Introduction to Systems Architecture

In recent times, we have seen development of many systems that are complex, multi-disciplinary as well as multi-functional. In this regard, civilian and military aircraft, missiles, launch vehicles, spacecraft, self-driven autonomous automobiles, robotic devices and humanoid robots, unmanned systems etc. are examples of systems that are fairly complex and aim to deliver a high degree of performance, with sufficient guarantee of success in the desired task.

An inherent feature of such complex systems is that they contain a large number of components, sub-systems, parts etc. which interface and interact with each other in a seamless manner in order to perform the designated tasks. However, in order to achieve such levels of performance, we need the design strategies that ensure that the system that is synthesized is able to deliver the desired performance with reasonable guarantees. In this regard, one such strategy is the concept of systems architecture that provides a framework for development of complex systems that have good chances of being successful.

Systems architecture is a framework that brings-in the overall philosophy of systems thinking into the development of complex systems, and thereby, enables a synthesis process that helps in reducing the gap between the user requirements and delivered performance. It is essentially a top-down design methodology that uses decomposition in an effective manner in order to achieve a homogeneous development methodology.

The present short course is intended as an introductory material with regard to the concept of systems architecture, its definition and aims to provide exposure to its constituents such as functional architecture, physical architecture, requirements architecture etc. The participants can expect to acquire basic knowledge about systems architecting and underlying principles and techniques. The course is of twelve hours duration and is delivered over six weeks.