

SYNTHEsys SYSTEMS ENGINEERING SERVICES
BROCHURE



SyntheSys
SYSTEMS ENGINEERING

EXPERTISE | INNOVATION | INTEGRITY

OUR MISSION

To increase our Customers' success by delivering best value, quality systems engineering services based on an ethos of integrity, independence, innovation, expertise, and assisting the local communities in which we operate.

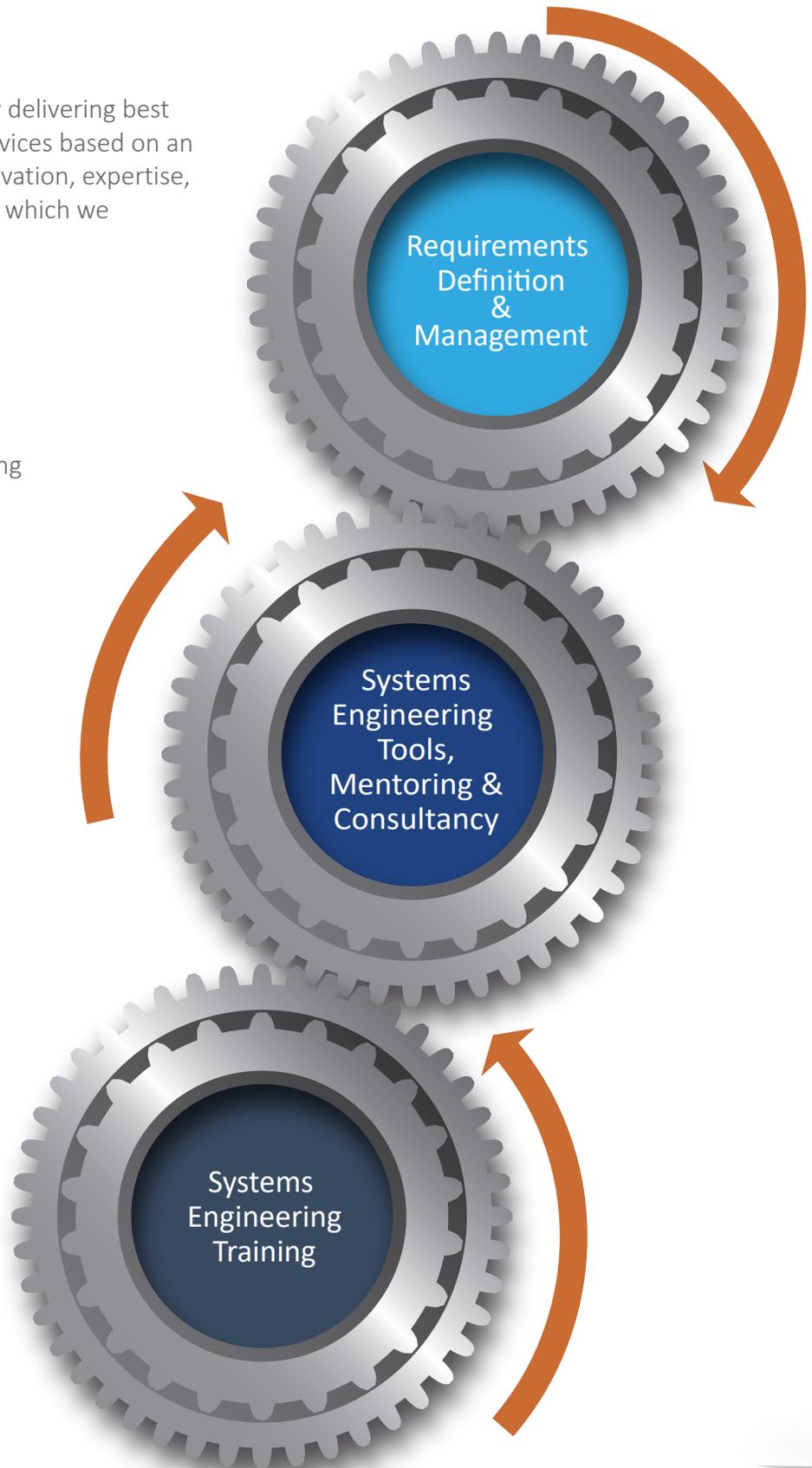
ABOUT US

SyntheSys provides systems engineering services to governments and industry around the world. Along with distinct support and consultancy services, our innovative product range makes us first choice provider for both large and small organisations.

