Course information 2020-21
IS1168 Introduction to computer systems architecture and programming

General information

COURSE LEVEL: 4

CREDIT: 30

NOTIONAL STUDY TIME: 300 hours

Summary

This unit presents an up-to-date introduction to computer science and programming. It introduces the foundations of computer architecture together with data representation, manipulation and storage. The use of algorithms for problem solving is introduced. The unit further introduces the concepts of operating systems and computer networks. Against these concepts fundamental programming methods, constructs and concerns will be introduced using the Java programming language.

Conditions

Exclusions: You may not register for this course in the same year as:

* IS1181 Digital infrastructures for business

Aims and objectives

* develop an understanding of the fundamentals of hardware and software technologies that underlie contemporary computer-based information systems
* develop an understanding of the underlying structure and theories of computers and programming
* provide the skills needed to develop algorithms for programming solutions
* provide the skills needed to write simple programs in Java

Learning outcomes

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

* Identify the basic elements of hardware and explain their functions and how they fit together to form an architecture
* Explain how data is represented, manipulated and stored within a computer system
* Identify and explain the functions of operating systems
* Explain how computers interact through local and wide area networks

Please consult the current EMFSS Programme Regulations for further information on the availability of a course, where it can be placed on your programme's structure, and other important details.

- identify various different types of programming languages and appreciate how they have evolved since the early days of computer programming
- Design algorithms to solve basic programming problems
- Explain common data types and structures
- Explain basic programming structures
- explain the underlying concepts of object-oriented programming
- Write simple but effective programs in Java

Essential reading

For full details please refer to the reading list:

Brookshear, J.G. *Computer Science: An Overview*. (Boston: Pearson, 2019) thirteenth edition [ISBN 978-1292263427]

Carrano F.M. *Imagine! Java: Programming Concepts in Context*. (Boston: Pearson, 2010) [ISBN 978-0131471061]

Reynolds, C. and P. Tymann *Schaum's Outline of Principles of Computer Science* (Schaum's Outline Series) (New York: McGraw-Hill, 2008) [ISBN 978-0071460514]

Assessment

This course is assessed by a three-hour unseen written examination.

Syllabus

Computer Architecture and Organization: The origins of computer science; Elements of a computer; Von Neumann architecture; Data representation; the binary system.

Operating Systems: Operating system architecture; Memory management; Process scheduling; Semaphores and deadlocks.

Networking: Network fundamentals; The TCP/IP reference model; Internet protocols ; The World Wide Web.

Problem Solving and Programming Concepts: Programming language generations; Algorithms & pseudocode; the object-oriented programming paradigm.

Introducing Programming with Java: Structure and components of a Java program; input and output; Objects, attributes, methods; Arithmetic and Boolean expressions; Variables and constants, data types; pre-defined Java classes; Control structures; Arrays.

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