

BACHELOR OF SCIENCE

Programme Document

School of Computing Sciences & Information Systems

Faculty of Sciences

(December, 2012)

This programme document contains information about the Bachelor of Science programme in Mathematics, Computer Science and Information Systems – the programme structure, choice of units for double major degree, and unit details, etc.

1 INTRODUCTION

1.1 Award title: Bachelor of Science

1.2 Background

The School of Mathematical and Computing Sciences(SMCS) is created to provide high quality tertiary education and research in Mathematics, Statistics, Computer Science, Information Systems and related areas. The school aims to focus on teaching, research and consultancy of a quality that are on equality with International Standards. This enables us to adopt a research-led approach to our teaching which ensures that our students are fully prepared to generate the next wave of innovations when they graduate.

1.3 Rationale

The School of Mathematical & Computing Sciences is one of schools under Faculty of Sciences (FoS) in College of Engineering, Science & Technology (CEST) and the school will offer Certificate, Trade Diploma, Higher Education Diploma and Bachelor of Science programs to accommodate single or double majors with flexible selection of units from Mathematics, Statistics, Computer Science and Information Systems.

The School of Mathematical & Computing Sciences contributes to the mission of Fiji National University (FNU) by providing mathematics major, a computer science major, information systems major, service to other departments, schools and colleges of FNU. The school focuses to measure whether students are meeting our goals for their Mathematics, Statistics, Computer science and Information system.

Within the computer industry, individuals with mathematics, statistics, computer science and Information systems expertise are employed by Internet service providers; Web search portals; and data processing, hosting, and related services firms. Others work for government, manufacturers of computer and electronic products, insurance companies, financial institutions, and universities. Areas in which someone with a degree in mathematics, statistics, computer science and information systems might find employment also includes artificial intelligence, biomedical information systems, computer design and engineering, computer networking, gaming systems, information technology, search engines, systems and software engineering, and computerized package distribution systems.

Bachelor of Science [Computing Science & Information Systems]

Graduates should be able to apply their knowledge and expertise in the development of computer-based solutions of complicated mathematical problems, including scientific and engineering calculations, and statistical analysis.

1.4 Graduate Profile

This particular programme is designed to deliver at, an undergraduate level, a sound and comprehensive grounding, of the fundamentals and principles of Mathematics, Statistics, Computer science, Information systems and Information technology.

The graduates of the BSc Programme will be able to:

- Gain a degree level qualification for scientific research and analysis in industries.
- Address the needs of the local academic and industries.
- Enrol in higher degree programmes to upgrade their qualifications.
- Conduct action research to improve their quality of work.
- Design and develop appropriate projects, and write suitable project proposals.
- Acquire generic skills (teamwork, punctuality, meeting deadlines, communication, etc.)

1.5 Programme Philosophy

The Bachelor of Science (B.Sc.) is a three year programme. Degree is awarded when a student has earned total credit points not less than 360 at or above level 500, with a minimum of 120 credit points at or above level 600 and a minimum of 120 credit points at or above level 700 and has performed satisfactory in generic skill units.

The programme philosophy is to ensure that the programme, Bachelor of Science, contributes to acquire skills of research, critical analysis, constructive synthesis and application to be able to demonstrate independence of thought in the areas of mathematics, statistics, computer science, Information systems and Information technology.

1.6 Aims and Objectives

1.6.1 Aim

This Programme aims to develop student's knowledge and skills in specific areas of Mathematics, Statistics, Computer science, Information technology and Information Systems to meet the demands of academia, industries, private and also the government sectors. Students can also choose one of the following subjects such as Physics, Chemistry, Biology, and Education with Mathematics or Computer Science or Information Systems for studying double major.

Teaching and learning activities that encourage students to be able to think independently, acquire life skills of teamwork, self-discipline and best practice approaches will be encouraged.

The ability to be able to carry out different types of researches will be emphasised, computer science and Information Systems programmes aims are to train the students to:

- A. Demonstrate the understanding of the fundamentals of Computer science and information systems and information technology.
- B. Enable them to solve problems intelligently.
- C. Meet the needs of ICT of Fiji and the region.
- D. Enable to establish the IT industry in Fiji.

1.6.2 Objectives

Upon completion of the Programme students should be able to: -

- Demonstrate their ability to understand and apply the fundamental concept and principles in the proposed programme.
- Look at the situation and problem from a perspective where the fundamental issues are apparent.
- Have the ability to evaluate an existing computing based system, process, component and program.
- Work efficiently in teams in designing and implementing software systems.
- Understand key ethical issues affecting computing and their responsibilities as professionals in the related area.
- Demonstrate a solid understanding of the concepts used in the field of study.