Established in 1988, the company combines technical expertise with intuitive software applications to solve industry challenges.

OUR SOLUTION

SyntheSys has more than 25 years' experience in providing systems engineering solutions to government and industry. We focus on tool supported systems engineering where we take world-class development tools and team them with our mentoring services and training packages to give our customers a competitive advantage.



UNDERSTANDING SYSTEMS ENGINEERING

Systems engineering can be considered from several perspectives: the development and realisation of systems that satisfy the stakeholder or customer needs; the application of processes that regulate the systems engineering actions; the consideration of the system under development as a whole rather than constituent parts.

The life cycle of a system determines the stages through which the system will progress, as moderated by decision gates, addressing business case, budget and technical aspects at appropriate points in the journey from concept to retirement.

Generic life cycle stages are:

- Concept: consideration of innovative technologies, operation, use and disposal concepts, stakeholder requirements and prototyping;
- Development: system requirements, design, implementation, integration with verification and validation;
- Production: produce and verify;
- Utilisation: operation of the system in its intended environment;
- Support: maintenance and support to ensure continued operation for the intended period;
- Retirement: removal of the system from operation in compliance with contractual and environmental obligations.

The conduct of a systems engineering project is a balance between the application of systems engineering effort through process and the cost effectiveness of the final product.

We have a variety of different tools, services and training solutions as detailed in the following pages, which support the systems engineering life cycle.

SYSTEMS ENGINEERING CONSULTANCY & SERVICES

We help organisations overcome a plethora of organisational challenges by teaching teams how to effectively manage software and systems development processes.

Our consultancy and support services focus on best practice systems engineering, the role that it plays within an organisation and how this can be developed and improved to achieve wider commercial objectives.

Central to our mentoring service is our team of specialists. We have some of the UK's most recognised technical specialists who offer years of industry experience and unrivalled knowledge of systems engineering processes and tools.



We deliver our services by embedding ourselves within development teams, or alternatively, on an off-site call-out basis.

Our capabilities lie in:

PROBLEM DEFINITION & STAKEHOLDER NEEDS

For any systems engineering project it is critical that the problem is correctly defined and stakeholder needs captured at the outset of the project. Without clearly defined and understood stakeholder needs it is difficult to proceed through the engineering life cycle with confidence. We are experienced in the problem definition and needs capture process through delivery of workshops to elicit the stakeholder needs effectively.

REQUIREMENTS DEFINITION & MANAGEMENT

Requirements definition and management is the basis for managed systems or software development. We have supported this process for many years across several industrial domains. SyntheSys has unrivalled experience in the use of IBM® DOORS® which is a market leading requirements management software application.

ARCHITECTURE DEFINITION & IMPLEMENTATION

Following the guidance of ISO/IEC/IEEE 15288:2015 and with INCOSE systems engineering certified professional status, our consultants can support the development process aligned with the requirements specified.

VERIFICATION & VALIDATION PROCESS

Management of requirements as they flow through the life cycle from Customer to System to Component, helps to ensure that the “right product is built” through validation. Verification is concerned with ensuring that “the product has been built right”. SyntheSys has been engaged across multiple domains in the verification and validation of requirements and therefore the implementation of the solution.

ISO = International Organization for Standardization
IEC = International Electrotechnical Commission
IEEE = Institute of Electrical and Electronics Engineers
INCOSE = International Council On Systems Engineering

CUSTOMERS

Our customers are at the core of everything we do. We make it our business to understand the common challenges and problems which affect our customers and make it our mission to help solve those problems. Advancements in our tools, training and consultancy have customer requirements at the centre. We have established a loyal customer base which stretches across many different industries, from major 'blue chip' organisations to smaller family owned companies.

