

# Systems Thinking Practitioner Apprenticeship



Resilience, sustainability, engineering, and security within contemporary societies require ways of thinking and communication that support the identification and resolution of complex, wicked problems. This series of courses provides an introduction to, and practice of, the methods and techniques, supported by relevant systems science and theory to address the complex problems experienced within our interconnected world. It has been designed to meet the Knowledge, Skills, and Behaviour requirements of the Institute for Apprenticeships Systems Thinking Practitioner Standard<sup>1</sup>.

This is an exciting, new, and very practical apprenticeship, and the benefits of this are: personal skills development, practical application in the workplace, employer support, a minimum of 20% off the job hours to support the training, and Cranfield expertise and support for the apprentice through to successful completion of the End Point Assessment.

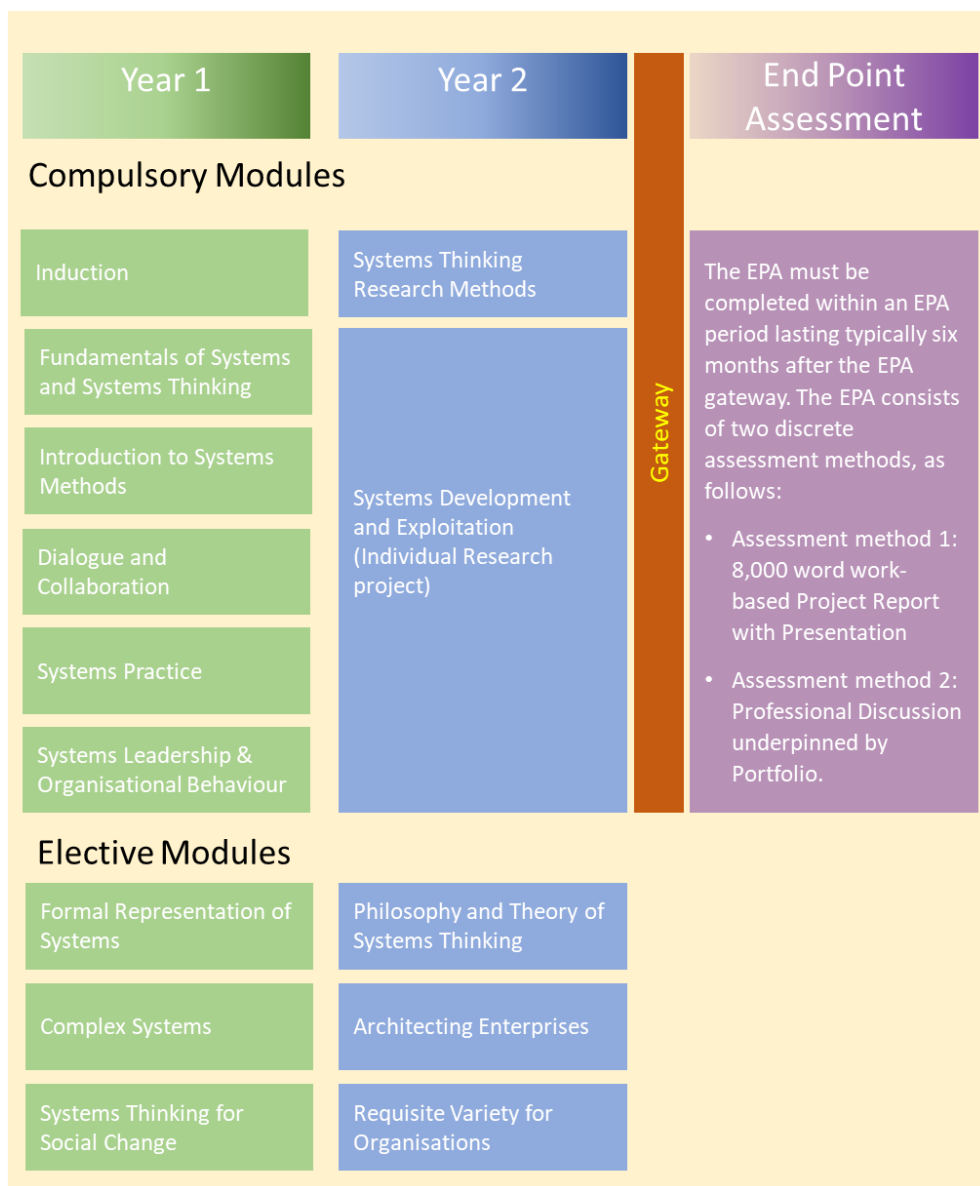


Figure 1 - Outline Programme

<sup>1</sup> [Systems thinking practitioner / Institute for Apprenticeships and Technical Education](#)

## Course Outline

The typical duration of the apprenticeship is 30 months plus an End Point Assessment (EPA) period which is 6 months. A set of modules have been developed which align to the Knowledge, Skills, and Behaviour requirements of the standards. These are illustrated above in Figure 1, with outline descriptions included below. The indicative teaching schedule is included at Figure 2 at the end of the document. The teaching portion is planned to run over a 24 month period, allowing a further 6 months to complete all the portfolio needs and prepare for the EPA.

