

MODULE: COMPUTER HARDWARE

Griffith College Dublin – Computing Science

Year-long module (Fall & Spring)

This module is open to YEAR ABROAD STUDENTS ONLY. No pre-requisites.

Aims

This module will show you the tangible side of computer science. It will give you an understanding of the fundamental topics of the architecture and infrastructure of a modern computer system.

In the course of the module you will gain a sound understanding of number systems and digital logic circuits. In addition to the above topics we will cover a foundation in computer hardware, showing the relation from the Von Neumann model to a modern system, and the function, design and identify and explain the role played by different components in a computer system.

To re-enforce the theoretical aspect of the course you will also be introduced to the practical side via a series of hardware labs. In these labs you will learn the skills to deal with basic hardware issues, such as installing new hardware and identifying problems in a computer.

Learning Outcomes

Upon successful completion of this module, you should be able to:

1. demonstrate the ability to convert numerical data from one format to another
2. design and simplify logic circuits using Boolean algebra and Karnaugh maps
3. identify and describe the internal hardware architecture and system software of a computer and illustrate how these components function and interact
4. distinguish between the architecture of various processors
5. disassemble and reassemble a modern PC competently and install and configure new hardware on a PC while implementing health and safety procedures
6. identify the different devices and device drivers used in a modern PC
7. practise fault analysis and formulate possible solutions

Indicative Content

Topic	Description
Number Systems and Computer Arithmetic	Binary, Octal and Hexadecimal number bases and their use. Conversion between bases. Data Representation: integer, character & floating point. Arithmetic: binary maths, one's complement, two complement, signed numbers.
Digital Logic	Logic gates and truth tables. Boolean Logic and Karnaugh maps.

	Basic logic circuits. Half and Full adder circuits. Flip-flop circuits;
Introduction to Computer Hardware	Von-Neumann Model. Processor overview and construction. Memory: RAM, ROM, cache.
I/O modules	Inputs: rs232, USB, firewire, IrDA, Bluetooth, AGP, PCI and PCI-E. Outputs: Monitors (CRT and LCD), printers.
Storage devices	HDD overview. HDD construction. Interleaving. RAID.
Hardware practical	Stripping a PC and re-assembling it. Learning the BIOS. Formatting and FDISK.

Assessment Methods

Continuous assessment will be based on a combination of some of the following:

- Lab practicals
- Selected homework and worksheets
- Case studies
- Class tests

The continuous assessment work addresses all the learning outcomes. The practical examination addresses learning outcomes 5 - 7. The written examination will assess learning outcomes 1 – 4.