Course information 2017–18
IS2182 Innovating digital systems and services

This course covers the methods, values, attitudes and techniques in building complex digital systems for business and society. It provides an understanding of the need for rigour and enables students to select and apply a relevant methodological approach to the development of well-designed and innovative digital systems and services.

Prerequisite

If taken as part of a BSc degree, courses which must be passed before this course may be attempted:

IS1060 Introduction to Information Systems *and* IS1181 Digital infrastructures for business

Aims and objectives

The main aims of this course are to:
- introduce and familiarise students with the overarching concerns of innovating digital systems and services within organisational contexts
- explain the various processes, tasks and techniques that are employed in developing and improving complex digital systems and services
- identify and discuss the main aspects of effective innovation project management
- provide students with an experience of the way methods and techniques are applied in practice (this is achieved through the individual innovation project work)

Assessment

This course is assessed by a three hour unseen written examination (60%) and coursework (40%). See 'Coursework and assessment' overleaf.

Essential reading

For full details, please refer to the reading list
Pressman R.S. and Maxim B.R. *Software Engineering: A Practitioner's Approach.* (London: McGraw Hill, 2015) **(Essential)**
Beynon-Davies, P., *Business Information Systems* (2nd ed.) (London: Palgrave, 2013) **(Supplementary)**

Learning outcomes

At the end of this course and having completed the essential reading and activities students should be able to:

- ☑ Describe and discuss the expectations, pressures and problems faced in innovating digital systems within today's organisational context
- ☑ Critically assess the processes, tasks, practices, and tools that support digital systems innovation.
- ☑ Explain how systems development processes can be applied in innovation
- ☑ Discuss the adoption of agile approaches for innovative system development
- ☑ Explain how mature software engineering practices are incorporated into system and service innovation within contemporary organisations
- ☑ Discuss the relevance of design features and principles within the process of digital systems innovation
- ☑ Explain how digital infrastructures contribute to the development of innovative systems and services
- ☑ Identify and discuss the main innovation project activities in the context of today's organisations.
- ☑ Demonstrate, through project work, the ability to analyse, design and evaluate a digital system and the ability to write a detailed report on the development process.

Syllabus

This is a description of the material to be examined, as published in the *Regulations*. On registration, students will receive a detailed subject guide which provides a framework for covering the topics in the syllabus and directions to the essential reading.

This syllabus covers the tasks, attitudes and values which underlie professional contemporary digital systems development and innovation. The emphasis is on how to develop innovative digital systems capitalising on new innovations (e.g. mobile Apps, Cloud Computing etc.) while still ensuring quality and robustness through relevant adoption of formal development methods.

Background: the changing nature of digital systems and the implications for innovation processes; history of information systems development; process models and their characteristics: the lifecycle model, evolutionary system development, incremental system development; an introduction to innovation and evolution of digital systems.

System innovation within a digital economy: Opportunities and challenges; identifying and maximizing the benefits of ubiquitous technologies within the business; the changing nature of systems: WebApps, Mobile Apps, Cloud computing; the need for flexible and speedy system development; startups – culture, capital and process;

Agile development: Agile methods, extreme programming, scrum, agility in organizations: DevOps

Innovation Tasks: Knowing what to build - acquiring and specifying requirements, identifying and modelling architectural views, component-level design, testing, code generation, creating usable systems - user experience design, structuring and analysing data; Object-oriented modelling using UML: the use case diagram, the class diagram, the object sequence diagram, the activity diagram; the deployment diagram;

Trends within the Digital Innovation Process: Reasons for reuse, features of good design, object-orientation, concept reuse, patterns, component-based system development, cloud computing, development platforms, low-code development, system of systems;

Project management: innovation project planning, innovation project control;

Coursework and assessment

The examination will be three hours and consist of seven questions of which students must answer four. This will contribute 60% to the overall mark.

Students will undertake a project for the remaining 40% of marks. This will require them to apply their learning to a real problem and finally reflect on the experience. The project will require them to write a short essay describing the approach they are intending to apply, its relevance to the problem chosen, and the challenges encountered and solved. They will then present an account of how the approach was applied in practice. This should include the relevant documentary material required for the chosen approach.

Students are not required to produce programming, but rather are assessed on their attempt to carry out and apply development tasks and techniques in practice. The focus is not on the produced system but on the quality of the process undertaken, the coherence of the documents presented and how successful the documents would be in developing a digital system.