



**College of Engineering, Science and
Technology**

School of Mechanical Engineering

Agricultural Engineering Department

Certificate IV in Agricultural Engineering

Programme Details & Units Descriptions

Glossary of Terms

To facilitate the understanding of the different terminologies found in this document, the following terms are hereby defined.

Agri - this term refers to agriculture as a whole and integrated industry covering crops, animals, fishery, and forestry as components of its production system at a macro scale. Thus, the term “agri-industry” connotes bigger and broader scale of reference.

Agro - this term has the same meaning as that of Agri but at a micro scale or usually applied only to applications at the farm level. Further, it also connotes to the production of crops and animals as components of the system. Thus, the term “agro-industry” involves only crops and animals production usually at the micro-scale or at the farm level.

Thesis - refers to the process and results of a scientific experimentation to prove a drafted hypothesis which can lead to the generation of a new knowledge or improvement of an existing one.

Team Teaching - refers to the formation of a group of lecturers based on their respective expertise to deliver and impart the required knowledge and skills to a class based on an organized lesson plan drawn up by the members of the group.

1 Introduction

1.2 Background

Agriculture is no doubt the backbone of Fiji's society and economy. Hence, improving productivity and development for the country's farming sectors and agri-based industries has always been the priorities of the different institutions working in the country from both the government and the private sectors, both local and international operating in the country. For its part, since 1987, FNU has offered and provided educational programmes and building of the country's human resource for agriculture to support these efforts through its Certificate IV Programme in Agricultural Engineering based at FNU's Ba Campus. Due to the increasing demand, the Certificate 4 offering was expanded in Samabula in 2011.

The said programme has produced a lot of skilled agricultural engineering technicians now working in various institutions in the country and abroad. However, technological developments and advancements in agricultural sciences and engineering professions coupled with the challenges and needs of the developing Fiji economy and industries in the country, particularly the agriculture sector, necessitate the upgrading and innovations also of the FNU's human resource development programmes including the agricultural engineering field to cope up with these challenges and demands from the different sectors of the economy.

Further, despite Fiji's abundant agriculture and natural resources, about 80% of the country's food supply is mainly imported from abroad draining much of the country's foreign reserves and negated much of the progress made by the its fast rising tourism industry. Further, productivity of the agriculture and natural resources sectors have been so stunted and limited contributing much of the poverty that is now experienced in much of the country's rural population. This situation forces rural people to seek refuge in urban centres to seek livelihood and job opportunities. In turn, this condition put a lot of pressures in these highly populated places and contributed much to the rising cost of living and occurrences of criminality as people struggled to survive and face poverty.

To address this alarming situation, FNU sees the importance of strengthening its agricultural engineering programs for human resource development as a means of luring back to the countryside these rural people seeking opportunities in the urban areas through the introduction of appropriate agricultural engineering technologies that will improve the productivity of farming as a means of livelihood and income for these rural population. This strategy was a strategic approach towards achieving economic productivity for the various stakeholders, the farmers, the private sectors, and the government on the threatening condition of food supply in the country to support the growing tourism industry.

Specifically recognising the role of the agricultural engineering field to support the efforts to increase production and food supply, all the sectors recognised that Fiji has

a critical need for skilled professionals and technicians that will be able to support its growing demands for agricultural and food products as well as technological services that are also critical to support other industries in the country.

The program shall be able to address the needs for engineering technologies vital to increasing and improving productivity for the agriculture and natural resources sectors of the economy.

1.3 Rationale

FNU's offering of the Certificate IV Programme in Agricultural Engineering demonstrated the University's contribution's strong and continuous commitment to help in uplifting and improving the plight of the country's agriculture and natural resources sectors in recognition of the sectors' vital and critical role in Fiji's socio-economic development as a nation. The agriculture and natural resources sectors are the prime backbone of Fiji's economic sectors, especially the food and tourism industries. However, the current conditions of these sectors impacted significantly on the country's economic development.

Thus, FNU stands and intends to help alleviate this deteriorating situation by introducing human resource development interventions in agricultural engineering through the upgrading of its current Certificate IV Programme. This action is part of FNU's contributions to address this sad situation based on its analysis of the situation and the corresponding framework of interventions that it wants to pursue to address these problems and challenges affecting the agriculture and natural resources sectors of the country as illustrated in Fig. 1.

