The LSCITS Engineering Doctorate (EngD) Programme requires students (Research Engineers, REs) to successfully complete a number of core taught modules, designed and delivered by senior faculty from the LSCITS Consortium universities of Bristol, Leeds, Oxford, St Andrews and York. The EngD also involves modules designed and delivered by The York Management School. This flyer gives summary details of each of the EngD core modules, and then briefly introduces the remaining components of the EngD.

The Engineering and Physical Sciences Research Council, the main funding agency for Computer Science in the UK, has reserved £4m to support the LSCITS EngD. In addition to covering set-up and running costs, the EPSRC funds are intended to provide for 30 fully-funded LSCITS EngD studentships over the four intake years 2008-2011.

1. Systems Engineering for LSCITS

This, the first module on the course, is an intensive one-week course intended to provide both a technical “flying start” and also some initial team-building among the REs. The module is intended to provide an overview of some of the key issues in developing and assuring large scale complex IT systems, especially covering requirements and architecture: the key elements of a Systems Engineering approach. It will also give a brief overview of other core modules, and it includes some orientation content to help familiarise the REs with the various academic facilities available at York. Sample texts include:


2. Empirical Methods for LSCITS

As IT systems increase in scale and complexity, so there is a growing need for graduates with strong understanding of empirical techniques for analyzing and visualizing their structure and dynamics. Understanding and managing LSCITS requires well-developed skills for generating, summarising, comparing, and making informed decisions from multivariate data that may not be well modelled by standard distributions. This module aims to provide students with a broad but firm grounding in methods drawn from the literature on experiment design, data analysis, and visualisation; and furthermore to integrate this with recent findings from studies of the interplay between network topology, growth-history, and dynamics. Sample texts include:


3. Predictable Software Systems

This module covers the main software systems modelling and verification techniques, and illustrates their usage with real-world examples studied and analysed with model-checking tools. The focus is on properties such as safety, dependability, resource usage, and performance. The content includes: reactive systems and their models; temporal logic; model checking and algorithms; modelling formalisms; verification of system properties; real-time model checking; probabilistic model checking; software verification; security and trust. Sample texts include:

4. High-Integrity Systems Engineering

This module provides an overview of the challenges in developing high-integrity software systems; and of current processes for accreditation of security-critical systems and for certification of safety-critical systems. It also provides an understanding of the growing diversity of high-integrity systems on which commerce, transport, healthcare, etc. increasingly depends. It introduces techniques for achieving and assuring high-integrity software, and the approaches to justifying their safety and security. On completion of this module, students will have a firm appreciation of the growing societal dependence on high-integrity systems, and they will understand the state of the art in developing high-integrity systems and the risk factors and approaches to managing key risks. Sample texts include:


5. Socio-Technical Systems

This module requires students to investigate and understand the relationship between LSCITS and organisations. Other EngD core modules start with technological complexity and work outwards toward production processes and governance. This module starts with organizations and shows how IT solutions are produced by complex organisational processes – and, in the case of start-ups, by broader social and economic processes. On completion of this module, students should be able to understand the social and organizational reasons why projects go well or badly; understand that it is essential to identify and study salient features of organizational processes; understand and be able to use social research methods to study the creation and use of LSCTS in an organization setting; and understand the issues and problems of setting up workplace fieldwork. Sample texts include:


6. Technology Innovation

The subtitle of this module is Strategy, Management, and Commercialisation. It aims to provide students with a firm grounding in the legal, managerial, and financial aspects of innovative technology research for knowledge transfer and wealth creation. This module is intended to provide a grounding in the current practices of industry and commerce, and current thinking and research in schools of business and management. It has been custom-designed for the LSCITS programme and the industry-focused careers expected of its EngD Research Engineers. Sample texts include:


Optional Modules & Individual Project

The taught component of the LSCITS EngD also requires the student to complete a number of optional modules, and an individual project, usually within the first two years. In addition to the optional modules offered by York’s Computer Science Department, optional modules may be studied at The York Management School, and/or at the LSCITS Consortium partner universities. LSCITS staff from all the Consortium partner sites are available as advisors for the student’s Individual Project.

The LSCITS EngD Centre at York

The LSCITS EngD is an entirely new degree course, centred at the University of York’s Department of Computer Science. The LSCITS EngD Centre Director is Gerald Luettgen, PhD. The LSCITS Initiative’s overall Training Director is Prof. John McDermid, Head of York’s Department of Computer Science.

For further details see the website at: [www.lscits.org](http://www.lscits.org)
Email: EngDInquiry@lscits.org