OUR CUSTOMER SUCCESSES

Transport for London - A Complex Requirement

Transport for London (TfL) runs the day-to-day operation of the Capital's public transport network and manages London's main roads. Every day more than 31 million separate journey segments are made across TfL's network. The services TfL operates include: London Underground, London Buses, Docklands Light Railway, London Overground, TfL Rail, London Trams, London River Services, London Dial-a-Ride, Victoria Coach Station, Santander Cycles and the Emirates Air Line. It is a huge and complex organisation part funded by the Government with the associated public pressures to succeed. SyntheSys was the successful candidate for winning the TfL two-year contract providing the Hosting environment for IBM® Rational® DOORS® on the cloudbaSE Software as a Service (SaaS) solution. TfL has outsourced this service for many years because this reduces overheads and is more economic than providing the service in house.

A Customer View

Graeme Pate who is a Systems Engineer at TfL, spoke to us about the complexities of managing systems engineering programmes at this level, and why development tools are paramount to success. He said...

"The complex nature of TfL's major projects means that robust requirements management is essential to success. DOORS® is an integral part of the requirements management process on our most complex projects, providing baselining, configuration control and the ability to link related information to each other. This facilitates an efficient impact assessment and configuration control process and is far superior to other less integrated products. Verification and validation processes are also made easier by having a clear, controlled and traceable set of requirements and ultimately leads to a simplified project completion and closeout."

Our SyntheSys representative said: "Instead of having licences and environment managed internally which would involve the costs for staffing and internal system support costs, TfL has chosen SaaS and bring their own licences to cloudbaSE. The cloud solutions are the way forward when managing data and files in the future. Our cloudbaSE environment provides a secure and compliant environment with a flexible approach."

The Bring Your Own Licences system means that companies who already have licences can utilise those exact licences within the Cloud and create a level of flexibility above on-premise software. This also saves time because applications can be brought into use faster and the infrastructure can be adjusted rapidly to meet varying demand. It is also very easy to increase and decrease both licensing and performance as needed. Finally, the application can be made available to a user anywhere in the world with internet access.

SyntheSys Support for Jaguar Land Rover

As an IBM® Gold Business Partner with an acknowledged and certified expertise with IBM Watson Internet of Things (IBM Watson IoT™) Rational® DOORS®, SyntheSys is proud to be supporting one of the most pioneering automotive manufacturers in the world, Jaguar Land Rover (JLR).

JLR is an extensive user of IBM® requirements management solutions within the engineering business.

Following a rapid expansion in staff, it was identified that the actual process and methodology for writing requirements within the organisation would benefit from a consolidated and coherent approach. Working with IBM® and JLR, a one-day training course was devised and maintained in the principles of requirements writing, which focuses on the underlying methodology regardless of tool usage.

In recognition of our skills in this area teamed with our systems engineering training capabilities, we have successfully delivered 60 one-day courses to over 800 employees at JLR.

INDUSTRIES

We successfully serve, and are proud to supply, some of the leading organisations in:



