

Module Code	Pre-requisite Module codes	Co-Requisite Modules code(s)	ISCED Code	Subject Code	ECTS Credits	NFQ Level (CPD)#
CMPU4022	CMPU3001, CMPU2029				10	8
Module Title	Distributed Systems and Systems Integration					

Distributed Systems and Systems Integration

School Responsible:	School of Computing
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Module Overview:

Distributed Systems form a rapidly changing field of computer science. Recently new topics have emerged such as sensor networks, while others have become much more mature, like web services and web applications in general. This module introduces students to distributed systems fundamentals and the issues facing their design and implementation. This module is split into two distinct parts i.e. Principles and Paradigms, with relevant case studies where appropriate.

Learning Outcomes (LO):

On Completion of this module, the learner will be able to

1	Discuss authoritatively the fundamental characteristics of distributed systems
2	Demonstrate an understanding of various distributed system architectures
3	Discuss how the characteristics of the underlying networks impact the behaviour and design of distributed systems
4	Compare and contrast the requirements for distributed system development with development in a localised environment.
5	Develop advanced distributed applications using sockets
6	Develop advanced distributed applications using remote method invocation
7	Discuss advanced distributed systems issues (e.g. processes and scheduling, time, synchronisation)
8	Demonstrate an understanding of importance of middleware for distributed systems.
9	Demonstrate an understanding of advanced distributed systems issues

Indicative Syllabus:

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Distributed System Fundamentals: Architectural models for distributed systems; concurrency, failure models, replication, naming and directory services, impact of underlying networks characteristics, internetworking, middleware.

Advanced Distributed Systems Issues: Processes and scheduling, time, security issues and securing distributed systems. Concurrency: synchronization, transaction management.

Distributed objects and remote invocation: Communication between distributed objects, distributed object model, Remote Method Invocation (RMI), events and notifications, web services.

Middleware: Purpose of middleware in distributed systems, middleware platforms.

Java in Distributed Systems: Java interface definitions, Java Remote Method Invocation (RMI), concurrency and multithreading, Java security manager, serialisation.

Learning and Teaching Methods:

The course delivery involves a combination of lectures and labs which may incorporate the use of blended learning techniques as appropriate throughout the delivery.

Total Teaching Contact Hours	39
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Total Self-Directed Learning Hours	161
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Module Delivery Duration:

This module is delivered over one semester

Assessment

Assessment Type	Weighting (%)	LO Assessment (No.)
Final Exam	70%	1,2,3,4,7,8,9
In class examination	30%	5,6,7,9

Module Specific Assessment Arrangements (if applicable)

(a) Derogations from General Assessment Regulations	
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(b) Module Assessment Thresholds	
(c) Special Repeat Assessment Arrangements	

<p>Essential Reading: (author, date, title, publisher)</p> <p>Tanenbaum A.S. & van Steen Marten (2016) Distributed Systems: Principles and Paradigms, Create Space Independent Publishing</p> <p>Anthony R., (2015), Systems Programming, Designing and Developing Distributed Applications, Morgan Kaufmann</p> <p>Coulouris G. & Dollimore J (2011) Distributed Systems, Pearson</p> <p>Supplemental Reading:</p> <p>Relevant supplemental reading will be indicated during the teaching of the module.</p> <p>Web References, Journals and other:</p> <p>Relevant web references, journals and other reading materials will be indicated during the teaching of the module.</p>

Version No:		Amended By	
Commencement Date		Associated Programme Codes	

Modules that are to be offered as Stand-Alone CPD Programmes must have an NFQ level assigned

*Details of the assessment schedule should be contained in the student handbook for the programme stage.

Date of Academic Council approval

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