Course information 2015–16
IS1060 Introduction to information systems

This course is intended to provide a broad introductory understanding of information systems.

Prerequisites
None apply

Exclusion
May not be taken with
IS2136 Information systems and organisations.

Aims and objectives
This course provides a broad introductory understanding of information systems, seen within organisational and societal contexts. The aim is to provide students with an appropriate balance of technical and organisational perspectives to serve as the basis for further study in the field.

Essential reading
For full details please refer to the reading list.
Laudon, K.C. and J.P. Laudon. Management Information Systems: Managing the Digital Firm. (New Jersey: Prentice Hall).
This text is updated regularly. Please buy the latest edition available.

Assessment
This course is assessed by a three hour unseen written examination (75%) and coursework (25%)

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

☑ explain fundamental assumptions made in studying information and communications technologies in organizations as socio-technical systems in contrast to purely technical or managerial views.

☑ debate the relevance of the sociotechnical approach and demonstrate this through the study of a number of practical business and administrative information systems within real organisations

☑ express a logical understanding of how the technical parts of computer-based information system work, their principal structures and components including contemporary technologies for information processing and communications

☑ explain the various functions of systems and network software and various classes of business-oriented application packages

☑ describe fundamental principals that can be applied to ensure that security and personal privacy is respected in information systems

☑ explain the tasks required when undertaking the establishment of a new information system and be able to contrast alternative approaches to development

☑ describe and justify a range of professional roles in information systems development activity, and their changing nature reflecting in part changes in technology use in and between organizations

☑ discuss the social, organisational, legal and economic context of computer use and be able to debate the significance of information and communications technologies on the economy and society

☑ demonstrate, through project work, understanding of the analysis and design of small projects using database and spreadsheet programs, and the ability to write brief but informative reports on such work.

Syllabus

This is a description of the material to be examined, as published in the *Programme handbook*. 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.

Information systems concepts: Information and data. Capture of data, storage, processing and display. Information systems in organisations, the digital economy. Introduction to systems ideas and their application to information handling activities. The sociotechnical character of information systems.

Information systems within organisations: The roles and functions of information systems within organisations including providing management information, supporting e-commerce, supporting knowledge work and undertaking transaction processing. Use of information by various types of people and as applied to various types of task. New models of organising. Information systems management roles and structures. Students are expected to undertake small investigative case studies of information systems within local organisations as part of their study.

Information and communications technologies: Introduction to computer hardware and software. Communications technologies and networks, the internet. Data storage systems, files and databases. Cloud computing. Operating software, applications packages and user written programmes. Open source software. Social networking. (Note: this does not entail any particular knowledge of electronics, rather it is concerned with the major components and the logical structures of a computer as exemplified in popular personal computers and networks including the internet.)

Systems development: Information systems development approaches; life cycle, prototyping, incremental models. Systems analysis tasks, methodologies, modelling and agile methods. Data modelling. Systems implementation. Professional roles in systems development. Criteria for successful applications development. Systems implementation and the management of change.

Practical coursework: The coursework has two elements. A design and implementation of a small database, and design and implementation of a spreadsheet model. No specific brands of software are required to be used, but typical examples would be Excel for spreadsheets and Access for databases. (A student can equally use other software, for example the open source desktop software found in the package Open Office.)

Note: Candidates taking this paper are required to submit coursework

Examiners' commentaries 2015

IS1060 Introduction to information systems – Zone A

Important note

This commentary reflects the examination and assessment arrangements for this course in the academic year 2014–15. The format and structure of the examination may change in future years, and any such changes will be publicised on the virtual learning environment (VLE).

Information about the subject guide and the Essential reading references

Unless otherwise stated, all cross-references will be to the latest version of the subject guide (2013). You should always attempt to use the most recent edition of any Essential reading textbook, even if the commentary and/or online reading list and/or subject guide refers to an earlier edition. If different editions of Essential reading are listed, please check the VLE for reading supplements – if none are available, please use the contents list and index of the new edition to find the relevant section.

Comments on specific questions

Candidates should answer **THREE** of the following **EIGHT** questions. All questions carry equal marks.

Question 1

a. **Describe the purpose of a Use Case diagram and the principal aspects of a proposed system that it can show.**

Reading for this question

See the subject guide, section 8.2; Curtis and Cobham (2008) Chapter 16.

