

Diploma in IT Syllabus

Systems Analysis and Design

Rationale:

Systems analysis and design are core, interlocking, elements of systems development. Systems analysis is the process of turning a set of user requirements into a logical system specification. Systems design takes the logical specification and converts it into a set of designs that can then be implemented to create a working application. There is a range of activities that are carried out during these processes. Traditional approaches have attempted to define a set of carefully defined procedures that, if adhered to rigorously, should result in high quality applications. This approach is now challenged by more 'agile' approaches that stress the need to avoid overly bureaucratic, rigid, and costly development practices. Candidates will need to be familiar with the principles and applicability of both approaches.

Aims:

- To provide an understanding of the role of systems analysis and design within various systems development lifecycles
- To develop an awareness of the different approaches that might be taken to systems analysis and design
- To understand the activities of the systems analyst and systems designer, and apply some current techniques

Objectives:

On completion of this module the candidate should be able to:

- describe different lifecycle models and explain the contribution of the systems analysis and design within them;
- discuss various approaches to systems analysis and design and explain their strengths and weaknesses;
- evaluate the tools and techniques of systems analysis and design that may be used in a given context;
- use appropriate methods and techniques to produce an analysis of a given scenario;
- use appropriate methods and techniques to produce a system design for an given scenario;
- provide suitable documentation for systems analysis and design activities.

Prior Knowledge Expected:

Candidates are expected to be familiar with the material covered in the Certificate syllabuses.

Content:

THE CONTEXT OF SYSTEMS ANALYSIS AND DESIGN

Systems development lifecycle and position of SAD within it

Role of business analysts, system analysts and system architects

The characteristics and purpose of systems analysis and design methods and methodologies - including agile approaches such as Dynamic Systems Development Method (DSDM) and eXtreme Programming (XP)

The selection and adaptation of methodologies to deal with the particular circumstances of a development or application environment, including adoption/adaptation of existing software solutions

REQUIREMENTS ELICITATION AND BUSINESS ANALYSIS

Stakeholder analysis

Requirements gathering techniques

Prioritization of requirements

Categorization of requirements, including the difference between function and quality requirements

Gap analysis

Business case and feasibility studies

Business activity modelling, including the use of data flow diagrams (DFDs)
Use of prototyping, particularly as a method of requirements elicitation.

SYSTEM ANALYSIS TECHNIQUES AND TOOLS

Use cases and scenarios

Identification of events, actors and use cases

Use case realisation

Entity relationship modelling (ERM)

Cross-referencing functions to data entities via Create/Read/Update/Delete tables

Activity diagrams

LOGICAL DATA DESIGN

Conversion of ERM to a relational schema

Normalisation and denormalisation

Identification of validation rules and other database constraints

Views

Data migration issues, for example mapping between equivalent data items in new and old applications

OBJECT ORIENTED DESIGN

OO concepts: classes and objects; encapsulation, interfaces, inheritance, polymorphism, message passing

Relating objects; associations and aggregations;

Static modelling, including UML class diagrams;

Dynamic modelling: including UML interaction diagrams, UML statecharts

INTERACTION DESIGN

Usability issues – this includes both ease of use and fitness for business purpose
Interface design

Primary Texts:

Course providers and candidates are encouraged to read all four primary texts, but certain key elements of each are particularly relevant to the syllabus and are indicated below:

Bennett, S., McRobb, S., and Farmer, R Object-oriented systems analysis and design using UML, McGraw-Hill (3rd edition), 2006, ISBN-13 978-0-0711000-0:
Chapters 3-7, 9, 13, 21 Sections 11.1-11.5, 16.1-16.3, 18.5

Avison, D. and Fitzgerald, G. Information systems development: methodologies, techniques and tools, McGraw-Hill (4th edition), 2006, ISBN-13 978-0-07-711417-6
Chapters 1-3, 6,7,11, 13, 22, 27, 28 Sections 5.6, Sections 12.1, 12.7,12.9, 21.1, 23.2, 23.3 Section 26.1

Maciaszek, L.A Requirements analysis and systems design: developing information systems with UML, Addison-Wesley (3rd edition) 2007
Chapters 2, 3, 4 and Sections 7.1 and 8.2

Yeates, D (editor) Business Analysis, The British Computer Society 2006, ISBN-13 978-1-902505-70-1
Chapters 1-6, 8-11, 12 (pages 177-191)