Mehran University of Engineering and Technology, Jamshoro
Department of Software Engineering

ORIGINAL SUBMITTED SYLLABUS

Title of Subject : Design and Modeling of Software Architecture

Code : SE870
Discipline : Software Engineering
Effective : 19PhD-IICT Batch and onwards
Pre-requisite : None
Assessment : 10% Sessional 30% Mid Semester 60% Final Semester Examination
Credit Hours : 03 + 0 **Marks :** 100
Minimum Contact Hours: 42

Specific Objectives of course:

The course will enable students to understand the architectural patterns, qualitative and quantitative assessment of architectures, quantitative modelling using architecture description languages and qualitative architecture evaluation methods. The course will also address the specific challenges related to scale, dynamics, and heterogeneity as found in system of systems.

Course outline:

- **Introduction**
  Engineering approach to software design, role of software architecture, role of software components, palladio approach.
- **Architectural modelling**
  Models, viewpoint, view types and views, structural viewpoints, behavioral viewpoint, deployment viewpoint, decision viewpoint
- **Architectural analysis**
  Modeling quality, quality attributes, goal-driven approach, component quality, usage profile and their propagation, execution environments, domain specific quality modeling, putting the pieces together.
- **Embedding into the software engineering process**
  Model driven quality prediction, A quality aware component-based development process, application in development process.
- **Architecture Evaluation techniques**
  Driver integrity check, Solution adequacy check, documentation quality check, architecture compliance check, code quality check
- **Domain specific modeling languages**
  System engineering applications (SysML), Embedded software domain (AADL, AUTOSAR, MARTE), service-oriented business systems engineering BPEL, BPMN, SoaML)

BOOKS RECOMMENDED

- Dorina C. Petriu, José Merseguer, and Simona Bernardi, (latest Edition), Model-Driven Dependability Assessment of Software Systems, Springer.
- Ralf H. Reussner, et al., (Latest Edition) Modeling and Simulating Software Architectures: The Palladio Approach, The MIT press.
- Christoph Rathfelder, (Latest Edition) Modelling Event-Based Interactions in Component-Based Architectures for quantitative system evaluation, KIT Scientific Publishing.
- Jens Knodel, Matthias Naab, (Latest Edition), Pragmatic Evaluation of Software Architectures, Springer.

Approval:

Board of Studies:	Res.No.01	Dated:25-09-2018
AS&RB:	Res.No.154.16(a)	Dated:04-12-2018
Academic Council:	Res.No.94.4	Dated:27-03-2019