

The Hong Kong University of Science and Technology

UG Course Syllabus

[Course Title] Distributed Systems

[Course Code] COMP 4901A

[No. of Credits] 3

[Any pre-/co-requisites] Pre-requisite COMP 1022P or 1029J or 3021 and COMP 2012 or 2012H

Name: [Instructor(s) Name] Prof. Hans-Arno Jacobsen

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Course Description

Today, distributed systems are pervasively deployed, supporting critical sectors such as healthcare, banking, finance, and the online services we rely on daily. These systems often appear to users as logically centralized entities, with their complex inner workings only becoming evident in the face of failures. Understanding how distributed systems function is crucial for developing resilient, scalable solutions in an interconnected world.

The Distributed Systems course begins by defining distributed systems and exploring prominent architectures deployed today, such as client-server and peer-to-peer models. It then delves into fundamental concepts, including clock synchronization protocols, logical clocks, coordination and agreement protocols, and consensus algorithms, such as Paxos and Raft. Later topics include replication techniques, peer-to-peer systems, and blockchain technology, all of which are essential to modern distributed applications.

Students will also engage in hands-on projects that involve the incremental development, deployment, and performance evaluation of a simplified but significant distributed system, providing practical experience that complements theoretical learning.

Assessments:

[List specific assessed tasks, exams, quizzes, their weightage]

Assessment Task	Contribution to Overall Course grade (%)
Course Project (four milestones)	50%
Final examination	50%

Required Texts and Materials

[List required textbooks, readings, and any other materials]

The course will draw from ACM and IEEE Digital Library publications for most course elements. The course will also draw from some of the chapters of the following texts which are however meant more for reference: the latest editions of

1. "Distributed Systems: Principles and Paradigms" by Maarten Van Steen and Andrew S. Tanenbaum.
2. "Distributed Systems: Concepts and Design" by George Coulouris, Jean Dollimore, Tim Kindberg, and Gordon Blair.

[Optional] Additional Resources

[List any additional resources, such as online platforms, library resources, etc.]

N/A