CS4280: ADVANCED INTERNET APPLICATIONS DEVELOPMENT

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Advanced Internet Applications Development

Subject Code
CS - Computer Science
Course Number
4280

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
CS2204 Fundamentals of Internet Applications Development
OR
(CS1103B Media Computing and
CS1303 Introduction to Internet and Programming and
CS2313 Computer Programming)

Precursors
CS2303 Data Structures for Media or
CS3201 Computer Networks

Equivalent Courses
Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims at providing an advanced study of designing and building Internet applications, with emphasis on the server-side architecture. Students should be able to set up enterprise-scale web-based services and develop application programs to support such services. Comparative study of different server-side technologies will also be included.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Explore the fundamental concepts and procedures of major server-side Internet application architectures and services.		x		
2	Build web sites that involve server-side processing.			x	
3	Write server-side processing scripts.			x	
4	Design advanced web-based application systems with state-of-the-art techniques using selected models and frameworks.			x	
5	Explore other advanced techniques of web servers, including security and cluster architecture.		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	Explore the fundamental concepts.	1, 2	3 hours/week
2	Tutorial sessions	Instructor led and self-paced laboratory exercises.	1, 2, 3, 4	8 hours/semester
3	Coursework	Problem based learning (PBL) activities in the form of projects with a substantial scope.	4, 5	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Assignment	1, 2	10	-	Yes
2	Quiz	1, 2, 4, 5	20	-	No
3	Projects	3, 4, 5	20	-	Yes

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Minimum Examination Passing Requirement (%)

30

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

Laboratory exercises conducted in tutorials

Criterion

Ability to applied to introduced concepts

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

Ability to explain the topics learned

Excellent (A+, A, A-)

High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Assessment Task
Coursework

Criterion
Ability to applied the introduced concepts

Excellent (A+, A, A-)
High

Good (B+, B, B-)
Significant

Fair (C+, C, C-)
Moderate

Marginal (D)
Basic

Failure (F)
Not even reaching marginal levels

Part III Other Information

Keyword Syllabus
Review of web server architecture and technologies. Multi-tier applications, full stack development, LAMP, .NET, Java EE & MEAN. Server-side programming models, CGI, selected server platform, template engines; Model View Controller. Security and scalability in web applications, session control, SSL, reverse proxy and server clusters.

Syllabus

- Review of web server architecture and technologies
  Comparative study of Web servers: Java based, .NET, Apache, Nginx and Node.js. Characterisation of multi-tier applications.
- Server-side programming
  Study of a selected Server side scripting technology. Template engines.
- Web systems design
  Model View Controller. Design pattern and implementation. RESTful API.
- Security aspects
  Network access control. Firewall. Proxy. Secure Socket Layer. Session Control.

- Multi-server web systems
  Performance and scalability. Server clusters.

Reading List

Compulsory Readings

	Title
1	Ihrig, Colin J. (2013). Pro Node.js for Developers. Apress
2	Mardan, Azat. (2014). Pro Express.js. Apress

Additional Readings

	Title
1	Holmes, Simon. (2016). Getting MEAN with Mongo, Express, Angular and Node. Manning Publications.