UNIVERSITY of BRADFORD

Module Details	
Module Title	Concurrent and Distributed Systems
Module Code	COS6012-B
Academic Year	2024/5
Credits	20
School	School of Computer Science, AI and Electronics
FHEQ Level	FHEQ Level 6

Contact Hours	
Type	Hours
Lectures	12
Laboratories	24
Directed Study	164

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Semester 2

Module Aims

Concurrent and distributed systems are essential in modern computing. They provide scalability, improved performance and fault-tolerance, and they are more and more widespread, with the ever-growing technological expansion.

This module introduces the nature and applications of two closely related topics: Concurrent Systems, and Distributed Systems. The first part introduces the students to concurrent programming and typical problems requiring synchronisation of and communication between concurrent processes. The second half presents fundamental concepts and issues in designing and implementing distributed systems.

Outline Syllabus

Key topics

* Introduction to concurrency.
* Processes and threads; mutual exclusion; syncronisation.
* Syncronisation in Java. Monitors and semaphores;
* Java syncronisation utilities.
* Deadlock; safety and liveness properties.
* Testing concurrent programs.
* Introduction to distributed systems.
* Distributed systems architectures, processes and communication.

Learning Outcomes

Outcome Number	Description
O1	Demonstrate knowledge and understanding of fundamental concurrency concepts and methods.
O2	Demonstrate knowledge and practical skills in using concurrent programming tools and libraries for building concurrent systems.
O3	Have a good understanding of the fundamental issues in distributed computing.
O4	Demonstrate an analytical approach to the construction of distributed systems software.

Learning, Teaching and Assessment Strategy

There will be a one-hour lecture per week, followed by a two-hour practical lab session. The practical sessions will provide support in learning about concurrency and developing concurrent programs / distributed systems. Learning materials will be principally delivered and made available to all students through our Canvas virtual learning environment. Other tools, such as Microsoft Teams, can be used to facilitate feedback, answer queries and support independent learning outside of formally timetabled sessions. Formative feedback on lab exercises will be primarily provided through timetabled lab sessions.

During directed study hours, students are expected to undertake reading to consolidate and expand on the content of formal taught sessions; complete programming tasks; research and prepare for assessments, revise material from formal taught sessions.

Private study will be facilitated and supported via the use of Canvas which will provide practical examples, additional resources and revision support.

The first coursework will focus on theoretical, analytical and implementation aspects in the construction of concurrent systems.

The second coursework will involve modelling and implementing a distributed system.

Students requiring supplementary assessment will conduct similar assessment to the original.

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Coursework - Written	Theoretical and practical aspects in the construction of concurrent systems (Implementation and report 2500 words)	50%
Summative	Coursework - Written	Modelling and implementing a distributed system (Implementation and report 2500 words)	50%

Reading List
To access the reading list for this module, please visit https://bradford.rl.talis.com/index.html