H6COMPSYS: Computing Systems

Module Code:	H6COMPSYS
Long Title	Computing Systems APPROVED
Title	Computing Systems
Module Level:	LEVEL 6
EQF Level:	5
EHEA Level:	Short Cycle
Credits:	5
Module Coordinator:	Horacio Gonzalez-Velez
Module Author:	Horacio Gonzalez-Velez
Departments:	School of Computing
Specifications of the qualifications and experience required of staff	MSc and/or PhD degree in computer science or cognate discipline. May have industry experience also.

Learning Outcomes

On successful completion of this module the learner will be able to:

#	Learning Outcome Description
LO1	Distinguish between different qualitative design and architectural considerations and their influence in technology, power, and cost of computing systems.
LO2	Outline and summarise different memory systems.
LO3	Distinguish between instruction- and data-level parallelism.
LO4	Discuss different cloud and utility computing models and their ethical application in enterprise environments.

Dependencies

Module Recommendations

No recommendations listed

Co-requisite Modules

No Co-requisite modules listed

Entry requirements	See section 4.2 Entry procedures and criteria for the programme including procedures recognition of prior learning

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Module Content & Assessment

Indicative Content
Quantitative Design and Analysis Computer Architecture. Classes of Computers.
Trends Trends in Technology, Power, and Cost. Dependability.
Performance Measuring, Reporting, and Summarising Performance. Performance, Price and Power. Amdahl's Law. Fallacies and Pitfalls.
Memory Hierarchy Levels of memory hierarchy. Cache: associativity and optimisations. Main memory. SRAM, DRAM, and SDRAM.
Memory Systems Virtual Memory and Virtual Machines.
Virtual Machines Virtual Machine monitors. Cache coherency
Storage Systems Magnetic and solid-state technologies. Disk arrays and RAID technologies.
Storage Systems Mean-Time-to-Repair (MTTR) and Mean-Time-To Failure (MTTF).
Warehouse-scale Computers Programming Models and benchmarks. Workloads. Computer architecture of warehouse-scale computers.
Cloud Computing I Concepts for delivering infrastructure and software as a service.
Cloud Computing II Physical infrastructure, location, power and ethical considerations for data centres.
Utility Computing Total cost of ownership. Influence of server cost and power. CAPEX vs. OPEX.

Assessment Breakdown	%
Coursework	40.00%
End of Module Assessment	60.00%

Assessments

Full Time

Coursework

Assessment Type:	Continuous Assessment	**% of total:**	Non-Marked
Assessment Date:	n/a	**Outcome addressed:**	1,2,3,4
Non-Marked:	Yes		

Assessment Description:
Ongoing feedback on ongoing tutorial activities. Feedback on regular reflection.

Assessment Type:	Continuous Assessment	**% of total:**	40
Assessment Date:	n/a	**Outcome addressed:**	4
Non-Marked:	No		

Assessment Description:
This assessment will evaluate the learners' knowledge and understanding of cloud utility models with emphasis on its ethical application in enterprise environments. A marking scheme is provided in Appendices.

Assessment Type:	Easter Examination	**% of total:**	60
Assessment Date:	n/a	**Outcome addressed:**	1,2,3
Non-Marked:	No		

Assessment Description:
The test will assess learners' knowledge and understanding of different computer architectures, memory systems and parallelism. A sample question, marking scheme, and solution, is provided in Appendices.

No End of Module Assessment

No Workplace Assessment

Reassessment Requirement

Repeat examination
Reassessment of this module will consist of a repeat examination. It is possible that there will also be a requirement to be reassessed in a coursework element.

Reassessment Description
Reassessment of this module will be via proctored examination that assess all learning outcomes.

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Module Workload

Module Target Workload Hours 0 Hours

Workload: Full Time

Workload Type	*Workload Description*	*Hours*	*Frequency*	*Average Weekly Learner Workload*
Lecture	Classroom & Demonstrations (hours)	24	Per Semester	2.00
Tutorial	Other hours (Practical/Tutorial)	12	Per Semester	1.00
Independent Learning	Independent learning (hours)	89	Per Semester	7.42
			Total Weekly Contact Hours	3.00

Module Resources

Recommended Book Resources

Hennessy, J & D, Patterson.. (2017), Computer Architecture: A Quantitative Approach (6th ed), Morgan Kaufmann, Amsterdam.

Marinescu, D. C.. (2017), Cloud Computing: Theory and Practice (2nd ed), Morgan Kaufmann, Amsterdam.

Supplementary Book Resources

Brookshear, G. & Brylow, D.. (2014), Computer Science: An Overview (12th ed), Pearson.

Englander, I.. (2014), The Architecture of Computer Hardware, Systems Software, and Networking: An Information Technology Approach (5th ed), John Wiley & Sons.

Hennessy, J. & Patterson, D.. (2014), Computer Organization and Design: The Hardware/Software Interface, Morgan Kaufmann, Amsterdam.

Hwang, K., Dongarra, J. J. & Fox, G.. (2011), Distributed And Cloud Computing: Clusters, Grids, Clouds, and The Future Internet, : Morgan Kaufmann, San Francisco, Calif.

Shafarenko, A. & Hunt, S. P.. (2017), Computing platforms. School of Computer Science, University of Hertfordshire, UK..

This module does not have any article/paper resources

This module does not have any other resources

Discussion Note:	