BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
WORK-INTEGRATED LEARNING PROGRAMMES DIVISION
SECOND SEMESTER 2014-2015
COURSE HANDOUT

COURSE NO. : SS ZG653

COURSE TITLE : SOFTWARE ARCHITECTURES

INSTRUCTOR : Santonu Sarkar

Course Description

Systems engineering and software architectures; quality attributes and impact on architecture; strategies to address the quality concerns in software architecture, architectural design patterns; software design, UML basics and design patterns

Scope and Objectives

The scope of the course is primarily to understand architectural abstractions, localizing and codifying the ways components interact, and distinguish among the various ways in which architectural principles can be applied to software system and analysis and design.

At the end of studying this course, the student should be able:

- To illustrate the current state of the discipline of Software Architecture and examine the ways in which architectural design can affect software design.
- To study the various architectural styles used in software engineering.
- To understand the evaluate designs of existing software systems from an architectural perspective.
- To provide the intellectual building blocks for designing new systems in principled ways, using well-understood architectural paradigms.
- To present concrete examples of actual system architectures that can serve as model for new designs.

Prescribed Textbooks

T1. Bass, Len . Software Architecture in Practice. Pearson Education, Either 2nd or 3rd Ed.
T2. Buschmann, F. Pattern Oriented Software Architecture. Vol 1, Wiley Student Edition, 2002.

Reference Books

R1. Mary Shaw & David Garlan, Software Architecture – Perspectives on an Emerging Discipline, PHI,1996.
R2. Stephen T. Albin, The Art of Software Architecture, Wiley Dreamtech, 2003.
R3. Gamma, E. et. Al. Design Patterns: Elements of Reusable Object Oriented Software, Addison Wesley, 1995.

Plan of Self Study

S.No. And Learning Objective	Topics	Textbook Chapter Reference
1 Introduction to Software Architecture	Software Architecture and its Importance	T1 Ch 1 T1 Ch 2
2 Understanding the Various Structures and Quality Attributes of Software Architecture	Software Structure and Quality Attributes	T1 Ch3 T1 Ch4
3-5 Quality Attributes	Understanding the role of Availability Attribute Understanding the role of Performance Attribute Understanding the role of Modifiability Attribute Understanding the role of Testability Attribute Understanding the role of Interoperability Attribute Understanding the role of Security Attribute	T1 Ch 4-5
6 Introduction to Design	Introduction to OO Design	Lecture Notes
7 Introduction to UML Models	Learning about classes, objects Learning about class diagram, sequence diagram Learning about Class Responsibility and Collaboration Cards	Lecture Notes and T1 Ch-9
8 Understanding the role of Architecture Patterns	Patterns What is a Pattern and What makes a pattern? Pattern Categories Pattern Description Mud to Structure Category : Layers Pattern : Pattern Description and Examples	T2 Ch1 (1.1-1.6) T2 Ch 2
9	**Review Session**	
Syllabus for Mid-Semester Test (Closed Book) : Topics covered in S. No. 1 to 9		
10-12 Architecture Patterns	Mud to Structure Category : Blackboard Architectural Style Pipe and Filter Architectural Style Distributed System Category: Broker Architecture Pattern Interactive System Category Model-View-Controller Adaptable System Category Microkernel Reflection	T2 Ch.2
13-17 Design Patterns	What is Design Pattern? Components of a typical Design Pattern? Categories of Design Patterns (Creational, Structural and Behavioral) Creational Pattern Structural Pattern Behavioral Pattern	T2 Ch 3 Lecture Slides
18	**Review Session**	
Syllabus for Comprehensive Examination (Open Book): All topics given in the Plan.		

Evaluation Scheme:

EC No.	Evaluation Component & Type of Examination	Duration	Weigh-tage	Day, Date, Session,Time
EC-1	Quiz	Over 10 days- one time attempt	15%	1. Feb 1-10 (5%) 2. Mar 1 – 10 (5%) 3. Apr 1 – 10 (5%)
EC-2	**Mid-Semester Test (Closed Book)**	2 Hours	35%	Feb 20 – 21, 2015 (R) Mar 14-15, 2015 (M)
EC-3	Comprehensive Exam **(Open Book)**	3 Hours	50%	Apr 18-19, 2015 (R) Apr 25-26, 2015 (M)

**** For details of EC-1 Assignment/Quiz please check the WILP LMS Taxila web site www.taxila.bits-pilani.ac.in***

AN: AfterNoon Session**;** **FN:** ForeNoon Session

Closed Book Test: No reference material of any kind will be permitted inside the exam hall.
Open Book Exam: Use of any printed / written reference material (books and notebooks) will be permitted inside the exam hall. Loose sheets of paper will not be permitted. Computers of any kind will not be allowed inside the exam hall. Use of calculators will be allowed in all exams. No exchange of any material will be allowed.

Note:
It shall be the responsibility of the individual student to be regular in maintaining the self study schedule as given in the course handout, attend the online/on demand lectures as per details that would be put up in the **BITS LMS Taxila** website **www.taxila.bits-pilani.ac.in** and take all the prescribed components of the evaluation such as Assignment **(Course Page on LMS Taxila),** Mid Semester Test and Comprehensive Examination according to the Evaluation Scheme given in the respective Course Handout. If the student is unable to appear for the Regular Test/Examination due to genuine exigencies, the student must refer to the procedure for applying for Make-up Test/Examination, which will be available through the Important Information link on the **BITS WILP LMS Taxila** website **www.taxila.bits-pilani.ac.in** on the date of the Regular Test/Examination. The Make-up Tests/Exams will be conducted only at selected exam centres on the dates to be announced later.

Instructor-in-Charge