

# CS4273: DISTRIBUTED SYSTEM TECHNOLOGIES AND PROGRAMMING

---

## Effective Term

Semester A 2024/25

## Part I Course Overview

### Course Title

Distributed System Technologies and Programming

### Subject Code

CS - Computer Science

### Course Number

4273

### Academic Unit

Computer Science (CS)

### College/School

College of Computing (CC)

### Course Duration

One Semester

### Credit Units

3

### Level

B1, B2, B3, B4 - Bachelor's Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

EE3009 Data Communication Protocols or  
EE3015 Computer Networks or equivalent

### Precursors

Nil

### Equivalent Courses

Nil

### Exclusive Courses

EE4216 Internet Client-Server Computing

## Part II Course Details

### Abstract

This course aims to provide introduction to advanced Internet technologies and programming. Students will gain the knowledge about fundamental concepts of distributed systems, distributed system architecture, and communications between different components of distributed systems. Students will also learn the programming skill and train their problem solving ability about development of distributed systems, web-based information systems, and networking systems. We will explore the state of art of distributed systems and web-based information systems. Specifically, we will discuss the programming of clients, middle tier servers and application servers in great details.

### Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe HTTP protocols, web-based systems and Internet services.	10	x		
2	Describe the fundamental concepts and design principles of the above.	10	x		
3	Investigate and design web-based information systems and explore new system technologies.	20	x	x	
4	Program client-server systems by using communication protocols.	20	x	x	x
5	Design and implement multi-threading server programs.	20	x	x	x
6	Evaluate and design multi-tier web-based information systems.	20	x	x	x

#### 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 real-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.

### Learning and Teaching Activities (LTAs)

LTAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Lecture	Explain concepts of distributed systems and programming.	1, 2, 3, 4, 5, 6	3 hours/week
2	Tutorial	Require students participate in problem solving of distributed system design.	1, 2, 3, 4, 5, 6	8 hours/semester
3	Group Project	Design, program, and test of distributed systems.	1, 2, 3, 4, 5, 6	6 hrs/wk for 6 weeks (2 projects)

**Assessment Tasks / Activities (ATs)**

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Two projects	1, 2, 3, 4, 5, 6	30

**Continuous Assessment (%)**

30

**Examination (%)**

70

**Examination Duration (Hours)**

2

**Additional Information for ATs**

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

**Assessment Rubrics (AR)****Assessment Task**

Projects

**Criterion**

- 1.1 ability to understand concepts of distributed systems
- 1.2 ability to design, program and test of distributed system
- 1.3 ability to solve problems in design of systems

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not reaching marginal level

**Assessment Task**

Examination

**Criterion**

- 2.1 ability to understand and explain concepts of distributed system
- 2.2 ability to design and develop distributed systems in details

**Excellent (A+, A, A-)**

High

**Good (B+, B, B-)**

Significant

**Fair (C+, C, C-)**

Moderate

**Marginal (D)**

Basic

**Failure (F)**

Not reaching marginal level

## Part III Other Information

**Keyword Syllabus**

WWW, HTTP, telnet, SMTP, HTML, XML, Java event model, Java GUI, Java Applet, Java Servlet, JSP (JavaServer Page), Client-server model, Socket API, CGI (Common Gateway Interface), thread, JDBC (Java Database Connection), RMI (Remote Method Invocation).

**Syllabus**

- WWW, HTTP protocol, HTML and XML
- Java Event model and Java GUI
- Java Applet programming
- CGI (Common Gateway Interface) programming
- Sockets communication and client-server programming
- Java Servlet and JSP (JavaServer Page)
- Multi-threading and concurrent programming
- Java DataBase Connections (JDBC), 2-tier / 3-tier system design
- Java RMI (remote method invocation)

**Reading List****Compulsory Readings**

Title	
1	Deitel, et al (2005). JAVA How to Program (6/E). Prentice Hall.

**Additional Readings**

Title	
1	Nil