Applied System Engineering

Stellenbosch University

Department of Industrial Engineering

9-12 June 2014

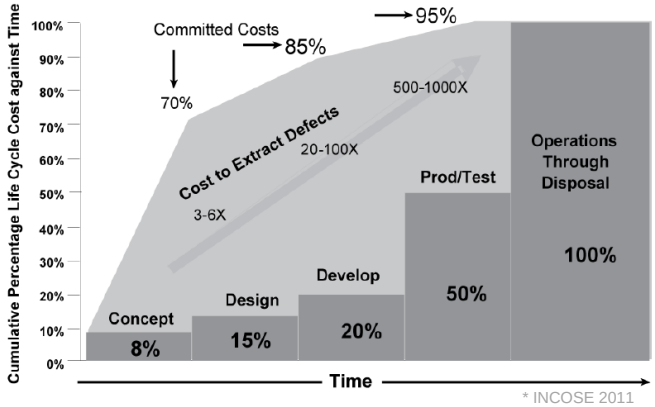
Overview

"Systems Engineering (SE) is an interdisciplinary approach and means to enable the realization of successful systems. It focuses on defining customer needs and required functionality early in the development cycle, documenting requirements, and then proceeding with design synthesis and system validation while considering the complete problem: operations, cost and schedule, performance, training and support, test, manufacturing, and disposal. SE considers both the business and the technical needs of all customers with the goal of providing a quality product that meets the user needs." (INCOSE 2011)

This course is intended to be the leading high level course on how the principles of System Engineering can be applied in practice to:

- enable organisations to design products and services focusing on the most important customer needs,
- decrease project cost & schedule overruns, and
- ultimately increase the profitability of the organisation.

The course specifically focus on the initial stages of a product or service's life cycle, where customer needs are formulated and translated into functional specifications. Quality decisions during these initial stages are critical, as the largest part of the life cycle cost are committed through these early decisions, as shown below.



* INCOSE 2011

Several synergistic system engineering tools/practices will be introduced, ranging from lateral thinking and concept generation tools to development approaches like Agile and the principles of lean.

The content is based on the ISO 15288:2008 standard, "Systems and software engineering – System life cycle processes"

Top learning objectives

Day 1	The principles of System Engineering
Day 2	User requirements elicitation & analysis
Day 3	Project scoping & concept generation towards system specifications
Day 4	Life-cycle based development approaches & group dynamics

Who should attend

Software & hardware product developers / engineers, business & systems analysts, managers and others professionals involved in translating user & business needs into technical systems

Admission requirements

The standard post graduate admission requirements of the Industrial Engineering department applies. Prospective students must hold either a B.Eng, BSc (Hons), applicable 4-year Bachelor's degree, PDE or MTech.

In exceptional cases students without one of the mentioned qualifications will be permitted on this post graduate course. Please contact B Bekker for assistance with admission.

Certification and Costs

Two levels of certification are available for the course:

Certificate of Attendance **R 10,750 per delegate**
Attending all four days of the course and participating satisfactorily in the individual & group assignments. Missing any session or part thereof will disqualify the student of receiving the certificate.

Certificate of Competency **R 12,950 per delegate**
Attending all four days of the course, participating satisfactorily in the individual & group assignments and passing a three hour exam on all material covered in the course on day four.

Morning tea & lunch are included in the course fee.

Course programme

** The course content and/or order of presentation might have to be altered slightly depending on logistical constraints.*

Day 1 System Engineering Overview

8:30	9:00	Registration
9:00	14:00	System engineering overview - Definitions - Systems thinking - ISO 15288:2008 standard - The hierarchy of systems & System of Systems - Life-cycle stages & decision gates - Technical Processes
14:00	17:00	Introduction to group project Group assignment: Exploratory Research Individual assignments

Day 2 Formulating User Requirements

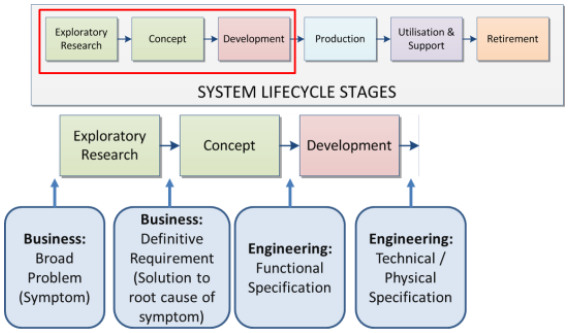
8:30	14:00	Feedback presentations and discussion on group assignment De Bono's Lateral thinking techniques & exercise Rational design and how to fake it (or why all models are wrong) User requirements analysis
14:00	17:00	Group assignment: Requirements baseline Individual assignments

Day 3 Through Concepts to System Specification

8:30	14:00	Feedback presentations on group assignment Peer review using De Bono's thinking hats Project scoping & architecture Concept generation tools
14:00	17:00	Group assignment: Functional baseline Individual assignments

Day 4 Development approaches & Tailoring

8:30	14:00	Feedback presentations on group assignment Life-cycle based development approaches Lean principles in system engineering Group dynamics & The Thinking Environment
14:00	17:00	Exam for students requiring the certificate of proficiency or post graduate credits. All material covered in the course will be tested in the exam.



Registration

Contact the Industrial Engineering post-graduate administrator, Amelia Henning, on (021) 808 4240 or ah2@sun.ac.za to register for the course.

Please indicate your desired level of certification clearly. Only 20 seats are available for participants not registered as students at SUN.

Course material

A selection of relevant course material will be made available to the student before the course commences.

Lecturer

Bernard Bekker
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