On successful completion of the first two years of the course, the student will be prepared and ready to undertake End Point Assessment to complete their apprenticeship. Successful completion of End Point Assessment will also result in the award of a Post Graduate Diploma in Systems Thinking Practice.

Though outside the scope of the apprenticeship and the funding band available, following successful EPA, apprentices can elect to continue their studies to achieve an MSc in Systems Thinking Practice.

## End Point Assessment

Regarding the duration of the apprenticeship programme, the EPA Plan<sup>2</sup> states:

“Full time apprentices will typically spend 30 months on-programme (before the gateway) working towards the occupational standard, with a minimum of 20% off-the-job training. All apprentices must spend a minimum of 12 months on-programme.

“The EPA period should only start and the EPA be arranged when:

- the employer is satisfied that the apprentice is deemed to be consistently working at or above the level set out in the occupational standard;
- all the pre-requisite gateway requirements for the EPA have been met and can be evidenced to an EPAO;
- apprentices have achieved level 2 in English and mathematics.”

The EPA period typically lasts for 6 months. This is in addition to the 30-month period allocated to for the apprentice to achieve Gateway. Assessment Method 1 is a work-based project report of 8,000 words. Prior to the Gateway, and after completion of the modules, the apprentice has a period of time to prepare their portfolio of evidence that should be submitted at the gateway. This portfolio is not assessed but underpins the profession discussion in Assessment Method 2.

Though 20% off-the-job training time is not mandated for the EPA period, there is quite a commitment required by the apprentice to prepare for and complete the assessments. Employers will be requested to accommodate this.

## Approach

The course is taught through a blend of on-site and remote teaching methods supported by workplace practice to develop appropriate skills and behaviours. Three modules are taught as residential modules, combining face-to-face lecturing, workshops, and group work. Three modules begin with a short residential period, and then continue to completion through practice in the

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<sup>2</sup> [st0787\\_systems-thinking-practitioner\\_17\\_forpublication7420.pdf \(instituteforapprenticeships.org\)](#)

workplace, with remote mentoring by Cranfield academic staff. One core module and the elective modules are taught through our learning portal providing flexibility to the student.

Full use will be made of blended learning, combining distance learning material via the Virtual Learning Environment with online and onsite workshops. A wide variety of remote learning methods and materials will be used across the course.

## Monitoring Progress

Cranfield must be able to evidence that apprentices' progress has been monitored and regularly reviewed throughout their apprenticeship. This review should cover apprenticeship progress beyond the academic programme and is based on a good understanding of the Apprenticeship Standard and End Point Assessment Plan. This includes adequate resources to undertake the reviews with apprentices.

## Apprentice Tutors

The apprentice will maintain a portfolio of evidence which will capture their progression and attainment of KSBs. This will be monitored by their allocated tutor. The apprentice tutor will provide email and telephone support, as well as on-line monitoring. They will also attend residential modules to meet apprentices and determine personal circumstances as well as maintain contact with the employer POC to whom they will escalate any issues related to the apprentice's progression.

In the period prior to the gateway, the apprentice tutor will provide support for the development of the portfolio and preparation for EPA.

## Milestones

Apprentices will complete modules, along with meetings with their tutors to ensure sufficient progress. Tutors will meet with the Masterships Office to update on any concerns they may have, and action can be taken in conjunction with the employer. Tripartite reviews between the Cranfield tutor, apprentice, and employer POC will be held every 6 months to monitor progress and satisfy any learning and development needs.

## Employer Contribution

The employer will be required to provide a Point of Contact (POC) for the apprentice and support the apprentice in providing appropriate work-based tasks according to their stage of progression. Initially these will be small in scope, but for the final practical module will need to be a major intervention. The employer will be required to allocate a minimum of 20% off the job training time to the apprentice (as well as sufficient time for EPA), ensure a supportive developmental environment at work, ensure appropriate participation for the work-based activities and ensure the apprentice has suitable equipment to undertake the course recognising the online elements. The employer POC will also provide appropriate feedback on the skills and behaviours demonstrated by the apprentice, including views of other involved stakeholders.

