Pokhara University
Faculty of Science and Technology

Course No.: CMP 328 (3 Credit)	Full marks: 100
Course title: IT Architecture (**3-1-2**)	Pass marks: 45
Nature of the course: Theory & Practical	Total Lectures: 45 hrs.
Level: Bachelor	Program: Computer/Software/IT

1. Course Description

This course provides an in-depth understanding of IT Architecture principles, methodologies, and best practices. It covers the design, implementation, and management of robust IT infrastructures that align with business goals. Students will learn about various architectural frameworks, enterprise architecture, service-oriented architecture (SOA), and cloud architecture.

2. General Objectives

- Understand the fundamental concepts of IT architecture.
- Analyze and design IT architectures that align with business strategies.
- Apply architectural frameworks and methodologies in real-world scenarios.
- Evaluate and select appropriate technologies and tools for IT architecture.
- Design and implement scalable, secure, and efficient IT infrastructures.

3. Methods of Instruction

Lecture, Discussion, Readings, Practical works, Case Studies and Project works.

4. Contents in Detail.

Specific Objectives	Contents
Understand the IT Architecture with key concepts, evolution and IT Architecture Frameworks.	**Unit 1: Introduction to IT Architecture (9 Hours)** 1.1 Overview of IT System Security: Goals and Importance 1.2 Definition and Importance of IT Architecture 1.3 Evolution of IT Architecture 1.4 Key Concepts and Terminologies 1.5 TOGAF (The Open Group Architecture Framework) 1.6 Zachman Framework 1.7 FEAF (Federal Enterprise Architecture Framework) 1.8 Comparing Frameworks 1.9 IT Architect Roles
Understand the key concept of Enterprise Architecture and Service Oriented Architecture	**Unit 2: Enterprise Architecture and Service Oriented Architecture (8 Hours)** 2.1 Understanding Enterprise Architecture 2.2 Roles and Functions of Enterprise Architecture 2.3 Components of EA: Business, Data, Application, and Technology Architectures 2.4 EA Development Processes and Tools 2.5 Principles of SOA 2.6 Designing and Implementing SOA 2.7 Web Services and Microservices 2.8 Case Studies and Real-world Applications
Understand the idea of business architecture along with security in software development and business architecture modeling	**Unit 3: Business Architecture (7 Hours)** 3.1 Understanding the Business 3.2 Security and Software Development 3.3 Agility in Software Architecture 3.4 Software Development Methods and Practices 3.5 Business Architecture Modeling 3.6 Designing the Business Logic Architecture 3.7 Designing the Business Operation Architecture 3.8 Interoperable Data Systems 3.9 API Management and Integration
Understand the concept of IT Infrastructure Architecture	**Unit 4: IT Infrastructure Architecture (7 Hours)** 4.1 Network Architecture 4.2 Data Center Architecture 4.3 Virtualization and Containerization 4.4 Storage Solutions and Strategies

Understand the concept of security architecture in IT Architecture	**Unit 5: Security Architecture (7 Hours)** 5.1 Principles of Security Architecture 5.2 Designing Secure IT Architectures 5.3 Identity and Access Management (IAM) 5.4 Risk Management and Compliance
Understand the concept of cloud architecture	**Unit 6: Cloud Architecture (7 Hours)** 6.1 Cloud Computing Models: IaaS, PaaS, SaaS 6.2 Designing Cloud Architectures 6.3 Cloud Security and Compliance 6.4 Migration Strategies and Best Practices 6.5 Edge Computing Future Trends and Innovations

5. **Practical Works**

The practical works of 30 hours per group of maximum 24 students should cover the following lab works:

SN	Practical Works
1.	Introduction to Enterprise Architecture Tools (Hands on with TOGAF Tools E.g. Archi : The Open Source modelling toolkit for creating ArchiMate models and sketches used by Enterprise Architects everywhere.)
2.	Designing a simple IT Architecture (Creating a high-level blueprint that outlines the key components, relationships, and technologies required to support an organization's business processes, ensuring scalability, security, and efficiency. This typically includes defining the structure of the network, data flow, application integration, and infrastructure layout to meet current and future business needs.)
3.	Implementing Service Oriented Architecture (Design and deploy services as independent, reusable components that communicate over a network using standardized protocols (e.g., REST, SOAP), ensuring each service performs specific business functions and can be integrated with other services seamlessly.)
4.	Cloud Architecture LAB in AWS (Deploying a Cloud Architecture LAB in AWS involves several steps, including setting up the AWS environment, creating and configuring virtual private clouds (VPCs), launching instances, and deploying necessary services such as ELB, S3 Buckets, Auto Scaling)
5.	Security Architecture Implementation with IAM

6. List of Tutorials:

The various tutorial activities that suit this course should cover all the content of this course to give students a space to engage more actively with the course content in the presence of the instructor. Students should submit tutorials as assignments or class-works to the instructor for evaluation. The following tutorial activities of 15 hours per group of maximum 24 students should be conducted to cover the content of this course:

A. **Discussion-based Tutorials:** (4 hrs.)

1. Discuss the importance of Enterprise Architecture and Service Oriented Architecture.

B. **Problem solving-based Tutorials:** (6 hrs.)

1. Design a simple IT Architecture of an Enterprise.
2. Develop a Service Oriented Architecture (SOA) of an Enterprise

C. **Review and Question/Answer-based Tutorials:** (5 hrs)

1. Case study on Infrastructure and Cloud Architecture of an Enterprise.
2. Students ask questions within the course content and assignments and review key course content in preparation for tests or exams.

7. **Evaluation system and Students' Responsibilities**

Internal Evaluation

The internal evaluation of a student may consist of assignments, attendance, internal assessment, lab reports and project work etc. The internal evaluation scheme for this course is as follows:

Internal Evaluation	**Weight**	**Marks**	**External Evaluation**	**Marks**
Theory		30	Semester-End examination	50
Attendance & Class Participation	10%			
Assignments	20%			
Presentations/Quizzes	10%			
Internal Assessment	60%			
Practical		20		
Attendance & Class Participation	10%			
Lab Report/Project Report	20%			
Practical Exam/Project Work	40%			
Viva	30%			
Total Internal		50		
Full Marks: 50 + 50 = 100				

Student Responsibilities:

Each student must secure at least 45% marks separately in internal assessment and practical evaluation with 80% attendance in the class in order to appear in the Semester End Examination. Failing to get such a score will be given NOT QUALIFIED (NQ) to appear for the Semester-End Examinations. Students are advised to attend all the classes, formal exam, test, etc. and complete all the assignments within the specified time period. Students are required to complete all the requirements defined for the completion of the course.

8. Prescribed Books and References

Text Book

1. “*Fundamentals of IT Architecture*” by Daniel Akenine, Eva Kammerfors, Sven-Hakan Olsson, Robert Folkesson

References:

1. "*Enterprise Architecture as Strategy*" by Jeanne W. Ross, Peter Weill, and David Robertson
2. "*SOA Principles of Service Design*" by Thomas Erl
3. "*Architecting the Cloud*" by Michael J. Kavis
4. "*IT Infrastructure Architecture - Infrastructure Building Blocks and Concepts*" by Sjaak Laan
5. Online resources and industry publications