



UNIVERSITY OF WALES: TRINITY SAINT DAVID
PRIFYSGOL CYMRU: Y DRINDOD DEWI SANT

School of Applied Computing

Computer Architecture
ACCC4003

AIM(S)

- To provide the student with an understanding of the key concepts and building blocks of current computer systems, components and architectures.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to demonstrate the ability to:

1. Demonstrate an understanding of number systems, data capacities and transfer speeds in the context of typical PC environments.
2. Demonstrate an understanding of the essential characteristics and concepts of computer systems and components
3. Identify, discuss and make recommendations regarding suitable hardware and/or software for computing related scenarios

INDICATIVE CONTENT

- Fundamentals of number systems. Binary, Dec and Hex notation, representation and conversion.
- Computer systems: major components and peripherals
- Fundamentals of Computer Networks
- Storage devices. Backup and archiving strategies.
- Nomenclature and specification of typical data capacities and transfer speeds
- Processor architecture: RISC, CISC and multi-core processors.
- Fundamentals of High Performance Computing architectures
- Computer architecture: system block diagram, CPU, memory, input/output unit, system clock, data bus, address bus, control bus, fetch-execute cycle. Harvard v Von-Neumann
- Memory Organisation: associative, cache, virtual memory (paged and segmented),
- Input/output including polled, interrupt driven and direct memory access.
- Introduction to Operating Systems.
- Fundamental Networking devices and principles for SOHO type use, e.g. requirements of a small network with shared facilities using DHCP.
- Mobile computer processors, i.e. ARM, Atom
- Mobile telephony including VoIP

LEARNING AND TEACHING STRATEGY

Formal lectures will be accompanied by handouts/VLE content to impart knowledge. Students will be required to perform their own personal research, which should consist of not only the more accessible web based resources, but also they should wherever possible, consult relevant academic publications, such as peer-reviewed journals, technical reports, and industry publications to assist their learning. Tutorials will be provided as required for sessions such as base conversion calculations or system design exercises.

The allocation of teaching to deliver the module is:

Activity type	Hours	Percentage
Scheduled learning	35	35%
Independent learning	65	65%
Placement learning	0	
TOTAL	100	100%

ASSESSMENT

Description of each assessment component and its weighting, together with an example for new forms of assessment:

Assessment Component 1 – Written - 100%

2-hour exam. Explain the essential characteristics and concepts of computer systems and components.

Assessment Summary

Activity type	Percentage
Written	100%
Coursework	0%
Practical	0%
TOTAL	100%

BIBLIOGRAPHY

Essential

Stallings, W. (2012) *Computer Organization and Architecture: Designing for Performance (9th edition)* Pearson Education.

Englander, I. (2009) *The Architecture of Computer Hardware and System Software: An Information Technology Approach, (5th Edition)*, Wiley: New York

Background

Hennessy, J. and Patterson, D. A. (2011) *Computer Architecture : A Quantitative Approach, (5th Edition)*, Morgan Kaufmann: Amsterdam

Peterson, L. and Davie, B. (2011) *Computer Networks: A System Approach, (5th Edition)*, Elsevier: San Francisco

Rauber , T and Rünger, G. (2010) *Parallel Programming for Multicore and Cluster Systems, (1st Edition)*, Springer: Berlin

Ruffing, J.S. (2011) *Windows Server 2008 R2 and SQL Server 2008 R2 High Availability Clustering* , Scream Publications

Tanenbaum, A. (2013) *Computer Networks, (5th Edition)*, Prentice Hall: New Jersey

Tanenbaum, A. S. (2013) *Modern Operating Systems, (3rd Edition)*, Prentice Hall: Upper Saddle River

Hallihan, R. (2008) *Windows Home Server: Protect and Simplify Your Digital Life*, John Wiley: Hoboken

Journals

IEEE Computer Magazine

IEEE Network Magazine

IEEE Transactions on Networking

IEEE Communications Magazine

IEEE Internet Computing Magazine

IEEE Transactions on Communications

IEEE Transactions on Wireless Communications

Websites

<http://anandtec.com>

<http://tomshardware.com>

<http://storagereview.com>

<http://www.cisco.com>

<http://www.microsoft.com>

<http://www.ss64.com/nt>

<http://www.networktutorials.info>