This document looks at the Key Knowledge criteria for the 2011-2014 Information Technology Study Design and relates each point to the location in the book *Software Development: Core techniques and principles*, written by Adrian Janson.

# Unit 3 Outcome 1

On completion of this unit the student should be able to analyse an information problem in order to produce software requirements specifications for a solution that operates within a networked environment.

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| Key Knowledge | Page |
| Stages of the problem-solving methodology | **2-7** |
| Key tasks associated with planning software projects, including identifying, scheduling and monitoring tasks, resources, people and time | **33-39** |
| A brief overview of the concept of the OSI model for network protocols | **26-30** |
| Purposes and functions of the physical layer (Layer 1) of the OSI and the relationship of the physical layer to the Transmission Control Protocol/Internet Protocol model | **26** |
| Appropriateness of interviews, surveys and observation as methods of collecting data to determine needs and requirements | **36-37** |
| Features of functional and non-functional solution requirements | **37-39** |
| Constraints that influence solutions | **39** |
| The functions, technical underpinnings and sources of worms, Trojans and spyware that intentionally threaten the security of networks | **159-165** |
| Factors that determine the scope of solutions | **40** |
| Tools and techniques for depicting the interfaces between solutions, users and the network, including use cases, via the Unified Modelling Language | **44-46** |
| Features of context diagrams and data flow diagrams that allow data flows to be depicted | **47-59** |
| Composition of an SRS and purposes of documenting an analysis in this form | **40-41** |

# Unit 3 Outcome 2

On completion of this unit the student should be able to represent a software design and apply a range of functions and techniques using a programming language to develop a prototype solution to meet a specific need.

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| Key Knowledge | Page |
| Stages of the problem-solving methodology (Also found in Unit 3, Outcome 1 and Unit 4, Outcome 1) | **2-7** |
| Characteristics of data types: integer, floating point number, Boolean, character, string | **90** |
| Types of data structures, including one-dimensional arrays, records and files | **91-94** |
| Methods of expressing software designs using data dictionaries and data structure diagrams, object descriptions and pseudocode | **62-68** |
| Formatting and structural characteristics of efficient and effective input and output | **68-71** |
| Needs of users and how these influence the design of solutions | **71-72** |
| Criteria for evaluating the efficiency and effectiveness of solutions | **136** |
| A programming language as a method for developing solutions that meet specific needs | **82-83** |
| Processing features of programming languages, including instructions, procedures, methods, functions and control structures | **83-85** |
| Purposes and characteristics of internal documentation | **85-87** |
| Techniques for checking that coded solutions meet design specifications, including construction of test data (Also found in Unit 4, Outcome 1) | **136-143** |

# Unit 4 Outcome 1

On completion of this unit the student should be able to apply stages of the problem-solving methodology to produce a solution for use on a mobile device, which takes into account technical and legal requirements.

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| Key Knowledge | Page |
| Stages of the problem-solving methodology (Also found in Unit 3 Outcomes 1 and 2) | **2-7** |
| Types and characteristics of mobile computing devices, including PDAs, mobile phones, laptops, gaming consoles | **17-20** |
| Procedures and techniques for handling and managing files, including security, archiving, backing up and disposing of files | **126-131** |
| Methods of organising files to suit particular software needs, including serial and random access | **131** |
| Ways in which file size, storage medium and organisation of files affect access of data | **131-132** |
| Characteristics of efficient and effective user interfaces | **73-74** |
| Factors affecting solution design, including user interface, user needs, processing efficiency, development time, technical specifications of mobile devices | **75-77** |
| Naming conventions for solution elements | **86** |
| Methods and techniques of expressing software designs | **78-79** |
| Forms and uses of data structures to organise and manipulate data, including two-dimensional arrays, stacks and queues | **97-110** |
| The syntax of a programming language | **83-85** |
| Validation techniques, including existence checking, range checking and type checking | **132-133** |
| Techniques for searching, including binary search, and techniques for sorting, including bubble sort and quick sort | **110-123** |
| Techniques for checking that coded solutions meet design specifications, including construction of test data (Also in Unit 3, Outcome 2) | **136-142** |
| Purposes and characteristics of internal documentation | **85** |
| Forms and types of user documentation, including printed, online Internet site (forms) and quick start guide, tutorial, content sensitive help and manual (types) | **142-143** |
| Applications and purposes of utilities in a programming environment | **87** |
| Legal obligations of programmers | **146-153** |
| Security measures designed to protect the integrity and security of data and information | **166-172** |

# Unit 4 Outcome 2

On completion of this unit the student should be able to recommend and justify strategies for evaluating the effectiveness and efficiency of solutions that operate in a networked environment.

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| Key Knowledge | Page |
| Technical underpinnings of intranets, the Internet and virtual private networks | **23-26** |
| Characteristics of wired and wireless networks | **20-23** |
| Techniques for measuring the reliability and maintainability of networks, including audits, errors and software tracking tools | **177-180** |
| Criteria and techniques for testing the security of networked environments | **173-174** |
| Characteristics of efficient and effective solutions | **72-77** |
| Strategies and techniques for acquiring evaluation data about the quality of solutions | **180-181** |
| Criteria and techniques for testing acceptance by users of solutions | **181-182** |
| Types of training for the users of solutions, and techniques for measuring the suitability of training programs | **182-183** |
| Types of system support documentation offered to users and criteria for determining their appropriateness for users | **183-185** |
| Practices that cause conflict between stakeholders who use, or are affected by, solutions that operate within networked environments | **154-156** |
| Suitability of setting codes of ethics, imposing sanctions, education programs and the use of decision-support frameworks as strategies for managing ethical dilemmas. | **187** |