



Institiúid Teicneolaíochta Chorcaí
Cork Institute of Technology

ELTR8007: Computer Systems Design

Module Details

Short Title:	Computer Systems Design			APPROVED		
Full Title:	Computer Systems Design					
Module Id:	3273					
Official Code:	ELTR8007		NFQ Level:	8	ECTS Credits:	5
Coordinator:	JOSEPH CONNELL					
Description:	This module will examine and develop an appreciation of the issues that have influenced modern Microprocessor based Computer Systems and allow the student to critically evaluate and make architectural decisions on modern computing applications					
Learning Outcomes:						
On successful completion of this module the learner will be able to...						
1. demonstrate an understanding of the factors that influence the performance of microprocessors in typical use scenarios						
2. critically evaluate different architectural approaches within micro-processors and systems design based on intended end use						
3. analyse and compare different processors and operating systems select appropriate devices for typical design problems						
4. analyse and specify memory models as appropriate to Modern Computer Systems						
5. identify and specify algorithms and system architectures to allow for parallel processing applications						
Pre-requisite learning						
Module Recommendations						
This is prior learning (or a practical skill) that is strongly recommended before enrolment in this module. You may enrol in this module if you have not acquired the recommended learning but you will have considerable difficulty in passing (i.e. achieving the learning outcomes of) the module. While the prior learning is expressed as named CIT module(s) it also allows for learning (in another module or modules) which is equivalent to the learning specified in the named module(s).						
Completion of a Level 6/7 module with exposure to micro-processor systems and micro-controller systems						
Incompatible Modules						
These are modules which have learning outcomes that are too similar to the learning outcomes of this module. You may not earn additional credit for the same learning and therefore you may not enrol in this module if you have successfully completed any modules in the incompatible list.						
No incompatible modules listed						
Module Requirements						
This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed. You may not enrol on this module if you have not acquired the learning specified in this section.						
No requirements listed						



Module Content & Assessment

Indicative Content

- **CPU/MPU Architectures**
History of Architectures, CISC, RISC, Comparison, Architectural Decisions, VLIW, future directions
- **Development of Architectures**
Bottlenecks, Hazards and solutions, Harvard Architectures, Pipelining, Parallelism, Architectural, Control & Data Hazards, Vector processors
- **End use of Computer Systems - Architectural Requirements**
Micro-processors Vs Micro-controllers, Interrupt Handling, Interrupt Vectors, Vector Maps and OS Interaction
- **Memory Models**
UMA/NUMA Memory models, Paged Memory Systems, Segmented Systems, Applications to System Architectures
- **Operating System & requirements**
Modern OS designs, requirements and implementations. Unix, Windows, MacOS: Comparison and selection for applications
- **Parallel/Distributed Architectures**
Algorithm Partitioning, Distribution, Machine interconnection networks, message passing systems, MPP systems

Assessment Breakdown	%
Course Work	40%
End of Semester Formal Examination	60%

	Outcome addressed	% of total	Assessment Date
Formal End-of-Semester Examination	1,4,5	60%	Semester End

Coursework Breakdown				
Type	Description	Outcome addressed	% of total	Assessment Date
Written Report	Team report to choose a microprocessor for a particular application	2	10	Week 6
Written Report	Team Report to identify, interrupt, OS and other requirements for a particular application	1,3	10	Week 10
Practical/Skills Evaluation	Series of Laboratory Exercises	1,2,3,4,5	20	Every Week

The institute reserves the right to alter the nature and timings of assessment



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Module Workload & Resources

Workload		Full-time mode			
Type	Description	Hours	Frequency	Average Weekly Learner Workload	
Lecture	Theory Lecture	1.5	Every Week	1.50	
Lab	Laboratory Session	1.5	Every Week	1.50	
Independent & Directed Learning (Non-contact)	Independent Learning	4	Every Week	4.00	
Total Weekly Learner Workload				7.00	
Total Weekly Contact Hours				3.00	

Workload		Part-time mode			
Type	Description	Hours	Frequency	Average Weekly Learner Workload	
Lecture	Theory Lecture	3	Every Second Week	1.50	
Lab	Laboratory Session	3	Every Second Week	1.50	
Independent & Directed Learning (Non-contact)	Directed Learning	4	Every Week	4.00	
Total Weekly Learner Workload				7.00	

Resources

Recommended Book Resources

- John Hennessy & David Patterson 2006, *Computer Architecture: A Quantitative Approach*, Fourth Ed., Morgan Kaufmann [ISBN: 0123704901]

Supplementary Book Resources

- David Culler 1998, *Parallel Computer Architecture: A Hardware/Software Approach*, Morgan Kauffman [ISBN: 1558603433]
- Ian Sommerville 2004, *Software Engineering*, 6th(2000) & 7th(2004) Ed., Addison-Wesley [ISBN: 0321210263]