ENTERPRISES
University of Pretoria



Systems Design

Presented by the Graduate School of Technology Management, University of Pretoria

5 CPD points from ECSA

Although most engineers and technical specialists, as part of their initial engineering studies, are taught how to design products and solutions, most are not taught the importance of higher system level design and the functional integration that is a prerequisite for a successful outcome. The certificate in Systems Design focuses on three important aspects that need to be achieved to ensure a successful product. These include *Systems Engineering Fundamentals* (that introduce delegates to the important processes and tools of systems engineering) and *Systems Architectures and Design* (that introduces the delegate to the more popular architecture frameworks such as Zachman and TOGAF and their use to systems designers). These two modules link well to the modules addressing requirements engineering (addressed by the certificate in Requirements Engineering), while the last module in this focus area addresses the important theme of *System Test and Evaluation*. This is a key element in any product's development as no amount of design can make up for poor or incomplete testing against specifications in a representative environment.

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Course content

The certificate comprises of the following modules and related content:

Systems Engineering Fundamentals 3 days	Systems Architecture and Design 3 days	Test and Evaluation of Systems 2 days
• Role of systems engineering in successful projects • History of systems engineering • Introducing the system life cycle model • Systems engineering processes, overview of popular models • Moving from requirements to solution to product • Integration of speciality engineering • Introducing model-based systems engineering • Advanced systems engineering concepts • Systems engineering standards • Case studies	• Fundamentals of system architecting • Architecture frameworks (Zachmann, TOGAF, DODAF, MODAF) • Developing a system architecture • Overview of system architecting tools • Case study and practical exercises	• Why is test and evaluation important? • Proceeding from system design to test and evaluation • Test planning • Test design • Role of modelling and simulation • Dealing with test and evaluation of software; why is it different? • Case study

Learning outcomes

After successfully completing the modules, delegates will be able to

- tailor a system engineering process to fit the specific needs of a project
- define an appropriate systems architecture for the product, in accordance with best practice framework standards, and
- define the requirements of testing and evaluation during both the development progress of the product as well as final representative testing in an environment close to that which the product would experience during use by the client.

Course fees

R26 285 per delegate (VAT incl.)

Course fees include all course material, lunch and refreshments.

Accreditation and certification

Enterprises University of Pretoria (Pty) Ltd is wholly owned by the University of Pretoria. As a public higher education institution, the University of Pretoria functions in accordance to the Higher Education Act 101 of 1997. Enterprises University of Pretoria offers short courses on behalf of the University and these short courses are not credit-bearing, and do not lead to formal qualifications on the National Qualifications Framework (NQF) – unless stated otherwise. Delegates who successfully complete a short course and comply with the related assessment criteria (where applicable) are awarded certificates of successful completion and/or attendance by the University of Pretoria.

Registration and enquiries

Course coordinator
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Shifting knowledge to insight

Systems Design

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Course presenters

Dr Jörg Lalk (PrEng)
Senior lecturer
University of Pretoria Graduate School for Technology
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Dr Lalk participated in the founding of the university's new Institutional Research Theme on Energy. His research interests include systems engineering and the techno-economic modelling of energy systems. He boasts more than 30 years' experience in systems engineering, engineering management, project management and the management of strategic technology programmes in the aerospace, automotive, ICT, consulting and energy industries.

Memberships

- Senior member of the IEEE (Institution of Electrical and Electronic Engineers)
- Founding member and past-president of the South Africa Chapter of INCOSE (International Council of Systems Engineers)
- Associate-Director for Technical Review of INCOSE

Dr Siebert Benade
Programme Director: Master's Programmes
University of Pretoria Graduate School for Technology

Dr Benade participated in and managed a wide variety of projects for 35 years in government, parastatal, academic and private sector environments. He worked in areas such as system development, manufacturing, logistics and information management. He was involved in business consulting for 7 years, focusing on enterprise architecture, process and system design and modelling.

Dr André van Heerden (PrEng)
Independant Consultant

Dr van Heerden is a registered Professional Engineer with 39 years of experience in the design, development, optimisation, manufacturing, maintenance, test and evaluation and qualification of SSC (Systems, Structure and Components). His has extensive theoretical knowledge and experience brought on by his career exposure and growth in various job roles throughout his career. He is currently working on a project evaluating the significance and the effect of weld flaws within in a high temperature (creep and fatigue) environment, as experienced in a modern super critical power boiler. He has the ability to utilise theoretical models and its physical hardware counterpart interactively when designing, developing, optimising and evaluating SSC. His knowledge and experience enabled him to perform failure investigations and trade-off studies, which includes consulting work for companies local and abroad.