## Module Aims

### Induction (Online module)

This module will provide the student with the means of accessing all required learning, assessment, and reference materials for successful study. It will provide an overview and understanding of University rules, regulations, policies, and procedures, and ensure the student recognises the University staff and support functions which enable course delivery and administration. Specifically, it will introduce to aspects of academic reading, writing and review of literature. This module remains available for the duration of the apprenticeship.

## Year One Modules

### *Fundamentals of Systems Thinking (Face to face (F2F) module)*

Introduces the concept of systems and systems thinking. Whether you are involved in providing value for money in services such as the provision of education, health, defence or policing, in introducing or managing major programmes and projects, responsible for the design and procurement of major engineering initiatives, and managing in conditions of uncertainty, understanding systems and systems thinking and their contribution is a significant benefit.

### Introduction to Systems Methods (F2F module)

This module introduces and practices a selection of methods currently used by a range of practitioners. Though the range includes a common set including System Dynamics, Soft Systems Methodology, Viable Systems Model, Critical Systems Heuristics and FRAM, the case studies used are tailored to the student's requirements.

### Dialogue and Collaboration (F2F module)

We all bring our own biases and perspectives into conversations about systems, and we are often very defensive of our ideas and beliefs. The significant benefit of thinking in systems comes when working collaboratively and being able to actively listen to others and contribute in an open constructive manner. This module explores the world of bias and reasoning, how they affect decision-making and, through practice, demonstrates the benefit of dialogue and conversation in building consensus. Techniques introduced include World Café, Appreciative Inquiry and Reflective Practice.

### Systems Practice (F2F module followed by workplace practice)

One of the unique characteristics of this MSc is in the specific opportunity to practice a selection of systems methods, as well as being guided in the planning, preparation, and execution of systems workshops. Students will work in small teams to address a real-world problem of their own choosing, including problem structuring and reaching some resolution. Mentoring will be available via videoconferencing.

### Systems Leadership and Organisational Behaviour (Online module)

Organisational agility and resilience are increasingly important for organisations to succeed in today's turbulent business environment. The key enablers for this are a good understanding of the organisational context, its stakeholders and nature of the organisational structure. Surrounding this is good systems leadership, requisite organisation for management, communication, and

collaboration across a range of capabilities and levels of work. The aim is to assess and manage the impact of people and systems leadership on an organisation's agility and resilience.

## Year One Electives (Choose one)

### Formal Representation of Systems (Online module)

Though not required for all methods involved in Systems Thinking, many methods require elements of mathematics and systems of notation to capture and record the logic and description of systems and systems behaviour. The aim of this module is to introduce a range of formal representations for systems and their behaviours.

### Complex Systems (Online module)

Though many systems are considered to be Complex Systems, this module provides a focus on the specific aspects of engaging with complex systems, developing systemic models and using micro-worlds to support their exploration. It takes the complexity worldview which reminds us of the limits to certainty, incorporating aspects of learning, variety adaptation, innovation, and surprise.

Aspects of autonomy and Artificial Intelligence, in conjunction with human activity and agency, will also be introduced, addressing learning systems in terms of complex feed-back.

### Systems thinking for Social Change (Online module)

Societal issues represent some of the most complex problems faced by nations today. Development of government strategy, and its implementation, has far reaching consequences, and those affected often have the least voice. Approaches to education, law enforcement, health, civil liberties, and industrial development, for example, are closely interconnected both nationally and internationally. Relationships between developed and less developed nations, where support and aid are required, can have unintended consequences that may not surface for some considerable time. This module focuses on the beneficial contribution of systems thinking in the development of effective and sustainable interventions and policy development.

## Year Two Modules

### Systems Thinking Research Methods (Mixed F2F and online module)

This module introduces students to research methods, their selection and application, specifically regarding the varying perspectives of engineering, science and social science, such that the most appropriate approach for systems research can be developed.

### Systems Thinking Development and Exploitation (F2F module followed by workplace practice)

This module allows the student to develop and demonstrate the application of knowledge and skills acquired in the taught modules in the context of a continually changing organisational environment and practical problem context. It is focused on a work-based problem solving context. Where a significant problem cannot be identified to enable the apprentice to demonstrate all skills and behaviours required, situations will be identified by the sponsor organisation to provide the apprentice with appropriate opportunities for practice.