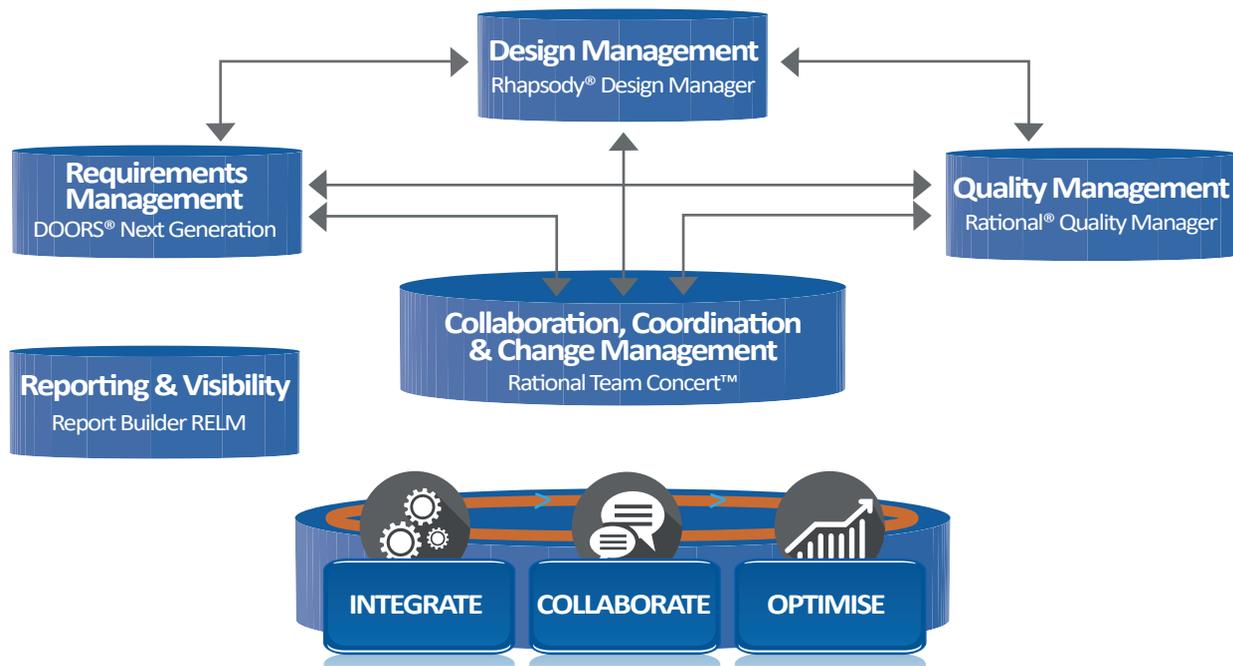
TOOL SUPPORTED SYSTEMS ENGINEERING

The ISO/IEC/IEEE 15288:2015 ‘Systems and software engineering - System lifecycle processes’, provides a wealth of guidance in the delivery of systems engineering projects across the entire life cycle. Having the processes identified and documented provides considerable governance to the development of systems as defined by the standard.

The next step in optimising systems engineering project development is the use of appropriate software tooling that supports the defined processes and helps in the collaboration of effort across the life cycle.

One of our key areas of expertise within the systems engineering life cycle is with Requirements Management, supported by IBM® DOORS® and DOORS® Next Generation software. The definition, management and maintenance of traceability of requirements is critical in the verification and validation of the product. The ability to collaborate across the life cycle process, with connected data and visibility of that traceability from requirements to design and requirements to verification, is an accelerator for systems development, while providing configuration management, change control, project planning and workflow control.

SyntheSys consultants utilise best practice systems methodology from the process standard and implement the IBM® Collaborative Lifecycle Management (CLM) solution to support the development of products for our clients.



Best of breed capabilities, integrated on a common platform

IBM® GOLD BUSINESS PARTNER

As an IBM Watson Internet of Things (IBM Watson IoT™) Gold Business Partner, SyntheSys provides a unique blend of application knowledge, experience and a flexible delivery mechanism, which provides customers with the right software solution and a deeper understanding of the tools to ensure maximum benefit.



Our ability to work with IBM® to distribute Watson IoT™ software is built on a firm foundation of industry know-how and extensive knowledge of the IBM Watson IoT™ tools which enables us to distribute the tools in a value added way. Our broad expertise of IBM® Rational® DOORS®, DOORS® Next Generation (NG), Rational Team Concert™ (RTC) and Rational® Quality Manager (RQM), makes us best placed to offer a value added service throughout the IBM Watson IoT™ community. Our offerings stretch much further than deployment of technology.

IN THE SPOTLIGHT - DOORS® Next Generation

DOORS® Next Generation is a powerful tool for requirements management. It allows you to optimise, communicate and verify your requirements whilst providing an automated way of collaborating with your team. The tool is designed to capture, trace, analyse and provide a more effective way of managing your overall software and systems requirements.