Bachelor of Science [Computing Science & Information Systems]

- Demonstrate the ability to use current techniques, skills and tools for ICT.
- Demonstrate the ability to apply mathematical foundations, algorithmic principles and computer science theory in the modeling and design of computing based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
- Demonstrate a working knowledge of selected topics from calculus, algebra, linear algebra, analysis, statistics and a distribution of other branches of mathematics.
- Determine the validity of a given argument and be able to construct mathematical proofs independently.
- Carry out the mathematical basis of common algorithms, and the ability to calculate accurately and efficiently.
- Solve problems, including applications outside of mathematics, by means of intuition, creativity, guessing, and the experience gained through the study of particular examples and mathematical models.
- Communicate mathematical ideas clearly. They will use correct mathematical terminology and proper mathematical notation.
- Design and write computer programs that are correct, simple, clear, efficient, well organized, and well documented.
- Create and implement data structures and algorithms.
- Apply mathematical knowledge in the areas of calculus and discrete mathematics to problems in computer science.
- Determine the hardware and software aspects of computer systems that support application software development.
- Show competence in data gathering, statistical analysis, interpretation, and reporting of results for decision making.
- Maintain quality standard of practice in the workplace.
- Communicate ideas and results using good English.

1.7 Learning Outcomes

On successful completion of the programme a graduate should demonstrate knowledge and skills as follows:

A: Knowledge and Understanding

- Mathematical principles and techniques.

Bachelor of Science [Computing Science & Information Systems]

- Basic and advanced Computer Science and information systems principles.
- Mathematical principles that is fundamental to understanding of Computer Science issues.

B: Intellectual/Cognitive Skills

- Analyse a given problem and select the most appropriate methods for its solution.
- Evaluate the relative strengths of a range of theories, techniques, and tools for automation of solution.
- Analyse validity of expressions and formulas.
- Construct formal proofs using valid and correct Mathematical theorems and techniques
- Using artificial intelligence for the development of cognitive machines and their solutions.

C: Practical Skills

- Effectively use a range of software and development tools.
- Analyse performance of hardware.
- Evaluate efficacy of algorithms and solution techniques.

D: Key Skills

Communication

- Communicate effectively in written reports and oral presentations using appropriate terminology and technical language.

Numeracy

- Use mathematical techniques in the processes of analysis and design

Problem Solving

- Analyse complex problems and design effective solutions.

Working with Others

- Plan and manage team projects using available support tools; work effectively as part of a team.

Bachelor of Science [Computing Science & Information Systems]

Self-Learning

- Organise activity and manage time in a programme of self-directed study.

2 PROGRAMME REGULATION

2.1 Entry Requirements

~~The minimum entry requirement for this programme is a pass in Form 7 (i.e. minimum of 250 out of 400) or foundation science programme, with pass in Mathematics and English and any other two subjects.~~

OR

~~Mature students (23 years and above) with relevant work experience will also be considered for candidature on a case by case basis subject to the selection committees approval or consent.~~

2.2 Credit Value

2.2.1 University awards Bachelor of Science with single major or double major.

2.2.2 Bachelor of Science consist of -

- a. A total credit of not less than 360 points from units at 500-700 level
- b. A pass in two generic units

2.2.3 A double major in a science subject is awarded upon completion of –

- a. 120-130 credits each in two of the subjects
- b. In each majoring subject at least 20-25 credits are 500 level, 40-50 credits at 600 level and 60-70 credits at 700 levels in each of the major subjects.
- c. Criteria a and b apply simultaneously

2.2.4 A single major in a science subject, is awarded upon completion of-

- a. 140-160 credits in the subject, with at least 30-35 credits are 500 level, 40-50 credits at 600 level and 60-70 credits at 700 level in each of the major subject.
- b. At least 75 credit in two other subjects wherein at least 20 credits is earned at 500,600 and 700 level each.
- c. At least 30 credit from any other subject units at 500-700 level or their equivalent
- d. Criteria b and c apply simultaneously.

2.3 Programme Duration

A Bachelor of Science degree is a three (3) year study programme and maximum duration of five (5) years on full time basis and ten (10) years on part-time basis for completing the programme.

