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Fiji National University Certificate in Biomedical (level 4) programme

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The main purpose of Certificate in Biomedical (level 4) programme is to prepare students for employment in Certificate level four occupations specializing in trade level biomedical engineering work in hospitals or biomedical engineering technology industries. The programme is directed towards occupations with typical job titles such as Biomedical trade's person and assistant technicians. The programme aims to provide a broad-based, initial vocational Programme for the technical workforce, specializing in Biomedical Engineering technology. In achieving the objectives, the programme incorporates the installation of equipment or devices for medical services, an introduction to anatomy and physiology, medical terminology, biomedical workshop practice including electrical and gas safety in hospitals. A range of courses are included to enable specialization in aspects of biomedical engineering technology such as power system circuits functionality, trouble shooting and diagnosis, electronic systems and technology, computer/microprocessor interface and application software, control systems and industrial electronics, and pneumatics and hydraulics systems.

1. BACKGROUND

In engineering, a tradesperson predominantly performs manual and physical work with some cognitive skills commensurate with trade tasks. Work at this level is usually performed in accordance with well-established practices and procedures and known solutions are applied to predictable problems The development of a tradesperson requires both a component of formal education and an extensive component of practical on-the-job training in industry. The content and delivery of the Fiji National University's Certificate in Biomedical Engineering (Level 4) emphasizes the practical application of the conceptual components of electronics. The content and delivery of the Programme is also 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 biomedical instruments. The Certificate in Biomedical Engineering (Level 4) Programme was first introduced in 2016, however, due to limited workforce in the discipline, it was fully offered in 2019.

2. PROGRESS AND ACHIEVEMENTS

2.1 Importance of the Programme

The introduction of the Certificate in Biomedical Engineering (Level 4) Programme has allowed the students with general interest in biomedical trades as well as those intending to choose a career pathway into biomedical trades to pursue their certificate level studies at Fiji National University. Biomedical technicians are needed to be trained and certified to carry out biomedical technician work and there is no other tertiary training institution that offers similar training locally and in the Pacific region. Therefore, the introduction of this programme provides skill labour force into biomedical sector and grants opportunities for students to develop relevant technical, vocational, and interpersonal competencies suitable for biomedical employment.

2.2 Structure of the programme

The Certificate in Biomedical Engineering (Level 4) Programme is a 2-year programme which includes one year of teaching and one year of practical attachment (https://www.fnu.ac.fj/study/program/?program=202). The programme is offered in quarter-based teaching, where each quarter is of 8 weeks, and it takes 4 quarters to complete the teaching component of the programme. In each quarter, 6 courses are offered, and each course is of 5 credit point. The details of courses are listed in Table 1.

Table 1: Course structure for Certificate in Biomedical Engineering (Level 4) Programme

STAGE	COUSES CODE		UNIT TITLE	EXAM(Y/N)	CP
1	1	EEC301	Electrical Calculations I	Y	5
	2	EEC302	Electrical Principles I	Y	5
	3	EEC303	Workshop Practice I	N	5
	4	ETH301	Introduction to Ethical Practices	N	5
	5	EEC305	Electrical Measurement and Components	N	5
	6	COM303	Introduction to Communication Literacy	Y	5
2	1	EEC306	Electrical Principles II	Y	5
	2	EEC307	Workshop Practice II	N	5
	3	EEC308	Analog Electronics I	Y	5

	4	EEC362	Electronic Communication Systems 1	N	5
	5	EEC309	Digital Electronics I	Y	5
	6	OHS303	Occupational Health & Safety	N	5
3	1	ACR498	Refrigeration Principles	Y	5
	2	BMT442	Introduction to Human Biology & Infection Control	Y	5
	3	EEC498	Network Fundamentals	N	5
	4	EEC447	Microcontroller Applications	N	5
	5	EEC451	Introduction to Mechatronics	Y	5
	6	PME442	Hydraulics & Pneumatics 1 (E)	Y	5
4	1	EEC471	Electronic Biomedical Materials and Device	N	5
	2	BMT474	Medical Imaging Processing	Y	5
	3	EEC426	Programmable Logic Controller	N	5
	4	EEC492	Electronic Biomedical Instrumentation	Y	5
	5	EEC466	Introduction to Bioinformatics	N	5
	6	EEC491	Biomedical Engineering Project	N	5
5			Industry Attachment[1]		

Note: Industry Attachment of 12 months[1]

2.3 Enrolments and graduation

Table 2 show the enrolment and graduation student numbers from 2019 when the programme was first fully offered. The enrolment number has increased from the first offer, however, only 6 students have graduated so far.

Table 2: Course structure for Certificate in Biomedical Engineering (Level 4) Programme

Year	Enrollment numbers	Graduations
2019	4	-
2020	7	-
2021	10	-
2022	33	6
2023	24	

3. CHALLENGES

3.1 Workforce and laboratory

Hiring of workforce with biomedical qualification is one of the challenges the department is confronting. Locally not many individuals are available with Diploma and Degree level qualification within biomedical engineering field. In the 2022/2023 academic year the department is exploring to hire instructors and senior instructors with Degree and Master level qualification in biomedical engineering discipline. In addition, one of the other challenges is the acquisition of the biomedical laboratory equipment's and trainers, which can supplement and be used to standardise and service biomedical instruments used locally.

3.2 Programme Development

Course review and programme development and upgrade is of great importance as we plan to produce assistant technicians and technicians for the biomedical engineering taskforce. To accomplish the aforementioned, the challenges are to get feedback from the industries and reflect through the review of Certificate in Biomedical Engineering (Level 4) Programme and initiating the process of proposing and documenting the offer of diploma level biomedical engineering qualification. The major

challenge in this is centred around the hiring of qualified biomedical engineering personals, acquisition of relevant equipment/trainers and meeting the budget constraints.

4. FUTURE DIRECTIONS

- Experience and master/PhD level Biomedical staff:
- Biomedical Trainers:
- Setup of biomedical service centre hub:
- Review of certificate Programme with industry feedback:
- Development of Diploma level Programme: