City University of Hong Kong
Course Syllabus

offered by Department of Computer Science
with effect from Semester A 2017/18

Part I Course Overview

Course Title:	Distributed Systems
Course Code:	CS6223
Course Duration:	One semester
Credit Units:	3 credits
Level:	P6
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	CS5222 Computer Networks and Internets or CS5275 High Speed Multimedia Networks or EE5412 Telecommunication Networks or equivalent
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	Nil
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

This course aims at developing evaluation and design skills of distributed computer systems.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Identify the fundamental concepts, protocols, and algorithms of distributed systems.		✓	✓	
2.	Design and implement client-server based systems by using Socket communication.		✓	✓	
3.	Design and implement client-server based systems by using RPCs.		✓	✓	
4.	Describe principles and implementation of distributed file systems and transaction processing systems.		✓	✓	✓
5.	Describe advanced technologies and applications of distributed systems, such as P2P systems, vehicular network systems and wireless sensor network systems.			✓	✓
		100%			

A1: Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

Teaching pattern:
Suggested lecture/tutorial/laboratory mix: 2 hours lecture; 1 hour tutorial.

TLA	Brief Description	CILO No.					Hours/week (if applicable)
		1	2	3	4	5	
Lecture	Explain the concepts, design principles, and algorithms of distributed systems.	✓	✓	✓	✓	✓	
Tutorials	Train students problem solving ability and techniques by applying the concepts taught during lectures.	✓	✓	✓	✓	✓	
Group project and presentation	Require students to conduct a group project. The project is to have an in-depth study and analysis of a distributed system and technology.	✓	✓	✓	✓	✓	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.					Weighting	Remarks
	1	2	3	4	5		
Continuous Assessment: 30%							
Class participation	✓	✓	✓	✓	✓	5%	
Group Project and Presentation	✓	✓	✓	✓	✓	25%	
Examination^: 70% (duration: 2 hours)							
						100%	

^ For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Class participation	ABILITY to EXPLAIN the concepts and to SOLVE problems of distributed systems	High	Significant	Moderate	Basic	Not even reaching marginal levels
Group Project and Presentation	ABILITY to EXPLAIN in details and ANALYSE the design of a distributed system or a distributed technology	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

Distributed systems architectures; Distributed mutual exclusion, election and agreement algorithms; Inter-process communications, RPC; Client-server communication; Distributed file services, caching, coherence protocols, name service, fault tolerance; Recovery techniques, distribution and duplication; Fault management; Distributed algorithms, distributed time, clock synchronization protocols; P2P systems, distributed hash table (DHT) routing; Vehicular ad hoc network systems; Wireless sensor networks.

Syllabus

1. Distributed time and clocks.
2. Distributed mutual exclusion, election, and agreement algorithms.
3. Inter-Process Communication (IPC) in distributed systems.
4. Client-server model and programming using RPCs (remote procedure calls).
5. Distributed file systems and transaction processing systems.
6. Vehicular ad hoc network (VANET) systems and wireless sensor network systems.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	*Coulouris, G.F, Dollimore, J., and Kindberg, T., G. Blair, Distributed Systems - concepts and design (5th Ed), Addison-Welsley, 2012*
2.	*A. S. Tanenbaum and M. V. Steen, Distributed Systems - principles and paradigms, (2nd edition), Pearson, 2007*

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	*Distributed System Course by Paul Krzyzanowski at http://www.cs.rutgers.edu/~pxk/rutgers/syllabus.html*