2.4 Credit Transfer

Students have to apply for credit transfers of individual units. The School Board in accordance with the University Academic & Student Regulations (UASR) of the Fiji National University would consider and deliberate on credit transfers

3 PROGRAMME STRUCTURE

3.1 Unit Table (B.Sc./B.Ed.)

The units offered for each major are outlined as below:

3.1.1 Computer Science

	Year-1	Credit	Pre-Requisite	Campuses
CSC511	Foundations of Programming	16	Pass in Form 7 or equivalent	TBA
CSC512	Object Oriented Programming	16	Pass CSC511	TBA
Year-2				
CSC621	Data Structures and Algorithms	16	Pass CSC511	TBA
CSC622	Artificial Intelligence	16	Pass CSC511	TBA
CSC625	Software Engineering	16	Pass CSC511 and CSC512	TBA
<u>Elective Units</u>				
CSC633	Operating Systems	16	Pass CSC511	TBA
CSC635	Mobile Computing	16	Pass CSC511	TBA
CSC638	Compiler Design	16	Pass CSC511	TBA
Year-3				
CSC725	Cryptography	16	Pass CSC511	TBA
CSC720	Design and Analysis of Algorithms	16	Pass CSC621	TBA
CSC722	Data Communication and Networks	16	CSC511	TBA
<u>Elective Units</u>				
CSC711	Automata Theory	16	Pass CSC511 and MTH511	TBA

Bachelor of Science [Computing Science & Information Systems]

CSC715	Computer Organization and Switching Theory	16	Pass CSC511 and MTH511	TBA
CSC705	Distributed Systems	16	Pass CIN623 and CIN628	TBA

3.1.2 Information Systems

Year-1		Credit		Campuses
CIN502	Information Systems in Organizations	16	Pass in Form 7 or equivalent	TBA
CIN501	Productivity Software	16	Pass in Form 7 or equivalent	TBA
CIN535	Multimedia and Communication	16	Pass CIN501	TBA
Year-2				
CIN603	Systems Analysis and Design	16	Pass CIN502	TBA
CIN623	Database Design and Programming	16	Pass CSC511 or CIN501	TBA
CIN628	Internet and Web Programming	16	Pass CSC511 or CIN501	TBA
<u>Elective Units</u>				
CIN607	Human Computer Interaction	16	Pass CIN502	TBA
CIN611	Electronic Commerce	16	Pass CIN502	TBA
CIN625	Business Application Development	16	Pass CSC511 or CIN501	TBA
Year-3				
CIN707	Information Technology Project	16	Pass CIN623 and CIN628	TBA

Bachelor of Science [Computing Science & Information Systems]

CIN711	Social Professional Issues in Computing	16	Pass in any	TBA
			600 level unit	
CIN714	Information systems Management	16	Pass in any	TBA
			600 level unit	

Elective Units

CIN704	Management Support Systems	16	Pass in any	TBA
			600 level unit	

3.1.4 Generic Units

LNG501	English for Academic Studies	8
EVG501	Ethics, Values & Governance	11

3.2.1 Computer Science and Information Systems

Year 1

Trimester 1			Trimester 2			Trimester 3		
Unit		Credit Points	Unit		Credit Points	Unit		Credit Points
CSC511	Foundations of Programming	16	CSC512	Object Oriented Programming	16	MTH511	Discrete Mathematics	13
LNG501	English for Academic Purposes	8	CIN501	Productivity Software	16	CIN535	Multimedia and Communication	16
CIN502	Information Systems on Organizations	16	EVG501	Ethics and Value an Governance	11	CIN628	Internet and Programming	16
Total Credit Points		40	Total Credit Points		43	Total Credit Points		45

Year 2

Trimester 1			Trimester 2			Trimester 3		
Unit		Credit Points	Unit		Credit Points	Unit		Credit Points
CSC622	Artificial Intelligence	16	CSC625	Software Engineering	16	CSC6XX	Elective Unit	16
CIN603	Systems Analysis and Design	16	CIN623	Database Design and Programming	16	CSC725	Cryptography	16
CSCXXX	Elective Unit	16	CSC621	Data structures and Algorithms	16	CIN714	Information Systems Management	16
Total Credit Points		48	Total Credit Points		48	Total Credit Points		48

Year 3

Trimester 1			Trimester			Trimester 3		
-------------	--	--	-----------	--	--	-------------	--	--

Bachelor of Science [Computing Science & Information Systems]

Unit		Credit Points	Unit		Credit Points	Unit	Credit Points
CSC720	Design and Analysis and Algorithms	16	CIN707	IT Project	16	Industrial Attachment	
CIN711	Social Professional Issues in Computing	16	CSC722	Data Communications and Networks	16		
CSC7XX	Elective Unit	16	CSC7XX	Elective Unit	16		
Total Credit Points		48	Total Credit Points		48	Total Credit Points	