- *Helps to recycle requirements*
- *Facilitates collaboration on requirements and sharing of requirements*
- *Integrates with other commercial databases and third party development life cycle tools*
- *Provides a shared platform which allows you to manage quality, design and the configuration of applications more effectively*
- *Offers powerful, built in task management functionality*

cloudbaSE - A SYNTHESYS SOLUTION

cloudbaSE: Flexible Delivery for IBM Watson IoT™ Toolset

Software and systems delivery is changing to adopt agile and continuous engineering approaches. A flexible and effective infrastructure to support these approaches is critical to success.



Welcome to **cloudbaSE**, SyntheSys' Software-as-a-Service licensing toolset for IBM® software. Gone are the days when software was purchased and maintained on an annual basis using unreliable usage forecasts; software licences can now be rented 'on demand' matching actual usage with actual licences.

What are the tools?

cloudbaSE offers world-class tools which accelerate effective software and systems delivery, fundamentally improving output quality.



It is well known that requirements management, definition and engineering practices are the foundation of project success. Our **cloudbaSERM** tool, using IBM® DOORS® and IBM® DOORS® Next Generation best practices to requirements management, are proven to save time and money by helping to avoid unnecessary development costs as a result of poor requirements management practices.



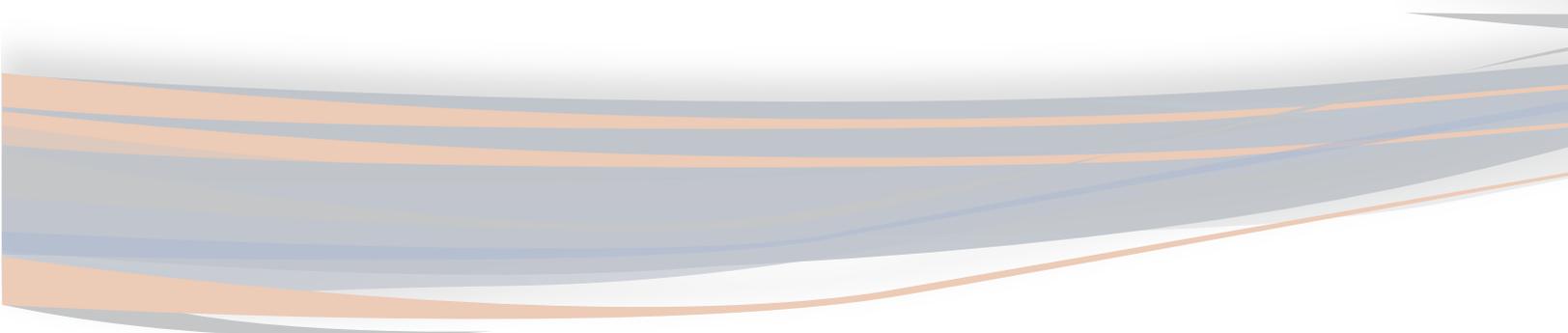
Built around IBM® Rational Team Concert™, **cloudbaSEPM** offers change, configuration and release management solutions which improve quality, increase productivity, unify work teams, automate development processes, and provide traceability across the system and software development life cycle.



Our **cloudbaSEDM** is built around IBM® Rhapsody® and provides a systems and software engineering solution that supports the requirements capture, design, implementation, testing, and maintenance phases of the development life cycle, helping to create end-to-end collaboration and performance.



cloudbaSEVM facilitates Testing & Validation Management which transforms the way teams work together to deliver quality across systems and software delivery life cycles from requirements, development, validation assurance, security and compliance to deployment. All this is done using proven IBM® Quality Manager functionality.



IBM® DOORS®

Requirements Manager

IBM® DOORS® provides an effective way to manage requirements, improves staff efficiency and enhances overall project output. The tool automates the requirements management process and enables your teams to concentrate on building the right product, not spending time on manual tasks and rework.

