BURGE HUGHES WALSH

SYSTEMS ENGINEERING

3-day Systems Engineering Fundamentals

Course Description

Systems Engineering is the systematic application of Systems Thinking to the design and introduction of new systems. Applied correctly Systems Engineering provides considerable strategic advantage to an organization by reducing introduction times, improving system performance and reducing through life costs. Its relevance is the only proven approach to handling risks associated with highly complex products and services.

Applying Systems Engineering correctly, however, requires not only skills and knowledge but also a profound understanding of the underlying systems principles on which it is built. Education and training are therefore critical to the development of an organizational capability in Systems Engineering. This course is about educating and training participants in how to do Systems Engineering. Along the path participants will also learn what it is and why it is like it is. Put simply; its purpose is to teach people how to design better systems.

Course Numbers and Who Should Attend?

This course is derived from our most popular offering; the 5-day Systems Engineering Fundamentals course and can be delivered to up to 20 participants. This course applies equally to the design of product-based as to service or process-based systems. The course is therefore suitable for all personnel involved in the introduction and through life support of any complex system. It is specifically aimed at those people who wish to practice or would like to practice a systems approach to system design.

Benefits to the Individual and Business

During an intensive three days of teaching and practical 'hands on' exercises, participants will be challenged to develop the skills and mindset that can be applied to any system design irrespective of type, scale or context.

At the end of the course participants will have:

- A greater understanding of systems concepts and thinking that underpin Systems Engineering.
- A profound understanding of the fundamental Systems Engineering processes
- Improved knowledge and skill in applying Systems Engineering tools to:
  - Gather and Analyse Requirements
  - Create System Concepts
  - Optimize Systems Design and subsystem specification
  - Confirm through Verification and Validation

Learning Approach

This course can be delivered remotely online or face-to-face on the client's site or preferred venue. The learning approach is based on the Kolb learning cycle with a significant proportion of the course set aside for exercises to reinforce the learning. Indeed, many of the small group exercises involve a case study that provides a practical focus for the course and enables the delegates to practise the methodology and tools presented. We offer a number of case studies that can be selected to reflect the client's organization.

Course Agenda

Day 1

- Introduction and Delegate expectations
- Why Systems Engineering
  - Complexity and Undesirable Emergence
- Systems Thinking Concepts used in Systems Engineering
- This is Systems Engineering
  - Process
  - People
  - Tools
- A Systems Approach to Requirements
  - Requirements Issues
  - Requirement Models
  - Requirements Engineering
- Gather Requirements
  - A Systems Approach to Collecting Stakeholder Needs—the Rationale and Process

Day 2

- Day 1 Review
- Specifying Stakeholder Requirements
- Analyse Requirements
  - Analyse Stakeholder Requirements
- Analyse Requirements
  - Deducing Unspoken Basic Requirements using Viewpoint-Analysis
- Analyse Requirements
  - Understanding the concept of operation using Functional Modelling
- Analyse Requirements
  - Finding and avoiding undesirable behaviour using Sensitivity and Failure Analysis by FMEA
- Specifying Systems Requirements

Day 3

- Day 2 Review
- A Systems Approach to Systems Design
- Design System
  - Generating System Concepts
  - System Architecting using N^2 Analysis
  - Concept Generation using Morphological Analysis
- Design System
  - System Concept evaluation and selection using a Pugh Matrix
- Design System
  - A Systems Approach to Detailed Design
  - Introduction to Robust Design
- Confirm System
  - A Systems Approach to Verification and Validation
  - Design Verification through Quality Function Deployment
  - Determination Testing
  - Progressive Validation
- Summary, Review and Close

Course Delivery and Costs

The cost of delivering the 3-day course, excluding delivery tutor-consultant accommodation and expenses, but including all courseware, is **£6,500.** VAT will apply at the prevailing rate.

The course can be tailored to suit individual customer's engineering lifecycle and review processes.

BURGE HUGHES WALSH

QAS INTERNATIONAL ISO 9001:2015 REGISTERED FIRM

ENDORSED TRAINING PROVIDER

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