Note:

This document is for polytechnic diploma holders admitted and matriculated in AY2005-6
(last updated on 14 June 2006)

Bachelor of Computing in Computer Engineering

Overview

The **Bachelor of Computing in Computer Engineering** is a four-year programme offered by the School of Computing from July 2000. Prior to July 2000, the Bachelor of Engineering (Computer Engineering) programme was jointly administered and organised by the School of Computing and the Electrical and Computer Engineering (ECE) Department in the Faculty of Engineering. It is now offered solely by the ECE Department. This section describes the B.Comp. (CE) programme. In a nutshell, both the B.Eng. (CE) and the B.Comp. (CE) programmes cover hardware as well as software with the former having a more hardware focus and the latter having a more software focus.

The recent decade has seen rapid advances moving computing from the PC into everyday appliances, and there is the concomitant advent of ubiquitous networking. A new breed of computer scientists with a deep appreciation of hardware issues is needed. The goal of this programme is to provide an integrated view of software-hardware design. This is very important for the area of embedded computing systems which require a solid understanding of the physical hardware issues with the ability of computer science abstraction in order to effectively tackle their complexity. Consequently, this programme will train computer scientists with a solid foundation in the fundamentals of computing as well as a keen appreciation of hardware to work creatively with the next generation of embedded systems — mobile computing devices, internet appliances, wearable computing and digital entertainment systems.

This programme should be distinguished from the B.Eng. (Computer Engineering) degree. The latter is closely related to the electrical engineering degree and the curriculum is designed in accordance with the requirements of the Faculty of Engineering and the Professional Engineers Board. The B.Comp. in Computer Engineering degree meets the standard requirements of the 4-year Bachelor of Computing in Computer Science; both of which are structured around the US Association of Computing Machinery (ACM) and the IEEE Computer Society's draft "Computing Curriculum 2001" recommendations. A student pursuing the B.Comp. in Computer Engineering degree has tremendous flexibility and opportunity to combine computer science and electrical engineering courses with elective courses from other Faculties such as Business, Arts and Social Sciences, or Science or take advanced courses in computer science. Furthermore, the School of Computing plans to offer a set of new elective modules on advanced software techniques for embedded systems. The programme caters for those with different professional and educational aspirations as well as provides a superb grounding for alternative future developments. To summarise, the graduate will be a computer scientist with good electronics and hardware knowledge with deep insights into the emerging area of embedded systems. This special set of skills coupled with the freedom of the electives allows the graduate to position himself/herself in a large number of upcoming and exciting fields of work including:

- Design automation: CAD/CAM tools, hardware-software co-design, next generation firmware, etc.
- Embedded software: software control of systems ranging from photocopiers to chemical processing plants, etc.
- Mission critical systems: robotic control, fault tolerant systems, real-time systems etc.
- Network: wireless application, network management, design and deployment o networks, Internet appliances, WWW development, etc.
- New media: multimedia, design and development of edutainment, digital audio and speech, digital video, etc.

- Ubiquitous systems: smart consumer electronics, defence applications, low-power portable devices, wearable computing, etc.

Degree Requirements

The Computer Engineering programme degree requirement is at least 160 modular credits. Modules are classified as follows (note that every module can only be counted towards satisfying exactly one requirement):

(i) ***PROGRAMME REQUIREMENTS***

Common Essentials

CS1101 or CS1101S	Programming Methodology
CS1102 or CS1102S	Data Structures and Algorithms
CS1104	Computer Organisation
CS2102S	Database Systems
CS2103	Software Engineering
CS2105	Introduction to Computer Networks

Major Requirements

Computing Related

CS1231	Discrete Structures
CS2106	Operating Systems
CS2271	Embedded Systems
CS3211	Parallel and Concurrent Programming
CS3215	Software Engineering Project
CS3220	Computer Architecture
CS3230	Design and Analysis of Algorithms
CS4101	Honours Project
CS4102	Technical and Management Training

Complete 16 modular credits from Computer Engineering Elective list:

Modules in area A7

CS3103	Computer Networks and Protocols[1]
CS3103L	Computer Networks Laboratory
CS3212	Programming Languages
CS4212	Compiler Design
CS4222	Wireless Computing & Sensor Networks

Mathematics Related

MA1505 Mathematics I
MA1506 Mathematics II
An ST-coded module in Discrete Probability

Electrical Engineering Related

EG1108	Electrical Engineering
EE2006	Digital Design
EE2009	Signals

Others

CS2301	Business and Technical Communication

[1] Students who take CS3103 Computer Networks and Protocols starting AY2006-7 must also take CS3103L (Computer Networks Laboratory).

(ii) ***UNIVERSITY LEVEL REQUIREMENTS***

(iii) ***UNRESTRICTED ELECTIVES***

University Scholars Programme (Computer Engineering)

Students in the University Scholars Programme who choose the Bachelor of Computing (Computer Engineering) major will take the Computer Engineering programme, but with the following variations:

1. They will not be required to take the University Level Requirements (28 MCs)
   (These are replaced by appropriate First-Tier Scholars Modules.)

2. They will take UROP modules (CS3208 and CS3209) in place of CS3215 (Software Engineering Project). CS3208 and CS3209 are independent study modules (ISMs) and they will also be counted as two of the four Advanced Scholars Modules [8 equivalent MCs].

3. They will take one out of the group (CS3211, CS3212 or CS4212) from the "Programme Essentials" [Namely, 4 MCs fewer].

4. Eight MCs (out of 48 MCs for USP) will count towards "Unrestricted Electives" .

Table 1: Summary of degree requirement for B.Comp. (Computer Engineering)

Modules	Modular Credits	Subtotals
UNIVERSITY LEVEL REQUIREMENTS		**28**
PROGRAMME REQUIREMENTS		**114**
Common Essentials		
CS1101/S Programming Methodology	5	
CS1102 Data Structures and Algorithms	5	
CS1104 Computer Organisation	4	
CS2102S Database Systems	5	
CS2103 Software Engineering	4	
CS2105 Introduction to Computer Networks	4	
Major Requirements		
Computing Related		
CS1231 Discrete Structures	4	
CS2106 Operating Systems	4	
CS2271 Embedded Systems	4	
CS3211 Parallel and Concurrent Programming	4	
CS3215 Software Engineering Project	8	
CS3220 Computer Architecture	4	
CS3230 Design and Analysis of Algorithms	4	
16 MCs from CE Elective Course list[2]	16	
CS4101 Honours Project	12	
CS4102 Technical and Management Training	0	
Science Related		
A Discrete Probability module	4	
Electrical Engineering Related		
MA1505 Mathematics I	4	
MA1506 Mathematics II	4	
EG1108 Electrical Engineering	3	
EE2006 Digital Design	4	
EE2009 Signals	4	
Others		
CS2301 Business and Technical Communication	4	
UNRESTRICTED ELECTIVES		**18**
Grand Total		**160**

[2] The **CE Elective** Course list includes: All modules in Elective Area A7, CS3103 (Computer Networks and Protocols), CS3103L (Computer Networks Laboratory), CS3212 (Programming Languages), CS4212 (Compiler Design), CS4222 (Wireless Computing & Sensor Networks), and other relevant courses approved by the Department of Computer Science.