Hence, the Certificate IV in Agricultural Engineering is a technician's qualification that bridges the individual student's career between an engineering tradesman and a professional agricultural engineer vital to boost and sustain productivity in the agriculture and natural resources sectors, and contributing significantly to Fiji's growing economy. It provides the avenue in enhancing the skills of the graduates with basic knowledge and applications in engineering and sciences, economics and entrepreneurship, rural development and extension, and computer technology for applications in farm machinery and appropriate farm mechanisation systems development, farm infrastructures design and construction, farm products processing and manufacturing, farm resources management, and integrated farming systems to help in addressing the problems and constraints currently experienced by the country's agriculture and natural resources sectors through sustainable productivity and development of the farming communities.

1.4 Graduate Profile

The Programme is basically designed to develop agricultural engineering graduates equipped with some basic knowledge and skills on enterprise development and management to contribute significantly in improving and sustaining production and productivity of the agriculture and natural resources sectors by (1) creating jobs and livelihood opportunities in the rural communities, thus, helping to solve the unemployment problem, and (2) adding value and opportunities to farmers and other stakeholders that will redound to improved Fiji's socio-economic development and sound environment and resource management. Thus, graduates of this Programme are expected to:

- 1.4.1 Use and apply knowledge and skills in agricultural engineering science and techniques to develop engineering technologies that will improve the productivity and profitability of farming as a source of livelihood and income.
- 1.4.2 Develop technologies and systems that will appropriately improve and sustain the productivity of the farming communities in the country for a balanced and sustainable socio-economic development.
- 1.4.3 Provide the necessary skills and expertise to relevant Fiji industries and institutions which are vital to the country's sustained growth and development under the current world's economic order.
- 1.4.4 Be able to contribute to the development of rural-based enterprise and livelihoods by becoming enterprising farmers/agri-businessmen and adequately skilled farm managers harnessing engineering science and technology to maximize and sustain productivity and profitability in farming, and at the same time enhancing growth and sustainable development in the rural areas.
- 1.4.5 Be able to pursue higher studies and career development in the field of agricultural engineering and other allied sciences.

1.5 Philosophy

The main philosophy of the programme is to educate school leavers with agricultural engineering science that will provide the graduates the adequate necessary skills and knowledge in improving and sustaining the farming communities' livelihood and productivity through employment in agri-industries, support the development of engineering-based farm businesses and enterprises, and the enhancement of farm environmental protection and resources management to support the country's tourism, food security and other priority sustainable development goals.

The Programme also provides the enhancement of skills in fabrication, construction and manufacturing of appropriate technologies to ensure that these efforts will really address the needs and concerns of the various stakeholders in the farming sectors of the economy. Further, these acquired knowledge and skills form the basic

foundations for the graduates to advance in higher degree of studies both locally and internationally.

1.6 Aims and Objectives

1.6.1 Aim

The Programme mainly aims to develop and enhance students' knowledge and skills in agricultural engineering that will equip them the necessary technical skills and know-how on developing engineering technologies for sound and sustainable agri-industrial development in the country by improving food security, increasing the productivity and livelihood opportunities of the farming communities and the countryside, and supporting related industries and sectors through the availability of appropriately educated and trained human resource for a balanced and sustained economic growth and development.

1.6.2 Objectives

Upon completion of the programme, graduates should be able to:

- 1.6.2.1 Develop appropriate and affordable engineering technologies such as machineries, tools and equipment, farm structures, irrigation systems, resource engineering techniques for conservation and management, and appropriate mechanisation systems that will help in improving and sustaining farm productivity and production profitability.
- 1.6.2.2 Develop adequate and sound fundamental knowledge and skills in agricultural engineering to provide technical support services and development to various allied industries such as the agribusiness manufacturing and food processing, renewable and biomass energy sectors, metals and machinery fabrications, and rural-based enterprises.
- 1.6.2.3 Develop and use basic and essential knowledge and competencies for employment and for livelihood generation through agribusiness development and entrepreneurship with quality and standards at par worldwide.
- 1.6.2.4 Use and apply agricultural engineering knowledge and skills in the development of appropriate technologies and transfer, disseminate and extend them to farmers and other stakeholders in the community.
- 1.6.2.5 Become model farmers and rural engineers that will showcase the productivity, profitability and prestige of farming as a means of livelihood to alleviate poverty and as an occupation.

2. PROGRAM REGULATIONS

2.1 Admission Requirements:

- (a) ~~School Certificate with 50% in Mathematics and a Physical Science subject and at least 35% in English.~~
- (b) Mature applicants with less than the above requirements but at least two years of farming/ job experience can be considered.