Approaching the question

An answer should focus on the purpose of the Use Case diagram, not its form or how it is drawn. Thus the purpose could be stated as to provide a way to depict a proposed new system from the outside in, and as it would be seen and used by people (actors) in the world. Its purpose is to show 1) who these people are, and 2) what they expect the system to do (e.g. the individual use cases (ovals) that represent coherent 'chunks of functionality').

Of course, at the early stages of a project there may be alternative designs and different Use Case diagrams can be the basis for expressing these options and debating them. Remember too, that a Use Case diagram will in all probability need some explanation text in addition to the actual diagram itself.

The use case diagram is intended to be a simple and overview diagram (answering mostly 'what' and 'who' but not 'how' questions) and as such should be understandable by many types of stakeholder and can be the basis of discussion and agreement in the early stage of a development.

b. **Explain how the combination of Use Case diagrams with Class Diagrams can capture and describe core aspects of a new information system in the early phases of a development project.**

Reading for this question

See the subject guide, section 8.2; Laudon and Laudon (2013) Chapter 13.

Approaching the question

In the early stages of systems development these two diagrams can give both the sponsors, users and the developers of a new system an overview of what the system will do (use cases), and the things in the world that it needs to know about and store data about (class diagram). Together they provide the basis for a description or specification of a system-to-be.

Of course more detail is needed as a project progresses, but this starting point is important. It informs developers and sponsors/users of the scope and limits of a system (e.g. who are the directly involved actors, what data is needed (and what is not), what use cases are included (and what are not)). Thus it can start to brief developers and programmers about the technical aspects they will need to address, for example how the database can be designed (e.g. as an ER diagram derived from the Class diagram, with reports and queries in support of specific use cases and actors). Untimely, it can help to specify how each agreed use case might be implemented in design for and production of computer code.

Illustrate your answer to both parts using examples of these diagram.

The question asks explicitly for examples, and marks are awarded for these both for their presentation and more particularly for how they are used to illustrate the written answer.

Question 2

a. **Explain the distinction between the concept of *data* and that of *information*. Show also the ways that they are related. Use an example of a spreadsheet program to illustrate your answer.**

Reading for this question

See the subject guide, section 3.2; Laudon and Laudon (2013) Chapter 2.

Approaching the question

The usual answer to this kind of question is to say that data is the raw material – discrete and de-contextualised observation, while information is processed data – processed for a particular purpose and reason (a human reason). The question also asks for an illustrative example drawn from a spreadsheet. By implication, you are being asked here to use your spreadsheet project to generate these examples. For example explaining their data as 'raw numbers' or observations taken from the world, and the spreadsheet outputs, perhaps in the form of a graph or table, as purposeful information useful to and valued by the spreadsheet's user.

b. **Suggest the qualities of information that would be most desirable for a user of i) a decision support system and ii) a report from a management information system.**

Reading for this question

See the subject guide, section 3.2; Laudon and Laudon (2013) Chapter 6.

Approaching the question

The point of an answer here is to make some distinctions between the desirable qualities of the information that might be produced in the two examples. Thus you should be able to demonstrate that you can

distinguish the one context from the other. So a general list style answer – as in the subject guide section 3.2.2 – is not really enough here to obtain good marks. The ideas you introduce for these qualities must be linked to the specific application. Thus for MIS you might emphasise the ability to summarise data, or to highlight exceptions or outliers, while for a DSS it might be information that can reduce or model uncertainty, or simulate alternative futures.

Question 3

a. **What is cloud computing?**

Reading for this question

See the subject guide, section 4.2; Laudon and Laudon (2013) Chapter 5.

Approaching the question

Wikipedia says it quite well and quite succinctly: 'the practice of using a network of remote servers hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer'. A good answer would echo most of these points. A good answer should also use examples of where cloud computing is used – for example Dropbox, or Google docs, or the various services that Amazon and Microsoft provide.

Your answer should probably also explain cloud computing as raising a fundamental choice for businesses – to do computing themselves 'in-house' with the resulting capital expenditure (CAPEX), or pay for the services they need as an operational expense (OPEX). Its not just that any one choice is necessarily cheaper and therefore better than the other, but that for a variety of reasons different situations may make one option preferable to the other.

b. **Explain why cloud computing may offer important new opportunities for organizations to flexibly and efficently develop their information systems. Identify any problems or concerns that that may arise.**

Reading for this question

See the subject guide, section 4.2; Laudon and Laudon (2013) Chapter 5.