- Improves the overall quality of the systems and software you deliver to your customers.
- Facilitates collaboration by providing transparency throughout the development process.
- Effective change notification allows you to analyse and administer change management.
- Enables you to respond to changes to requirements in a more controlled, effective way.
- Helps you to provide evidence of regulatory compliance.
- Integrates seamlessly into your development, test and design environments and creates a level of traceability throughout the life cycle.

IBM® Rational® Rhapsody®

Design Manager

IBM® Rational® Rhapsody® (with Design Manager) provides proven functionality for modelling and design management. The suite of tools offers development, design and test environments for software and systems engineers and teams. The Rhapsody® suite supports SysML, UML and AUTOSTAR whilst facilitating control of defence frameworks and industry standards.

The tool allows you to manage complexity within your software and system development processes.

- Collaborate, share and review artefacts created within Rhapsody® or other tools.
- Ongoing validation through prototyping, swift simulation and execution to tackle errors effectively.
- Autonomous cross-checking to increase and enhance agility and promote reuse.
- Helps to reduce both recurring and non-recurring costs.

IBM® Rational® Quality Manager

Quality Manager

To achieve quality driven software and systems, development teams need to collaborate, share information and adopt a level of automation throughout the software & systems development process. Rational® Quality Manager offers test planning, test construction and test artefact management functions, which helps quality assurance teams collaborate, automate and govern more effectively.

- Uses comprehensive and customisable test plans to track quality driven software delivery.
- Provides powerful dashboards which present data and information in a more productive way.
- Offers test execution schedules which helps in optimising environment coverage.
- Facilitates collaboration of geographically dispersed teams through a web interface.
- Helps with test scheduling and execution through physical and virtual lab assets.
- Provides manual test authoring with rich text and inline images for exact test definition.

IBM® Rational Team Concert™

Project Management

IBM® Rational Team Concert™ facilitates individuals and teams to collaborate to build better software and systems by aligning development environments. The tool provides an all-in-one common platform where the user can manage workspaces and software version control more effectively whilst facilitating development support.

- Promotes consistent processes which improves overall software and systems quality.
- Improves productivity and flexibility with an open standard-based platform.
- Improves real-time collaboration for distributed project teams.
- Gives teams a greater level of transparency with health information and status transparency.
- Offers integrated source control, work item and build capabilities.

IBM® Rational® Publishing Engine

Document Generation and Automation

IBM® Rational® Publishing Engine offers powerful, automated documentation generation functionality which helps organisations generate documents for in-house review purposes, contractual obligation, or compliance with standards.

- Synchronised document generation to meet the needs of your stakeholders from a single template, which reduces the risk of error.
- Various output formats which can be presented in multiple ways, to improve customer communication and satisfaction.
- Allows you to integrate data from multiple sources to create reports and automatically generate required documents.

IBM Watson Internet of Things (IBM Watson IoT™) Rational® DOORS® 9 Training Course

This 2-day course aims to equip students with a fundamental knowledge of DOORS® 9 and its constituent processes, in order to enhance requirements management procedures within software and systems development teams.

The course combines real-world scenarios with theory, presented by a DOORS® specialist, to provide students with a unique learning experience, which will enable them to use the tool with more confidence and efficiency. The course examines: why effective requirements management is so important; and the various stages of the process. We then go on to map DOORS® functionality onto this process, which will give students the ability to utilise the tool in order to have greater control of requirements. The course teaches how to implement a formal and unified process, whilst reducing time and effort spent on requirements. We also examine how to work smarter with configuration and work management.

IBM Watson Internet of Things (IBM Watson IoT™) DOORS® Next Generation (NG) Training Course

This 2-day course is aligned with the topics and processes covered within the DOORS® 9 course. However, the DOORS® NG, course focuses on the usage and application of DOORS® NG, for effective requirements management procedures.