## Year Two Options (Choose One)

### Philosophy and Theory of Systems Thinking (Online module)

The background to systems thinking is multi-disciplinary and can be found in anthropology, biology, engineering, sociology, psychology, informatics, and economics amongst others. This module enables the student to understand the ontologies and epistemologies of systems and systems thinking, enabling them to draw on concepts from one discipline to provide insight into others, as well as to 'join up' thinking across disciplines to avoid the artificial separation that discipline-oriented thinking forces. It is this multi-disciplinary systems thinking that enables one to gain insight and achieve resolution into the most complex issues faced by our societies today.

### Architecting Enterprises (Online module)

Within the world of Information Technology and Information Systems, efficiencies have been gained through the development and application of Enterprise Architecture. The key to success with enterprise architecture is in being able to align it with the enterprise purpose and key performance criteria, including resilience and sustainability. This module provides methods, tools, and practice to ensure information systems can remain congruent with the business strategy goals and needs.

### Requisite Variety for Organisations (Online module)

Fundamental to enterprise resilience and sustainability are their inherent governance and structures. These will vary according to the enterprise; its strategy, culture, scale, and governance structure (commercial, Not-for-profit, government, etc.). Not only does an enterprise require a relevant and effective method of governance, an appropriate variety of process, procedures, skills, and competences are also essential. This module introduces additional ways of thinking (including Morgan's Images of Organization, and Emery and Trist's Causal texture) together with the application of selected methods and tools relevant to enterprise organization.

# Systems Thinking Practice Apprenticeship – Indicative Schedule

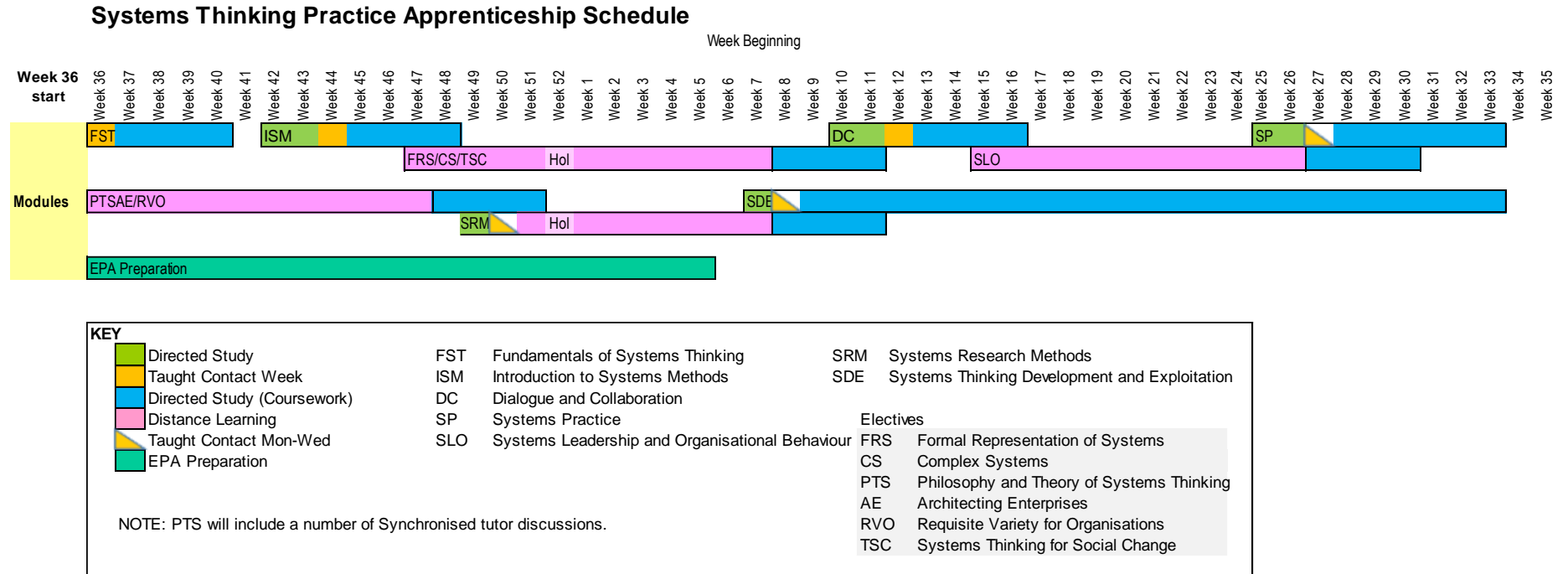


Figure 2 - Indicative Teaching Schedule