~~**Note:** There are a limited number of places offered at every intake and demand often outweighs supply therefore the selection process is necessarily competitive. The Institute is also bound by ethnic balance regulations so applications must understand that places cannot be guaranteed even when the above admission requirements are admitted.~~

2.2 Credit Points of Program

The total credit points for all the units in this program is one hundred fifty (150).

2.3 Duration of the Program

The Program can be completed in three trimester , including the mandatory six months entrepreneurial practices after completion of trimester three of the Program. The actual career practice is absolutely mandatory hence, it cannot be waived.

2.4 Cross Crediting

Students should apply for cross-crediting of individual units of the Programme with the other programmes at FNU. The School Board in accordance with the UASR will deliberate and approve such cross-crediting applications.

2.5 Award of Certificate IV

The general requirements for award of the qualification are laid down in the latest issue of UASR .Grades A+ to E are allocated according to the level of achievements.

3. PROGRAM STRUCTURE

The three (3) trimesters are completed in succession. During the 6 months attachment period, the student will be expected to maintain a diary during the conduct of his/her entrepreneurial practices to demonstrate and document the process/methodology he/she employed in completing

successfully his/her proposed project in the form of established enterprise successfully pilot tested in a farm.

The three trimesters are interspersed with relevant industrial experience for school leavers. The student will be expected to maintain a diary of experience during the period of employment to demonstrate industrial application of the full range of core activities. The programme consists of 20 units drawn from Levels 3 to 4. The study time allocated to each unit is approximately 50 hours. The total instruction time allocated will be 2250 hours and the student will be programmed for a further 990 hours of self directed learning. This time will be used both inside and outside the institute on assignments and projects. 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.

3.1 Program Structure Matrix

CERTIFICATE IV IN AGRICULTURAL ENGINEERING					
Code	Unit name	Pre- requisite	Exam Units	Credit Points	Learning hours
Trimester 1					
MEN 305	Introduction to Mechanics	Fslc completed	X	4	60
FMG 317	Basic Machining Processes and Practice	Fslc completed	N/A	8	120
MEN 303	Engineering Drawing	Fslc completed	NA	6	90
CIN 301	Application of Computer Technology in Communication	Fslc completed	X	4	60
OHS 401	Occupational Health & Safety	Fslc completed	N/A	3	45
AGE 350	Integrated Farming Systems	Fslc completed	X	8	120
MEN 304	Workshop Calculation	Fslc completed	x	4	60
AGE 351	Farm Surveying & Mapping	Fslc completed	X	8	120
EVG 301	Ethics, Values and Governance	Fslc completed	N/A	5	75
Trimester2					
AGE 450	Farm Irrigation Drainage & Practice	Trimester 1 completed	X	10	150
AGE 451	Farm Power & Mechanization Systems	Trimester 1 completed	X	9	135
AGE 452	Tractor Operation & Maintenance	Trimester 1 completed	X	11	165
AGE 453	Farm Environment & Agriecosystems	Trimester 1 completed	X	9	135
EEE 329	Electrical & Electronic Principles & Testing Equipment	Fslc completed	X	5	75
FWG302	Welding Processes & Practice	Trimester 1 completed	N/A	6	90
TRIMESTER 3					
AGE 461	Farm Management & Entrepreneurship	Trimester2 completed	X	10	150
AGE 462	Farm Structures, Buildings, And	Trimester2	N/A	10	150

	Construction Practices	completed			
AGE 463	Farm Implements , Cultivation, and Maintenance Practice	Trimester2 completed	na	10	150
AGE 470	Engineering Project 1	Trimester2 completed	na	10	150
AGE 464	Post-Harvest Processes and Practice	Trimester2 completed	x	10	150
TOTAL	20 UNITS			150	2250

ATTACHMENT 6 months

3.2 Compulsory Components

All the units are compulsory, including the actual field practices and exercises.

3.3 Delivery Mode

Programme units delivery are done through classroom lectures, multimedia presentations, case studies, laboratory and field works, research works, field trips and observations, and attendance to/conduct of relevant seminars, industry consultations, conferences and field exhibitions and demonstrations.

There is a considerable degree of flexibility tolerated for the 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 advance units and,
- (b) Resets and repeats can only be taken when the unit is not offered officially.

The final outcome for graduation must be the accumulation of twenty (20) appropriate units plus the mandatory field practical experience/practice with diary.

3.4 Order of Delivery

Units are timetabled according to chronological order arranged and shown in the Program Structure Matrix above.