MODULE: Software Architecture & Implementation

SEMESTER I (Fall)

STAGE III

NUMBER OF CREDITS: 4 semester credits/6 quarter units

THEMES Computer Systems

ASSESSMENT Continuous Assessment 50%
Examination 50%

Aims

This module aims to: provide students with an understanding of software architecture and its underlying principles; an understanding of architectural patterns; establish an understanding of the application frameworks and the evolution of tier development; In addition, the module aims to enhance the students' programming skills by supplying practical knowledge of a given application frameworks for both two and three tier application development.

Learning Outcomes

Upon completion of this module, a student will be able to:

- Discuss the importance of software architecture.
- Explain the quality attributes of software architecture and how they can be achieved.
- Discuss what an application framework is and identify a number of application frameworks available in the current market.
- Demonstrate an ability to implement and deploy a two-tier dynamic web enabled application with database connectivity.
- Identify and evaluate possible architecture solutions for a given problem domain and interpret these solutions in respect to the ABC (Architecture Business Cycle) problem domain requirements and quality attributes.

Indicative Content

Topic	Description
Introduction to Software Architecture	What is Software Architecture; Principles of Software Architecture; The ABC (Architecture Business Cycle);
Quality Attributes of Software Architecture.	Understanding Quality Attributes: Changeability; Interoperability; Efficiency; Reliability; Testability; Reusability; Portability; Scalability; Security; Achieving Qualities;
Case Studies	Various industrial case studies that illustrate software

	architectures in practice. Showing the relationship to ABC (Architecture Business Cycle), requirements and Qualities and Architectural Solution.

Tier development	two-tier development; problems with two-tier development; three-tier development; advantages of three-tier development; problems with three-tier development; N-tier development.
Practical Implementation	Web Development**:** Programming dynamic web applications; Database connectivity from web tier; Tracking web users; Environment set up for web development: Web server set up; Database server set up; Deployment tools;
Application frameworks	What is an application framework; Different types of application frameworks; two-tier model using an object oriented application framework; application framework components;

Teaching and Learning Methods

Students will be taught using a combination of lectures, tutorials and practicals. Practical sessions will be based on lab workbooks. These will contain many small programming assignments to help the students understand the numerous programming constructs being introduced. A number of graded assignments will also be given as part of the course.

Assessment Methods

Assessment will include both a continuous component and an end of semester examination. The continuous assessment component is used to develop practical skills of programming techniques and will be based both on the lab workbooks and graded assignments / in class tests. Students will be expected to develop efficient, well-documented code, meeting accepted quality standards.

Primary Reading List

Title	**Author**	**Publisher**
Core Servlets and JavaServer Pages (JSP) (2^{nd} Edition)	Marty Hall	Prentice Hall
ASP.NET in a Nutshell	G. Andrew Duthie, Matthew MacDonald	O'Reilly
Advanced Java 2 Platform	Deitel, Deitel, Santry	Prentice Hall
Java How to Program (4^{th} edition)	Deitel, Deitel	Prentice Hall

Recommended Reading List

Title	**Author**	**Publisher**

Java Servlet Programming, (2nd Edition)	Jason Hunter, William Crawford	O'Reilly
Software Architecture in Practice (2nd edition)	Len Bass, Paul Clements, Rick Kazman;	Addison Wesley