Approaching the question

As hinted at in the question, opportunities can be seen in the twin areas of efficiency and flexibility. The one focused on resource savings (e.g. of the cost of an IT department, or of dedicated hardware and software), the other on agility, scalability and convenience. Your answer should explore these dimensions a bit further and come to some conclusions as to the significance of the cloud as driver of change. Remember, you can decide whether to argue for the most fundamental shift in how business source their computing needs, or for a far more careful and limited impact. Whatever your argument you will need some convincing evidence in support

As for problems, you should probably focus on two principal ones. First, issues of security and reliability with such an outsourced infrastructure, and second on the longer term consequences of committing to a third party service and perhaps giving up control over key operational aspects of the business.

Question 4

a. **What is meant by an 'enterprise system'? Give some relevant examples and explain why they are needed and how organizations develop them.**

Reading for this question

See the subject guide, section 5.10; Laudon and Laudon (2013) Chapter 2.2.

Approaching the question

Try to give your own definition here based on what you know. We do not want memorised definitions from the text book but rather evidence that you have your own understanding of the concept and can express it in your own words. You might express this in terms such as organisation-wide systems that integrate or connect the organisation in terms of transactions and activities (business processes), and in terms of maintaining a common pool of shared data. Laudon and Laudon (2013) express this in terms of 'large scale integrated systems that span the organisation and help to hold it together by integrating business processes'.

Relevant examples of enterprise wide systems could include payroll, inventory, order processing, supply chain management etc. A good answer will mention SAP and similar modular ERP software packages, the basis of many Enterprise systems. To answers the part that asks about how organisations develop such systems should probably focus on COTSS (Commercial Off The Shelf Software Systems) (e.g. application packages that embody good business practices for the whole enterprise, and the specialist consultancies who support their implementation and exploitation). That is, most organisations do not 'develop' from scratch, but seek packaged software and specialist expertise in the market.

b. **Explain the purposes that are served by a Customer Relationship Management (CRM) system. Why are CRM systems usually classed as 'enterprise' systems?**

Reading for this question

See the subject guide, section 5.10; Laudon and Laudon (2013) Chapter 9.3.

Approaching the question

The answer expected here is again a broad definition of CRM as a common and shared data resource that allows many parts of a business to know about actual or potential customers. Many parts of the business may contribute to this data resource, and many draw from it. Thus knowledge (data) about a customer is not fragmented between different systems, and incomplete of contradictory. CRM systems, for example are central to the use of call centres as a primary means of maintaining contact with customers and meeting their needs: customers call one number and talk to somebody who knows everything about them (because of the CRM) and on this basis is able to handle many types of query. Thus, drawing on your answer to the first part of the question you should be able to justify CRM as an enterprise system.

Question 5

"Given today's needs for rapid development of specific new information systems, and the tools available to help build them, the sensible approach in most cases is to adopt agile methods". Discuss.

Reading for this question

See the subject guide, section 6.3; Laudon and Laudon (2013) Chapter 13.

Approaching the question

Your answer here needs to take a position on some or all of the implications suggested in the question (e.g. on the need to be rapid (e.g. competition and change in the business environment), the availability of new kinds of tools (e.g. cloud computing, and web based software platforms) and the question of method (e.g. how to develop systems you need when you need them)).

Arguments you might deploy include:

The business and technical environment changes very quickly so new methods like agile are necessary to help keep up the pace of change and new

development. Thus a need for speed is crucial, as too is achieving true user participation and ownership of projects. There is also often an understanding or desire that less time should be 'wasted' on meetings and more time spent in actual development work – or more importantly delivery of actual usable code. Also, agile approaches through their iterative style can manage risk in the environment, offering the chance to re-think work on a regular basis.

Your answer should focus on agile and not spend too long discussing the waterfall or older methods in any detail. For example, your answer should echo the core elements of the Agile Manifesto.

- individuals and interactions
- working software
- customer collboration
- responding to change.

Question 6

The technical development of a new information systems may be relatively easy. But managing change as a new system is introduced into use, and satisfying the various needs of the organization, its customers and the people who work, there is difficult.

Reading for this question

See the subject guide, section 6.4; Laudon and Laudon (2013) Chapter 14.4.

