

BCS Certificate in Systems Design Techniques Syllabus

Version 3.5
December 2016

This professional certification is not regulated by the following United Kingdom Regulators - Ofqual, Qualification in Wales, CCEA or SQA

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Change History

Any changes made to the syllabus shall be clearly documented with a change history log. This shall include the latest version number, date of the amendment and changes made. The purpose is to identify quickly what changes have been made.

Version Number and Date	Changes Made
Version 3.5 December 2016	Strapline regarding regulated statement has been added
Version 3.4 March 2015	Updated language requirements for additional time and use of dictionaries.
Version 3.3 May 2013	Amendments to clarify topics and align the syllabus with examination requirements
Version 3.2 September 2012	Reasonable Adjustments Requirements Update Included a section to cover excerpts from BCS books
Version 3.1 August 2012	Added in details of extra time for foreign language candidates
Version 3.0 August 2011	Updated ISEB to BCS logos and strapline. Added table of contents, levels of knowledge, levels of skill and responsibility, format of the examination, change history and definition of terminology. Technical content changes: Main changes made to ensure this syllabus works for both candidates doing both structured and UML/OO versions of System Modelling Techniques. Stronger links to architectural considerations. Lots of discussion re I/O design and data capture considerations More on component design. Refreshed section on controls and security. Addition of star schemas and Fact and Dimension Tables. Stronger links to other modules.

Introduction

The certificate focuses on design issues. It is concerned with all aspects of design. The user interface (input forms, input screens, output screens, reports and documents, dialogues) as well as underlying principles of developing analysis models into logical and physical systems designs using data driven or component driven approaches. As in other certificates, the design approach is not prescribed. The syllabus refers to both UML and structured systems design models and techniques.

Objectives

The candidate should be able to;

- Develop logical and physical systems' designs from structured and UML analysis models.
- Use data and component design techniques.
- Select and use a recognised design methodology to meet specific system design requirements.
- Explain the role and objectives of systems design in the systems development life cycle.
- Evaluate the suitability of an input and output system.
- Construct a usable user interface (HCI).
- Apply the rules of normalization to a set of data attributes.
- Understand and apply the principles of security, confidentiality and privacy

Eligibility for the Examination

There are no specific pre-requisites for entry to the examination; however candidates should possess the appropriate level of knowledge to fulfil the objectives shown above.

Format and Duration of the Course

Candidates can study for this certificate in two ways: by attending training courses provided by BCS Examination Providers or by self-study. Training courses leading to the certificate should normally run for 21 hours. The course can be delivered a number of different ways from traditional class-room based training to online e-learning.

Format of the Examination

The format for the examination is a one hour written (open book) examination based on a business scenario with 15 minutes reading time.

Candidates who are awarded a pass for the examination are awarded the BCS Certificate in Systems Design Techniques.

Additional time for candidates requiring Reasonable Adjustments due to a disability

Candidates may request additional time if they require reasonable adjustments in line with the BCS [reasonable adjustments policy](#). It will be the Examination Provider's responsibility to make a decision regarding candidate eligibility and keep a record of the decision. This is subject to audit by BCS.

Additional time for candidates whose language is not the language of the examination

If the examination is taken in a language that is not the candidate's native / official language then they are entitled to 25% extra time.

If the examination is taken in a language that is not the candidate's native / official language then they are entitled to use their own **paper** language dictionary (whose purpose is translation between the examination language and another national language) during the examination. Electronic versions of dictionaries will **not** be allowed into the examination room.

Excerpts from BCS Books

Examination Providers may include excerpts from BCS books in the course materials. If you wish to use excerpts from the books you will need a license from BCS to do this. If you are interested in taking out a licence to use BCS published material you should contact the Head of Publishing at BCS outlining the material you wish to copy and the use to which it will be put.

