated on the changes taking place in our industries.

6. MONITORING, EVALUATING AND REVIEW OF PROGRAMME

6.1 College Academic Board

The Board of Studies composition as detailed in the University Academic and Student Regulations is assembled to review, discuss and amend programme curricula.

6.2 Examination Board

The Examination Board composition as detailed in the University Academic and Student Regulations sits to review, discuss and amend individual results by consensus at the end of every stage.

6.3 On-going Monitoring

The College Academic Board sits quarterly to review programme curricula and make adjustments according to various inputs including

- new technologies
- new industrial practices/legislation
- new educational developments
- changes to staff responsibilities
- employers and the IAC
- the Academic Board
- the student body
- staff training roster
- Accreditation Body.

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

Final Exam papers are externally moderated by experts in appropriate fields.

6.5 Industry Advisory Committee (IAC)

Composition at the time of publication:

Chairman: A Representative from the Industry
Secretary: Head of School of Mechanical Engineering
Members: Representatives from:

1	Fiji Institute of Engineers	10	Water Authority of Fiji
2	FSC	11	Sopac/SPC
3	FEA	12	Fiji Employers Federation
4	USP	13	Vatukoula Gold Mine
5	Pacific Energy	14	Goodman Fielder International
6	Total Oil Company	15	Mark 1 Apparel Pty. Ltd
7	PWD	16	Other Universities that could be invited
8	Department of Energy	17	Other Organizations that could be invited
9	Min. of Labour - Depart. of OHS	18	Ministry of Education
		19	Student Rep