DOORS® eXtension Language (DXL) Training Course

This 2 to 4-day course aims to equip students to extend the functionality of DOORS® 9 using the DOORS® eXtension Language (DXL), to enhance requirements management and related processes. DXL is a proprietary language used only by DOORS®. The course is tailored to the needs of a group of attendees, focusing on those capabilities in DXL that are most relevant to a particular role or task. It is presented by an IBM®-trained technical specialist, experienced in writing DXL, to ensure that attendees get the most out of their time. The aim is to give students a capability in relevant aspects, rather than progressing through disjointed, functional views of DXL. The course examines the fundamentals of the language, accessing DOORS® database items (Modules, Objects, Links, etc.), storing and retrieving data, building custom user interfaces, importing and exporting data, and more. Each taught unit contains at least one exercise, where you can verify your learning. Model answers are provided for you to take away.

IBM Watson Internet of Things (IBM Watson IoT™) Rational® Publishing Engine (RPE) Training Course

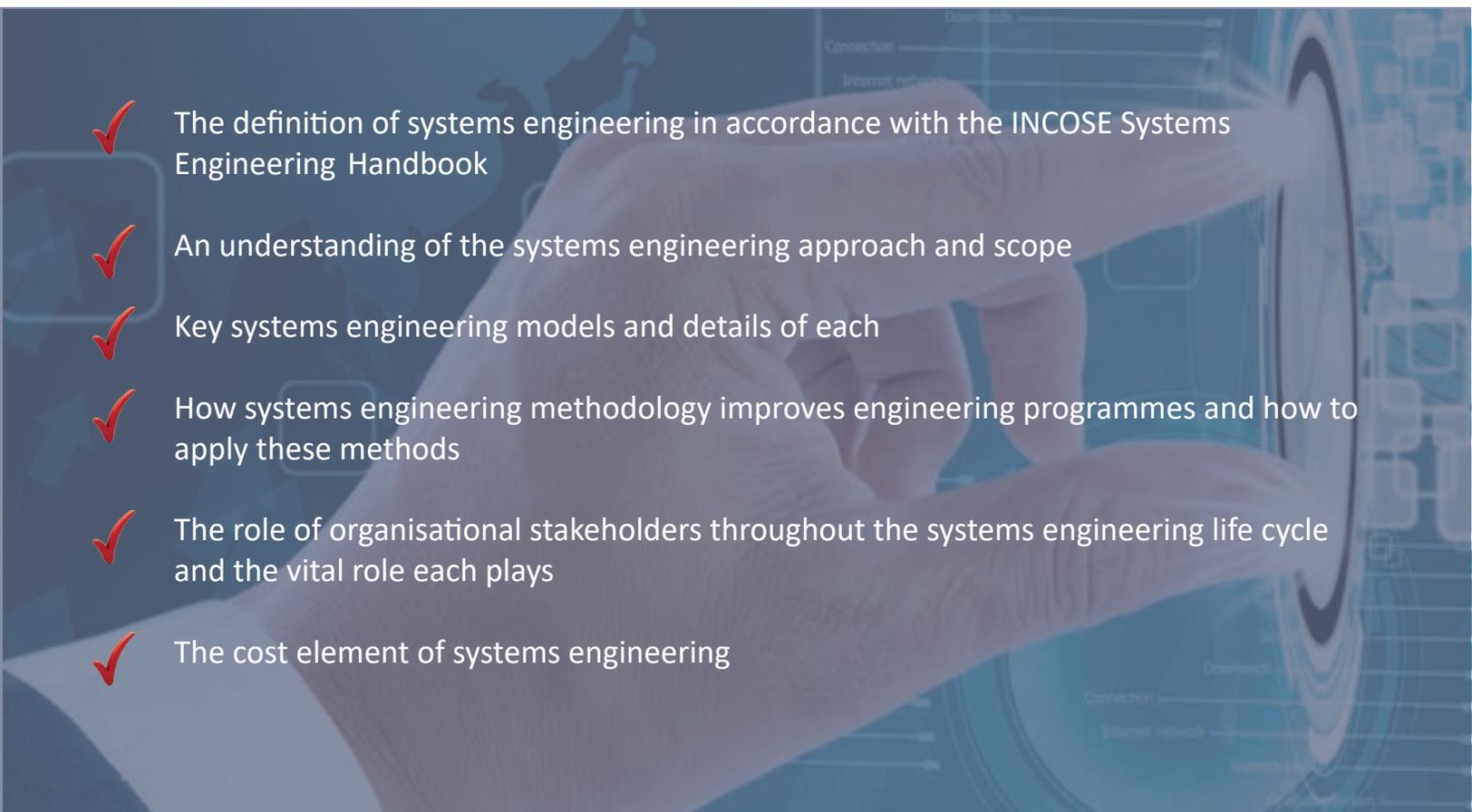
This fully customised 2-day course is designed to familiarise and teach students about creating, editing and using RPE templates to support and enhance reporting programmes. The course equips students with the knowledge and practical skills to be able to establish a reporting mechanism that incorporates data from other tools such as DOORS® 9, DOORS® NG, Rational Team Concert™ (RTC™) or Rational® Quality Manager (RQM). Students will learn about the RPE tool via interactive demonstrations, tutorials and practical exercises. The course is customisable based on customer requirements relating to other tools they may be using.