Approaching the question

Write a short report for managers identifying and explaining the most important issues that need to be addressed to achieve successful change when a new system in set to work.

In a broad sense this question is about implementation/changeover, but the way the question is phrased asks you to look back or outwards to the antecedents of success in changeover. So for example, descriptions of the need for training, parallel running or evaluation may be a part of the answer, but are not enough for a good one. You need to think about all the aspects and tasks that might contribute to success.

So answers might need to talk about strong feasibility studies, user participation in analysis, sociotechnical approaches, design of good jobs and appropriate roles as well as goods technical systems. Ideas of evaluation too can be taken forward into strategies to support system refinement and consequential change to exploit new opportunities.

Remember that this question is asking for a report to a manager so write your answer in report format (e.g. with section heads and an operational and impereative kind of writing: what we might call a normative approach).

Question 7

a. **What is meant by the phrase 'Big Data'? Explain why it is usually seen as a quite recent and distinct phenomenon.**

Reading for this question

See the subject guide, section 3; Laudon and Laudon (2013) Chapter 1 and Chapter 6.3 and 'Interactive session'.

Approaching the question

Big Data is in the news all the time in recent year. It refers to the accumulation by businesses and organisations of volumes of data that far exceed the normal ability of databases to manage them. In part this is reflected in their sheer size, and in part from the heterogeneity of the data (different kinds, different sources, different formats). For example all the data

that a big retail company might collect on a customer – the purchases they make, when they occur, how long they are in store, what aisles they walk down, what the weather is, if they use the carpark, toilets, café, who else lives at their address etc. etc. All this and much more personal data may be regularly available about you when you do your daily shopping – be it in store or on-line.

Big Data is usually seen as new because only recently have most organisations have had technologies and systems that allow them to collect data on this scale (think of web site cookies, loyalty cards, etc.) and then to store and process it. Others might argue that it's not so new and that data has been fairly abundant for many organisations for decades. In either case the ways that it is used to model populations and help in strategic decision making, as well as and tailor ('personalise') relationships between business and customers (as well as governments and citizens, doctors and patients etc.) is less equivocally new.

b. **What benefits for business and for citizens may be expected from Big Data? What problems or threats may it pose?**

Reading for this question

See the subject guide, section 5.13; Laudon and Laudon (2013) Chapter 6.

Approaching the question

For 'benefits' most candidates would focus on the issues of better decisions (e.g. for marketing) and a more personalised response to individual customers by organisation. In health care this may be seen in better understanding of disease and thus better diagnosis and treatment. You may want to use examples such as the targeting of adverts by Google or Facebook (a benefit?), or the screening of data in health care to alert people at risk. As for problems, the most obvious topics to write about are security and privacy risks, losing the ability to maintain control of our own data and have private lives, and the risk of surveillance. You might even want to suggest that reliance on big data may actually make organisations dumber – knowing only what is in the data they have – and forgetting to use all the other ways of understanding and interpreting the world, their customers and suppliers.

Question 8

Explain why maintenance and evaluation is usually included as the last phase in a system life cycle. In your answer explain why maintenance is needed, and what benefits might be expected from undertaking evaluations.

Reading for this question

See the subject guide, section 7; Laudon and Laudon (2013) Chapter 13.

Approaching the question

Certainly both are included in most descriptions of the syetms life cycle, but that does not mean they are always or even often done! But to be more positive, you may want to introduce evaluation first and in particuar the type of evaluation carried out to produce a working agenda for the ongoing maintenance to keep system up-to-date and opeational. The other benefits of evaluations in helping make future decisions about how other system are developed, to learn what has worked and what has not, should also be introduced.

For maintenance itself we should acknowledge that there are three (or perhaps four?) main types of maintenance to consider. The three key ones are corrective, perfective and adaptive, where corrective fixes bugs (and usually needs to be addressed first and quickly); perfective involves making the code

run more smoothly or elegantly but usually doesn't add too much to new functionality; and finally adaptive types where changes are needed in the code due to a change in the environment that makes it sometimes imperative for software changes. The fourth type – in some accounts is preventative maintenance, but that is perhaps closely aligned with perfective, so not really warranting a separate category.

Remember too that in answering a question such as this choosing and using good example are an important way to make your points. So be prepared to give example for each type of maintenance, or various style and focuses for evaluation.