Syllabus

1. Introduction (20%)

- 1.1 Role of the system designer
- 1.2 System design and Solution Delivery
- 1.3 Scope of Design
 - Component design
 - Data design
 - Input/output design
 - Security design
 - Impact of business rules on design
- 1.4 Architectural issues in design
 - Business, Application and IT architectural considerations
 - Use of design patterns for software architecture
- 1.5 Impact of COTS and the impact of legacy systems
- 1.6 Using requirements documentation as a basis for design activities
 - The requirements catalogue
 - Functional models (e.g. use case diagram)
 - Event-based models (e.g. state machine diagram)
 - Domain models (e.g. analysis class diagram)

2. Component Design (20%)

- 2.1 Use and notation of UML (OO) models
- 2.2 Coupling and cohesion in Use Case Realisation
- 2.3 Component design
 - Presentation, business and data layers
 - Interfaces between these layers
 - User Interface Components
 - Persistent Data Components
 - Security Components
 - Provided and Required Interfaces
- 2.4 Design using class, activity and state transition models
 - Mapping Class operations and attributes from Use Case descriptions
 - Producing Sequence Diagrams from Class and Activity diagrams
 - Modelling user interfaces with state machine diagrams

3. Data Design (20%)

- 3.1 Use and notation of Structured System Models
- 3.2 Logical Systems Modelling
- 3.3 Access Paths
- 3.4 Detailed definition of processes using Structured English / pseudocode / flowcharts
- 3.5 Normalisation
 - Normalisation of selected inputs and outputs from un-normalised to third normal form
- 3.6 Physical systems modelling including de-normalising
- 3.7 Star Schemas; design of Fact and Dimension Tables

4. Input /Output Design (20%)

4.1 Identifying I/O Data Elements and selection of data capture and I/O technologies

4.2 Implications of design on:

- Transmission
- Data Quality
- Data Entry
- Storage and Retrieval

4.3 Management Information Reports

4.4 Design of input and output interfaces

- Dialogue Modelling and Design
- Forms and Layout Design
- Inter-system data exchange format design
- Style guides – purpose and usage

4.5 Prototyping the user interface

- Types of Prototype
- Prototyping Issues

5. Controls and Security (20%)

5.1 Verification and Validation of data

5.2 Public; protected; private; packages, attributes and methods

5.3 Output controls

5.4 Physical and logical security

5.5 Risk assessment of controls and security

5.6 Backup and recovery procedures

5.7 Disaster Planning

Levels of Knowledge / SFIA Levels

This course will provide candidates with the levels of difficulty / knowledge skill highlighted within the following table, enabling them to develop the skills to operate at the levels of responsibility indicated.

The levels of knowledge and SFIA levels are explained in on the website www.bcs.org/levels

The levels of knowledge above will enable candidates to develop the following levels of skill to be able to operate at the following levels of responsibility (as defined within the SFIA framework) within their workplace:

Level	Levels of knowledge	Levels of skill and responsibility (SFIA)
K7		Set strategy, inspire and mobilise
K6	Evaluate	Initiate and influence
K5	Synthesise	Ensure and advise
K4	Analyse	Enable
K3	Apply	Apply
K2	Understand	Assist
K1	Remember	Follow

Format of the Examination

Type	Written examination based on a business scenario
Duration	1 Hour preceded by 15 minutes reading time Candidates are entitled to an additional 15 minutes if they are sitting an examination in a language that is not their native/official language.
Pre-requisites	None
Supervised / Invigilated	Yes
Open Book	Yes
Pass Mark	50%
Distinction Mark	None
Calculators	Calculators cannot be used during this examination.
Delivery	Paper based examination

Recommended Reading List

Title: UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design (2nd Edition)

Author: Jim Arlow and Ila Neustadt

Publisher: Addison Wesley

Publication: June 2005

ISBN: 0321321278

Title: Design Patterns- Elements of Reusable object-oriented software

Author: Erich Gamma, Richard Helm, Ralph Johnson and John Vlissides

Publisher: Addison Wesley

Publication: October 1994

ISBN: 0201633612

Title: Requirements Analysis and Systems Design (3rd Edition)

Author: Leszek Maciaszek

Publisher: Addison Wesley

Publication: June 2007

ISBN: 0321440366

Title: Classical and Object-Oriented Software Engineering (8th Edition)

Author: Stephen Schach

Publisher: McGraw-Hill

Publication: December 2010

ISBN: 0071222081

Title: Introducing Systems Development

Author: Steve Skidmore and Malcolm Eva

Publisher: Palgrave Macmillan

Publication: August 2003

ISBN: 0333973690

Title: Systems Analysis and Design

Author: Don Yeates and Tony Wakefield

Publisher: FT Prentice Hall

Publication: September 2003

ISBN: 0273655361