SYSTEMS ENGINEERING FOUNDATION COURSE

Our Systems Engineering Foundation course has been designed to provide a high-level foundation to the principles and practices of systems engineering. The course is aimed at those whose role heavily integrates with a software or systems development process and is suitable for both engineers and non-engineers at all levels.

The course content is aligned with the INCOSE Systems Engineering Handbook V.4 and provides an introduction and overview of the processes required for successful systems engineering delivery of projects. Presented by an experienced systems engineering practitioner, the course examines the role and benefits of applying systems engineering principles within your organisation.

WHAT STUDENTS LEARN

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- ✓ The definition of systems engineering in accordance with the INCOSE Systems Engineering Handbook
 - ✓ An understanding of the systems engineering approach and scope
 - ✓ Key systems engineering models and details of each
 - ✓ How systems engineering methodology improves engineering programmes and how to apply these methods
 - ✓ The role of organisational stakeholders throughout the systems engineering life cycle and the vital role each plays
 - ✓ The cost element of systems engineering

“Instructor had very good knowledge of subject matter and delivered subject in a clear concise way.”

Student on our Systems Engineering Foundation course - March 2018

ASSOCIATE SYSTEMS ENGINEERING PROFESSIONAL (ASEP) / CERTIFIED SYSTEMS ENGINEERING PROFESSIONAL (CSEP) EXAM PREPARATION

Prepare to pass the certification examination. This 5-day course equips students with the knowledge and structure of the INCOSE Systems Engineering Handbook and its constituent processes to prepare for the ASEP/CSEP examination. The course combines real-world scenarios with theory to provide students with a unique learning experience which will enable them to comfortably sit the INCOSE CSEP examination.

The ASEP certification is an entry level certification and does not require leadership experience, or any other entry level education. The CSEP certification requirement is the same as for ASEP. However, to gain CSEP, previous experience, as well as knowledge of the INCOSE Systems Engineering Handbook, is assessed by INCOSE.

WHAT STUDENTS LEARN



An understanding of the significance of the CSEP certification



How to apply processes from the INCOSE Systems Engineering Handbook



How to define and recognise the part systems engineering plays within your organisation



An understanding of the different elements of the systems development process



How to apply the knowledge you gain to your day-to-day role



At the end you will be able to confidently sit the CSEP examination having gained knowledge and skills over the 5 days of the course

Top learning outcomes from students who attended one of our CSEP courses during 2017 included:

“Better understanding of life cycle processes”; “Overview of INCOSE” and “Insight of SE (Systems Engineering) in different engineering industries”.



Our new SyntheSys Systems Engineering LinkedIn Showcase page is now live

To see useful content and interesting updates from our Systems Engineering group, such as best practices in Collaborative Lifecycle Management, Requirements Management, and Verification and Validation, please follow our new page - <https://bit.ly/2JAC2Ls>

follow us on
LinkedIn





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